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ABSTRACTS

ORAL & POSTER PRESENTATIONS

Oral Presentation - 01

Trend in hormone receptor expression of breast carcinoma; experience at a single center from 2006 to 2015

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Introduction

The hormone receptor (HR) expression of breast carcinoma (BC) is a reflection of its biologic character and a predictor of survival and response to treatment. There are published data on increased expression of hormone receptors in BC attributed mainly to the detection of early stage cancers by screening.

Objective

To determine whether there is any trend in the expression of HR in BC and attributable factors.

Methodology

This retrospective study included all BC patients who sought immunohistochemistry services of our unit from 2006 to 2015.Data were retrieved from laboratory records. The chi-square test for trend was used in the analysis.

Results

The study included 1236 BC patients. There was an increase in the percentage of HR expressing (χ^2 trend <0.001), Her 2 over-expressing (χ^2 trend=0.003) and grade 1 (χ^2 trend <0.001) BCs over time. A downward trend in the triple negative and grade 3BCs (χ^2 trend<0.001) was observed. No trend in the size or stage was evident. The laboratory techniques, antibodies used and method of scoring for HR had been the same over the period of 10 years.

Conclusion

There is a significant upward trend in the HR positive BCs and a downward trend in the triple negative BCs which could be attributed to the better differentiation of tumours. Although it is expected to give a better survival individually, this may be hindered on a population basis by the upward trend in the over-expression of Her 2.

This study therefore reflects a change in the biological nature of BC over the past decade.

Oral Presentation - 02

Validation of St Gallen risk categories of breast cancer on a cohort of Sri Lankan patients

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Introduction

The St Gallen risk categorization identifies three risk-categories of breast cancer patients; low-risk (LR), intermediate-risk (IR) and high-risk (HR). This is used in deciding on the adjuvant treatment. The risk categorization departs from the traditional node-positive/node-negative boundary, by including patients with 1-3positive axillary lymph nodes but no other adverse features in the IR.

Objective

To determine the validity of St Gallen risk categories based on the survival outcomes of breast cancer patients.

Method

This retrospective study included all breast cancer patients who had sought the immunohistochemistry services of our unit from May 2006 to December 2012. Patients who had neo-adjuvant chemotherapy were excluded. Patients were stratified into LR, IR and HRcategories.IR category was subdivided based on absence / presence of 1-3 positive-nodes (absent-IR1, present-IR2) and HR on the number of positive-nodes (1-3HR1, >3-HR2). Kaplan-Meier and Cox-regression models were used in the survival analysis.

Results

This study included 727 breast cancer patients (LR - 2%, IR1 - 45%, IR2 - 10%, HR1 - 13%, HR2 - 30%). Five year breast cancer specific survival (BCSS) was LR - 100%, IR - 91%, HR - 66% and the recurrence free survival (RFS) was LR - 85%, IR - 84%, HR - 65%. BCSS and RFS curves were significantly different between the three risk categories ($p<0.001$).

No survival difference was evident between the IR1 and IR2 (BCSS - $p=0.232$, RFS - $p=0.114$). HR1 and HR2 had a distinctly different BCSS ($p=0.033$) with no difference in RFS ($p=0.115$).

Conclusion

This study validates the three risk-categories. However, the HR includes two subsets of patients with a distinct difference in BCSS. The IR is a homogenous group irrespective of the inclusion of node-positive patients.

Oral Presentation - 03

Evaluation of photoprotective activity of some selected medicinal plants in Sri Lanka

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Introduction

The incidence of various diseases and disorders related to the solar ultraviolet (UV) radiation has alarmingly increased over the recent years, thus, synthetic skin care formulations are extremely popular as preventive and therapeutic strategies. However, with the realization of their adverse side effects, the recent trend is to search for alternative formulations especially of plant origin.

Therefore, this study focused on evaluation of photoprotective activity of eleven medicinal plants extensively used in Sri Lanka for improving complexion and as dermatological therapeutics.

Methods

Since antioxidants are playing a major role in photoprotection, the antioxidant activity was evaluated by DPPH radical scavenging assay. For the determination of UV filtering potential of the extracts, UV absorption was measured and the sun protection factor (SPF) was calculated according the Mansur equation.

Results

Among the eleven aqueous extracts (1mg/ml), *Atalantia zeylanica, Hibiscus furcatus, Leucas zeylanica, Mollugo cerviana, Olax zeylanica and Ophiorrhiza mungoshave* displayed SPF value above 25, which were even higher than two commercial photoprotective creams used as the positive controls. Moreover, some of the active extracts have indicated the potential of being "broad spetrum sunscreens" due to the high UV absorbance in 260-350 nm range. Most of these extracts were found to be photostable without any significant reduction in the SPF after exposition to direct solar radiation for seven days. The radical scavenging potential was above 50% in four extracts (*Hibiscus, Mollugo, Olax and Ophiorrhiza*).

Conclusion

Our preliminary findings offer an exciting avenue for further research towards the development of herbal cosmetics.

Oral Presentation - 04

An audit on antibiotic sensitivity pattern of coliform isolated in urine cultures in a center in Galle

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Introduction and Objective

Antibiotic resistance is an emerging problem in the world. According to antibiotic stewardship, the pattern of antibiotic resistance in the local setup is useful to modify antibiotic usage in a specific area. The objective is to determine the antibiotic sensitivity pattern of coliforms isolated in urine cultures, performed at the Department of Microbiology, Faculty of Medicine, Galle.

Methods

Retrospective analysis of all urine culture test results from 2011 to date performed at the Department of Microbiology, Faculty of Medicine, Galle. Only the isolates of pure growth of coliform with antibiotic sensitivity pattern were selected for the analysis. Both intermediate and resistant antibiotics were collectively taken as "Resistant" for the analysis.

Results

A total of 72 samples were selected for the audit. Twelve were extended spectrum beta-lactamase (ESBL) producing coliforms. The percentage of resistance kept around 50% for nalidixic acid, trimethoprim-sulfamethoxazole and norfloxacin. It is below 30% for nitrofurantoin, gentamicin, netilmicin and amikacin. The percentage of resistance of cephalexin, cefuroxime, amoxicillin-clavulanic acid and cefotaxime varied from 50%-87.5%, 45%-62.5%, 50%-92.5% and 25%-61.5% respectively. The imipenem and meropenem remains fairly sensitive over this period. The percentage of ESBL producing coliforms increased from 10% in 2012 to 25% in 2015.

Conclusion

Although the sensitivity of carbapenems are spared, the percentage of ESBL coliforms among urine culture isolates are on the rise. Each year the local antibiotic resistance pattern slightly varies. It is important to follow it when selecting antibiotics for treating urinary tract infections to minimize the development of antibiotic resistance.

Oral Presentation - 05

Nutritional status, associated factors and related outcomes in hospitalized children

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Introduction

Nutritional status is a key determinant of adequate growth and health status of children. Understanding nutritional status and underlying factors in hospitalised children provide valuable opportunities to identify and correct any nutritional problems. This study focused on assessing nutritional status and its correlates among children hospitalised for acute illnesses in a tertiary care setting.

Methods

A survey was conducted among 261 children with acute illnesses admitted to paediatric wards in Teaching Hospital, Karapitiya in 2014. An interviewer administered questionnaire was used to collect data on frequency of illness, feeding behaviours and socio-demographic characteristics. Weight and height measurements of children were compared with reference growth standards in Child Health Development Record (CHDR).

Results

Majority of the children were males (58.6%) and below 5 years of age (60.2%). Among children below 5 years, 21.8% were underweight and 38.8% were stunted. Among children above 5 years, 31.4% were underweight and 43% were stunted. Low maternal education was associated with underweight in children below 5 years and stunting in children above 5 years (both $p<0.01$). All children with stunting had more hospital admissions during the past year compared to those without stunting ($p<0.05$). Stunted children of all ages reported better feeding patterns during illness and convalescence (both $p<0.05$), probably a result of advice from doctors and public health midwives.

Conclusion

A considerable proportion of hospitalized children are undernourished and chronic undernutrition is associated with repeated hospital admissions. Low maternal education is a significant contributory factor for malnutrition in children, suggesting the need for educational interventions.

Key words: nutritional status, feeding, hospitalized children

Oral Presentation - 06

An evaluation of breast feeding practices of mothers who sought advice regarding breast feeding after discharge from post natal wards: a hospital- based study

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Background

Antenatal and immediate postnatal education and training programs help mothers to establish early breast feeding. Still hospital re-admissions and consultations for breast feeding problems seem to be rising in Galle.

Objectives

To identify common suboptimal practices of breastfeeding and related factors.

Method

A hospital-based cross sectional study was conducted using a sample of 102 mothers who sought medical advice on breast feeding practices. Babies above 34 weeks of gestation and less than two months of age were included. Babies with congenital anomalies, medical or surgical problems and mothers with medical, surgical or psychological problems were excluded. A structured questionnaire was used.

Results

Of the total, 85 (83.3%) were primies and 49 (48%) had male infants. Seventy five (73.5%) mothers did not practice demand feeding for early hunger cues. Of the total, 61.2% (30) of male infants and 43.4% (23) of female infants had problems in positioning with significant difference (p=0.07). Seventy seven (75.5%) mothers had problems in attachment. Five (4.9%) mothers had sought advice just because they thought breast milk supply was inadequate. Ninety six (94%) mothers had received education, training and support from the postnatal ward, and 79 (82%) of them had received accurate advice. Among those who received accurate advice, 45 (56%) had simply failed to follow them and 23 (29%) had changed their practices later, on others' advice.

Conclusion

Not practicing demand feeding, irrational assessment of milk supply, failing to latch on the baby properly for feeds seem to be the significant feedings.

Oral Presentation - 07

Clinico-epidemiological features of pit-viper bite; a prospective observational study from Deniyaya, Sri Lanka

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Introduction

Hump-nosed viper (*Hypnale hypnale, Hypnale zara and Hypnale nepa*) and green-pit viper (*Trimeresurus trigonocephalus*) bites are common pit viper bites reported in Sri-Lanka. The objective was to assess epidemiology and clinical features of pit viper bites.

Methods

A prospective observational study was conducted in Base Hospital, Deniyaya from October 2013 to February 2015. A pre-tested questionnaire was used to ascertain information from in-ward patients. Live or dead specimens of offending pit vipers brought by the victims were studied. Dead specimens of pit vipers were collected and identified by a herpetologist. When the specimen was not available, identification was done by the victim pointing to dead specimens and photographs of relevant snakes.

Results

Seventy three pit viper bite patients were admitted (55 hump-nosed vipers and 18 green-pit vipers). Thirty-three dead specimens of hump-nosed vipers were identified; 23 of *Hypnale zara* and 10 of *Hypnale hypnale*. Majority (69.8%) were reported as day time bites while they were working in a tea plantation. Significant number of green-pit viper bites (55.5%) caused extensive limb swelling (more than half a limb) whereas most of hump-nosed viper bites (85.5%) caused local swelling. Haemorrhagic blisters (n-15) and prolonged WBCT (n-5) were reported in both groups of patients.

Conclusions

Hypnale zara, *Hypnale hypnale* and *Trimeresurus trigonocephalus* were three species reported in Deniyaya. Many victims were tea plantation workers. Most of the cases were reported in day time. Pain, extensive limb swelling, bite-site swelling, haemorrhagic blisters, regional lymphadenopathy and coagulopathy were prominent clinical features. Nephrotoxicity and neurotoxicity were notably absent.

Oral Presentation - 08

Adequacy of GDM screening in a Tertiary Care Hospital: Are we missing GDM in a big way?

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Introduction

GDM is associated with adverse maternal and fetal complications and the treatment of GDM improves these pregnancy outcomes. GDM screening during antenatal period is a standard practice and the most commonly used screening tests include Postprandial blood sugar (PPBS), Fasting blood sugar (FBS), Glucose challenge test (GCT) and Oral glucose tolerance test (OGTT). Out of them OGTT is considered as the gold standard screening test.

Objective

To describe screening tools used for GDM in women admitted for delivery at a tertiary care hospital and to assess the prevalence and predictors of macrosomia**.**

Method

This study was a hospital-based cross sectional study carried out in several units of Teaching Hospital Mahamodara over a period of three months. All women delivered at full term were included in the study. Data on GDM screening were collected using interviewer administered questionnaire and from hospital and patients records.

Results

Out of 254 women studied, prevalence of GDM was 26.4 % and the most commonly used test was PPBS (38.6 %), followed by OGTT (19.3 %). Urine sugar was done as the only screening test in13% of women.

Prevalence of macrosomia (>3.5kg birth weight) was 18.5% (47/254), and of women who delivered macrosomic babies 51% had caesarean sections. Among women who delivered macrosomic babies, only 36.2% were found to have GDM with the available tests. Proper GDM screening with OGTT was done only in 23.4% women who delivered macrosomic babies.

Conclusions

For screening for GDM variety of tests were used in Teaching Hospital, Mahamodara with OGTT used only in 19% of women. There was higher prevalence of Macrosomia which may indicate that GDM was missed in some women.

Oral Presentation - 09

Effect of vitamin D therapy on bone mineral density among patients with diabetic nephropathy; a randomized, double-blind placebo controlled clinical trial

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Objectives

Objective of this study was to determine the effect of vitamin D given to patients with early diabetic renal disease on BMD and BMC which were measured as secondary outcome variables in a randomized controlled trial.

Methods

Patients with early diabetic nephropathy were allocated to two groups. Treatment group received 50,000IU of vitamin D3 intramuscularly and the control group was given an equal volume of distilled water (0.25mL) monthly for six months. BMD and BMC in the total body, lumbar spine (L1 - L4) and proximal femur were measured by DXA. After six-months and one year all the measurements done at the baseline were repeated.

Results

Of 155 patients invited, 85 were randomly assigned to two groups. No significant differences were found between two groups at the baseline. After six months, the treatment-group total body BMD, total body BMC and BMDs of spine, femoral neck and total hip regions increased by 2.0%, 2.2%, 1.8%, 2.1% and 2.6% ($P<0.05$ for all within-group differences), respectively. In Control-group, BMD or BMC of any region mentioned above did not change significantly during the initial 6 months ($P<0.05$ for the between- groups differences). After 6 months of stopping treatment, a statistically significant reduction of total BMD and BMC was observed in the treatment group ($P=0.009$). In the control group none of the BMD/BMC measurements changed significantly during the post-trial follow up 6 months period.

Conclusion

The improvements of total body BMC, total body BMD, BMDs of spine, femoral neck and hip were statistically significant among vitamin D treated patients compared to patients in the control group. Six-months after stopping treatment the improvement in the regional BMD remained unchanged while only a marginal loss was observed in total body BMD and BMC.

Oral Presentation - 10

Dengue and third space fluid accumulation (TSFA): Ability of indicators of fluid leakage in detecting TSFA

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Background

A 20% rise of hematocrit (HCT) and a decrease in serum albumin (SA) and total cholesterol (TC) are proposed as indicators of fluid leakage in dengue fever (DF). This study was carried out to assess the ability of above parameters in detecting TSFA.

Methods

A cohort study was carried out at the University Medical Unit, Teaching Hospital, Anuradhapura from January to August 2014. All suspected patients of DF were recruited to the study and the disease confirmation was done using NS1 antigen, PCR or IgM antibodies. Serial ultrasound scans were done twice daily to assess TSFA.

Results

Of 109 confirmed cases of dengue, only 14 (12.8%) patients had ultrasound evidence of TSFA. Out of them, 6 had TSFA on admission. Thirty two patients (29.4%) had their highest HCT value on admission. This included one patient who had TSFA on admission and two patients who developed fluid leakage later. Altogether eight patients developed a HCT rise >20% and out of them only four had TSFA. HCT rise >20% alone had a positive predictive value and sensitivity of 50% and 28.6% respectively in detecting TSFA. Of 12 patients with TSFA and without >20% HCT rise, four (33.3%) developed bleeding manifestations. TC <100 mg/dl had a positive predictive value and sensitivity of 13.5% and 40%, respectively whereas SA <3.5 g/dL had a positive predictive value and sensitivity of 25% and 80% respectively in detecting TSFA.

Conclusion

Rising HCT by >20%, daily assessment of TC and SA are not good indicators of detecting TSFA in dengue fever.

Oral Presentation - 11

What predicts testosterone deficiency in patients with coronary artery disease?

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Objective

Recent epidemiological studies revealed a link between coronary artery disease (CAD) and testosterone deficiency. We evaluate the predictors of testosterone deficiency in a group of patients with CAD.

Methods

Two hundred and six males with CAD 103 with acute STEMI and 103 with angiographically proven CAD were studied. Morning basal serum total testosterone (TT) was estimated. The optimal time to obtain blood for high sensitivity C-reactive protein (hs-CRP) and TT from patients with myocardial infarction was determined as on admission (day one) by a preliminary study. The possible clinical variables were evaluated to find out their predictive ability of testosterone deficiency in the logistic regression model.

Results

There were 64 (31.0%) patients with TT deficiency. The mean age (54 ± 10 VS. 55 ± 10 years) and body mass index (23.3 ± 3.9 VS. 22.2 ± 3.4 kgm^{-2}) were not significantly different between the two groups of deficient TT and normal TT. The group with TT deficiency had a significantly higher serum hs-CRP (4.42 ± 1.24 VS. 3.20 ± 1.15 mg/L, p=0.001), LDL-Ch (4.90 ± 1.96 VS 3.96 ± 1.84 mmol/L, p=0.001), plasma glucose (5.90±1.99 VS. 5.42±1.12 mmol/L, p=0.027) levels and significantly lower HDL-Ch (0.73 ± 0.14 VS. 1.30 ± 0.64 mmol/L, p=0.001) than the group with normal level of TT. TT deficiency was positively associated with hs-CRP (p=0.001, OR=2.23, 95% CI=1.48-3.36), LDL-Ch (p=0.002, OR=1.29, 95% CI=1.10-1.52), waist circumference (p=0.021, OR=1.51, 95% CI=0.98-1.64) and inversely associated with HDL-Ch (p=0.001, OR=0.245, 95% CI=0.13-1.14).

Conclusions

About one third of patients with coronary artery disease had testosterone deficiency. The predictors of testosterone deficiency were waist circumference, hs-CRP and LDL-Ch.

Oral Presentation - 12

Clinical presentations and sequel of leptospirosis: Experience from a single medical unit, Teaching Hospital Anuradhapura over a period of one year

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Background

Clinical presentations and sequel of leptospirosis observed are different from classical textbook descriptions. We planned this study to investigate the clinical scenario of leptospirosis during hospital stay and sequel.

Methods

A cross sectional study was carried out at University Medical Unit, Teaching Hospital Anuradhapura from June 2012 to May 2013. All suspected patients with leptospirosis were recruited. Daily investigations and clinical observations were documented. Disease confirmation was done using rapid diagnostic kit Lateral Flow Immunochromatography (LFIA) and MAT using a panel of 19 serovarsin, a WHO collaborating reference laboratory for leptospirosis.

Results

Total number of patients recruited was 142 and 76 were confirmed of having leptospirosis. Out of confirmed cases 59 were male and 62 had worked in a paddy field. Myalgia, reduced urine output, icterus and difficulty in breathing were noted on admission in 67, 22, 18 and 13 confirmed cases, respectively. Of confirmed cases, 33 patients developed acute renal failure (ARF) but only one of them required dialysis. Fourteen patients developed systolic blood pressure less than 90mmHg and 11 of them received inotropic therapy. Myocarditis and acute lung involvement was seen in 12 and 6 patients, respectively. One patient developed haemoptysis with chest radiographic changes suggesting pulmonary haemorrhages. None of them had SGOT and SGPT values more than 400IU/L. A single death was observed due to acute lung injury and ARF.

Conclusions

Classical description of leptospirosis (Weil's disease) was observed only among one fourth of the patients. Common complications are ARF, hypotension, myocarditis and acute lung injuries.

Oral Presentation - 13

Trimester vs. Method specific reference ranges in thyroid function tests: Are we underestimating subclinical hypothyroidism during pregnancy?

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Introduction

Thyroid disorders are among the common endocrine problems in pregnancy. Both overt and subclinical hypothyroidism has adverse effects on maternal and foetal outcome. It is important that thyroid dysfunctions are detected early for timely intervention. Reference values of thyroid function tests in pregnancy differ from that of the general population. Hormone assessment has been suggested using trimester-specific reference values.

Methods

A prospective study was carried out among 425 pregnant women (POA ≤ 12weeks) who were recruited consecutively from July 2012 to September 2013in Bope-Poddala Health Division. Thyroid hormones (TSH & free thyroxine) were assessed at the study entry and at 36 weeks of gestation.

Results

All pregnant women had normal free thyroxine levels (6.40 25.70pmol/L) in both first and third trimesters. Prevalence of subclinical hypothyroidism was calculated using method specific reference value for TSH (0.3 - 5.2 mU/L) since trimester specific reference values were not available. Only 2.4% (n=10) and 0.5% (n=02) of pregnant women had subclinical hypothyroidism in first and third trimesters, respectively. When trimester specific reference values (first trimester, 0.1 to 2.5 mU/L, third trimester, 0.3 to 3.0 - 3.5 mU/L) recommended by American Thyroid Association was applied, 11.2% (n=47) of pregnant women in the first trimester and 8.7% (n=32) in the third trimester were found to be subclinically hypothyroid.

Conclusion

There is a significant difference in the prevalence of subclinical hypothyroidism depending on the reference values. Trimester specific reference values should be used in the interpretation of thyroid function tests during pregnancy to avoid underestimation of subclinical hypothyroidism prevalence.

Oral Presentation - 14

Use of buccinator myomucosal flap for palatal lengthening to improve quality of speech in patients with corrected cleft palate

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Introduction

Altered speech has high negative impact in social-interactions and self-esteem at any stage of life. Dynamic nature of velopharyngeal sphincter is critically important in speech. The aim of this study was to assess the speech improvement after correction of Velopharyngeal Insufficiency due to structural defects, by palatal lengthening using posterior-based unilateral buccinator myomucosal flap (BMF) in previously corrected cleft palate patients.

Objectives

To assess improvement of speech intelligibility was using resonance, nasal emission and consonant production after soft palate lengthening in previously corrected cleft palate patients.

Materials & Methods

Patients (n-34, M:F - 1:1, Age categories: <8 yrs and >8 yrs) who had undergone palatal lengthening using BMF procedure for correction of VPI at OMF Unit, TH Karapitiya from 2010 - 2012, were assessed pre and post surgically after 1 year for quality of speech by Speech & Language Therapist.

Results

All the patients below 8 years showed a significant improvement of hypernasality (Resonance) whereas only 60% of patients above 8 years showed improvement after the surgery. All the patients showed a significant improvement in nasal air emission and significant reduction of errors in consonant production at least by one consonant. The group below 8 years showed more improvement in speech intelligibility after the surgery. These findings were statistically significant ($p<0.05$).

Conclusion

An improvement was observed in speech intelligibility in all patients who underwent palatal lengthening using BMF procedure for correction of VPI. Improvement is significantly more in young age of life. These findings conclude that palatal lengthening using BMF procedure is a good treatment option for correction of VPI - particularly in young ages - in terms of improvement of quality of speech.

Oral Presentation - 15

Study of motor cycle accidents in Galle District

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Introduction

Motor cycles are the commonest vehicles involved in traffic accidents in Sri Lanka. According to the available statistics, there were 714 reported motor cycle accidents island-wide in 2013 and 9168 in 2014 which shows a marked increase over time leading to severe disabilities among victims. The objective of this study was to identify the demographic data and injury patterns of victims facing accidents.

Methods

A retrospective study using data obtained from Medico-Legal Examination forms completed by the authors' during 2013 - 2014. Data were analysed using descriptive statistics.

Results

Total of 267 motor cycle accidents were considered and majority (56.2%) of the victims were between 20-40 years. Accidents occurred mainly (30.7%) between8.00 a.m. and 12.00 noon. Majority of accidents occurred in rural areas (78.3%). One hundred and sixty one (60.3%) accidents were due to a collision with a vehicle, 57 being a collision with another motor cycle. Two hundred and forty seven had injuries. Most of the injuries (79.3%) involved the head and neck region. Fractures were the commonest type of injury (76.9%). Ten out of 247 were with severe head injuries endangering life.

Conclusions

Motor cycle accidents were common among young adults and occur mainly in rural areas in the morning hours following collision with another motor cycle. Head and neck were the commonly affected area; however the commonest injury was the fractures involving lower and upper limbs. These findings indicate the need for implementation of awareness programs for motor cycle riders to reduce the incidents of accidents.

Key Words: Road Traffic Accidents, Medico-Legal Examination

Oral Presentation - 16

An audit of the kidney transplantation programme in the Southern Province of Sri Lanka

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Introduction

With the establishment of a new Vascular & Transplant Unit at the Teaching Hospital, Karapitiya, patients from Southern province get the opportunity for early transplant. A clinical audit was performed from the beginning of the programme in November 2012upto June 2015 over three years.

Objective

To evaluate the clinical outcome of live donor renal transplants performed at vascular and transplant unit at Teaching Hospital, Karapitiya.

Materials and Methods

Retrospective data concerning all recipients and donors involved in the transplant programme were obtained from patients' clinic records and operative registry.

Results

All 18 cases were living donor transplants. All nephrectomies were left sided. One had double renal arteries and one had double ureters. Mean age of the donor was 38.6 years (24 - 61). One donor developed incisional hernia. No other donar complications recorded. There is 100% survival of donors. Among the recipients 3 (16.66) were female and 15 (83.33) were male with a mean age of 46.33 years (23-59).One recipient developed urinoma which led to exploration and revision of ureteric anastomosis. Another developed perinephric collection and guided aspiration was performed. During follow up 3 (16.66%) recipients died due to community acquired infections complicated with sepsis. All three deaths were more than six months post transplant. Three of the living recipients developed acute rejection and were treated successfully. Among the living recipients, graft survival was 100%.

Conclusions

Considering the limited facilities in a newly established vascular surgical unit, the surgical outcome of renal transplant is impressive.

Oral Presentation - 17

Prevalence of conventional cardiac risk factors among young individuals with acute coronary syndrome

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Introduction

Conventional risk factors such as dyslipidaemia, hypertension, diabetes mellitus (T2DM), family history of premature ischaemic heart disease (IHD), and cigarette smoking are associated with increased risk of developing IHD. However, it is unknown whether these conventional risk factors play a similar role in development of premature IHD particularly among Sri Lankans.

Objective

The aim of this study is to determine the prevalence of the conventional risk factors and study the demographic and historical characteristics of the patients with premature IHD.

Method

This study was conducted as a hospital-based cross sectional study. Patients ≤ 55 years presented with acute coronary syndrome (ACS) were recruited by convenient sampling method.

Results

The mean age of the study population was 45.3 (±6.9) years and there were more males (65.7%) than females. Unstable angina (44.7%) was the commonest type of ACS followed by STEMI (31.6%) and NSTEMI (23.7%). At least one conventional risk factor for IHD was observed in 85.5% of them. The commonest risk factors were smoking and family history (41%) followed by dyslipidaemia (33%), hypertension (32%) and T2DM (25%). Smoking (62%) was the commonest risk factor in males where as in females the commonest risk factor was family history (46%) followed by dyslipidaemia and T2DM (38%). Among 11 individuals with no conventional risk factors for IHD, 5 were found to have BMI ≥23.

Conclusion

Evidence from this study suggests that conventional risk factors account for more than 85% of premature ACS. Close to 50% of males with premature ACS were smokers.

Oral Presentation - 18

Clinicopathological study of epithelial salivary gland tumours; a retrospective study

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Introduction

Tumours of the salivary glands are infrequent, yet they represent an extensive variety of both benign and malignant subtypes.

Objective

The aim of this retrospective study was to evaluate the clinicopathological data to determine the distribution of epithelial salivary gland tumours in patients who were diagnosed at OMFS Unit Teaching Hospital, Karapitiya, Sri Lanka from 2004 to 2014.

Materials and Methods

A total of 77 salivary tumours were diagnosed during the period of 11 years from 2004 to 2014 were reviewed using biopsy reports.

Results

Out of the 77 epithelial salivary tumours, 35 (45.45%) were classified as benign and 42 (54.5%) as malignant, indicating a benign-to-malignant ratio of 1 : 1.2. Malignant tumours were more common in minor salivary glands, indicating a percentage of 59.52% (25/42) of total malignant tumours. 73.52% (25/34) of minor salivary gland tumours were malignant. In benign tumours of salivary glands, 74.28% (26/35) occurred in major glands.

Conclusion

There is a higher occurrence of malignant tumours in minor salivary glands in the study population.

Poster Presentation - 01

Socio-demographic characteristics and risk factors of lower respiratory tract infections in children admitted to a tertiary care hospital, Sri Lanka

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Background and Objectives

Acute lower respiratory tract infection (LRTI) is a leading cause of morbidity and mortality in children. Several socioeconomic, demographic and risk factors are known to associate with LRTIs. The objective of this study was to find out the socio-demographic profile and the prevalence of known risk factors in children admitted with acute LRTIs.

Methods

A hospital-based,descriptive,cross sectional study was conducted for one year at Teaching Hospital Karapitiya. Data were extracted by interviewing parents of children with LRTI and from hospital and personal records. Socioeconomic categories were determined according to Barker and Hall guidelines. Data were analyzed using Minitab software and were presented as frequencies and percentages.

Results

Two hundred and eighty one children with LRTIs were studied. Their age ranged from one month to 12 years. Majority of the respondents were below 5 years of age (n=206, 73.3%). Two hundred and thirty eight (84.7%) of them were from Galle district and majority of them (n=173, 61.5 %) were boys. Majority (64.4%) of fathers belonged to occupational categories of 3 (partly skilled) and 4 (unskilled). Most mothers were house wives (86.4%). 63.6% children were in the social class 4 and 5.

Low birth weight (<2.5 kg), bronchial asthma, past history of LRTI, preterm birth, anaemia, congenital heart disease and exposure to passive smoking were reported in57 (20.2%), 76 (27.0%), 26 (9.2%), 12 (4.2%), 95 (33.8%), 18 (6.4%) and 33 (11.7%) patients, respectively.

Conclusion

Bronchial asthma and anaemia were the most prevalent of known risk factors for LRTI. Majority of the patients were from lower socioeconomic backgrounds.

Poster Presentation - 02

Quality of the supportive evidence used in drug promotion in Sri Lanka

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Background

Drug promotion material (DPM) is a commonly used communicating tool by drug companies to 'educate' doctors. Most DPM contain certain claims about products and their quality. Some of these claims are supported by references to other sources such as journal publications and websites.

Objective

To study the quality of supportive evidence found in DPM.

Method

DPM received by three physicians, two paediatricians and three general practitioners were collected. 266 supporting evidence / references in those DPM were analyzed. The following information were collected; type of evidence and publication year of the evidence. If it is a journal, whether indexed by PubMed or ISI (Web of Science) and the journal impact factor.

Results

From the total 266 of supporting evidence/references, 229 (86.09%) were journals, 15 (5.64%) were websites, 8 (3.01%) were conference presentations, 4 (1.5%) were books, 2 (0.75%) were guidelines/protocols, 2 (0.75%) were WHO documents and 1 (0.38%) was a document from an 'organization'. Five (1.88%) could not be traced further, using given information.

Out of 266 references, publication year was mentioned in 239 (89.85%). 166 (69.45%) were published before 2000 and only 13 (5.43%) were published after 2010.

Out of 229 of journal articles, 226 (98.69%) were from PubMed indexed journals and 196 (85.59%) were ISI indexed with an impact factor. Considering low impact factor references, 33 (16.84%) were below 2, 79(40.31%) were below 3, 133(67.86%) were below 5. Considering high impact factor references, 30 (15.31%) were above 10 and 63(32.14%) were above 5.Wikipedia and some 'personal' websites were included among those websites used as references.

Conclusion

Even though, number of high authority and quality evidence such as journal articles from high index journals were included, there were low authority evidences such as Wikipedia and personal websites. Five evidences could not be traced. They can be considered as 'ghost' references. Since origins of considerable number of these evidence swere very old, DPM cannot be considered as a communication material of new developments in the field.

Poster Presentation - 03

Study of epidemiology and risk factors of *Staphylococcus aureus* bacteraemia in a tertiary care hospital, Sri Lanka

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Introduction

Staphylococcus aureus(SA) remains a major cause of community and hospital acquired infections causing severe morbidity and mortality especially with increasing drug resistance. Here we describe the epidemiology and risk factors of SA bacteraemia and prevalence of MRSA bacteraemia in the hospital.

Method

A retrospective analysis was done using laboratory data and clinical history of the patients with SA positive blood cultures in a tertiary care hospital, Southern Province, from February 2013 to June2015.

Results

There were 157 blood culture isolates of SA. Sixty five (41%)of them were from adults over 50 years and 34 (22%) were from neonates. Most common presentation was with sepsis of unknown source resulting 45(29%) of the isolates. Skin and soft tissue infections caused 37(24%) of the positive blood cultures while line related infections represented 25 (16%) of bacteraemia. Neonatal sepsis, pneumonia and endocarditis accounted for 23 (15%), 15 (10%), and 6 (4%) of the isolates respectively. Forty seven percent of the infections were of nosocomial origin. According to ABST, 45% were MRSA. Ninety seven (62%) patients had risk factors like vascular lines, diabetes, renal disease, shunts, surgery, intensive care stay and immunosuppression. One hundred and fourteen (73%) blood cultures became positive within 24 hours of incubation.

Conclusion

Majority of the SA bacteraemia did not reveal a source of infection at the time of blood culture positivity and it emphasizes the importance of investigating including echocardiography. Most patients were having identified risk factors leading to SA bacteraemia and those factors should be managed appropriately. Prevalence of MRSA bacteraemia in this hospital is 45%.

Poster Presentation - 04

Fasting blood sugar levels as a predictor for the severity of cellulitis

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Introduction

Cellulitis is a non-suppurative infection of the skin or subcutaneous tissue. Affected patients are treated in-ward and usually respond well to antibiotics, but some encounter devastating complications.

Methods

A prospective case series study was conducted from November 2013 to February 2014 at ward 9 of Teaching Hospital, Karapitiya. Sixty five patients were studied using an interviewer-administered questionnaire and clinical examination.

Results

The age of the patients ranged from 24 to 88 (Mean = 61.7; SD = 15.76). Majority were males (58.5%). The duration of hospital stay ranged from 1 day to 13 days (Mean = 5.95, SD = 2.94). Twenty two (33.8%) were patients with diabetes mellitus (DM). Body Mass Index (BMI) ranged from 12.35 kgm^{-2} to 31.20 kgm^{-2} (Mean = 21.96, SD = 4.62). There were 12 (18.5%) smokers and 6 (9.2%) people were using alcohol. A disruption to cutaneous barriers was seen in 54 (83.1%) patients, while 2 (3.1%) had lymphoedema and 7 (10.8%) had venous insufficiency. The fasting blood sugar levels were in diabetic range (more than 126mg/dl) in 33 (50.77%) individuals and the incidence of their hospital stay being more than 5 days was extremely statistically significant ($P<0.0001$) compared to those who had fasting sugar levels below diabetic range. However, the association between known DM patients and their duration of hospital stay was not statistically significant ($P= 0.4011$).

Conclusion

Patients admitted with cellulitis and high fasting plasma sugar levels on admission have a higher chance of a prolonged hospital stay, irrespective of their past history of DM.

Poster Presentation - 05

Anatomical aspects of musculocutaneous nerve entry into the coracobrachialis

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Introduction

Musculocutaneous nerve (MCN), one of the terminal branches of the lateral cord of the brachial plexus, innervates and pierces the coracobrachialis muscle (CBM). The objective of this study was to elucidate the precise anatomical point of entry of the MCNinto the CBM with reference to surrounding anatomical landmarks in an adult Sri Lankan population.

Materials and Methods

One hundred and four upper limbs were dissected to study the relationship of CBM with the MCN. Straight distances between the tip of the coracoid process of the scapula and (a) medial epicondyle of the humerus (arm length) and (b) point of entry of MCN into the CBM (distance P) was measured independently on both sides using a sliding caliper capable of measuring to the nearest 0.01 mm.

Results

MCN perforated the CBM in 83.33% of cases. The commonest site (50%) of piercing was in the middle one third of the muscle. Distance P was 50.62 ± 23.34 mm while the arm length was 285.53 ± 15.83 mm. A positive correlation was observed between the arm length and distance P.

Conclusion

The results indicate that the arm length provides a reliable means of gauging the distance P of an individual. Detailed knowledge of the precise anatomical location of the MCN in relation to the CBM using well defined anatomical landmarks will be imperative in modern surgical procedures, which in turn will invariably reduce the potential complications encountered during clinical procedures.

Key words: Coracobrachialis, coracoid process, musculocutaneous nerve

Poster Presentation - 06

Anatomical variations of the coracobrachialis muscle

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Introduction

Coracobrachialis muscle (CBM) which occupies the anterior compartment of the arm shows a wide range of variations in its morphology and innervation. It has been characteristically described as originating from the apex of the coracoid process of the scapula and a tendinous insertion into the medial surface of the shaft of the humerus. The musculocutaneous nerve (MCN), innervates and pierces the CBM. The goal of this study was to elucidate the morphological variations of the CBM in an adult Sri Lankan population.

Material and Method

One hundred and twenty upper limbs were dissected and examined for the proximal and distal attachments, variations and its relationship with the MCN. Upper limbs with any physical deformities or trauma were excluded from the study.

Results

The anatomical variations of the CBM were manifested as absent tendon of CBM (16.67%), variant insertion of CBM into the median intermuscular septum (16.67%) and MCN not perforating the CBM (12.5%).

Conclusion

From a morphological and surgical stand point of view, CBM has a potential role in post-mastectomy reconstruction, as a transposition flap in deformities of infraclavicular and axillary areas and as a vascularized muscle transfer for the treatment of longstanding facial paralysis. Therefore, knowledge of anatomical variations is of considerable importance during radio-diagnostic, orthopedic, reconstructive, or surgical procedures in the upper limb.

Key words: Coracobrachialis, Variations, Musculocutaneous nerve

Poster Presentation - 07

Prognostic significance of electrocardiogram characteristics in patients with acute ST-elevation myocardial infarction

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Purpose

Electrocardiogram (ECG) is still a widely used, most readily available and quickest method for the diagnosis of acute myocardial infarction (AMI) in a resource limited location, although new confirmatory laboratory investigations have emerged. Therefore the aim of our study was to evaluate the predictive ability of some characteristics in standard ECG for the occurrence of AMI related complications.

Method

Patients (n=103) withacute ST-elevation myocardial infarction (STEMI) were followed up for the occurrence of AMI related complications during the hospital stay. Different characteristics of standard 12-lead ECG and modified Selvester QRS scoring system were evaluated for their ability to predict the occurrence of AMI related complications.

Results

There were 43 (41.7%) patients with inferior or inferolateral AMI, 35 (33.9%) with anterolateral, 13 (12.6%) with anteroseptal and 12 (11.65%) with anterior AMI. Mean QT interval was 0.40 ± 0.05 S and there were 31 (30.1%) with mean QT more than 0.42 S. Mean ST-segment elevation (STSE) was 1.3 ± 0.9 mv and about 99% of them showed STSE in three or more leads. Mean QRS interval was 0.12 ± 0.04 S and prolonged QRS interval (>0.1 S) was observed in 64 (62.1%) patients. Pathological Q waves were present in 98 (95.2%) ECGs. Maximum STSE (p=0.039,OR=2.7, 95% CI=0.91-5.19), number of leads with STSE (p=0.012,OR=3.91,95% CI=0.97-4.40), number of leads with pathological Q wave (p=0.040,OR=1.24, 95% CI=1.01-1.52) and QRS score (p=0.001,OR=3.5, 95% CI=1.13-6.93) showed significant predictive ability of AMI associated complications, but not other ECG characteristics such as mean STSE, mean QRS interval, mean QT interval, presence of prolong QRS interval, pathological Q wave and prolong QT interval.

Conclusions

Modified Selvester QRS scoring system, number of leads with pathologic Q wave and STSE and maximum STSE are predictors of complications associated with acute ST-elevated myocardial infarction during the hospital stay. Electrocardiogram is a useful tool in predicting the outcome of STEMI.

Poster Presentation - 08

A study on violence against women in Galle district

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Introduction

Violence against women is an act of gender-based violencecausing physical, psychological or sexual harm to women.It is a serious health and social issue for the women especially in Asian countries like Sri Lanka. The objective of this study was to determine socio-demographic factors and common injury patterns observed on the victims of gender based violence.

Methods

A retrospective study was done using data from the Medico Legal Examination forms collected by the authors during 2013- 2014 at the Teaching Hospital, Karapitiya. Data were analyzed using descriptive statistics.

Results

A total of 83examinations of women involved in gender-base violence were considered. The majority (53%) were in the age group 20-40 years. Out of all, 96.4% were married. Out of the married women, 85% was assaulted by the husband. Association of alcohol was observed in 79.4% of incidences. The commonest weapon used was a blunt force weapon. The severity of injuries ranges from contusions(59%), followed by abrasions(22.9%). Themain anatomical area involved were head and neck (54.2%) and 22.4% were grievous injuries.

Conclusions

The commonest affected group was the married women in the society and most often due to consumption of alcohol. Contusion is the most common injury involved in head and neck region. Gender based violence is a crucial issue that needs focused and strategic responses and multifaceted initiatives aimed at addressing and reducing it.

Keywords: Violence against women, injury patterns

Poster Presentation - 09

Study of Pedestrian injuries following traffic accidents in Galle District

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Introduction

Pedestrians form the largest group of victims of road traffic accidents leading to sustain multisystem severe injuries and mortalities. The objective of this study was to determine the socio-demographic factors and injury patterns of pedestrians following accident in Galle District.

Methods

A retrospective study using data from the Medico-Legal Examination forms collected by the authors during 2013 - 2014 and data were analyzed for descriptive statistics.

Results

A total of 37 pedestrians were considered. Majority (78.3%) of victims were between 20 - 60 years of age. Accidents have occurred mainly between 8.00 a.m. -12.00 noon (27%) and 4.00 p.m. - 8.00 p.m. (29%). Females accounted for 54.1% of victims while 45.9% were males. The commonest vehicle involved in accidents was motor cycles (62.2%), followed by three-wheelers(16.2%). The common injuries were grazed abrasions (53.8%) and fractures (26.9%). The injuries mainly involved head and neck region (55.2%). Out of the total, 35.1% had severe injuries.

Conclusions

Pedestrian injuries mainly involve the productive segment of the population. Light vehicles frequently cause injuries to pedestrians. As expected, accidents causing pedestrian injuries happen more frequently during busy hours of the day. Significant amount of injuries cause severe disabilities.

Key Words: Pedestrian, Medico-Legal Examination, Injury Patterns, Grazed abrasions

Poster Presentation - 10

Leptospirosis disease awareness, risk factors, exposure and prevention among a cohort of paddy farmers

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Introduction

Leptospirosis is a life-threatening zoonosis specially affecting the paddy farmers in Sri Lanka, which is potentially preventable.

Objectives

We conducted a survey to assess the environmental exposure, risk factors, disease awareness and prophylactic measures regarding leptospirosis in a farming community at Bulathsinghala Govi-Jana-Sewa Divisional area.

Methods

Study included 300 registered farmers selected by cluster sampling. An investigator-administered, 43-item questionnaire with four components (demography, disease awareness, exposure and preventive measures) was used to collect information. A scoring system was used to grade the last three components.

Results

Out of 300 farmers, 236 (78.66%) were males. A total of 184 (61.33%) farmers were highly exposed to leptospirosis. Eighteen (6%) had leptospirosis at some point during their farming life. Eight farmers (2.66%) witnessed others getting leptospirosis while working in their own field, 21% reported farmers from near by fields getting leptospirosis. Majority (82%) of farmers reported seeing rats in their fields either singly (60.66%) or in groups (22.33%). Only four 1.33% farmers used good preventive measures while 44.66% had average and 54% had poor preventive measures. Overall,74.33% had poor disease awareness, 25% were average and two (0.7%) had good disease awareness. Majority (n-252, 84%) were aware about chemoprophylaxis and 29.66% used prophylactic doxycycline. Among them 24% used prophylaxis accurately. There was no association between years of farming experience, disease awareness or use of prophylactic doxycycline.

Conclusions

Farmers in Bulathsinhala Govi-Jana-Sewa Divisional Area were highly exposed to leptospirosis. They had poor disease awareness and did not use good preventive measures. This cohort represents the average farming population in the country.

Poster Presentation - 11

Targeted therapy for Her2 positive breast cancer; what should be the target in trastuzumab therapy?

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Introduction

Trastuzumab is an expensive, monoclonal antibody, directed against Her2 receptors. It is recommended for node positive and negative, Her2 positive breast cancer (BC) patients for 1 year at 3 week intervals.

Objective

To determine the effect of trastuzumab cycles on the survival of Her2 positive BC patients.

Method

This retrospective study included all Her2 positive BC patients who sought Immunohistochemistry (IHC) services of our unit from 2006 to 2012. Data were collected through follow up visits, clinic and laboratory records. Tumours expressing IHC 3+ were considered Her2 positive. Kaplan-Meier with log-rank test was used to analyse breast cancer specific survival (BCSS) and recurrence free survival (RFS). The median follow up time was 41.5 months.

Results

Of the 159 Her2 positive BC patients, only 5.8% (9/154)had the full course of trastuzumab and 60% (92/154) did not receive a single cycle. Patients who received <5 cycles of trastuzumab or none had a significantly poor survival (5-year BCSS - 52%) compared to those who received 5 or more cycles (5-year BCSS - 72%) (p=0.026). However, trastuzumab had no significant effect on the RFS (p=0.888).

Limitation: BCSS between patients who received full course and those who received 1 - 4 cycles were not compared as number of patients who received the full course was only 9.

Conclusion

Trastuzumab provides a significant BCSS advantage even with a limited number of cycles which was 5 for the present cohort. Therefore, it is recommended giving at least 5 cycles of trastuzumab to Her 2 positive BC patients when financial constrains is the limiting factor.

Poster Presentation - 12

Evaluation of defence injuries: Analysis of clinical findings

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Introduction

The natural response to attack by an assailant is to shield oneself with raised arms. They are medico-legally significant as they indicate that the victim was conscious, at least partly mobile and not taken by surprise. In this study we evaluated specific patterns and distribution of defence injuries and relationship between the usage of alcohol and defence.

Methods

This descriptive study recruited the 67 patients admitted to the surgical wards at the Teaching Hospital Karapitiya following assaults and who had defended.

Results

A total of 67 patients with defence injuries were recruited. Majority of them (76%) were males. The commonest age groups were 31 - 40 yrs (n=27) and 21 - 30 yrs (n=22). 23% of victims had consumed alcohol. 65% had simple injuries. Blunt force injuries were 49% and sharp force injuries were 34%. The commonest sites of defence injuries were right posterior forearm (16%) and left posterior forearm (16%). Right upper limb had more (55%) defence injuries than left. Head was the commonest targeted body part by the assailant (79%). Cuts were the commonest type of defence injury (30%) followed by the contusions (23%).

Conclusion

The study shows that young people (21 - 40 yrs) have more defence injuries than elderly and right upper limb is the commonest site of defence injuries. The commonest part of the body used to defend in assaults is the forearm. Victims who had not consumed alcohol were able to defend better than the victims who consumed alcohol.

Key words: Defence injuries, medico legal examination, alcohol

Poster Presentation - 13

A study on abdominal approach for complete rectal prolapse surgery

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Introduction

Complete rectal prolapse does not have an accepted standard surgical treatment. Surgery can be assigned to abdominal or perineal. Abdominal procedures involve open or laparoscopic rectopexy using suture/mesh with or without resection of sigmoid colon. This study aimed to study the surgical outcome comparing relative merits of open and laparoscopic procedures in local settings where the most common practice is open surgery.

Methods

A prospective study was done in a general surgical unit over a period of 2 years. Patients who underwent abdominorectopexy were followed-up to assess the surgical outcome. The outcome measures were, change in defaecatory performance (continence, evacuation-Kamm score), change in Quality of Life (EuroQoL EQ-5D), operative morbidity and recurrence of prolapse. A standard questionnaire was administered for data collection.

Results

Eighteen abdominal suture rectopexy (laparoscopic 8 (44%), open 10 (66%)) were performed. Median age was 65. Median follow up was 9 months (6-12). Median hospital stay was 3 and 5 days for open and laparoscopy, respectively. Constipation and incontinence were improved in 75% of patients in both groups. There was no recurrence during study period. Quality of life was improved in all patients irrespective of the procedure. Two patients (20%) in open group had post-operative morbidity whereas it was zero in laparoscopy group.

Conclusion

Both open and laparoscopic approach are equally effective in improving patients' symptoms and quality of life, but laparoscopic approach is a better option considering shorter hospital stay and less post-operative morbidity. Even though these results are comparable to Western figures, a study with a larger number of patients and a longer follow up may give a statistically clearer picture.

Poster Presentation - 14

Trends of antibiotic use in lower respiratory tract infections in a tertiary care center in Southern Sri Lanka

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Background and Aims

Lower respiratory tract infections (LRTIs) are one of the most frequent causes of admission to paediatric units and generate an elevated prescription of antibiotics. The aim of this study was to find out the trends of antibiotic use in LRTIs in paediatric units in a tertiary care center in Southern Sri Lanka.

Methods and Material

It was a descriptive cross sectional study which included hospitalised paediatric patients with LRTIs admitted to Teaching Hospital, Karapitiya. The data on antibiotic usage were collected over a period of one year and were analyzed to determine the antibiotic usage trends.

Results

Two hundred and eighty one children with LRTIs were studied. Their age ranged from one month to 12 years. The duration of hospitalisation varies from one to 16 days. There were patients with pneumonia 54 (19.0%), bronchiolitis 11 (3.9%), LRTI with wheezing 87 (30.9%) and LRTI without wheezing 129 (45.9%). Two hundred and seventy eight (98.9%) patients were treated with antibiotics. Total of 13 antibiotics were prescribed among them. Intravenous (IV) antibiotics were used on 200 (71.1%) patients, while oral antibiotics were prescribed for 159 (56.5%). Both oral and IV antibiotics were prescribed for 77 (27.4%), while123 (43.7%) were only on IV antibiotics and 82 (29.2%) were treated with oral antibiotics only. Intravenous ampicillin was the drug used most (35.6%) among the IV antibiotics. Clarithromycin is the oral drug prescribed at the highest rate 85 (30.2%).

Conclusion

Despite the growing resistant, the use of antibiotic for lower respiratory tract infection remains high, irrespective of the aetiology, probably because of the unavailability of facilities for a complete microbiological diagnosis.

Poster Presentation - 15

Adequacy of equipment available for the insertion of chest drains: A single center study within a tertiary care setting in Sri Lanka

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Introduction

Insertion of a chest drain is a common, potentially life-saving procedure, and most doctors will be required to insert a chest drain at some stage of their career, regardless of their specialty. Complications can occur during this procedure that can be life threatening. Non-availability of equipment has been highlighted as an important cause of iatrogenic complications.

Objectives

To formulate a check list of items required for insertion of chest tubes and assess the adequacy of the equipment available within the tertiary care setting of our hospital.

Methods

A check list was compiled based on the British Thoracic Society guidelines with modifications according to the Sri Lankan setting and further modified after a consensus from an expert panel. This check list was used to perform a descriptive cross-sectional study involving 11 units where chest drain insertion is carried out in Teaching Hospital Karapitiya, Galle.

Results

The majority of units (64%) did not have designated packs for chest drain insertion. Another 64% did not have non-trocar chest drains that were safer than their trocar counterpart. A minority (27%) did not have curved instruments for dissection to facilitate safe insertion.

Conclusions

Lack of pre-packed surgical instruments for the procedure, absence of a curved instrument in some packs and reduced availability of the safer and cheaper non-trocar chest drains were the main areas of inadequacies. This study has created a useful list of instruments that will serve as a guideline for the preparation of equipment used for chest drain insertion in future.

Poster Presentation - 16

Reasons for selecting private hospitals over government hospitals: a qualitative study

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Introduction

Quality of government hospitals (GH) is a common topic in the mass media and people frequently criticize the services of GH. On the other hand, services of private hospitals (PH) are becoming popular and new private hospitals are being opened regularly. Objective of this study was to explore the reasons for selecting PH by patients.

Methods

Study was conducted using a qualitative research method. In depth interviews were conducted with 20 outpatients in a PH to find answers for the research question 'why patient select PH over GH'. Data saturation was achieved. Data were analyzed according to the principles of Giorgis' phenomenological analysis with the participation of two researchers.

Results

Several themes were identified. Following deficiencies related to GH were mentioned as reasons for selecting PH in these themes; poor qualities of employees (public relationships, communication, attitudes, tendency to do personal favours), quality of resources (drugs, Investigations, poor organization of resources), mistrust (treatment, doctors, drugs), some unfavorable believes (drugs are of low quality, doctors will not do the best, It takes time to cure), crowded system(long queues, waiting lists, want to give chance to poor people), unfavourable time factors (take time to meet a doctor, day time is not easy), patients are less empowered(cannot ask questions, possible 'repercussions'), difficult access to specialists (no direct referrals, unable to meet them directly).

Conclusions

Some deficiencies in GH are mentioned as reasons for selecting PH by patients. Policy makers need to consider them if they want to improve the quality of GH.

Poster Presentation - 17

Incidence of anatomical variations of the brachialis muscle

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Introduction

Brachialis, a muscle of the anterior compartment of the arm, shows a wide range of variations in its morphology and innervation. Being a powerful flexor of the elbow, it has a dual innervation by the musculocutaneous and radial nerves. It originates from the lower half of the front of the humeral shaft. Its fibres converge to form a tendon that is inserted to the tuberosity and coronoid process of the ulnar. Knowledge of anatomical variations of brachialis is of considerable importance during radio-diagnostic, reconstructive and surgical procedures of the upper limb. The goal of this study was to elucidate the morphological variations of the brachialis muscle in an adult Sri Lankan population.

Material and Method

One hundred and twenty upper limbs were dissected and examined for the attachments, variations and its innervation. Upper limbs with any physical deformities were excluded from the study.

Results

The anatomical variations of the brachialis were manifested as absent tendon (8.33%), accessory slips to brachioradialis (12.5%), accessory slips to bicipital aponeurosis (4.16%) and absence of radial nerve innervation (21.67%).

Conclusion

It is speculated that the failure of the muscle primordia to disappear leads to additional slips of brachialis muscles. Clinically, these variant muscle slips may cause entrapment neuropathy. Therefore, knowledge of the incidence of variations of the brachialis will be invaluable in procedures such as surgical treatment of the fractures of the humeral shaft and for the tendon transfer procedure in wrist drop following radial nerve palsy.

Key words: Brachialis, Variations, Radial nerve, Incidence

Poster Presentation - 18

Knowledge and attitudes on falls and fractures among elderly

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Introduction

Falls and related fractures among elderly are one of the important health concerns in Sri Lanka. Identification of individual's knowledge and attitudes on falls and fractures facilitates a better pathway to improve their health status.

Objectives

To assess the knowledge and attitudes on falls and fractures among elderly.

Methodology

Interviewer administered questionnaire was administered to 300 participants (175 females) over 65 years in Nagoda area, Galle.

Results

Mean age (SD) was 73.0 (6.7) years. Half of the participants knew falls and fractures are the leading causes of hospital admission among elderly. Majority considered proper nutrition, good lighting and active lifestyle as protective factors to reduce the chance of falling. Majority (72%) were able to name biological factors which increase the risk of falls, but only 31% knew the increased falls risk in diabetes. Around 60% knew the importance of environmental and behavioral factors for fracture prevention. Out of 300 participants, 18% had poor and 61% had moderate level of knowledge on falls and fractures. Most frequent falls and fracture awareness information sources were television (49%) and neighbors (32%). Majority (79.7%) had positive attitudes towards falls and fracture prevention. Significant associations were found between, age and educational status with the level of knowledge and attitudes.

Conclusion

Poor and moderate level of knowledge and high positive attitudes were seen among the elders on falls and related fractures. This study emphasizes the importance of increasing the level of knowledge on falls among elderly in preventing falls and fractures.

Keywords: Knowledge, Attitudes, Falls, Fractures, Elders

Poster Presentation - 19

Post-operative pain experience of surgical patients

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Introduction

Postoperative pain continues to be inadequately managed leading to patient distress and an increased incidence of a multitude of complications.

Objectives

To assess postoperative pain experience and its predictors.

Methods

An interviewer-administered questionnaire which included a numeric rating pain scale was administered to 250 patients (136 females, 114 males)at the Teaching Hospital, Karapitiya (THK) who were selected with the convenience sampling technique.

Results

The mean age (SD) was 46.74 (15.5) years. Common surgeries were, head and neck -28 (11.2%), abdominal -72 (28.8%), vascular -17 (6.8%), urological -15 (6.0%), orthopedic -48 (19.2%), reconstructive -12 (4.8%) and skin, muscle and soft tissue -58 (23.2%). They were performed under GA (129) or SA (121). Majority (75.2%) experienced the worst pain in the 1st post-operative day. Those who had orthopedic procedures reported more severe postoperative pain (8.75 ± 1.86). Post-operative pain highly affected their mental and functional status. Age (p=0.676), gender (p=0.655), type of surgery (p=0.258) and anesthetic type (p=0.803) were not significant predictors of postoperative pain. Paracetamol (91.6%) and NSAIDs (90%) were the commonest analgesics used and majority (46.5%) considered rectal suppositories as the best form of post-operative pain relief. Majority (59.2%) were satisfied with their pain management.

Conclusion

This study shows useful evidence and aspects of postoperative pain management which are still to be improved. Despite an increased focus on pain management programs and the development of new standards for pain management, many patients continue to experience intense pain after surgery. Additional efforts are required to improve patients' postoperative pain experience.

Key words: Post-operative pain, Post-surgical patients

Poster Presentation - 20

Use of Facebook among medical students: Does it adversely affect their academic activities?

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Introduction

Social networking sites have become one of the most popular communication vehicles of the younger generation. Facebook has become the most popular social networking site. Although benefits of social networking sites are emphasized, problems caused by heavy usage of social networking were also highlighted. University students are at a high risk of getting addicted to Facebook. Thus it is important to assess the influence of Facebook usage on academic performances of university students.

Objective

The objective was to determine the prevalence of Facebook addiction among medical students and possible relationship between Facebook use and their academic performances.

Method

The research was carried out as a cross-sectional study using a questionnaire. The questionnaire consisted of Bergen Facebook addiction scale (BFAS) and few questions about their examination performance. The study was conducted using one batch of students in Faculty of Medicine, University of Ruhuna.

Results

A total of 140 students responded and 115 students (82.1%) who responded to all questions in BFAS were used for analysis. 32 students can be categorized as 'addicts', 57 students were as 'possible addicts', 26 students were as 'not addicted' according to BFAS guideline. Correlation between the BFAS score and a scale prepared using the results of the previous main examination as stated by the students was calculated. There is no correlation (Spearman R) between examination results and BFAS score in all students or separately in 'addict' and 'possible addict' groups.

Conclusion

Even though Facebook use is considerably high, degree of Facebook use does not influence medical students' academic performances.

Poster Presentation - 21

Do good family and neighbourhood relationships have a potential in reducing psychological distress in older people?

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Introduction

Psychological health would become the most vital health issue in older people in the coming decades. Minimizing stress in older people would reduce the burden of population aging on the health care system. The objective of this study was to assess the level of psychological distress, and the role of family and neighbourhood relationships in reducing psychological distress in older people.

Methodology

A cross sectional survey was conducted among 208 individuals aged 60 and over, in Galle district, using a self-administered questionnaire. Age stratified purposive sampling method was used to select subjects. Psychological distress was measured using Kessler psychological distress scale (K-10). The scale has been validated in Sri Lanka. Family relationships and neighbourhood relationships were assessed using single questions using five-point Likert-type scale.

Results

Among the participants 126 (60.6%) were females. The mean score of K-10 for females (Mean=16.0, SD ± 5.5) was slightly higher than that of males (Mean=15.6, SD ± 5.9), but no significant difference was found. Those who reported having good family relationships had higher mean scores in K-10 than that of others, but no significant difference was found [16.2 (SD ± 5.9) versus 14.9 (SD ± 4.8)]. Also, those who reported having good neighbourhood relationships had higher mean scores in K-10 than that of others, but no significant difference was found [16.1 (SD ± 5.6) versus 14.7 (SD ± 5.9)]. Living with the spouse seems to be a protective factor against psychological distress. [16.8(SD ± 5.8) versus15.4 (SD ± 5.5), p=0.08].

Conclusions

Gender does not seem to play a role in psychological distress in older people. Living with spouse may protect older people from developing psychological distress.

Poster Presentation - 22

Prevalence and predictors of poor compliance among hospitalised patients with chronic medical conditions needing long-term treatment at a Tertiary Care Hospital in Sri Lanka

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Introduction

Chronic medical diseases are long lasting conditions, which cannot be cured, but can be effectively controlled. Poor compliance is a major problem, which may lead to disability or even death.

Objective

The aim of this study was to identify the prevalence and predictors of poor compliance among a cohort of patients with chronic medical conditions including type 2 diabetes mellitus, hypertension, dyslipidaemia, stroke and asthma.

Methods

This is a descriptive cross sectional study carried out in medical wards in Teaching Hospital Karapitiya. Patients with chronic medical conditions were selected using simple random sampling method. An interviewer-administered questionnaire was used to collect data.

Results

The study population consisted of 120 males (60%) and 80 females (40%). The mean age of the study population was 55.5 (9.4) years and the majority (75.5%) were between 50 - 65 years of age. Nearly half of the study population (44.5%) had education up to O/L or above. Poor compliance was observed in 54% patients. Poor knowledge about the disease (56%), poor attitude (42%) and difficulty to access the clinics (26.6%) were the main reasons for poor compliance. There were no significant association between poor compliance with gender, age, monthly income, level of education, cost for clinic visits, time spend for clinic visits and frequency of clinic visits ($p>0.05$).

Conclusions

This study revealed more than 50% of patients with chronic medical conditions had poor compliance to prescribed treatment. Lack of knowledge about the underlying disease was the main reason behind poor compliance.

Acute Myeloid Leukaemia complicated by myeloid sarcoma presenting as acute flaccid paralysis

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Introduction

Myeloid sarcoma (MS) is a rare soft tissue tumour. Its presentation can vary from an isolated extra medullary leukaemic tumour, concurrently with or at relapse of acute myeloid leukaemia (AML) (1). The clinical presentation of MS varies according to the site of involvement. Common sites include sub-periosteum of skull, paranasal sinuses, sternum, ribs, vertebrae and pelvis. Lymph nodes and skin are also common sites. We report a case of MS in a sixteen year old girl presenting with acute flaccid paraparesis due to cord compression.

Case report

A 16-year-old, previously healthy girl presented with acute weakness and numbness of lower limbs and lower trunk for few hours. She had not passed urine for 12 hours. She had history of varicella infection one week prior but not sought any medical advice. Two days before admission, she was treated for dyspepsia and epigastric pain by her general practitioner. She denied having any trauma, history of exertional dyspnoea, recurrent infections other than the varicella infection or any abnormal bleeding manifestations.

On examination, she was febrile and anicteric. Healed ulcers of varicella infection were evident. There were flaccid hyporeflexic lower limbs with sensory loss of all modalities up to T6. Rest of the neurological examination including the upper limbs was normal. There was no lymphadenopathy or hepatosplenomegaly. Bladder was palpable extending up to umbilicus. Cardiovascular and respiratory system examination was normal.

Preliminary investigations revealed pancytopaenia (Hb - 7g/dL, WBC - $6.1x10^9$/L, platelet - $57x10^9$/L) and her peripheral blood film showed normal red cell morphology, leukopaenia and neutropaenia with some blast cells and moderately low platelets. The haematological findings suggested acute leukaemia. Bone marrow aspiration and trephine biopsy confirmed acute myeloid leukaemia with maturation (FAB AML M2). Chest radiograph showed retro cardiac shadow separated from cardiac border (Figure 1). An urgent Magnetic Resonance Imaging (MRI) of the spine showed paraspinal mass extending from T2 to T7. The mass extended into the spinal canal through left T4/T5 and T5/T6 exit foramina and there was an evidence of severe cord compression at the same level. Biopsy of the paraspinal mass under the ultrasound guidance was done and the histology was compatible with myeloid sarcoma.

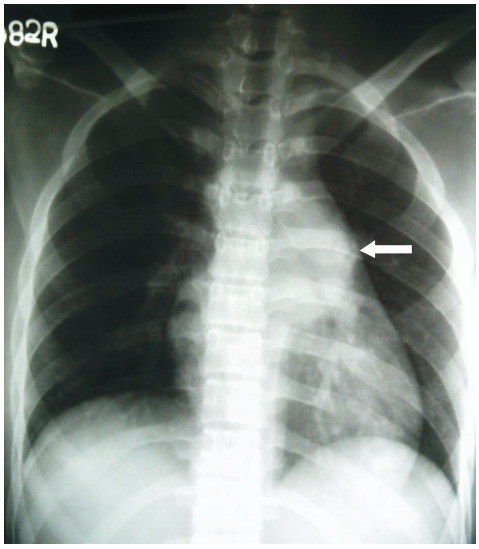

Figure 1: Retrocardiac shadow (arrow)

The diagnosis of myeloid sarcoma concurrent with acute myeloid leukaemia was made based on above investigations and the patient was referred to neurosurgeon and oncologist for urgent de-bulking surgery and radiotherapy. Patient underwent laminectomy followed by radiotherapy.

Discussion

Myeloid sarcoma is defined as an extramedullary tumour consisting of myeloid blast cells with or without maturation, with associated effacement of tissue architecture (2). MS may be secondary to AML, chronic myeloid leukaemia (CML), blast crisis or myelodysplastic syndrome in the descending order of frequency (3). The other sites of occurrence of MS include mediastinum, pancreas, parotid gland and uterus (4). The presentation of myeloid sarcoma as acute paralysis due to cord compression by MS is rare and diagnostically challenging (5).

As this patient had varicella infection one week prior to the presentation with acute flaccid paralysis, the first differential diagnosis was post-viral transverse myelitis. But pancytopenia and blast cells in blood picture suggested an alternative diagnosis. Imaging revealed a paraspinal mass causing cord compression and the possibility of ganglioneuroblastoma or ganglioneuroma were considered. With the haematological and blood picture findings suggestive of AML, it was necessary to differentiate between ganglioneuroblastoma infiltrating marrow causing pancytopenia and leukemic deposits causing cord compression. Findings of the biopsy of the paraspinal mass and bone marrow aspiration finally confirmed the later diagnosis.

Finding of myeloid cells with different maturation with strong positivity of myeloperoxidase staining of paraspinal mass biopsy (Figure 2) further supported the diagnosis of MS. The varicella infection prior to this presentation could be due to immunosuppression secondary to leukopenia with AML.

The diagnosis of AML with maturation (classified according to the WHO classification) was made with the morphological appearance of blasts of more than 20% in the bone marrow with more than 10% maturing granulocyte component and less than 20% of monocyte lineage.

Patient underwent debulking surgery followed by radiotherapy under the oncologist's supervision. But the observed clinical improvement from paralysis was minimal two weeks following therapy.

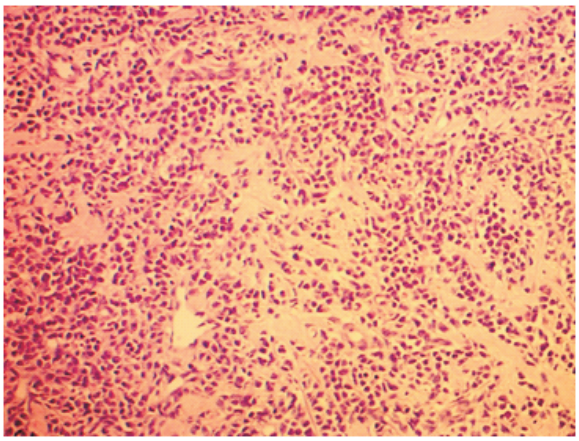

Figure 2(a): Haemotoxyline and Eosin stain

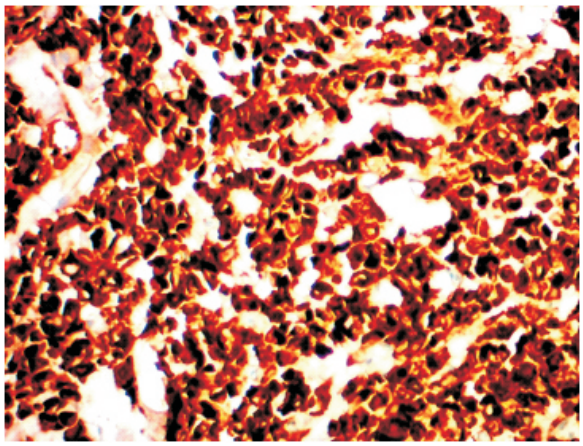

Figure 2(b): Myeloperoxidase staining

Figure 2: Biopsy of paraspinal mass.

Conclusion

The acute flaccid paralysis following viral infection is not always transverse myelitis. The high degree of suspicion to exclude local causes is important to prevent / reduce rate of permanent neurological damage. Early diagnosis and intervention will change the prognosis from "poor" to reasonable outcome even though the diagnosis is challenging.

References

1. Ansari-Lari MA, Yang CF, Tinawi-Aljundi R, Cooper L, Long P, Allan RH, *et al.* FLT3 mutations in myeloid sarcoma. *British Journal of Haematology,* 2004; **126**: 785-91.

2. Pileri SA, Orazi A, Falini B. Myeloid sarcoma. WHO classification of Tumours of Haematopoietic and Lymphoid Tissues. Lyon: IARC Press; 2008: 140-1.

3. Singhal RL, Monaco SE, Pantanowitz L, Cytopathology of Myeloid Sarcoma: A study of 16 cases, *Journal of the American Society of Cytopathology,* (2014), doi: 10.1016/j.jasc.2014.10.001.

4. Massimo Breccia, Franco Mandelli, Maria C. Petti, MariellaD' Andrea, Edoardo Pescarmona, Stefano A. Pileri, Ida Carmosino, Eleonora Russo, Paolo D Fabritiis, Giuliana Alimena. Clinicopathological characteristics of myeloid sarcoma at diagnosis and during follow-up: report of 12 cases from a single institution. *Leukaemia Research,* 2004; **28:** 1165-9.

5. Landis DM, Aboulafia DM. Granulocytic sarcoma: An unusual complication of a leukaemic myeloid leukaemia causing spinal cord compression. A case report and literature review. *Leukaemic Lymphoma,* Oct 2003; **44**(10): 1753-60.

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Infective endocarditis by an unusual organism - Abiotrophia species

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Introduction

Infective endocarditis (IE) is one of potentially life threatening condition presenting with pyrexia of unknown origin. The commonest organism of IE in Sri Lanka is viridans streptococcus species (1). We report an uncommon bacterium causing IE, which is Abiotrophia species and we were unable to find previous records of IE caused by this organism.

Abiotrophia is also known as nutritionally variant streptococci (NDS). It is a part of oral, upper respiratory tract and urogenital flora (2). Infective endocarditis due to this organism is associated with high rates of treatment failure, relapses and mortality than Viridans streptococci (3). It is a slow growing organism with special nutritional requirements and challenging phenotype testing. Hence it is a major cause for culture negative infective endocarditis (3,4). Therefore an early identification is necessary to reduce morbidity and mortality.

Case report

A 48-year-old male presented with a history of intermittent fever for three months. One week before admission he had an episode of right ankle joint pain and swelling, which settled with analgesics. He also had loss of appetite, fatigue and weight loss.There was no past history of rheumatic fever. He denied recent history of dental extractions, intravenous cannulation, substance abuse or catheterization.

On admission he was febrile, pale and had first degree finger clubbing. A pan systolic murmur was heard at the mitral area suggestive of a mitral regurgitation without evidence of pulmonary hypertension or heart failure. Rest of the clinical examination was unremarkable. Full blood count showed neutrophil leukocytosis and normochromic normocytic anaemia. Urine analysis showed field full of red cells. Ultrasound scan of abdomen revealed 5 mm calculus in the right kidney. ESR was 100 mm and CRP was 45.9 mg/L. Transthoracic echocardiogram revealed a mass attached to the posterior mitral valve (Figure 1) with normal left ventricular function.

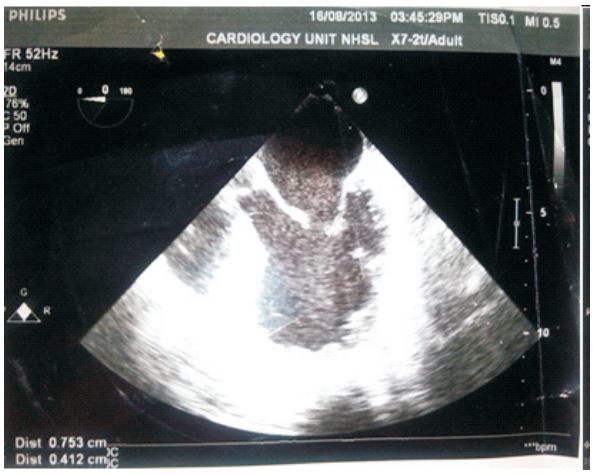

Figure 1: Trans esophageal Echocardiogram of the patient showing the healed vegetation

Three blood cultures were positive for the same organism after 24 hour manual sub culture. A minute colony appeared on blood agar without evidence of haemolysis. But it did not grow on MacConkey agar. The colony did not show carbon dioxide dependency. It showed gram positive cocci smaller than usual streptococci with short chains and Lancefield grouping did not give agglutination. Since this organism was fastidious, antibiotic sensitivity was done on both chocolate and blood agar. Both ABSTs did not show sensitivity zone for ceftriaxone but penicillin gave a good zone diameter making penicillin the choice of treatment.

In Clinical and Laboratory Standard Institute (CLSI) test method there is no interpretation criterion for this type of organism given in M100. It was sub cultured in CLED medium and the organism grew in larger colony size. Because of this, the isolated organism was assumed to be cysteine dependent. There were no centers with biochemical test kits (ex: API step) that can identify streptococci species in Sri Lanka.

Our patient was initially started on ceftriaxone, before the transthoracic echocardiogram after taking blood cultures. As we suspected infection with Abiotrophia species, he was started on penicillin and gentamicin. Antibiotics were continued for six weeks. Fever responded well and inflammatory markers were normalized. Patient went home after full course of antibiotics without complications.

Discussion

Abiotrophia is a rare cause for IE which accounts for 5-6% of all causes of IE in developed countries (3). Abiotrophia is a cause of serious infections including endocarditis, brain abscess and septic arthritis and known to associate with higher morbidity and mortality (3,5). One of the serious complications of IE due to this infection is destructive valvular lesions causing heart failure in which early surgical intervention should be considered. Slow growth of the organism and need of unique nutritional requirement for growth make the isolation of the organism difficult. However, early antibiotic treatment with penicillin and gentamicin gives a high rate of success. Although infective endocarditis caused by Abiotrophia is extremely rare, early identification is crucial to improve the outcome of the patients as treatment with ceftriaxone leads to treatment failure.

Conclusion

It is possible to isolate Abiotrophia species even with manual blood culture system. As this organism can cause complications and treatment failure, attempts should be taken to take blood cultures before starting antibiotics and it is important to know when to suspect this organism in the blood culture since rapid identification of this organism is not available in Sri Lanka.

References

1. Piyasiri DLB, Chandrasiri P. Prospective study of patients with infective endocarditis. *Bulletin of the Sri Lanka College of Microbiologist,* 2011; **9**: 22-3.

2. Christensen JJ, Facklam RR. Granulicatella and Abiotrophia species from human clinical specimen. *J Clin Microbiol,* 2001; **39**: 3520-3.

3. Brouqui P, Raoult D. Endocarditis due to rare and fastidious bacteria. *Clin Microbiol Rev,* 2001; **14**(1): 177-207.

4. Frenkle A, Hirsh W. Spontaneous development of L forms of streptococci requiring secretions of other bacteria or sulfhydryl compounds for normal growth. *Nature,* 1961; **191**: 728-30.

5. Cerceo E, Christie JD, Nachamkin I, Lautenbach E. Central nervous system infections due to Abiotrophia and Granulicatella species: an emerging challenge? *Diagn Microbiol Infect Dis,* 2004; **48**(3): 161-5.

Yellow nail syndrome; a well documented condition but missed for many years due to unknown reasons

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Case Report

A 77-year-old labourer was admitted to medical ward at Base Hospital Tangalle with bilateral leg swelling of one week duration. He had repeated hospital admissions to other hospitals over the last twenty years for chronic cough, breathlessness and wheezing and had several diagnosis cards issued for chronic obstructive pulmonary disease, bronchial asthma pneumonia and bronchiectasis. Pulmonary tuberculosis has been excluded on three occasions but there was no regular clinic follow-ups.

He had no history of ischaemic heart disease, hypertension or diabetes. Patient had attended school only up to 3rd grade and had a very poor social-economical background.

On general examination his upper limb nails were dystrophic, yellowish (Figure 1) and both legs were swollen (non pitting oedema) up to the thighs (Figure 2). He had bilateral basal crepitations and ronchi. Air entry was less in the right lung base. His cardiovascular, abdominal and central nervous system examinations were unremarkable.

Routine investigations including ECG, full blood count, serum creatinine, electrolytes, blood urea, TSH, serum albumin and liver function tests were normal. He had a normal 2D echo with ejection fraction of 45%. Three sputum samples were negative for acid fast bacilli (AFB).

His chest radiograph showed a moderate right sided pleural effusion (Figure 3) and 400ml straw coloured clear fluid was aspirated. It showed, protein; 6.4g/dL, sugar; 146mg/dL, LDH; 303u/L, amylase; 44u, Red Blood Cells 650/mm^3, leucocytes 1042/mm^3 with 80% lymphocytes and was negative for malignant cells and AFB. Ultrasound examination showed a small (4.4cm) echogenic right kidney and normal (9.7cm) left kidney and no other abnormalities or ascites.

There was no cause detected for his pleural effusion or lymphoedema and the diagnosis of Yellow nail syndrome was made in the presence of the typical triad of yellowish discolouration of nails, pleural effusion and lymphoedema with recurrent attacks of bronchitis or bronchiectasis.

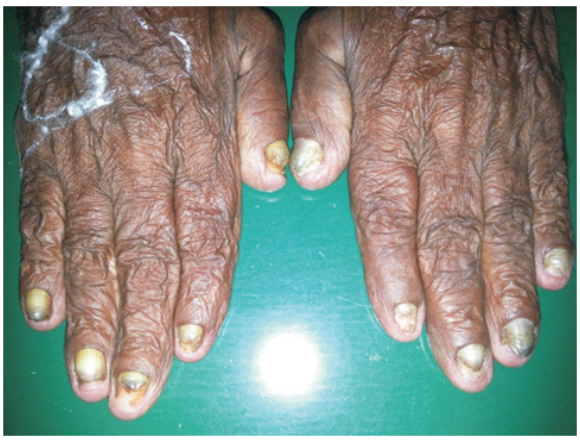

Figure 1: Dystrophic,yellowish nails

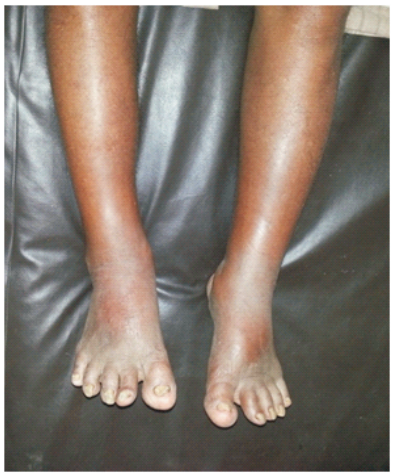

Figure 2: Bilateral non pitting oedema of legs

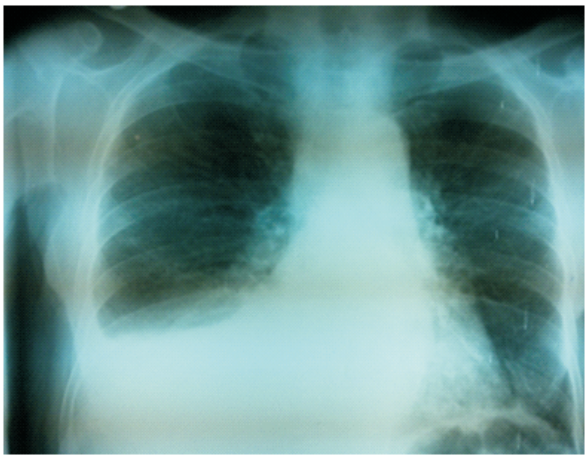

Figure 3

Discussion

The Yellow nail syndrome is a very rare disease with a typical tirade of yellow nails, lymphoedema and pleural effusions (1). Typically, the nails are slow-growing, thick and dystrophic with a yellowish discolouration and there may be onycholysis (2). It is commonly associated with recurrent respiratory problems such as bronchitis, bronchiectasis recurrent pneumonia and sinusitis (1,2). It is usually acquired later in life but there may be congenital cases. Most of these signs coexist simultaneously, but usually develop at different stages of life as seen in our patient. As different clinical features of the syndrome may occur at wide intervals patients may not present with the classical triad of symptoms (2). Our patient has been suffering from chronic respiratory problems over the last 20 years with multiple hospital admissions. Although he had a yellowish nail discolouration it remained unnoticed due to the coexisting fungal infection. Typically yellow nails are seen in both limbs but this patient only presented with upper limb involvement.

His pleural effusion and lymphoedema developed most recently and simultaneously. All common causes for pleural effusion and oedema were excluded before arriving at this diagnosis. As seen in this patient non pitting leg swelling (lymphoedema) occurs more than 80% but there may be hands, facial and genital involvements (3). Pleural effusions are commonly exudates and are predominant with lymphocytes (3). The etiology of this syndrome is unknown and management is largely symptomatic (4). There are other reported associations of this condition such as chylous ascites, intestinal lymph--angiectasia, thyroid abnormalities, malignancies; immunological abnormalities and rheumatoid arthritis (2,5). Our patient had unilateral contracted small kidney.

References

1. Riedel M. Multiple effusions and lymph*o*edema in the yellow nail syndrome. *Circulation*, 2002; **105**(3): E25-6.
2. Hillerdal G. Yellow nail syndrome: treatment with octreotide. *The Clinical Respiratory Journal,* 2007; **1**(2): 120-1. doi: 10.1111/j.1752-699X.2007.00022. [published Online First: Epub Date].
3. Valdes L, Huggins JT, Gude F, *et al.* Characteristics of patients with yellow nail syndrome and pleural effusion. *Respirology,* 2014. doi: 10.1111/resp.12357. [published Online First: Epub Date].
4. Liptrot S, Hulks G, Roberts F. Early pulmonary manifestations of yellow nail syndrome: a case report. *Virchows Archiv: An International Journal of Pathology* 2007; **451**(5): 985-6. doi: 10.1007/s00428-007-0503-7 [published Online First: Epub Date].
5. Gunnarsson O, Bjornsson E, Bjornsdottir US, Gudbjartsson T. [Yellow nail syndrome]. *Laeknabladid,* 2007; **93**(11): 751-3.

Malignant chickenpox with coagulopathy in a healthy adult female; a case report and review of literature

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Introduction

Varicella Zoster virus is a double stranded deoxyribonucleic acid virus of alphaherpesvirinae subfamily. It is the aetiological agent of usually self limiting primary disease commonly known as chickenpox in children and adolescents. Reactivation of dormant infection is known as herpes zoster ("Shingles"). Disseminated Varicella infection with organ dysfunction is sometimes rarely seen amongst diabetics and immunocompromised patients (1).

We present a case of presumably healthy adult female who acquired primary Varicella infection which progressed to malignant disease with lung, liver and haematological complications and then discuss the therapeutic options available.

Case report

A 60-year-old female presented with high fever, epigastric pain and vomiting for one day duration. Pain was severe and did not respond to analgesics including opioids. On admission patient was in pain, heart rate of 110/min with blood pressure 160/100 mmHg. There were few bilateral coarse crepitations in lower zones of lungs with epigastric and right hypochondriac tenderness on abdominal examination. No evidence of hepatomegaly or peritonitis. She was conscious rational, without any features of encephalitis and cerebellar disease.

On second day of admission she developed classical blisters with "Dew-drop on Rose-petal" appearance. Vesicles started to spread from the chest and rapidly generalized with haemorrhagic transformation. Oral mucosa was also involved with palatal ulcers. Oral acyclovir was started at the first crop of blisters but she developed generalised abdominal pain with petechiae and ecchymoses of skin on the third day. Large spontaneous bruise marks were seen in limbs and simultaneously she started passing red coloured urine. Marked guarding and rigidity of abdomen were noted. Complete blood count showed lymphocytic leukocytosis with a total count of 24,000/mm^3 with lymphocytes 54% and neutrophils 40% on differential count. Haemoglobin on admission was 12.1g/dL and reduced up to 7.1g/dL by third day. Platelets were initially 140,000/mm^3 but rapidly reduced to 8000/mm^3 with bleeding manifestations. Blood picture showed evidence of microangiopathic haemolysis with probable disseminated intravascular coagulation.

Prothrombin time was 20 sec with an INR of 1.44, APTT 50 seconds and d-dimers were elevated. Liver profile showed elevated transaminases of SGPT; 2080U/L, SGOT; 4220U/L, total bilirubin; 2.15mg/dL, ALP; 665U/L. Ultrasound abdomen scan was normal. Chest radiograph showed features of bilateral Varicella pneumonia with evidence of bronchopneumonia. Saturation on high flow oxygen was 84%. Arterial blood gas analysis revealed pH; 7.01, PO_2; 55mmHg, PCO_2; 50mmHg and HCO_3; 11mmol/L. ECG showed sinus tachycardia and 2D-ECHO revealed no evidence of myocarditis or heart failure. Urine output was throughout adequate despite haematuria and serum creatinine was 0.5 mg/dL. Fasting blood glucose was 116 mg/dL.

Patient was started on intravenous acyclovir and vancomycin according to the advice of microbiologist. Fluids and semi-solid food were administered through intravenous route and nasogastric tube, respectively because patient found oral intake excruciatingly painful. Septic screening with cultures was negative. Eight units of platelets and ten units of fresh frozen plasma were transfused

for component correction. Patient was admitted to intensive care unit on the 3rd day of admission for increasing dyspnoea, low blood pressure and multi organ failure, where she was intubated and ventilated. Acidosis was corrected and inotropes commenced. Despite intensive support she succumbed due to fulminant sepsis and organ failure on sixth day.

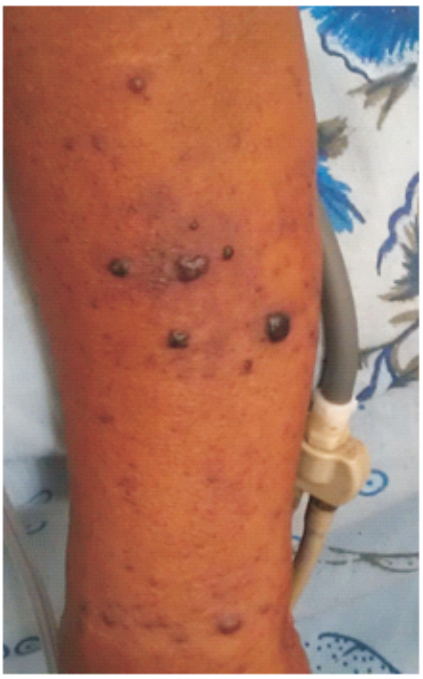

Figure 1: Haemorrhagic Varicella blisters of an arm day three

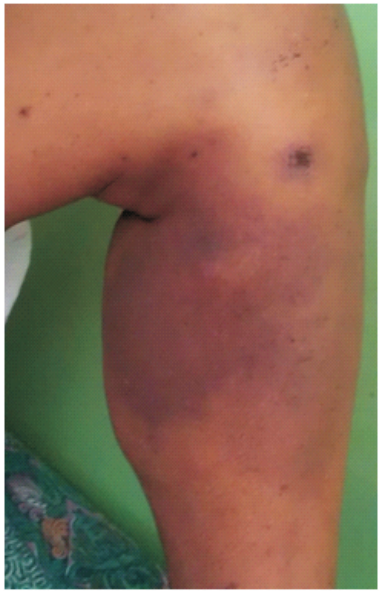

Figure 2: Large patch of ecchymoses with onset of coagulopathy

Disseminated haemorrhagic Varicella can cause Varicella pneumonia, encephalitis, hepatitis and haemorrhagic complications (2). People with blood or solid organ malignancy who are on immuno--suppresants, thrombophilics (protein C and S deficiencies) and diabetics are considered as susceptible groups (1,3).

Haemorrhagic complications seen prominently in this patient, are described in five major clinical syndromes (4). Febrile purpura, malignant chickenpox with purpura, post-infection purpura, purpura fulminans and anaphylactoid purpura. Our patient fits second type criteria the best. Acyclovir is a guanosine nucleotide analogue and a selective inhibitor of herpes virus replication. Oral acyclovir and valacyclovir are considered for healthy adults at increased risk of fulminant Varicella. Acyclovir in a dose of 800 mg five times a day for a week minimizes symptoms and disease duration. Lung and nervous system involvement is sometimes rarely seen in healthy individuals.

In contrast immuosuppresed patients benefit from intravenous acyclovir. Some of these patients turn out to be acyclovir resistant due to either resistant viral strain or host factors. Alternatives in this situation are brivudin, foscarnet, vidarabine and interferon (5). Prompt initiation of anti-viral treatment, being vigilant on herpes viral infections in immunocompromised patients and intensive care support are fundamental to success in managing fulminant chickenpox patients. Susceptible patients should take necessary precautions to prevent acquiring the disease at the first place.

References

1. Vinzio S, Lioure B, Goichot B. Varicella in immuno-compromised patients. *Lancet,* 2006; **368**(9554): 2208.
2. Karadag AS, Bilgili SG, Calka O, *et al.* A case of fulminant varicella infection with purpura fulminans, hepatitis, and rhabdomyolysis. *Indian J Dermatol,* 2012; **57**(6): 503.
3. Nguyen P, Reynaud J, Pouzol P, *et al.* Varicella and thrombotic complications associated with transient protein C and protein S deficiencies in children. *Eur J Pediatr,* 1994; **153**(9): 646-9.
4. Maness D L, Rogers D Y. Haemorrhagic complications of varicella. *Am Fam Physician,* 1987; **35**(2): 151-5.
5. Safrin S, Berger T G, Gilson I, *et al*. Foscarnet therapy in five patients with AIDS and acyclovir-resistant varicella-zoster virus infection. *Ann Intern Med,* 1991; **115**(1): 19-21.

Alcohol septal ablation in hypertrophic cardiomyopathy leading to permanent complete heart block; a case report

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Introduction

Hypertrophic cardiomyopathy (HCM) is a disease state characterised by unexplained left ventricular hypertrophy in the absence of another cardiac or systemic disease which can explain it (1). HCM is inherited as an autosomal dominant trait and has diverse clinical manifestations ranging from asymptomatic patients with normal life span to sudden cardiac death (2). A considerable proportion of patients with HCM have left ventricular outflow tract obstruction (LVOT) at rest or on provocation. Medical management of HCM involves beta blockers and calcium channel blockers. Patients with LVOT obstruction, refractory to medical management are considered for septal reduction therapy with alcohol septal ablation (ASA) or myomectomy. Complete heart block is a known complication of ASA which is usually transient. We report a HCM case with LVOT obstruction needing permanent pacing following ASA.

Case report

In 2005, a 51-year-old male presented with shortness of breath on moderate exertion and systolic murmur was found on clinical examination. His ECG revealed bizarre ST and T wave changes. Transthoracic echocardiogram (TTE) confirmed the diagnosis of HCM with interventricular septum diameter of 20mm, LVOT obstruction of 85mmHg and systolic anterior motion of mitral valve. He was started on beta blockers following which the patient became asymptomatic. Meanwhile, the family screening with echocardiography revealed negative results.

In January 2013, patient presented with worsening dyspnoea accompanying chest pain on moderate exertion. He underwent coronary angiogram which showed a prominent first septal branch in left anterior descending artery (LAD). There was no evidence of syncopy and his left ventricular (LV) ejection fraction was satisfactory during the course of illness. Since he continued to be symptomatic despite maximum medical therapy it was decided to proceed with ASA.

Pre procedure simultaneous pressure recordings at LVOT and LV apex revealed a difference of 72mmHg. We proceeded with the coronary angiogram to identify the first septal perforator of LAD which was subsequently engaged with 2mm over the wire balloon (OTW). With the inflation of OTW balloon the pressure gradient across LVOT and LV reduced dramatically to 20mmHg. Area supplied by the first septal branch and absence of backflow to LAD were confirmed with contrast injection. A temporary pace maker (TPM) lead was placed in the right ventricular apex anticipating atrioventricular blocks. 1ml of 100% alcohol was slowly injected with 0.5ml at a time and kept for 15 minutes. There was a dramatic reduction in pressure gradient across the LVOT (4mmHg) and the patent went into complete heart block and became dependent on TPM.

During the seven day stay at coronary care unit, the patient continued to have intermittent complete heart block and was TPM dependent. After consulting cardiac electrophysiology team, it was decided to insert a permanent dual chamber pacemaker. However following the insertion of permanent pacemaker he became asymptomatic and gradually

resumed his usual life style. TTE done 1month later revealed only 30mmHg pressure gradient across the LVOT which is expected to reduce in next few months.

Discussion

ASA is accepted as a reliable modality of treatment for symptom relief in patients with HCM since 1994 (1,3). The indications for ASA are refractory symptoms despite medical treatment, resting or provocable pressure gradient across LVOT more than 50mmHg and inter-ventricular diameter more than 18mm. As our patient fulfilled these criteria we considered him for ASA (1,3).

Tributaries of the first septal branch of the LAD have significant individual variations. They supply a large area of myocardium including right ventricular septum and the LV apex. Therefore, the exact localisation of the septal branch supplying basal septum is paramount in ASA. Anatomical variations of LAD can result in post procedural atrioventricular conduction defects but they usually recover spontaneously within 24 - 48 hours while 10 - 20% will persist and require permanent pacing (1). The myocardial contrast echocardiography (MCE) during procedure gives an opportunity to select the target septal branch in each individual, minimizing above complication (3,4). Thus the reduction of the incidences of post procedure pacemaker implantation is a proven advantage of MCE guided ASA which is yet to establish in our country (4).

Alternatively the dual chamber pacing is considered as an effective mode of treatment for symptom relief in HCM (1). The right ventricular apical pacing with the maintenance of atrioventricular synchrony has been reported to decrease the LVOT pressure gradient. Therefore, our patient was benefitted in both aspects with permanent pacing.

References

1. ACCF/AHA guideline for the diagnosis and treatment of Hypertrophic cardiomyopathy 2011. A report of the American College of Cardiology foundation / American Heart Association Task force on practice guideline (2011). *Journal of the American College of Cardiology, 2011;* **58(**25): e213-e260.

2. Agarwal SS, Choksi C, Sheikh I. Sudden death - A case Hypertrophic Cardiomyopathy: *JIAFM*, 2004; **26**(4) ISSN 0971-0973.

3. Marsy EJ, Breall JA. Alcohol septal Ablation for Hypertrophic Cardiomyopathy: *Curr Cardial Rev*, 2008; **4**(3): 193-7.

4. Faber L, Seggewiss H, Gleichmann U. Percutaneous Transluminal Septal Myocardial Ablation in Hypertrophic cardiomyopathy. Results with respect to intraprocedural myocardial contrast echocardiography: *Circulation,* January 1999 2415-2421.

   Available in http://www.researchgate.net/ publication/ 13453283

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Editorial

Rejection of manuscripts and possible reasons

With the introduction of a mandatory research component for board certification in many PGIM conducted postgraduate examinations, there is a renewed interest among postgraduate trainees in the country to conduct research and publish them. Further, providing incentives have encouraged people to engage in research. Whatever the reasons, this can be regarded as a positive step in the right direction and would eventually lead to the expansion of local database and provide much needed evidence to improve our clinical practice and patient care.

As a result, the number of manuscript submissions has somewhat increased during the recent past and the rate of rejection too has shown a parallel increase. Although editors make maximum efforts to accommodate all submissions there are many limitations that restrict them accepting all manuscripts submitted. Among many reasons, flaws in methodology and inadequate or ambiguous experiments are the main reasons for the rejection of manuscripts. Errors of this nature cannot be rectified and rejection is inevitable. Inappropriate statistics, over interpretation of results and unsupported conclusions are other reasons but these are potentially correctable.

Poor English grammar and style are not strong reasons for rejection provided other aspects of the manuscript are acceptable. Well-written manuscripts, however, have a higher chance of being accepted by reviewers and editors. Inadequate sample size and not defining measuring variables and outcomes can be prevented if adequate precautions are taken in the planning stage. In addition, constructive comments of peers can be useful to improve the outlook of the manuscript.

Sarath Lekamwasam
Chandrani Liyanage
Editors / GMJ

GALLE MEDICAL JOURNAL; INSTRUCTIONS TO AUTHORS

The Galle Medical Journal is published by the Galle Medical Association. The *journal* is published biannually, March and September and the submissions are accepted throughout the year. The aims of the Journal are to foster co-operation among the medical fraternity and to be a forum to make literary contributions, share experiences encountered in medical practice, update their knowledge and have debates on topics related to all aspects of medicine. Also, we attempt to cater to the educational needs especially of the postgraduate trainees. The *Journal* publishes original articles, reviews, leading articles and case reports. When an article is reviewed for publication we expect that the work it reports has not been published, submitted simultaneously to another journal or accepted for publication elsewhere. All manuscripts will be reviewed anonymously before acceptance.

Manuscripts must be submitted with the text type written in 12-point Times New Roman font double spaced. Text and all illustrative material should be submitted in two hard copies and the electronic version in Microsoft Word document format. In order to avoid delay we require authors to comply with the following requirements. All manuscripts should accompany a covering letter indicating the number of words in the manuscript, institution where ethical clearance was granted, conflict of interests and contact details of the corresponding author.

Types of contributions:

Review articles and Leading articles: We encourage submission of review or leading articles which are less than 3000 words in length and address topics of current interest. They should be supported by no more than 20 references. Submissions may be subjected to external review before acceptance.

Original articles: Should normally be in the format of introduction, methods, results and discussion. Each manuscript must have a structured abstract of 200 words. The text should be limited to 3000 words and maximum of 5 tables/figures taken together with no more than 15 references. Lengthy manuscripts are likely to be returned for shortening. The discussion in particular should be clear, concise and should be limited to matters arising directly from the results. Avoid discursive speculation.

Case Reports: These should not exceed 750 words and 5 references; no abstract is required. Case report should be informative and devoid of irrelevant details.

References:
These should conform to the Vancouver style. The reference in the text should be numbered consecutively in Arabic numerals in parentheses in the same line of the text in the order in which they appear. The first five authors should be listed and if there are more than five, then the first three should be listed followed by et al. Examples are given below:

1. Kumar A, Patton DJ, Friedrich MG. The emerging clinical role of cardiovascular magnetic resonance imaging. *Canadian Journal of Cardiology* 2010; **26**(6): 313-22.

2. Calenoff L, Rogers L. Esophageal complication of surgery and lifesaving procedures. In: Meyers M, Ghahremani G, eds. Iatrogenic Gastrointestinal Complications. New York: Springer, 1981: 23-63.

Units / Abbreviations

Authors should follow the SI system of units (except for blood pressure which is expressed in mmHg). Authors should use abbreviations sparingly and they should be used consistently throughout the text.

Manuscripts that do not conform to these requirements will be returned for necessary modifications.

Manuscripts should be addressed to Chief Editors, Galle Medical Association, Teaching Hospital, Karapitiya.

Predictability of adverse clinical events following ST-elevation myocardial infarction by risk assessment tools

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Abstract

Background: Killip classes, TIMI and GRACE scores are simple validated clinical risk scores used in risk stratification in acute coronary syndrome including ST-elevation myocardial infarction (STEMI).

Objectives: Our study aimed to determine the predictive ability of post-myocardial adverse events by commonly used clinical risk scores.

Materials and Methods: Data were analysed from 120 male patients with acute STEMI, admitted to Teaching Hospital, Karapitiya. The risk scores were calculated during the acute phase. Patients were followed up for 365 days for the occurrence of clinically significant adverse cardiovascular events.

Results: Adverse clinical events related to STEMI developed in 50(41.7%) patients during the hospital stay. Later, during the follow up of 365 days, 39 (32.5%) patients developed major complications. Killip class II-IV was significantly ($p = 0.001$) associated with adverse clinical events during the hospital stay, but not later. TIMI score was a significant predictor of the occurrence of the clinically significant STEMI related adverse events, while in the ward ($p = 0.004$, OR = 1.51) and during the first 30 days ($p = 0.008$, OR = 1.42), but not beyond this period. GRACE score was unable to predict the adverse cardiovascular events in this patient cohort. Negative predictive values for both TIMI and GRACE scores were close to 100 at each time interval.

Conclusions: The development of major complications or adverse clinical events following STEMI was less common in the cohort. The TIMI score could predict the adverse events until 30 days, but not later. GRACE score was unable to predict adverse events. Killip class grading was strongly associated with the major complications occurred during the hospital stay.

Keywords: *Myocardial infarction, adverse clinical events, clinical risk scores, predictability*

Introduction

The age-standardized death rates for coronary heart disease are declining in many developed countries but are increasing in developing countries including Sri Lanka and demographic changes, urbanization, and lifestyle changes seen in these countries probably contribute to this trend (1,2). Coronary artery disease (CAD) is one of the leading causes of mortality in men. Cardiovascular disease accounts for the highest rate of hospital deaths in Sri Lanka (2). Traditional cardiovascular risk factors (CVRFs) such as advancing age, diabetes mellitus, hypertension, dyslipidaemia, smoking, obesity and family history of CAD are well recognized for their association with acute coronary syndromes (3).

Risk stratification is important in acute coronary syndromes (ACS). It provides information to both patients and clinicians on the possible prognosis and

serves as a guide to appropriately strategizing therapy (4-5). ST-segment elevation myocardial infarction (STEMI) forms the most severe spectrum of ACS. Killip classes, TIMI (Thrombolysis in Myocardial Infarction) and GRACE (Global Registry of Acute Cardiac Events) risk scores are popular and powerful tools for risk stratification in the acute phase of myocardial infarction (6). In most cases, these have been developed from selected populations of patients, very often subjected to fibrinolytic therapy (7,8).

Materials and Methods

Patients were diagnosed as STEMIs according to the Universal Definition for myocardial infarction (9). One hundred and twenty male patients with STEMI admitted consecutively to Teaching Hospital, Karapitiya were interviewed using an interviewer-administered questionnaire. Further details were extracted from the hospital and personal records. They were followed up over a period of one year (365 days) for the occurrence of clinically significant major adverse cardiovascular events (MACE) at specific time intervals of 30 days (short-term), 31 - 90 days, 91 - 180 days and >180 days to 365 days (medium-term) from the first ACS event (8,10). Development of heart failure, unstable angina, myocardial infarction, cardiac arrhythmias, cardiogenic shock, intracardiac clots and death were considered as adverse cardiovascular events.

Weight and height were measured. Killip classes were assigned and the two clinical risk scores; TIMI and GRACE were calculated from the initial clinical history, electrocardiogram and laboratory values collected on admission (11-13). Heart failure (HF) with cardiogenic shock was defined as Killip class IV and HF without shock, requiring diuretic treatment classified as Killip class IIIII, absence of HF as Killip class I. TIMI score ranged from 0 to 10 while GRACE score ranged from 85 to 244. Two-dimensional echocardiography was done in all patients during the hospital stay and ejection fraction was estimated.

Numerical data were examined for normality and presented as mean ± SD. Categorical data are displayed as percentages or frequencies. Categorical data were analysed using the Fisher's exact test or Chi-square test. Statistical significance was defined when p values was <0.05. Binary logistic regression was used in analysing the predictive ability of the risk score on the occurrence of adverse effects, where complications were used as responses and the scores were applied as factors in the model. Sensitivity, specificity, positive predictive values (PPV) and negative predictive values (NPV) were calculated.

Ethical clearance was obtained from the Ethical Review Committee of Faculty of Medicine, University of Ruhuna. Informed written consent was obtained from all participants.

Results

One hundred and twenty (n=120) male patients admitted with STEMI were in the mean (SD) age of 54 (8) years. Mean (SD) body mass index (BMI) was 21 (4) kgm^{-2}. The baseline characteristics of the patients are illustrated in table 1. The prevalence of CAD risk factors was high and among them smoking had the highest prevalence of 96 (80 %).

Table 1: Baseline characteristics of male patients with ST-elevation myocardial infarction

Characteristics	STEMI patients (n = 120)
Age (years)	54 ± 8
History of hypertension	23 (19.2 %)
Diabetes mellitus	19 (15.8 %)
Previous ACS events	12 (10 %)
Family history premature CAD	3 (2.5 %)
Smoking	96 (80 %)
Overweight and obesity	14 (11.7 %)
Location of MI	
Anterior MI	64 (53.3 %)
Inferior MI	53 (44.2 %)
Other types of MI	3 (2.5 %)
Acute complications while in hospital	
LBBB	3 (2.5 %)
Cardiogenic shock	4 (3.3 %)
Heart failure	40 (33.3 %)
Cardiac arrest	3 (2.5%)
Intraventricular clots	10 (8.3 %)
In-hospital reinfarction	1 (0.83 %)
Ejection fraction (%) on admission	48.6 ± 11
Thrombolysis therapy	106 (88.3%)

ACS = Acute Coronary Syndrome, MI = Myocardial Infarction, CAD = Coronary artery disease, STEMI = ST-elevation myocardial infarction, LBB = Left Bundle Branch Block, 2DEho = Two-dimensional echocardiography. Data presented as Mean ± SD and frequencies or %.

Adverse clinical events related to STEMI developed in 50 (41.7%) patients during the hospital stay. Following discharge from the hospital adverse events were observed during the first 30 days, 31 - 90 days, 91 - 180 days and 181 days to 365 days in 8 (6.7%), 7 (5.8%), 2 (1.7%) and 5 (4.2%) patients respectively. There were 2 (1.7%) deaths, 7 (5.8%) recurrent myocardial infarctions and 30 (25%) patients with unstable angina. Only 7 (5.8%) needed interventional treatment, while the rest of the patients were managed medically.

Killip class I, II, III, IV categories included 80 (66.7%), 34 (28.3%), 2 (1.6%) and 4 (3.3%) patients respectively. The severity assessed by KIllip classes as the presence of HF in the acute stage of the disease (Killip class II-IV) or absence of HF (Killip class I) was associated strongly with the development of major complications related to STEMI during the hospital stay (p = 0.001), but not for the periods thereafter (first 30 days, p = 0.266; 31-90 days, p = 0.422; 91-180 days, p = 1; 181-365 days, p = 0.663).

TIMI score was a significant predictor of the clinically significant STEMI related adverse events while in the ward and during the first 30 days following the first STEMI, but not beyond this period (Table 2). However, GRACE score was not significantly associated with post-myocardial events (Table 2).

Table 2: Predictive ability of risk scores on the development of STEMI related complications

Predictors	*p* value	Odds ratio	95% CI
Complications during hospital stay			
TIMI score	0.004	1.51	1.14 - 1.99
GRACE score	0.065	1.02	1.00 - 1.04
Complications during first 30 days			
TIMI score	0.008	1.42	0.22 - 1.79
GRACE score	0.094	1.03	1.00 - 1.07
Complications during 31 - 90 days			
TIMI score	0.572	1.15	0.70 - 1.89
GRACE score	0.745	0.99	0.96 - 1.03
Complications during 91 - 180 days			
TIMI score	0.699	1.19	0.49 - 2.90
GRACE score	0.978	1.00	0.95 - 1.06
Complications during 181 - 365 days			
TIMI score	0.541	1.20	0.67 - 2.13
GRACE score	0.802	1.00	0.96 - 1.03

TIMI = Thrombolysis in Myocardial Infarction, GRACE = Global Registry of Acute Cardiac Events, Binary logistic regression was used; presence of complication was used as the response and the scores were applied in the model predictors.

Table 3 shows the performances of the TIMI score with the cut off values of ≥ 4. The sensitivity, specificity, positive predictive value (PPV) and the negative predictive value (NPV) are varying at different time intervals. However, it seemed that NPV remained close to 100%, while PPV was low. Specificity and the sensitivity were close to 50%.

Table 3: Performance of TIMI risk score

TIMI score	Cutoff utilized	Sensitivity (95% CI)	Specificity (95% CI)	PPV	NPV
During hospital stay	≥ 4	56.7%	55.4%	36.2%	74.6%
During first 30 days	≥ 4	50.0%	49.1%	20.0%	87.3%
During 31 - 90 days	≥ 4	51.7%	53.0%	7.0%	95.2%
During 91 - 180 days	≥ 4	50.0%	52.5%	1.7%	98.4%
During 181 - 365 days	≥ 4	60.0%	53.0%	5.3%	96.8%

PPV = Positive predictive value, NPV = Negative predictive value, TIMI = Thrombolysis in Myocardial Infarction, CI = Confidence interval

Table 4 demonstrates the performance characteristics of GRACE score cut off of ≥113 value. Sensitivity was high, while specificity was low. The NPV remained close to 100%, whilst PPV stayed low as in TIMI score.

Table 4: Performance of GRACE risk score

GRACE score	Cutoff utilized	Sensitivity (95% CI)	Specificity (95% CI)	PPV	NPV
During hospital stay	≥ 113	81.0%	22.9%	31.9%	73.0%
During first 30 days	≥ 113	62.5%	20.5%	5.3%	88.4%
During 31 - 90 days	≥ 113	71.4%	21.2%	5.3%	92.3%
During 91 - 180 days	≥ 113	97.8%	22.0%	2.1%	98.3%
During 181 - 365 days	≥ 113	80.0%	21.7%	4.2%	96.1%

PPV = Positive predictive value, NPV = Negative predictive value, GRACE = Global Registry of Acute Cardiac Events, CI = Confidence interval

Discussion

In our study, TIMI score in the acute phase of the myocardial infarction significantly associated with clinically important short-term (during the hospital and during first 30 days) adverse events, but not with medium term outcomes. The NPV of TIMI score at different time intervals remained close to 100%, while PPV was low. Specificity and the sensitivity were close to 50% for TIMI score at the specified cut off values according to our study. In the present study, GRACE score was unable to predict the outcome following acute STEMI. It showed high sensitivity but low specificity with low PPV and high NPV at the 113 cut off values. The NPV remained close to 100%, whilst PPV stayed low in both scores at the used cut offs. It is reassuring that the patient is less likely to have the major adverse cardiovascular events if TIMI score is <4 and GRACE is <113.

Several risk scores have been developed for predicting survival after myocardial infarction from patient cohorts treated with thrombolysis (14-16). The risk stratification tools such as Killip classes, TIMI and GRACE risk scores were shown to have strong association with future events in patients with

unstable angina, non ST-elevation myocardial infarction and ST-elevation myocardial infarction and are used to guide treatment options (12-17). However, these studies included heterogeneous groups of populations with STEMI and non-STEMI patients, but the present study included 120 STEMI patients. There is a previous study done on closely similar number of study subjects (18).

Current AHA/ACC and ESC guidelines promote the use of the TIMI and GRACE risk scores to evaluate the in-hospital and post-discharge risk of ACS patients (19-21). Both of these scoring systems have been shown to predict the response of ACS patients to various treatment modalities and therefore significantly influence therapeutic management (22-24). The GRACE risk score developed from a large multinational prospective patient registry and has been validated and shown to be a strong predictor of in-hospital mortality of ACS patients (25-26). It has been validated in patient population in Canada (27), Potugal (28) and United Kingdom (25).

TIMI risk score is the most validated and the most extensively used in patients with non-ST-elevation ACS. TIMI risk score for STEMI has been derived from databases of clinical trials and has been validated in non-selected Western patient populations (12, 17, 29-31). The TIMI risk score has shown to provide the ability of predicting mortality at 30 days. However, it is not known how the TIMI risk score performs in a population with many characteristic differences from the population the risk score was derived from. A multi-ethnic study conducted in Malaysia has shown that TIMI risk score was strongly associated with 30-day mortality (32).

Killip class grading was strongly associated with the major complications occurred during the hospital stay, but not thereafter according to the present study. Killip class has been one of the most important variable in predicting death, survival and complications after myocardial infarction (33-34).

In developing countries where there is a wide variation of provision of healthcare facilities, it is often challenging to provide the best treatment strategies recommended in international guidelines. Hence, using simple bedside risk stratification tools to do prompt risk stratification of patients with STEMI is of great importance to achieve the clinical benefits. These types of risk scores which are low cost risk estimation tools may be suitable to use in developing countries like ours. It needs to be validated further in real life patient cohorts and also in different treatment settings with the availability of novel management options, such as early revascularization. Our study included all consecutive patients admitted to the hospital with acute STEMI and 106 (88.3%) received thrombolytic therapy and standard medical therapy in line with current clinical practice guidelines. Lesser number of patients developed complications after the 30 days from STEMI among our study subjects. It is possible that these risk scores therefore failed to show strong associations with clinical events in the medium term. In addition, parameters reflecting final infarct size (left ventricular ejection fraction and peak cardiac enzymes) are lacking in the traditional risk scores as TIMI and GRACE investigators (12-16). The present study being restricted to male is a limitation.

Conclusions

The development of major complications following an episode of STEMI was less common in the cohort. TIMI score appear to predict the short-term, but not medium term adverse events. GRACE score was unable to predict the adverse events following acute STEMI. Both TIMI and GRACE scores had NPPV close to 100. Killip classes showed significant association with in-hospital adverse events. The risk stratification is important in special focus on cardiovascular mortality and morbidity. The results of the present evaluation need to be confirmed and validated by conducting prospective studies including a large series of STEMI patients treated with current strategies.

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References

1. Rosamond W, Flegal K, Furie K, *et al*. Heart disease and stroke statistics - 2008 update: A report from the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. *Circulation,* 2008; **117**: e25-e146.
2. Annual Health Bulletin, Ministry of Health, Sri Lanka 2007; 31.
3. Yusuf S, Hawken S, Ounpuu S, *et al.* Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study. *Lancet,* 2004; **364**: 937-52.
4. Cannon CP. Evidence-Based Risk Stratification to Target Therapies in Acute Coronary Syndromes. *Circulation,* 2002; **106**: 1588-91.
5. Fitchett D, Goodman S, Langer A. New advances in the management of acute coronary syndromes: 1. Matching treatment to risk. *CMAJ,* 2001; **164**: 1309-16.
6. Kumar A, Cannon CP. Acute Coronary Syndromes: Diagnosis and Management, Part I. *Mayo Clinic Proceedings,* 2009; **84**: 917-38.
7. Gumina RJ, Wright RS, Kopecky SL. Strong predictive value of TIMI risk score analysis for in-hospital and long-term survival of patients with right ventricular infarction. *Eur Heart J,* 2002; **23**: 1678-83.
8. Abu-Assi E, García-Acuña JM, Peña-Gil C, *et al.* Validation of the GRACE risk score for predicting death within 6 months of follow-up in a contemporary cohort of patients with acute coronary syndrome. *Rev Esp Cardiol,* 2010; **63**(6): 640-8.
9. Thygesen K, Alpert JS, White HD et al. On behalf of the Joint ESC/ACCF/AHA/WHF Task Force for the Redefinition of Myocardial Infarction. Third Universal definition of myocardial infarction. *J Am Coll Cardiol,* 2012; **60**(16): 1-18.
10. Militaru C, Donoiu I, Dracea O et al. Serum testosterone and short-term mortality in men with acute myocardial infarction. *Cardiol J,* 2010; **17**: 249-53.
11. Killip T. 3rd, Kimball JT. Treatment of myocardial infarction in a coronary care unit. A two year experience with 250 patients. *Am J Cardiol,* 1967; **20**: 457-64.
12. Morrow DA, Antman EM, Charlesworth A, *et al.* TIMI risk score for ST-elevation myocardial infarction: A convenient, bedside, clinical score for risk assessment at presentation: An intravenous nPA for treatment of infarcting myocardium early II trial sub study. *Circulation,* 2000; **102: 2031**-7.
13. Eagle KA, Lim MJ, Dabbous OH, *et al.* A validated prediction model for all forms of acute coronary syndrome: estimating the risk of 6-month post-discharge death in an international registry. GRACE Investigators. *JAMA,* 2004; **291**: 2727-33.
14. Marchioli R, Avanzini F, Barzi F, *et al.* Assessment of absolute risk of death after myocardial infarction by use of multiple-risk-factor assessment equations: GISSI-Prevenzione mortality risk chart. *Eur Heart J,* 2001; **22**: 2085-103.
15. Lee KL, Woodlief LH, Topol EJ, *et al.* Predictors of 30-day mortality in the era of reperfusion for acute myocardial infarction. Results from an international trial of 41, 021 patients. GUSTO-I Investigators. *Circulation,* 1995; **91**: 1659-68.
16. Morrow DA, Antman EM, Giugliano RP, *et al.* A simple risk index for rapid initial triage of patients with ST-elevation myocardial infarction: an In TIME II sub study. *Lancet,* 2001; **358**: 1571-5.
17. Wiviott SD, Morrow DA, Frederick PD. Performance of the thrombo*lysis i*n myoc**a**rdial infarction risk index in the National Registry of Myocardial Infarction-3 and -4: A simple index that predicts mortality in ST-segment elevation myocardial infarction. *J Am Coll Cardiol,* 2004; **44**: 783-89.
18. Jaffery Z, Hudson MP, Jacobsen G, *et al.* Modified thrombolysis in myocardial infarction (TIMI) risk score to risk stratifies patients in the emergency department with possible acute coronary syndrome. *J Thromb Thrombol,* 2007; **24**(2): 137-44.
19. Anderson JL, Adams CD, Antman EM, *et al.* ACC/AHA 2007 guidelines for the management of patients with unstable angina/ non ST-elevation myocardial infarction: A report of the American College of Cardiology / American Heart Association Task Force on Practice Guidelines. *Circulation,* 2007; **116**(7): e148-304.
20. Bassand JP, Hamm CW, Ardissino D, *et al.* Guidelines for the diagnosis and treatment of non-ST-segment elevation acute coronary syndromes: The Task Force for the Diagnosis and Treatment of Non ST-Segment Elevation Acute Coronary Syndromes of the European Society of Cardiology. *Eur Heart J,* 2007; **28**(13): 1598-660.
21. Van De Werf F, Bax J, Betriu A, *et al.* Management of acute myocardial infarction in patients presenting with persistent ST segment elevation. *Eur Heart J,* 2008; **29**(23): 2909-45.
22. Bhatt DL, Roe MT, Peterson ED, *et al*. Utilization of early invasive management strategies for high-risk patients with non ST-segment elevation acute coronary syndromes:

Results from the CRUSADE quality improvement initiative. *J Am Med Assoc,* 2004; **292**(17): 2096-104.

23. Yan RT, Yan AT, Tan M, *et al*. Underuse of evidence-based treatment partly explains the worse clinical outcome in diabetic patients with acute coronary syndromes. *Am Heart J,* 2006; **152**(4): 676-83.
24. Collinson J, Flather MD, Fox KA, *et al.* Clinical outcomes, risk stratification and practice patterns of unstable angina and myocardial infarction without ST elevation: Prospective Registry of Acute Ischaemic Syndromes in the UK (PRAIS-UK). *Eur Heart J,* 2000; **21**(17): 1450-7.
25. Granger CB, Goldberg RJ, Dabbous O, *et al.* Predictors of hospital mortality in the global registry of acute coronary events. *Arch Intern Med,* 2003; **163**(19): 2345-53.
26. Yan AT, Yan RT, Tan M, *et al.* Risk scores for risk stratification in acute coronary syndromes: Useful but simpler is not necessarily better. *Eur Heart J,* 2007; **28**(9): 1072-8.
27. Bradshaw PJ, Ko DT, Newman AM, *et al.* Validity of the GRACE (Global Registry of Acute Coronary Events) acute coronary syndrome prediction model for six month post-discharge death in an independent data set. *Heart,* 2006; **92**: 905-9.
28. De Araujo Goncalves P, Ferreira J, Aguiar C, *et al.* TIMI, PURSUIT, and GRACE risk scores: Sustained prognostic value and interaction with revascularization in NSTE-ACS. *Eur Heart J,* 2005; **26**: 865-72.
29. Morrow DA, Antman EM, Snapinn SM, *et al.* An integrated clinical approach to predicting the benefit of tirofiban in non-ST elevation acute coronary syndromes. Application of the TIMI risk score for UA/NSTEMI in PRISM-PLUS. *Eur Heart J,* 2002; **23**: 223-9.
30. Morrow DA, Antman EM, Parsons L, *et al.* Application of the TIMI Risk Score for ST-Elevation MI in the National Registry of Myocardial Infarction 3. *JAMA,* 2001; **286**: 1356-9.
31. Kozieradzka A, Kaminski K, Dobrzycki S, *et al.* TIMI Risk Score accurately predicts risk of death in 30 days and one-year follow-up in STEMI patients treated with primary percutaneous coronary interventions. *Kardiol Pol,* 2007; **65**: 788-95.
32. Selvarajah S, Fong AY, Selvaraj G, *et al.* An Asian validation of the TIMI risk score for ST-segment elevation myocardial infarction. *PLoS One,* 2012; **7**: 7.
33. Califf RM, Pieper KS, Lee KL, *et al.* Prediction of 1-year survival after thrombolysis for acute myocardial infarction in the global utilization of streptokinase and TPA for occluded coronary arteries trial. *Circulation,* 2000; **101**(19): 2231-8.
34. Lee JH, Park HS, Chae SC, *et al.* Predictors of six-month major adverse cardiac events in 30 days survivors after acute myocardial infarction (from the Korea Acute Myocardial Infarction Registry). *Am J Cardiol,* 2009; **104**(2): 182-9.

Audit on evaluation of emergency equipment for cardiopulmonary resuscitation available in clinical areas in Teaching Hospital Anuradhapura

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Abstract

Introduction: Successful cardiopulmonary resuscitation (CPR) is critical in saving lives in critical care management. Both skills and facilities are important to achieve a successful CPR. This study was aimed to determine the currently available facilities for cardiopulmonary resuscitation in various clinical areas at Teaching hospital, Anuradhapura.

Methods: The audit was carried out in all wards, ICUs and operating theatres of Teaching Hospital Anuradhapura during one week period in 2013. This was a questionnaire based, cross-sectional observational study.

Results: Data were collected from 54 clinical areas. Only 80% of clinical areas had ambu bags, face masks, oropharyngeal airways, portable suction apparatus, yankauer sucker and tracheal suction. Almost every clinical area had tracheal tubes of various sizes. More than 95% of sites had a larygoscopy handle. Less than 20% of places had LMA, magil forceps and bougie for use in difficult intubation. Only 40% of the clinical areas had defibrillator in working condition. Most of the sites had equipment for fluid resuscitation. Almost all trolleys had adrenalin 1mg vials and atropin 0.6mg vials. However $CaCl_2$, 10% glucose, naloxone, Saline 10ml vials and GTN spray were available in less than 50% of places we assessed. Only one thirds of the clinical areas did regular checks on the emergency trolley at every shift.

Conclusion: It is important update emergency trolleys according to guidelines and ensure regular check-up to make sure they are up-to-date.

Introduction

Successful cardio pulmonary resuscitation (CPR) is critical in saving lives in critical care management. Both skills and facilities are important to achieve a successful CPR. National reporting and learning system data from Great Britain indicates that ill-stocked resuscitation trolleys directly led to a number of preventable deaths (1). For advanced life support to be effective, the cardiac arrest equipment need to be readily available and in good working order. Equipment failure has been identified as a factor responsible for delays in instituting cardiopulmonary resuscitation in 18% of arrest calls (1).

The National Patient Safety Agency (NPSA) reported 86 incidents involving missing or broken equipment on cardiac arrest trolleys (2) and a separate survey of such trolleys in 2002/2003 found that the equipment available varied considerably from recommended standards (3). Defibrillators were also reported to fail occasionally, while many errors were caused by poor defibrillator care and maintenance (4).

While there is increasing awareness of the fact that the trainee young doctors often lack adequate skills in basic and advanced life support (5), there is a lack of information on the facilities available for successful CPR especially in the Sri Lankan hospital setup.

Resuscitation trolley should contain all the equipment needed for emergency resuscitation. The Intensive Care Society and the Resuscitation Council (UK) (2004) guidelines recommend the minimum required equipment including airway management equipment, circulation equipment, drugs and miscellaneous items (6).

In order to ensure the quality of resuscitation practices, it is essential to maintain required equipment in the resuscitation trolley depending on the anticipated workload and specialized local requirements. The hospital should conduct regular audits in order to improve the resuscitation practices and facilities (7). This study was aimed to determine the current available facilities for Cardiopulmonary Resuscitation in the clinical areas at the Teaching hospital, Anuradhapura.

Methods

The audit was carried out in cross-sectional manner covering all wards, ICUs and theatres of the Teaching Hospital Anuradhapura within one week in 2013. The hospital has 45 wards, seven ICUs and five theatre complexes. Permission for the study was obtained from the Director, Teaching hospital, Anuradhapura and ethical clearance for this study was obtained from the Ethics Committee of Rajarata University.

Two medical officers visited all selected clinical areas and filled up a questionnaire after appropriate observation. The questionnaire assessed the availability of the minimum required equipment as recommended by the Resuscitation Council UK guidelines (2004) (6), storage conditions and the expiry date of each item (if applicable).

Questionnaire had four sections. Section A assessed the airway equipment using 20 questions. Circulatory equipment was assessed by 11 questions included in the section B. Essential drugs which should be in the emergency trolley were assessed in section C. Additional miscellaneous items were assessed in section D.

Results

Data were collected from 54 clinical areas. Wards represented 78% of the study sites while ICUs represented 13% and theaters 9%. Of the clinical areas studied, 80% had ambu bags, face masks, oropharyngeal airways, portable suction apparatus, yankauer sucker and tracheal suction. Less than 5% places had nasopharyngeal airways. As shown in figure 1, almost every clinical area had tracheal tubes of various sizes. More than 95% of sites had a larygoscopy handle. Less than 20% of places had LMA, magil forceps and bougie for use in difficult intubation. Most of the sites had several types of syringes. More than 90% sites were equipped with oxygen cylinders and oxygen cylinder keys.

Only 40% of the clinical areas had a defibrilator in working condition. Less than half of the places had ECG electrodes to detect rhythm during cardiac arrest. Approximately 10% areas had defibrilator gel pads.

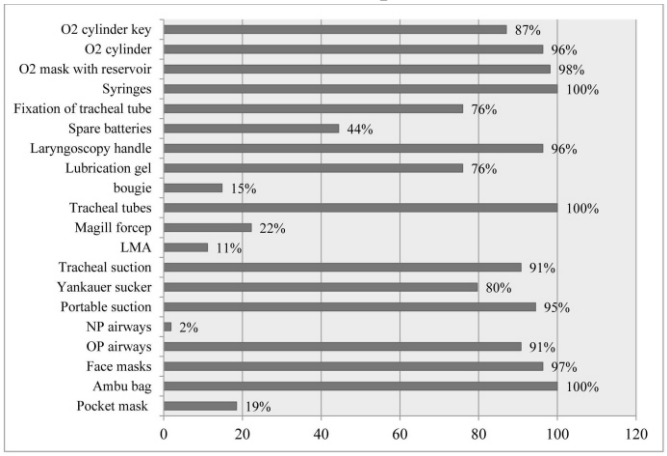

Figure 1: Grapical representation frequency of airway equipment avaiable in the clinical areas

Most of the sites had equipment for fluid resuscitation such as IV cannula, syringes, cannula fixation dressing, IV infusion sets, 500ml, 0.9% saline bags and tourniquets in the emergency trolley. Less than 50% sites had arterial blood gas (ABG) syringes and less than 20% sites had central venous pressure (CVP) monitoring kits in the emergency trolley (Figure 2).

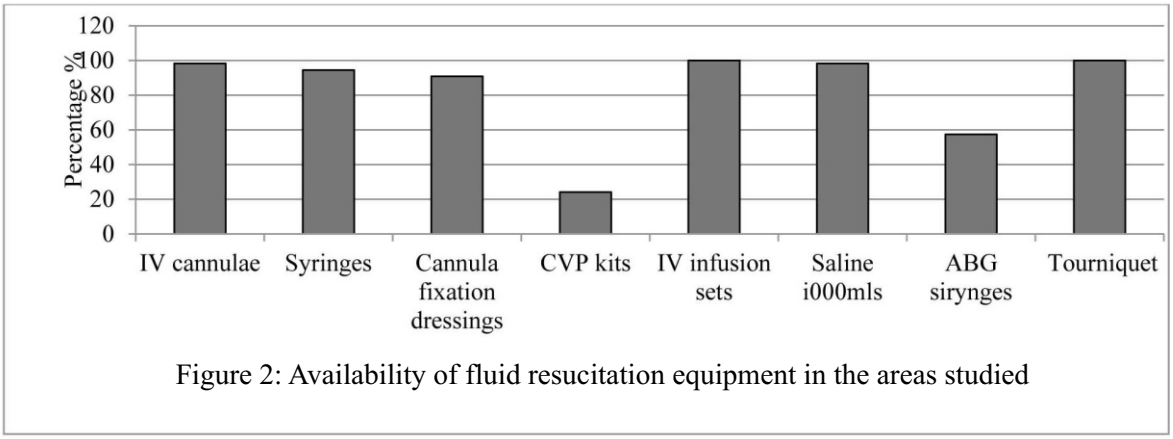

Figure 2: Availability of fluid resucitation equipment in the areas studied

Essential emergency drugs available in all the trolleys were assessed. Of the 22 drugs that were considered, almost all trolleys had adrenalin 1mg vials and atropine 0.6mg vials. Of other essential drugs more than 90% sites had chlopheniramine, hydrocortizone, bicarbonate, salbutamol and aspirin in emergency trollyes.

Frusemide, lidocaine, magnesium, midazolam, KCl and ipratropium were available in more than 50% places. Atropine 3mg, amidarone, adinosine, $CaCl_2$, 10% glucose, naloxone, Saline 10ml vials and GTN spray were available in less than 50% of places we assessed (Figure 3).

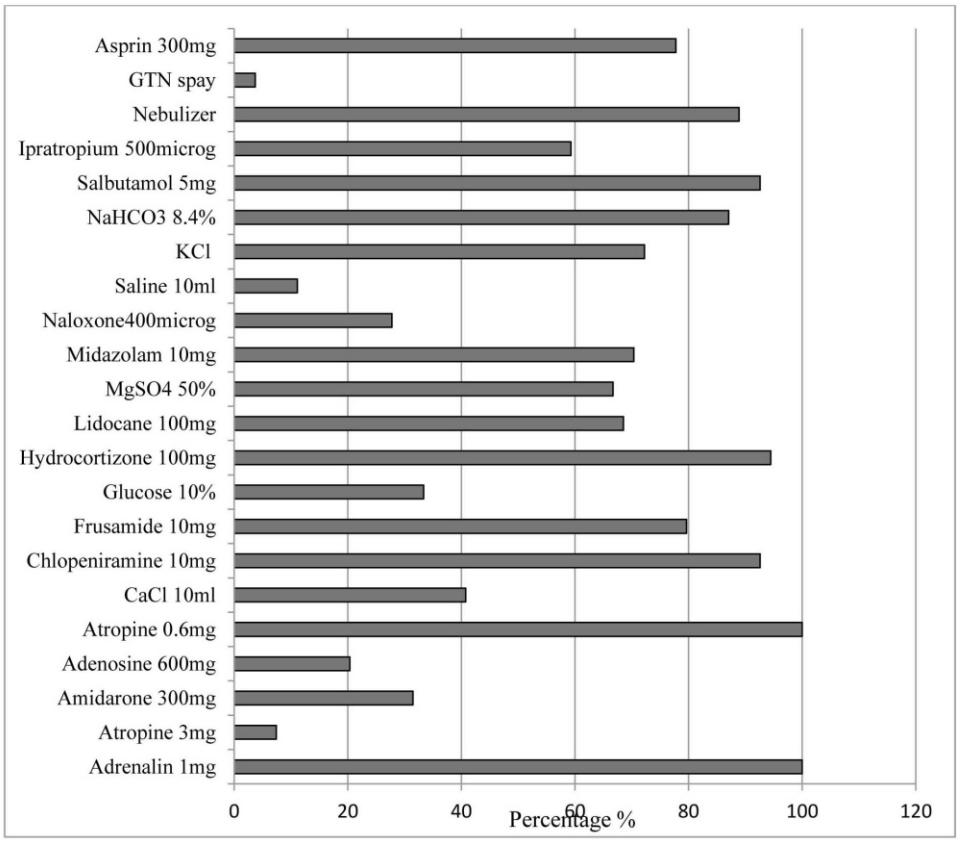

Figure 3: Availability of emergency drugs in the areas studied

More than 90% places had a clock to time CPR, personal protective items such as gloves and aprons and sharp disposal containers. Blood sample bottles and scissors were in the emegency trolley in more than 80% sites. However, none of the trolleys had alcohol wipes required for disinfection (Figure 4).

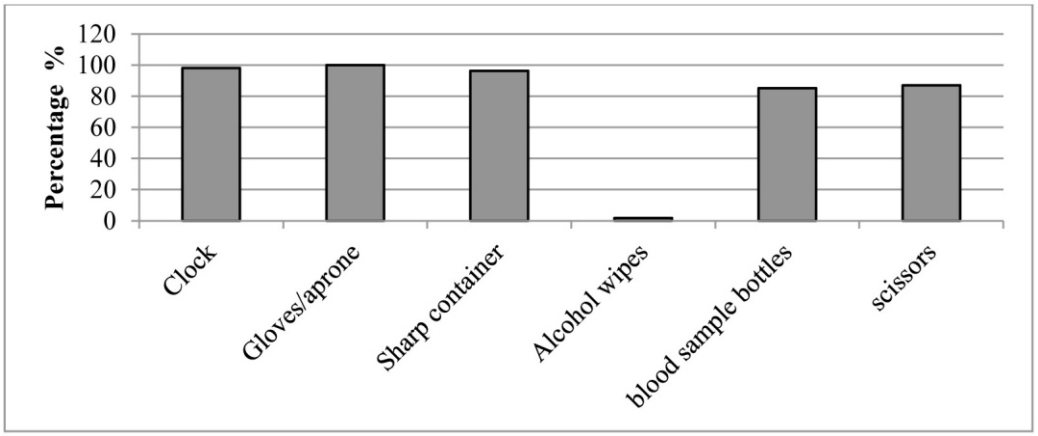

Figure 4: Availability of miscellaneous instruments in clinical areas

Of the clinical areas we assessed only 31% of the emergency trolleys were checked at every shift as recommended. Daily checks were carried out in 24% of areas, while weekly checks were carried out in 16%. Twenty eight percent of the emergency trolleys were checked even less frequently every month. Approximately 90% of the deficiencies in the emergency trolley had been identified by regular checks according to the survey and 85% of them were informed to the relevant authorities. Nine percent deficiencies were not identified by regular checks and not communicated or addressed by the relevant authorities in the ward.

Discussion

Emergency trolleys are essential to save lives in a critical situation. Well equiped emergency trolleys and properly functioning equipment can reduce the in-hospital mortality, considerably. It is important to carry out regular check, maintain and restock emergency trolleys in order to maximize the efficiency and avoid delays in critical care management. A study by Kolkailah *et al.* (2014) showed that the anaesthetists knowledge regarding the location of emergency trolleys were unsatisfactory (8) which suggests the importance of all medical staff to be made aware of the location of the resuscitation trolleys in the ward, ICU or operation theatre. Our study was conducted in 54 clinical areas which included wards, ICUs and operation theaters. In most of the sites there was an organized emergency trolley which is helpful in the management of patients in emergency situations.

Commonly used airway devices were present in most of the places except for the nasopharyngeal airway. All sites had equipment for tracheal intubation. This is very useful in emergency tracheal intubations. But only one fifth of the places had equipment for difficult intubation and these sites were obviously the theaters. Only 90% of the sites had oxygen available which is a basic drug which saves life in emergencies. It is therefore recommended to upgrade availability to all sites.

Almost all the places had equipment for fluid resuscitation including various types of fluid. This will enable rapid fluid resuscitation specially in hypotensive and shock patients. Both adrenalin and atropine were available in almost all sites which is very helpful during management of cardiac arrest patients. Hydrocortizone and chlorpheniramine were available in most of the places. These are useful medications for the management of anaphylaxis which can occur at anytime. Amiodarone, $CaCl_2$ and 10% glucose were not readily available which needs to be addressed as these are essential for the cardiac arrest management. Salbutamol, ipratropium and magnesium were available in most of the sites as these were used in management of acute severe asthma.

Personal protective equipment were available in most of the sites. Sharps disposal container was available in most of the sites for safe disposal of sharps. But we need to upgrade the availability to 100% for the prevention of cross infections even in an emergency situation. Unfortunately none of the places had alcohol wipes.

Checking of the emergency trolley was not satisfactory as only 50% of the sites checked it at least daily. Ideally this has to be done during every shift and after use. We suggest this to be done at the beginning of every shift so that deficiencies can be identified and corrected. These steps are useful for efficient resuscitation of critically ill patients and has a effect on the outcome of the patients**.**

Recommendations

We recommend to keep a log book to assess regular checkups and random checks by the outreach team to determine whether these are done regularly. Resuscitation trolleys should be checked at the beginning of every shift and required items should be restocked. Further we recommend to carry out regular audits and health care personnel awareness programmes to improve checking, maintaining, restocking and repairing the equipment in the emergency trolley. A standardized checklist of the equipment in the emergency trolley and a standard layout is recommended for all hospitals for more efficient use.

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References

1. King D, *et al.* Survey of cardiac arrests and cardiac arrest trolleys in a district general hospital. *Br J Clin Prac,* 1994; **48**: 248-50.
2. National Patient Safety Agency. Patient Safety Bulletin 1. Rapid learning from reported incidents. *NPSA*, London July 2005.
3. Hogh I, *et al*. Variations in the provision of resuscitation equipment: survey of acute hospitals. *Postgrad Med J,* 2005; **81**: 409-10.
4. Cummins RO, Chesemore K, White RD. Defibrillator failure. Causes of problems and recommendations for improvement. *J Am Med Assoc,* 1991; **264**: 1019-1025.
5. Winston T, Drybala G. Improving resuscitation skills in psychiatric hospitals; *Psychiatric Bulletin,* 1997; **21**; 557-60.
6. Resuscitation Council (UK). Recommended minimum equipment for in-hospital adult resuscitation. *RCUK*, London October 2004. (www.resus.org.uk/pages/eqip IHAR.htm).
7. Gabbott D, *et al.* Cardiopulmonary resuscitation standards for clinical practice and training. Royal College of Anaesthetists, Royal College of Physicians of London, Intensive Care Society, Resuscitation Council (UK) October 2004. (www.rcoa.ac.uk/docs/Cardio-Resus.pdf).
8. Kolkailah AA, Ghonaimy S, Cassells N, Gillespie A. Emergency Trolleys: Available and maintained, but are their locations known? closing the loop. *European Scientific Journal,* 2014; **3**(Special. ed.): 31-4.

Patient perceptions on hospital food service at Teaching Hospital, Karapitiya

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Abstract

Background: Hospital diet is an integral part of the management of in-ward patients. The quality of hospital food plays a major role in determining the overall satisfaction of patients with regards to their hospital stay.

Objective: To investigate the level of patient satisfaction with regards to the diet supplied at Teaching Hospital (TH), Karapitiya.

Methods: A descriptive, cross sectional study was conducted among 316 patients who received inward treatment at TH Karapitiya and consumed hospital diet. Data were collected using an interview-administered questionnaire and analyzed using SPSS statistical software.

Results*:* During the study period, only 27% of the in-ward patients consumed hospital diet. Of 316 included in the analysis, 13.6% rated hospital diet "good", 59.7% "fair", and 26.6% "unsatisfactory". Patients were satisfied with the quantity of all types of food provided (above 85%), time of food distribution (90%), temperature of food (85%) and texture (86%). However, 31% of patients were unsatisfied with taste, 40% were unsatisfied with the smell of food and 29% were unsatisfied with the diversity of food provided. No significant association was found between overall satisfaction regarding food service and the patients' age, gender, ethnicity, educational level or length of hospital stay.

Conclusions: Patient perception on hospital food service at TH, Karapitiya was mostly favourable although patients were less satisfied about the quality of food. The proportion who consumed hospital food was low. Attempts must be taken to enhance the taste, smell and the diversity of food provided.

Key words: Hospital food service, hospital diet, patient satisfaction, food consumption

Introduction

Hospital diet is an essential component of patient recovery and well being (1). Diet consumed during hospital stay forms an integral part of patient management, therefore provision and consumption of a balanced diet is essential to speed up the recovery. These meals can provide a nutritional model for patients requiring dietary management, when tailored to their specific health conditions. Hence, every hospital food service must target to provide food that meets nutritional requirements, satisfies the patient and are microbiologically safe (2).

The quality of the food served while in the hospital plays a major role in patients' satisfaction with their overall hospital experience (3). It is reported that in-patients evaluate food service quality based on various factors such as taste, texture, variety, nutritional quality, sanitation, temperature, portion size, meal time, and servers' characteristics (4-6).

Therefore, the attitude and the satisfaction of patients regarding hospital food service depend largely on these factors.

Despite its role as an essential contributor for recovery of patients, hospital food has a wide reputation for being tasteless, overcooked and unappetizing (7). Improvement of hospital food services remains a constant challenge due to many tangible and intangible aspects related to quality, ranging from menu items, portion size, taste, temperature, texture and variety of food to tray presentation, sanitation, offering nutritional information and responsiveness to food problems (8-12).

According to the Hospital Manual published by the Ministry of Health, Sri Lanka a patient's diet for a day is the entire requirement of food for a period of 24 hours, starting from 12 noon on a particular day to 12 noon of the following day (13). Medical Officer in charge has to determine the diet as it is regarded as a part of the management. All government hospitals in Sri Lanka provide diet free of charge to in-ward patients. Some patients, however, prefer food brought from their homes. A situational analysis performed by the principal investigator in four major hospitals in Galle and Ratnapura districts revealed that only a limited number of in-ward patients consumed hospital food: 25% in Teaching Hospital, Karapitiya, 12% in Teaching Hospital, Mahamodara, 30% in General Hospital, Ratnapura and 20% in Base Hospital, Embilipitiya (unpublished data). The major reasons for poor consumption according to the key informants were tastelessness, unpleasant aroma of food and shyness to eat hospital food.

Regular attempts to review the quality and patient satisfaction of hospital food are of paramount importance to reap the benefits of this service. Conducting research on above aspects is mandatory to identify the deficiencies in the hospital food service and to explore the expectations of consumers with regards to the standards of meals provided to them. Such measures are useful in improving overall patient satisfaction and to prevent plate wastage due to poor meal quality. This study was conducted to assess the patient perceptions on hospital food with regard to menu, amount, hygiene, timeliness, taste and texture.

Methodology

This study was a descriptive, cross-sectional study, conducted at the Teaching Hospital (TH), Karapitiya which is the only tertiary care institution in southern Sri Lanka. Study sample included patients who received in-patient care from the medical, surgical, eye, Ear, Nose and Throat (ENT), neurosurgical and orthopedic wards and consumed hospital food during a period of 3 months from 25th July 2013. A total of 316 patients were enrolled to the study and this included only the patients who consumed a normal hospital diet and could understand and respond to the questionnaire. Critically ill patients and those who were not on normal diet were excluded.

A pre-tested, interview-administered questionnaire was used to collect data on client satisfaction with regards to hospital food service. Data on basic socio-demographic profile of the participants were also collected. All data were collected by the principal investigator in order to minimize the interviewer bias. Informed consent was obtained from the eligible patients before data collection. Ethical approval for the study was obtained from the Ethical Review Committee, Faculty of Medicine, and University of Colombo. Institutional approval was obtained from the Director, TH, Karapitiya. Chi-squire test was used to determine the statistical significance of associations between variables. A probability level of 0.05 was considered as the critical value for statistical significance.

Results

A total of 316 patients on normal hospital diet were interviewed on perceived satisfaction with regards to hospital diet. During the study period, only 27% of the inward patients consumed hospital diet (Number of patients who consumed hospital diet/ average mid night total*100). Characteristics of the study participants are given in Table 1.

In reporting the adequacy of the food provided, nearly 91% of the respondents stated that rice was adequately supplied. Approximately 85% were satisfied with the amount of fish given. Some patients had not received certain food items despite their requests (e.g. about 23.7%. respondents stated that they did not receive fish even though they requested a fish diet). Overall, the proportion of

patients who did not consume the different types of food provided ranged from 5% to 30%. Patients' responses on the adequacy of the meals and the proportion who consumed different types of food are summarized in the Table 2.

Patients' views on taste, smell, texture and diversity of the food were studied to determine the perceived level of satisfaction with regards to the quality of hospital diet. Approximately 30% of the patients reported that the taste was not satisfactory and 40% said that the smell was unsatisfactory. The majority were satisfied with the texture, temperature and the timeliness of the food provided. However, over 26% mentioned that the overall quality of the food was unsatisfactory. The level of patient satisfaction regarding the different aspects of hospital food service is shown in Table 3.

About 33.5% (n=106) of the patents mentioned that they did not consume the whole diet provided. Poor taste (17.7%), food being in excess (10.1%) and inability to eat due to their illness (5.7%) were the reasons highlighted for failure to consume the whole diet.

The association between the overall satisfaction regarding hospital diet and the characteristics of the patients such as age, gender, ethnicity, marital status, education and length of hospital stay was assessed using Chi square test (Table 4). There was no significant association between any of the above variables and the overall quality of the hospital diet except marital status of the patients, where more unmarried persons rated quality of diet as unsatisfactory.

Table 1: Characteristics of the respondents (n=316)

Characteristic	Number of respondents (%)
Gender	
Male	133 (42.1)
Age	
Less than 18 year	8 (2.5)
19-60 years	176 (55.7)
Above 60 years	132 (41.8)
Ethnicity	
Sinhalese	298 (94.4)
Tamil	9 (2.8)
Moor	9 (2.8)
Educational qualifications	
Not attended to school	33 (10.4)
Up to grade 5	60 (19.0)
Grade 5-11	120 (38.0)
G.C.E (O/L)	51 (16.2)
G.C.E. (A/L)	49 (15.5)
Diploma and degrees	3 (0.9)
Monthly income	
Economically dependant	106 (33.6)
Less than Rs. 5000	40 (12.6)
Rs. 5000 - 10000	38 (12.0)
Rs. 10000 - 20000	66 (20.9)
More than 20000	66 (20.9)
Length of hospital stay	
1-7 days	158 (50.0)
8-14 days	69 (21.8)
15 and above	89 (28.2)

Table 2: Patient perceptions regarding the adequacy of the meal provided and the percentage who consumed each food item

Food Item	Patients' perception on adequacy of meals		Total No. of patients who consumed the particular food item (%)
	Adequate No. (%)	Not adequate No. (%)	
Rice	288 (91.1)	28 (8.9)	316 (100.0)
Fish	189 (85.9)	31 (14.1)	220 (69.6)
Meat	Not given		
Egg	207 (95.8)	31 (4.2)	238 (75.3)
Vegetable	270 (91.5)	25 (8.5)	295 (93.3)
Green leafy vegetables	279 (94.5)	16 (5.5)	295 (93.3)
Dried fish	188 (89.9)	21 (10.1)	209 (66.1)
Coconut sambol	250 (83.6)	49 (16.4)	299 (94.6)

Table 3: Distribution of the level of patient satisfaction on the food service of Teaching Hospital, Karapitiya

Aspect of hospital food service	Level of satisfaction of the patients			Not answered (%)
	Good No. (%)	Fair No. (%)	Unsatisfactory No. (%)	
Taste of the food	54 (17.1)	164 (51.9)	97 (30.7)	1 (0.3)
Smell of the food	49 (15.5)	137 (43.4)	127 (40.2)	3 (0.9)
Texture of the food	198 (62.7)	74 (23.4)	41 (13.0)	3 (0.9)
Varieties of food given	96 (30.4)	98 (31.0)	93 (29.4)	29 (9.2)
Time for the food serving	232 (73.4)	53 (16.8)	28 (8.9)	3 (0.9)
Temperature of the food received	191 (60.5)	42 (13.3)	80 (25.3)	3 (0.9)
Cleanliness of the spoons, plates and dishes	225 (71.2)	31 (9.8)	8 (2.5)	52 (16.4)
Attitude and behavior of the food serving staff	216 (68.4)	73 (23.1)	22 (7.0)	5 (1.5)
Overall quality of the food service	43 (13.6)	189 (59.8)	84 (26.6)	0 (0.0)

Table 4: Distribution of level of satisfaction of the hospital food service according to the characteristics of the patients

Variables	The overall quality of food service			p value
	Satisfactory (good/fair) No. (%)	Unsatisfactory No. (%)	Total No. (%)	
Age				
60 years or above	131 (71.2)	53 (28.8)	18 (100.0)	0.291
< 60 year	101 (76.5)	31 (23.5)	132 (100.0)	
Ethnicity				
Sinhala	221 (74.2)	77 (25.8)	298 (100.0)	0.224
Others	11 (61.1)	7 (38.9)	18 (100.0)	
Educational level				
Not schooled or below primary	66 (71.0)	27 (29.0)	93 (100.0)	
Grade 5-11	89 (74.2)	31 (25.8)	120 (100.0)	0.813
O/L and above	77 (74.8)	26 (25.2)	103 (100.0)	
Marital status				
Married	203 (75.5)	66 (24.5)	269 (100.0)	0.049
Unmarried	29 (61.7)	13 (38.3)	42 (100.0)	
Economic dependency				
Non dependent	150 (71.4)	60 (28.6)	210 (100.0)	0.260
Dependent	82 (77.4)	24 (22.6)	106 (100.0)	
Income				
No income	82 (77.4)	24 (22.6)	106 (100.0)	0.455
Below Rs.10000	54 (69.2)	24 (30.8)	78 (100.0)	
Above Rs.10001	96 (72.7)	36 (27.3)	132 (100.0)	
Duration of hospital stay				
1-7 days	121 (76.6)	37 (23.4)	158 (100.0)	0.115
8-14 days	53 (76.8)	16 (23.2)	63 (100.0)	
Above 14 days	58 (65.2)	31 (34.8)	89 (100.0)	

Discussion

The findings of this study revealed that the majority of the in-ward patients do not consume hospital food. Among patients who consume hospital diet, overall quality of food service was perceived as satisfactory by the majority. However, the taste, aroma and diversity of food were rated unsatisfactory by more participants when compared to other aspects of hospital food service.

In public health care institutions in Sri Lanka, where health care is provided free of charge, it is not unusual for the patients to perceive hospital food as an extended facility provided by the hospital, not as a part of patient management. In this study, most respondents did not consider it as a right or privilege. Therefore, some patients were of the opinion that it is not fair to comment on hospital food service. Some patients were not concerned about the quality of the food service, as they were on a short stay and some believed that they were receiving a special

diet with less salt and spices due to their illness, therefore it is necessarily tasteless. Even though these opinions were not surveyed in a formal manner, these perceptions were voiced by the patients during the interviews.

According to our findings more female patients (58%) were taking hospital meals. Although statistical significance of this finding could not be ascertained within the present study design, we hypothesize that it could be a reflection of the prevailing cultural practice, where females bear the sole responsibility in food preparation. As a result, when male patients are admitted, usually the female partners provide home-made food for them. However, when females are admitted, their male partners are not capable of providing home-cooked meals and thus, they are compelled to eat hospital food. In a similar study conducted in United Kingdom, Li-Jene *et al.* reported that the consumption of hospital meal is more in females (14), although Kim and colleague found no difference in hospital meal consumption with regards to sex of the patients (11).

Majority (55.7%) of patients taking hospital meals in this sample were between 19-60 yrs. As most of the in-ward patients are likely to be in this age group our sample is likely to be representative sample of hospital in-ward patients. The demographic pattern in Sri Lanka also indicates that a higher percentage of persons are found in this age group (15). The least number of patients were in less than 18 years age group. Patients of this age category are mostly dependents and these patients are frequently visited by their family members. This may be the reason for them not to accept hospital foods. Li-Jen *et al.* reported that hospital food consumption is higher in the oldest age group (14). Kim and co-workers reported that the consumption rates are not significantly different between age groups (11).

Interestingly, only one third of patients who were taking hospital food were economically dependent. Contrary to the popular belief that hospital diets are consumed by the poor, this indicates that even people with a regular income are willing to consume hospital diet. This exerts a positive impression toward the hospital diet.

In this study, more than 80% of patients said that they were satisfied with the quantity of all food items provided. Most of subjects were satisfied with the texture, time of delivery and temperature of the meal but the proportion satisfied with the taste, aroma and variety of food was lower. Studies conducted in Canada and Saudi Arabia have reported similar results (9,16).

With regards to delivery of meals, most consumers were satisfied with the cleanliness of utensils, timeliness of distribution of food and the attitudes and behaviour of serving staff. More than 90% mentioned that the attitudes of the staff were good or satisfactory. However, this could be due to the reluctance of the patients to make any adverse comment on the hospital staff for the fear that it might affect their hospital care. Although a self-administered questionnaire would have been the ideal method for data collection, during the pilot study it was found that the response rate was poor with this method.

Overall satisfaction towards the hospital meal was very low with only 13.6% of patients rating that food service was good. Although the majority rated it as fair, a considerable proportion of the study sample (26.6%) were unsatisfied with overall food service. Although these results are in accordance with the existing findings (17), a closer look at consumer satisfaction with respect to different aspects of food service reveals interesting complexities.

According to this study, cleanliness, time of food distribution and attitudes of staff are not in keeping with the overall satisfaction of the meal. The majority of patients rated these aspects as good, despite stating that overall food service was fair or unsatisfactory. According to Li-Jen *et al.* timeliness is strongly associated with patient satisfaction on meal (14). Dube *et al.* also have reported the same finding (18). However, in this population, taste and aroma of food seem to be the major determinant of the overall satisfaction. Any food service aiming to enhance consumer satisfaction should focus on improving the palatability of meals and making them more appetizing, in addition to providing food in a timely and hygienic manner.

The evaluation of association between overall satisfaction of hospital food service and the characteristics of the patients failed to demonstrate any significant findings. Both Li-Jen *et al.* and O' Hara *et al.* reported that there is no association

between patients' perception of meal and age, gender, length of stay and the gross income (9,14). On the contrary, Dube *et al.* confirmed that such individual characteristics influenced perception of hospital food (18).

This study has a few limitations. We could not exclude response bias due to the tendency of respondents to give favorable responses regarding the diet, because the interviewer was a medical officer. However, such patients would have only voiced favourable responses, thus it cannot explain the high levels of dissatisfaction seen among the participants. In addition, some patients were consuming hospital diet on an irregular basis. The perception of those patients would not have been comparable to those who consumed meals regularly, although both groups were considered together in assessing overall satisfaction with food service. The third source of bias relates to the current illnesses and the treatments of participants, which may have affected the appetite and the taste for foods, interfering with their appraisal.

Conclusion

The patient perception on the hospital food service at TH Karapitiya was fair. The rate of hospital food consumption was considerably low. Attempts need to be taken to enhance the taste, smell and the diversity of food provided. Regular supervision and 'surprise observations' must be conducted to maintain the standards of food service. Continuous monitoring and evaluations must be carried out including consumer surveys in order to identify the areas needing improvement. Norms should be developed regarding the food services of the hospitals.

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References

1. McLymont V, Sharon C, Stell F. Improving patient meal satisfaction with room service meal delivery. *Journal of Nursing Care Quality,* 2003; **18**(1): 27-37.
2. Hartwell H, Edwards JSA. A preliminary assessment of two hospital food service systems using parameters of food safety and consumer opinion. *The Journal of the Royal Society for the Promotion of Health,* 2001; **121**: 236-42.
3. Williams R, Virtue K, Adkins A. Room service improves patient food intake and satisfaction with hospital food. *Journal of Pediatric Oncology Nursing,* 1998; **15**(3): 183-9.
4. Theurer VA. Improving patient satisfaction in a hospital cfood service system using low-cost interventions: determining whether a room service system is the next step. *All Graduate Reports and Creative Projects,* 2011; **32**: 6.
5. Wright OR, Connelly LB, Capra S. Consumer evaluation of hospital food service quality: an empirical investigation. *International Journal of Health Care Quality Assurance Incorporating Leadership in Health* Services 2006; **19**(2-3): 181-94.
6. Fallon A, Gurrs S, Hannan-Jones M, Bauer JD. Use of the Acute Care Hospital Food service Patient Satisfaction Questionnaire to monitor trends in patient satisfaction with food service at an acute care private hospital. *Nutrition & Dietetics,* 2008; **65**: 4146. doi: 10.1111/j.1747-0080.2007.00219.
7. Alford L. Hospital Food Review: Sourcing more local and sustainable food. 2010. Pp2.http://www.soilassociation.Org/LinkClick.aspx?fileticket=qf0jvMzz26U%3D&tabid=131 (last accessed on 29th Sep 2015).
8. Jung SH, Yeom HS, Sohn CM. The improvement of hospital food service in quality and customer satisfaction by using 6-sigma strategy. *Journal of the Korean Dietetic Association,* 2007; **13**: 331-4.
9. O'Hara PA, Harper DW, Kangas M, Bubeau J, Borsutzky C, Lemire N. Taste, temperature, and presentation predict satisfaction with food services in a Canadian continuing care hospital. *Journal of American Dietetic Association,* 1997; **97**: 401-5.
10. Lim HS, Yang IS, Cha JA. Analysis of patient satisfaction and factors influencing satisfaction on hospital food service quality. *Journal of the Korean Dietetic Association,* 1999; **5**: 29-47.

11. Kim YS, Lyu ES. Evaluation of patients' satisfaction with food service of mid-size hospitals in Busan area. *Journal of the Korean Society of Food Science and Nutrition,* 2003; **32**: 1153-6.

12. Kim MY, Kim KJ, Lee KE. In-patients' food consumption and perception on foodservice quality at hospitals. *Journal of the Korean Dietetic Association, 2008;* **13**: 87-96.

13. Ministry of Health. Manual of management of teaching, provincial, base, and special hospital, ministry of health: Diet service 1995; Ministry of Health. 442-58.

14. Li-jene, Anita E, Dosomdre T. Gap analysis of patient meal service perception, *International Journal of Health Assurance,* 2003; **16**(3): 143-153.

15. Census and statistics department. Http://www.indexmundi. Com/sri_lanka/demographics_profile.html. Sri Lanka Demographics Profile 2013. (last accessed on 29th Sep 2015).

16. Abdelhafez AM, Qurashi LA, Ziyadi RA, Kuwair A, Mograbi MSH. Analysis of factors affecting the satisfaction level of patients towards food services at general hospitals in Makkah, Saudi Arabia. *American Journal of Medicine and Medical Sciences,* 2012; **2**(6): 123-30.

17. Kulkarni1 MV, Dasgupt S, Deoke AR, Nayse. Study of satisfaction of patients admitted in a tertiary care hospital in Nagpur. *National Journal of Community Medicine, 2011;* **2**(1): 37-9.

18. Dube L, Trudeau E, Belenger M. Determining the complexity of patient satisfaction with food services. *Journal of the American Diabetic Association, 1994;* **94**: 394-8.

Vitamin D and diabetes; a review

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Despite advanced therapeutic and primary prevention strategies, diabetes mellitus remains a significant global health care problem. Substantial morbidity and mortality associated with the disease, emphasize the importance of primary prevention. In Sri Lanka the prevalence of diabetes among male is 14.2% and 13.5% among females and these figures are expected to increase over the next few decades (1).

Vitamin D and its active metabolite 1, 25 OH_2 cholecarciferol are widely known for their role in calcium homeostasis and bone metabolism. Recently, there has been a much evolving enthusiasm on the extra skeletal benefits of vitamin D. The basis for this appears to be related to the findings in several observational studies which reveal a close association between vitamin D and the development of autoimmune diseases, malignancies and metabolic abnormalities abnormalities such as type 2 diabetes (2).

The exact mechanism of vitamin D deficiency causing diabetes remains largely unknown. Vitamin D has a beneficial effect on insulin action either directly or indirectly by improving insulin exocytosis via activating calcium depending endopeptidases (3). It has been shown that type 1 diabetes is associated with an imbalance of pro anti-inflammatory cytokines and vitamin D acts as a potent immune suppressor and down regulator of transcription of proinflammatory cytokine genes, reducing the risk of type 1 diabetes (3).

This paper reviews the association of vitamin D with regard to the incidence, morbidity and mortality of diabetes.

Incidence

Several cross-sectional and cohort studies and randomized controlled trials have examined the association between vitamin D and the incidence of type 2 diabetes. A population based cross-sectional study reported a significant inverse association between serum 25 (OH) D3 and the risk of developing diabetes. (OR 0.25, 95% CI 0.11 - 0.60) for non-Hispanic whites and OR 0.17, 95% CI 0.08 - 0.37 for Mexican Americans (4).

Knekt *et al.*,observed that men with highest vitamin D quartile had a 82% lower risk of developing type 2 diabetes compared to men in the lowest vitamin D quartile. No significance association, however, was found among women (5). Nurses' Health Study by Pittas *et al*., showed that higher levels of plasma 25- OHD were associated with a lower risk for type 2 diabetes in women. (The relative OR between highest and lowest vitamin D quartiles was 0.52, 95% CI 0.33 - 0.83) (6).

Few studies such as the Nurses Health Study (7), the Women's Health Study (8) and the Japanese cohort study (9) have assessed the relationship between the dietary intake of vitamin D and the risk of developing diabetes. Of them, only the Japanese cohort study revealed a clear decreasing trend of type 2 diabetes with increasing dietary intake of vitamin D (9). The other two studies did not reveal any significant relationship between the total intake of vitamin D and incidence of type 2 diabetes.

Several interventional studies have studied the effects of vitamin D supplementation on the development of type 2 diabetes. Pittas *et al* (2007) administered 700IU vitamin D_3 in combination with calcium 500mg or placebo daily for 3 years for healthy adults and found that among participants

with IFG those who took combined vitamin D and calcium supplements had a lower rise in fasting plasma glucose level (p=0.042) and a lower rise in HOMA-IR (p=0.031) at 3 years compared to those on placebo. Butamong those who had normal fasting glycaemia there was no difference in the change of FPG and HOMA IR (10).

Von Hurst *et al* (2009) showed a significant improvement in insulin sensitivity, fasting Insulin and insulin resistance with vitamin D supplementa--tion over placebo in non-diabetic, insulin resistant South Asian women after supplementation of 4000IU of vitamin D_3 for a 6 months.(Insulin sensitivity increased p= 0.01, fasting insulin decreased p=0.02, Insulin resistance decreased p=0.03) (11). Several other interventional studies carried out in participants with normal glycaemic level found no significant effect of vitamin D supplementation on fasting plasma glucose level and insulin resistance. (Niles L., 1984, de Bore *et al*., 2008, Avenell *et al*., 2009) (12-14).

Bin-Abbas *et al* and Janner M *et al,* found the prevalence of vitamin D deficiency among children and adolescent with diabetes to be high (15,16). Further, Hypponen *et al* in their birth-cohort study showed a decreased frequency of type 1 diabetes with regular vitamin D supplementation. (OR 0.12, 95% 0.03-0.51) and concluded that vitamin D supplementation in infants could help prevent or reverse the incidence of type 1 diabetes (17) and the EURODIAB Study also concluded that vitamin D supplementation in infancy is associated with a decreased risk of type 1 diabetes, (OR - 0.67 in 95% 0.53 - 0.86) (18).

Case-control studies done by Stene LC, *et al* (2000 and 2003) found that when mothers consumed cod liver oil, (a known vitamin D supplement) during pregnancy their offspring had a lower risk of diabetes (OR - 0.30 in 95% CI 0.12 to 0.75) (19,20). Also the use of cod liver oil during the first year of life may reduce the risk of type 1 diabetes. (OR - 0.74 in 95% CI 0.56 to 0.99) (21).

Complications

Although the association between vitamin D and diabetes has been studied in several observational and interventional studies, evidence for the association between complications of diabetes and vitamin D are sparse. A cross-sectional study carried out by Massimo C *et al* (2005) found that the prevalence of cardiovascular disease among diabetics is greater when they have co-exsistant hypovitaminosis D (Odds ratio 1.70 in 95% CI 1.1-2.6, p-0.01) (22). Furthermore, two randomized controlled trials by Sugden JA *et al* (2007 and 2010) showed a significant improvement in Flow mediated vasodilation (a tool of assessing endothelial function) in the vitamin D received group compared to the placebo group (23,24). Measurement of endothelial function is a surrogate marker to assess cardiovascular risk, especially atherosclerosis (25).

Another study showed a clinically and statistically significant reduction in systolic blood pressure among vitamins D supplemented group than in the placebo group after 8 weeks of therapy (26). No significant changes were found, however, with vitamin D supplementation on HbA1c or insulin resistance even with higher doses of vitamin D3 (26).

Few studies have assessed the association of vitamin D with diabetic neuropthy. Paul Lee *et al* in 2010 showed that patients with type 2 diabetes who have low vitamin D levels had distressing neuropathic pain according to a visual analogue scale(VAS) and pain scores for both the VAS (r^2=0.10) and McGill pain questionnaire (MPQ r^2=0.18). Repletion of vitamin D with mean oral daily dose of 2059IU for 3 months resulted in a significant reduction in pain scores on both the VAS and MPQ, -48.5% and -39.4%, respectively (27). A similar study by Soderstrom L. Hrevealed that vitamin D insufficiency is associated with the self-reported peripheral neuropathy even after adjusting for demographic factors, medications and diabetes duration (28). Shehab D *et al,* also showed that vitamin D deficiency is an independent risk factor of diabetic neuropathy among patients with established diabetes. A greater proportion (81.5%) of patients with diabetic neuropathy had vitamin D deficiency compared to patients without neuropathy (60.4%) and diabetic peripheral neuropathy associated with vitamin D deficiency. (OR - 3.47: CI 1.04 - 11.56, p=0.043) (29).

Nephropathy

The potential relationship between thevitamin D and diabetic retinopathy has been the focus in several cross sectional studies. In 2000, Aksoy H *et al* reported that mean 1, 25 (OH_2) D3 concentration fell with increasing severity of diabetic retinopathy. (DR) (background DR 63.4 $\pm$ 17.26 pmol/L, pre-proliferative DR 47.7 $\pm$ 13.27 pmol/L and for proliferative DR 43.1 $\pm$ 19.45 pmol/L). They also found that, compared to the control group, serum 25 (OH) D concentration was lower in diabetic patients (31). A similar study by Patricia A *et al,* also reported the same results which the percentage of individuals with vitamin D deficiency increased with the severity of retinopathy. But the regression analysis of retinopathy severity vs serum 25-hydroxyvitamin D did not reveal a statistically significant relationship between the two variables (32). Alam *et al,* evaluated the relationship between the two variables and found that there was no difference in serum 25-hydroxyvitamin D concentration between diabetic retinopathy group and the diabetic non-retinopathy group (33). Although most of the studies showed a increased vitamin D deficiency with the severity of the diabetic retinopathy, none of the studies have shown a statistically significant difference between the two variables.

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Vitamin D and mortality in Diabetes

Emerging evidence suggest that inadequate vitamin D may influence the mortality in chronic diseases, especially diabetes. Christel *et al,* followed up 227 patients with type 1 diabetes and during the follow up 44 (18%) patients died, 81 (37%) patients developed microalbuminuria, 27 (12%) developed macroalbuminuria and furthermore 192 (87%) patients developed retinopathy. The hazard ratio of mortality in subjects with severe vitamin D deficiency was 2.7 (95% CI : 1.1 to 6.7). They concluded that severe vitamin D deficiency independently predicts all causes of mortality in patients with type 1 diabetes but not the development of microvascular complications (34). Cristel J *et al,* showed increased all cause mortality among patients with severe vitamin D deficiency during the follow up of 289 patients with type 2 diabetes. (Hazard ratio was 1.96 with 95% CI 1.29-2.98) (35).

Summary

Previous studies have shown a significant association between serum vitamin D status and the incidence of type 2 diabetes. But the dietary vitamin D intake did not show a significant reduction of diabetes incidence. However, in clinical trials, vitamin D supplementation showed a marked improvement of insulin sensitivity and fasting insulin levels in people with insulin resistance but not in people with normal glucose tolerance. However few case control studies have shown that vitamin D supplementation during pregnancy and first year of life could reduce the incidence of type 1 diabetes.

Intervetional studies showed an association between cardiovascular disease and hypovitaminosis D. Few clinical trials also reported a significant improvement of endothelial function resulting in lower systolic blood pressure with vitamin D supplementation in type 2 diabetes.

Vitamin D therapy probably exerts beneficial effects on diabetic microvascular complications as well. Several cross sectional and longitudinal studies have reported an inverse association between serum vitamin D3 level and neuropathic pain and the severity of diabetic retinopathy. Studies have reported that severe vitamin D deficiency is associated with increased mortality in patients with both types of diabetes. Considering above results a hypothesis can be developed that vitamin D status is a significant determinant of the incidence, occurrence of complications, and the all cause mortality of diabetes.

References

1. Katulanda P, Sheriff MHR, Matthews DR. The diabetes epidemic in Sri Lanka a growing problem. *Ceylon Medical Journal,* 2006; **51**(1): 26-8.

2. Visweswaran R Kasi, H Lekha. Extra skeletal effects and manifestations of Vitamin D deficiency. *Indian Journal of Endocrinology and Metabolism,* 2013; **17**(4): 602.

3. Seshadri Krishna G, Bubblu Tamilselvan, and Amarabalan Rajendran. Role of vitamin D in diabetes. *Journal of Endocrinology and Metabolism,* 2011; **1**(2): 47-56.

4. Pittas Anastassios G, *et al.* The effects of calcium and vitamin D supplementation on blood glucose and markers of inflammation in nondiabetic adults. *Diabetes Care,* 2007; **30**(4): 980-6.

5. Knekt Paul, *et al.* Serum vitamin D and subsequent occurrence of type 2 diabetes. *Epidemiology,* 2008; **19**(5): 666-71.

6. Pittas Anastassios G, *et al.* Plasma 25-hydroxyvitamin D concentration and risk of incident type 2 diabetes in women. *Diabetes Care,* 2010; **33**(9): 2021-3.

7. Pittas Anastassios G, *et al.* Vitamin D and calcium intake in relation to type 2 diabetes in women. *Diabetes Care,* 2006; **29**(3): 650-6.

8. Liu Simin, *et al*. Dietary calcium, vitamin D, and the prevalence of metabolic syndrome in middle-aged and older US women. *Diabetes Care,* 2005; **28**(12): 2926-32.

9. Kirii K, *et al.* Calcium, vitamin D and dairy intake in relation to type 2 diabetes risk in a Japanese cohort. *Diabetologia,* 2009; **52**(12): 2542-50.

10. Pittas Anastassios G, *et al.* The effects of calcium and vitamin D supplementation on blood glucose and markers of inflammation in nondiabetic adults. *Diabetes Care,* 2007; **30**(4): 980-6.

11. von Hurst, Pamela R., Welma Stonehouse, Jane Coad. Vitamin D supplementation reduces insulin resistance in South Asian women living in New Zealand who are insulin resistant and vitamin D deficient - a randomised, placebo-controlled trial. *British Journal of Nutrition,* 2010; **103**(4): 549-55.

12. Nilas L, Christiansen C. Treatment with vitamin D or its analogues does not change body weight or blood glucose level in postmenopausal women. *International Journal of Obesity,* 1983; **8**(5): 407-11.

13. De Boer, Ian H, *et al.* Calcium plus vitamin D supplementation and the risk of incident diabetes in the Women's Health Initiative. *Diabetes Care,* 2008; **31**(4): 701-7.

14. Avenell Alison, *et al*. Vitamin D supplementation and type 2 diabetes: a substudy of a randomised placebo-controlled trial in older people (RECORD trial, ISRCTN 51647438). *Age and Ageing,* 2009; afp109.

15. Bin-Abbas, Bassam S, *et al.* Vitamin D levels in Saudi children with type 1 diabetes. *Saudi Medical Journal,* 2011; **32**(6): 589-92.

16. Janner Marco, *et al.* High prevalence of vitamin D deficiency in children and adolescents with type 1 diabetes. *Swiss Med Wkly,* 2010; **140**: w13091.

17. Hyppönen Elina, *et al.* Intake of vitamin D and risk of type 1 diabetes: a birth-cohort study. *The Lancet,* 2001; **358**(9292): 1500-3.

18. Levy-Marchal C, Patterson CC, Green A. Geographical variation of presentation at diagnosis of type I diabetes in children: The EURODIAB study. *Diabetologia,* 2001; **44**(3): B75-B80.

19. Stene LC, *et al.* Use of cod liver oil during pregnancy associated with lower risk of Type I diabetes in the offspring. *Diabetologia,* 2000; **43**(9): 1093-8.

20. Stene Lars C, Geir Joner. Use of cod liver oil during the first year of life is associated with lower risk of childhood-onset type 1 diabetes: a large, population-based, case-control study. *The American Journal of Clinical Nutrition,* 2003; **78**(6): 1128-34.

21. Zipitis Christos S, Anthony K Akobeng. Vitamin D supplementation in early childhood and risk of type 1 diabetes: a systematic review and meta-analysis. *Archives of Disease in Childhood,* 2008; **93**(6): 512-7.

22. Cigolini Massimo, *et al.* Serum 25-hydroxyvitamin D3 concentrations and prevalence of cardiovascular disease among type 2 diabetic patients. *Diabetes Care,* 2006; **29**(3): 722-4.

23. Giovannucci, Edward, *et al.* 25-hydroxyvitamin D and risk of myocardial infarction in men: a prospective study. *Archives of Internal Medicine,* 2008; **168**(11): 1174-80.

24. Sugden J A, *et al.* Vitamin D improves endothelial function in patients with Type 2 diabetes mellitus and low vitamin D levels. *Diabetic Medicine,* 2008; **25**(3); 320-5.

25. Witham MD, *et al.* The effect of different doses of vitamin D3 on markers of vascular health in patients with type 2 diabetes: A randomised controlled trial. *Diabetologia,* 2010; **53**(10): 2112-9.

26. Widlansky Michael E, *et al*. The clinical implications of endothelial dysfunction. *Journal of the American College of Cardiology* ,42.7 (2003): 1149-1160.

27. Witham MD, *et al*. The effect of different doses of vitamin D3 on markers of vascular health in patients with type 2 diabetes: A randomised controlled trial. *Diabetologia,* 2010; **53**(10): 2112-9.

28. Lee Paul, Roger Chen. Vitamin D as an analgesic for patients with type 2 diabetes and neuropathic pain. *Archives of Internal Medicine,* 2008; **168**(7): 771-2.

29. Soderstrom LH, *et al.* Association between vitamin D and diabetic neuropathy in a nationally representative sample: Results from 20012004 NHANES. *Diabetic Medicine,* 2012; **29**(1): 50-5.

30. Shehab D, *et al.* Does Vitamin D deficiency play a role in peripheral neuropathy in Type 2 diabetes? *Diabetic Medicine,* 2012; **29**(1): 43-9.

31. Aksoy Hülya, *et al.* Serum 1, 25 dihydroxy vitamin D (1, 25 (OH) ₂ D ₃), 25 hydroxy vitamin D (25 (OH) D) and parathormone levels in diabetic retinopathy. *Clinical Biochemistry,* 2000; **33**(1): 47-51.

32. Patrick Patricia A, *et al.* Vitamin d and retinopathy in adults with diabetes mellitus. *Archives of Ophthalmology,* 2012; **130**(6): 756-60.

33. Alam Uazman. Nine Chapter IX-Vitamin D Deficiency is not associated with Diabetic Retinopathy or Maculopathy: A Cross Sectional study. *Vitamin D and Diabetic Neuropathy,* 300.

34. Joergensen Christel, *et al.* Vitamin D levels, microvascular complications, and mortality in type 1 diabetes. *Diabetes Care,* 2011; **34**(5): 1081-5.

35. Joergensen Christel, *et al.* Vitamin D levels and mortality in type 2 diabetes. *Diabetes Care,* 2010; **33**(10): 2238-43.

Theories of Disease Causation: Social Epidemiology and Epidemiological Transition

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Abstract

Modern Western medicine is based on scientific reductionism, the key assumption of which is that complex phenomenon can be understood by reducing and dividing into smaller parts. The "biomedical model" diagnoses disease in terms of measurable biological parameters, and treats the patient as a biological organism. Although this particular approach has been responsible for tremendous successes in modern medicine, the tendency of the biomedical model to neglect social, economic and psychological factors has been criticized, and alternative explanations have been sought to complement it. This paper presents a brief analysis of these models.

Key words: *Social epidemiology, germ theory, multi-causality, general susceptibility*

Introduction

The foundation of modern Western medicine is generally described as the biomedical model. It assumes that diseases are the results of deviations in the normal functioning of biological (somatic) variables. Further, it distinguishes between the body and the mind, and asserts that disease can be treated separately from the mind. As diseases represent some form of departure from the normal order of biological variables, they can be cured by medicine, which restores the normal functioning of the body. The body is thus like a machine, and any breakdown of it a disease can be repaired. Since medicine takes the mechanical metaphor, it presumes that the doctor is a mechanic who undertakes the task of repairing the dysfunctioning body. As the whole biomedical model the body, disease, medicine, and doctor has been understood in terms of a mechanical metaphor, it is described as the "mechanistic biomedical model" (1).

This particular approach to the human body tends to overestimate the role of medicine as a technological imperative. Consequently, it leaves no room within its framework for social, environmental, behavioural, and psychological dimensions of health and illness. The biomedical model not only requires that the disease be dealt with as an entity independent of social and behavioural factors, it also advocates that behavioural disorders themselves are caused by bio-chemical or neuropsychological deficiencies. Subjective interpretations of health and illness are deemed irrelevant.

Clearly, biomedicine takes a reductionist approach to disease. The complex phenomenon of disease is reduced to a single primary principle of cause and effect. Here, the primary causal factor is physical, which can be explained in terms of the language of chemistry and physics. The philosophical foundation of the mechanistic biomedical model was reinforced by the development of the *germ theory* of disease in the nineteenth century, which postulated that every disease was caused by a specific, identifiable agent (such as bacterium or virus). Cures, which were understood to destroy the infecting agent within the biological realm, came to be sought. In a series of empirical studies between

1861 and 1880, Louis Pasteur demonstrated that the injection of *cholera vibrio* into chickens produced this (and no other) disease. In 1882, Robert Koch discovered the *tubercle bacillus*, which was pronounced as the cause of tuberculosis. These two important discoveries contributed to the doctrine of a "specific aetiology" and the concept of a "magic bullet" (chemical agents that destroy the organisms). Researchers strived to find single, specific causes of disease, and then destroy them with "magic bullets," leaving other organisms unharmed (2).

Although the movement of social medicine was active in the late nineteenth century, it was seen as too radical because it advocated social reforms for improving the living conditions of people. For example, Rudolf Virchow advocated developing both medical and economic conditions in Germany, and wanted to bring about social reforms affecting living conditions to complement the emerging bacteriological discoveries. Edwin Chadwick, Friedrich Engels, and John Snow exposed the terrible living and working conditions of the people that contributed to widespread diseases during the industrial revolution. Engels, in one of his best known essays, *The Condition of the Working Class in England* (1845), wrote: "When one individual inflicts bodily injury upon another, such injury that death results, we call the deed manslaughter; when the assailant knew in advance that the injury would be fatal, we call his deed murder. But when society places hundreds of proletarians in such a position that they inevitably meet a too early and an unnatural death, one which is quite as much a death by violence as that by the sword or bullet" (3). Such views were often censured as too radical, and were prevented from being absorbed into the mainstream academic discourse and scientific inquiries.

Although germ theory was a major breakthrough in the development of medicine, it inadvertently convinced scientists to focus exclusively on laboratory procedures devoid of social and economic contexts. Instead of making the reasonable judgment that while bacteria and viruses are the prime causative agents of disease, with their pathogenic effects being mediated by socio-environmental conditions, supporters of germ theory totally dismissed the importance of non-biological factors. Thus, the practice of medicine in the twentieth century came to rest solidly on the following premises: 1) Disease is a process accounted for by deviations from the norm of measurable biological parameters; 2) Disease is best understood by means of a science like pathophysiology, where principles are formulated in terms of molecular biology, biochemistry, and physics; 3) The human patient is a biological organism ("whole body") such that, in René Descartes' phrase, "were there no mind in it at all, it [the body] would not cease to have the same functions;" 4) Each part of the body is thus a field for specialized knowledge; 5) The cure for disease is typically achieved physically (e.g. reducing, or neutralizing the pathogenic agent); 6) Medicine is an applied science developed through laboratory research (4).

Multi-causality Approach

Although medicine and medical technology continued to be recognized as vitally important contributors to the rising life expectancy and declining mortality in the early twentieth century, the evidence in support of an equally important contribution made by the improved social and economic conditions to health began to gather momentum. Since the 1940s, an increasing number of studies by medical historians and sociologists have shown that only a small part of the decline of mortality from infectious disease in the late nineteenth century was due to bacteriological discoveries, and major diseases such as tuberculosis, dramatically declined long before the development of medicine. For example, Thomas McKeown found convincing evidence that the mortality from infectious diseases, with the exception of the mortality from smallpox, declined since the late nineteenth century with the improvement in nutrition, living conditions, and personal hygiene long before the development of effective medicine. He argued that the infant mortality declined owing to improved nutrition, better care and feeding for infants, and the adequate supply of food for mothers rather than the improved obstetric services. Likewise, the decline of mortality from typhoid and dysentery convinced McKeown that "rapid decline in mortality from diseases spread by water and food since the late nineteenth century owed little to medical intervention" (5).

Notwithstanding the fact that modern medicine and laboratory sciences made significant contribution to the decline of mortality and the increase life expectancy, the process of disease causation is much more complex than a single causal factor to be explained by the germ theory of disease. The decline of mortality with the improved living conditions and public health suggests that disease causation is a complex development, involving a disease agent, a human host and the environment (both social and physical) that need to be understood as a multi-causal process. The disease agents are biological, chemical or physical factors, the presence of which is necessary to cause a disease. The human host, whose personal behaviors, genetic predisposition, immune system, and the emotional state make the person susceptible to the effect of the disease agent. The environment, which is external to the host, contributes either to weaken or to strengthen the host by the societal activities. For example, political upheaval or natural disasters are two different external factors, which have the potential to weaken the "defenses" and to "expose" the human host to disease-causing agents. The individual's *susceptibility* is dependent upon the biological, immunological and psychological capacity to face the hostile environment, and to ward off an attack from a disease-causing agent. The decline of mortality from infectious and parasitic diseases owing to social and economic developments therefore came from at least two different fronts: First, the improvement of sanitary and living conditions, the supply of clean water and sewerage systems significantly reduced the *hostility* of the environment making it "livable" to the human host. Second, the *availability* of adequate quantities of nutritious food, and the access to education improved the knowledge on personal hygiene and feeding practices for infants that strengthened the host's *defensive* capability. Both these developments were clearly outside scientific medicine in the late nineteenth century.

General Susceptibility

The multi-causality approach to disease, like the mono-causal germ theory, highlights the connection between the disease-causing agent and the human host. However, unlike the germ theory, the multi-causality model emphasized the mediating social and physical environment, and the psychosomatic factors that make human host vulnerable to attacks by disease-causing agents. In this sense, the multi-causal approach seems a step forward in understanding disease and health in their broader socio-environmental context. Yet, the problem with both these approaches is that they could not give an explanation to the relationship between certain demographic variables and mortality patterns in the same population, exposed to the same pathological agents. For example, mortality rates were found to vary between married and unmarried people, social classes, or status groups, and the people with greater social ties or extensive social networks of relationships. As early as 1937, writing on the decline of mortality from tuberculosis in the United States, Wade Hampton Frost argued that the decline of the disease was not confined to the areas where specific measures had been adopted, but far and wide in places where no such measures were taken: "One of the most important factors in the decline of tuberculosis has been progressively increasing human resistance, due to the influence of selective mortality and to environmental improvements such as better nutrition, relief from physical stress, tending to raise what may be called nonspecific resistance" (6).

Taking the queue from this early investigation into the hypothesis of improved *nonspecific* host resistance, social epidemiologists, Lisa Berkman and Cassel Syme presented a 9-year perspective study of 6,928 adults living in Alameda County in California. The result showed that the people with fewer social ties at the time of the initial study in 1965 were more likely to die over the 9-year follow-up period. An index of social ties (that measure the degree of social integration), which included a range of social connections such as marital status, contacts with friends and relatives, organizational membership, and church membership, was correlated with mortality rates from the first study in 1965 to the 9-year follow-up period. What they found was astounding. Those who were most isolated were 2 to 3 times more likely to die from a wide range of causes, such as heart diseases, cancer, respiratory disease, gastrointestinal, and all the other causes of death during the follow-up period, compared to those who were the most socially connected. The association between social ties and mortality was found to be independent of

self-reported physical health status during the initial study in 1965, socio-economic status, and health practices, such as smoking, alcohol consumption, obesity, physical activity, and utilization of preventive health services (7).

Over the years, since the publication of this study, several others who carried out similar research concluded that people who are more socially connected: 1) live longer; 2) are more likely to survive a myocardial infarction; 3) are less likely to experience a recurrence of cancer; 4) are less likely to suffer from infectious illness, than those who are less integrated to the community (8). What these findings highlight should not be entirely new to those who are familiar with the work of the classical sociologist, Emile Durkheim, who studied suicide in Europe in the late nineteenth century. He clearly established the link between suicide rates and the level of social integration. Although suicide is clearly a *personal* act of self-destruction, it is deeply influenced by certain social conditions that the individual has come to reject. For Durkheim suicide was not merely a personal tragedy, but a condition of an entire society that has a tragic personal consequence (9).

Social epidemiologists have established that social isolation often manifests as certain behavioral modifications of the individual that leads to unhealthy lifestyle choices, such as smoking, drinking, overindulging and the lack of physical exercise. Robert Putnam who carried out several studies on social capital argues that: "As a rule of thumb, if you belong to no groups but decided to join one, you cut your risk of dying over the next year *in half*. If you smoke and belong to no groups, it's a toss-up statistically whether you should stop smoking or start joining" (10). He argued that social connectedness is the most basic, but the most powerful determinant of human wellbeing. Perhaps this is what classical political philosophers (like Marx and Hegel) meant when they wrote: "human beings are social beings." To negate this very human nature comes at a price.

In essence, the question that social epidemiologists were trying to answer was: "how do social relations get inside of our bodies." People with extensive social networks receive material and emotional support during the time of highly stressful situations in their lives. Such community supports and the sense of belongingness function as a "safety net" that prevents the individual from sinking into despair. This reduces the *general susceptibility* to disease, rather than to any specific disorder. In addition, social relations also have positive psychological impact on the individual's behavior through enhanced motivation to be more socially active. Social epidemiologists have studied the direct biological link between social support and enhanced host resistance. What they discovered was the clear connection between neuroimmunological endocrines and stress. Most everyday stressful experiences activate multiple hormones, and affect the functioning of multiple biological systems, and could cause serious end organ damage (heart, kidney, brain etc.) by the prolongation of the situation. Research has shown that protracted stress leads to rapid aging mediated by neuroimmunological endocrines. Stress affects health multiple ways mediated by both external and internal reactions: while *internal* mediation could activate neuroimmunological endocrines, *external* reactions to stress may lead to behavioral modifications, such as drinking, smoking, overeating and the lack of physical exercise. Both these processes mediate between the persistent stressful experiences and the biological manifestation of illnesses such as heart disease, cancer, stroke, peptic ulcer, and infectious diseases (11).

The general susceptibility thesis explains the level of *vulnerability* of a given population (social group) to diseases. The *Whitehall* study reinforced the general susceptibility thesis when the researchers discovered the social gradient of disease independent of the access to medical and health services (12). The study that began in 1967 found that civil servants of the lower echelons of the British Civil Service had higher rates of deaths from coronary heart diseases than their counterparts in the higher echelons. The 25-year follow-up of the first *Whitehall* study participants confirmed the original discovery of an inverse gradient between mortality and the bureaucratic rank: the higher the rank, the lower the mortality. The social gradient in mortality was observed for most of the major causes of death. The study disclosed an important connection between the *distribution* of wealth and mortality rates. It is no longer the *absolute* income that is connected to mortality in developed countries. Rather, it is the *relative* deprivation, or the unequal distribution of

wealth that is connected to mortality rates. As people go down the social ladder, their level of income declines, although the people of lower social echelons are still above the poverty line. Thus, the real effect of income hierarchy is not associated with material deprivation, but it is the decline of sense of self-worth in the social environment that affects their health.

The relative deprivation manifests as *social status*, which affects health and illness through psychological pathways. As Richard Wilkinson argued, the *absolute* income affects morbidity and mortality of a population up to a certain income threshold that is sufficient to meet a certain standard of living (according to Wilkinson, Western Europe reached this income threshold at around $5,000 GDPpc. at the 1995 price level). Once this income threshold is exceeded, it is the relative income that matters for mortality. Wilkinson concluded that psychological factors associated with social status, social relations and social interactions are critical intermediaries between socio-economic factors and disease (13). These intermediaries do not determine which specific disease will people get, or become vulnerable to. Rather they create a general susceptibility to diseases in the overall epidemiological context. If the majority of the population is impoverished, and the mean blood cholesterol level is low, no amount of stress could lead to an epidemic of heart disease. However, if the majority of the population is well nourished and the average plasma cholesterol level is high, the increase of stress could lead to heart diseases. The sense of lack of control and the feeling of alienation at the workplace and in society are related to the social gradient in cardiovascular disease. The sense of control means power and social status in social circles, and those who feel that they have no control over what is happening around them are often inclined to gain that control by turning to alcohol or violence, and are often unable to relax without a smoke. These habits, in turn, become the mediating factors between their social class status and morbidity.

Conclusion

Our understanding of what makes us sick, and what keeps us healthy inevitably contributes to what measures we take to prevent us from getting sick and promoting health. The educational system, health care system, social organization and welfare policies in general reflect what are believed to be the major determinants of health and illness. The germ theory of disease that emerged in the late nineteenth century acquired recognition as epidemiologists responded to major infectious diseases around the world by successfully diagnosing the specific causative agents and developing treatments to cure them. The processes of diagnosis and treatment were further compressed by developing a classification of infectious and parasitic diseases as air-born, water-born, food-born and vector-born, which facilitated the actions against the major diseases. Thus, it contributed to a rapid succession of major discoveries in bacteriology, immunology and cellular pathology that led to the development of the biomedical model. These discoveries in biomedicine, together with the rapidly improving social and living conditions that reduced the hostility of the environment and increased the host resistance to disease, led to the decline of parasitic and infectious diseases since the mid-nineteenth century.

The multi-causal theory of disease emerged in the second half of the twentieth century with the epidemiological transition from predominantly infectious disease to degenerative diseases as the leading causes of death. The multi-causal epidemiology involved not only a major shift in the object of study and the recognition of the role of multiple causes, but also new techniques of studies and data analysis. Many of the contemporary health problems cannot be explained in terms of the germ theory of disease, as they are not directly connected to specific disease agents. Unlike infectious diseases, the complex development process of chronic diseases, such as coronary heart disease or cancer, often take a long period for the physical manifestation of the illness as specific behavioral, social, psychological and environmental factors themselves take shape as powerful determining factors in the behaviour of the individual. These factors eventually determine the level of disease in the community as a whole. In this context, the multi-causal analysis appears to be *holistic* in that it recognizes the importance of a multidisciplinary approach, and treats the population group as the unit of analysis.

The general susceptibility approach is not simply concerned with specific causal factors, but seeks to understand why certain population groups, such as unmarried, socially isolated communities, ethnic minorities, occupational groups and marginalized people in the population, are more susceptible to diseases than others. The general susceptibility approach could therefore be complementary to both germ theory and the multi-causal model of disease causation in health promotion and disease prevention strategies at the population level given that it not only takes into account the multiple causes of disease, but also examines their distributions at sub-population levels. If the majority of people today are dying because of chronic diseases, how useful is the germ theory of disease to prevent people developing heart diseases? Moreover, if divorced and widowed people are found to be more susceptible to high mortality rates from many different diseases, than the rest of the population, then how useful is it to know all the multiple causes responsible for the disease unless the curative and preventive measures are directed at these high risk groups? The general susceptibility approach essentially completes the methodological direction that the multi-causal analysis has initiated. As Mervyn Susser suggested, epidemiology must be broadened at its base, and move beyond its focus on individual risk factors to a new multilevel eco-epidemiology (14). Health does not exist in a vacuum apart from people, and people create societies, where structure and organization influence their behaviour. It is in these social structures that major causes of disease and death reside. The social epidemiology that examines social determinants of disease and their social distribution must be multidisciplinary and be more social scientific (15). Epidemiology is just one approach by which the major determinants of health in a population can be addressed, and it should be completed by historical and sociological research, both qualitative and quantitative, on a wide range of behavioural and socio-cultural aspects that have significant implications for morbidity and mortality rates in a given population. Effective social policies, and educational programs can modify these socio-cultural factors.

References

1. Soma Hewa, 2002 "Physicians, the Medical Profession, and Medical Practice," In B. Singh, Bolaria and Harley D. Dickinson (Eds.) *Health, Illness and Health Care in Canada*, Toronto: Nelson, Thomson Learning; Soma Hewa and Robert W. Hetherington, "Specialists without spirit: Limitations of the mechanistic biomedical model" *Theoretical Medicine,* 1995, 16: 129-139; Sara Nettleton, 1995 *The Sociology of Health and Illness*, Cambridge: Polity Press.
2. Kelvyn Jones and Graham Moon, 1987 *Health, Disease and Society*, London: Routledge and Kegan Paul.
3. Friedrich Engels, [1845] 1987 *The Condition of the Working Class in England*, p. 127. Middlesex: Penguin Books.
4. Laurence Foss and Kenneth Rothenberg, 1987 *The Second Medical Revolution, from Biomedicine to Infomedicine*, Boston: New Science.
5. Thomas McKeown, 1976 *The Role of Medicine: Dream, Mirage or nemesis?* London: Nuffield Hospital Trust.
6. Wade H Frost, "How Much Control of Tuberculosis?," *American Journal Public Health and The Nation's Health*, 1937: 759-766; Joseph Berkson, "Mortality and Marital Status: Reflections on the derivation of etiology from statistics," *American Journal of Public Health*, 1962, **52**: 1318-1329.
7. Lisa F Berkman and Cassel Syme, "Social Networks, Host Resistance and Mortality: a nine-year follow-up study of Alameda County residents, *American Journal of Epidemiology,* 1979: **109**: 186-204.
8. Ichiro Kawachi and Bruce P. Kennedy, "Health and Social Cohesion: why care about income inequality?" *British Medical Journal*, 1997; **314**: 1037-40; Ichiro Kawachi, Bruce P. Kennedy, Kimberly Lochner and Deborah Prothrow-Stith, "Social Capital, Income Inequality and Mortality," *American Journal of Public Health*, 1997; **87**:1491-98.
9. Emile Durkheim, [1897] 1951 *Suicide*, New York: Free Press.
10. Robert D Putnam, 2000 *Bowling Alone: The Collapse and Revival of American Community*, New York: Simon & Schuster, p.331.
11. Jacob M Najman, "Theories of Disease Causation and the Concept of a General Susceptibility: A Review," *Social Science and Medicine*, 1980, **14A**: 231-7; Lisa F. Berkman

and Ichiro Kawachi, 2000 "A Historical Framework for Social Epidemiology," In Lisa Berkman and Ichiro Kawachi (Eds.) *Social Epidemiology*, New York: Oxford University Press.

12. Michael G Marmot and Shipley M J, "Do Socio-economic Differences in Mortality Persist After Retirement? 25 year follow up of civil servants from the first Whitehall study," *British Medical Journal*, 1996; **313**: 1177-80.

13. Richard G Wilkinson, 1996 *Unhealthy Societies: The Affliction of Inequality*, London: Routledge.

14. Mervyn Susser, "The Logic in Ecological: I. The Logic of Analysis," *American Journal of Public Health*, 1994, **84**: 825-9.

15. Neil Pearce, "Traditional Epidemiology, Modern Epidemiology, and Public Health," *American Journal of Public Health,* 1996, **86**: 678-83.

Management of lower limb open fractures: An unresolved challenge

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Introduction

Management of lower limb open fractures is one of the major orthopaedic challenges still subjected to many arguments. Infection is the most devastating complication of all open fractures, which needs special attention. Failure of such attention may lead to a significant morbidity causing delayed union, non-union, multiple additional surgeries or even amputation (1).

Many decades back Gustilo and Anderson in their landmark study expressed clearly the increased risk of infection with the increase in severity of the fracture. It was 2% in type I fractures, 2% to 15% in type II fractures, and 5% to 50% in type III fractures (2). In a recent study similar results emerged as risk of infection 1.4%, 3.6% and 22.7% for type I, II and III fractures, respectively (3).

Factors leading to infections include incomplete excision of poorly vascularised tissue, inadequate haemostasis and haematoma evacuation, insufficient drainage of wound discharges, devascularization of primarily viable tissue, large metallic fixation devices implanted under poorly vascularised tissue, wound closure under tension and failure to recognize compartment syndrome (4). Many of these factors can be avoided by following a standard management procedure in handling open fractures.

In the standards set by BPRAS/BOA (The British Association of Plastic Reconstructive and Aesthetic surgeons and The British Orthopedic Association) in the management of lower limb open fractures early administration of appropriate antibiotics, thorough surgical debridement, proper skeletal stabilization and early soft tissue cover have been considered as the main steps (5).

Except in a tertiary care setup with adequate orthopedic staff and facilities the initial wound handling of an open fracture is done by General surgical teams. As the first debridement is the most important prognostic factor of open fractures the knowledge on proper handling of lower limb open fracture is an equally important topic for General surgery as well.

Emergency Management

Advanced Trauma Life Support Protocol would be the guide for initial management of lower limb open fractures. Resuscitation and stabilization of the patient should be done following a rapid accurate assessment of the condition of the patient. If there is evolving or already established limb threatening condition (e.g. vascular injury) immediate steps should be taken to correct it or transfer the patient to a better facility. It is appropriate inform the receiving hospital beforehand.

In the emergency department the open fracture should be handled only for the removal of gross contaminants, photography and radiography related to injury. Except for saline soaked dressing nothing should be used to cover the wound (5). Limb splintage is the ideal method for immobilization of the limb. Antibiotic and anti-tetanus prophylaxis can be started at the same time.

Antibiotic prophylaxis

In the absence of prophylactic antibiotics the risk of infection would be nearly 20% in open fractures (6). Thus many studies have recognized the value of early prophylactic antibiotics including a recent

Cochrane group study which declared a reduction of infection rate from 13% to 5% in a comparison of prophylactic antibiotics vs placebos in the management of open fractures (7).

The BAPRAS/BOA recommendations have stressed the value of early administration of antibiotics and the importance of administration them within the first 3 hours (5). This 3 hour rule emerged as a result of a study which recognized the 3% increase in the risk of infection when the administration of prophylactic antibiotics delayed beyond 3 hours (8).

Many authors have reported a higher prevalence of *Staphylococcus aureus* in surgical site infections in open fractures (9,10,11), and some of them detected a significantly high rate of MRSA (11). In order to cover Gram positive infections, the most widely used drug of choice is the first generation cephalosporin. Some authors including recently published East guidelines (12) have suggested an additional Gram negative cover for severe open fractures (4,6,13,14).

Based on evidence, British recommend Intravenous first generation cephalosporin or Co-Amoxiclav as the first line antibiotic for lower limb open fracture management. Further they suggest gentamicin single dose prior to wound debridement to cover the Gram negative organisms, combined with a single dose of vancomycin or teicoplanin at the time of skeletal stabilization or definitive soft tissue cover. In an allergy to penicillin is reported, clindamycin would be the drug of choice (5).

In another evidence-based protocol clindamycin was used as the drug of choice in cases with grossly contaminated wounds eg: farmyard/sewage, (1) but some have considered metranidazole in agricultural infections (4). Due to inadequate evidence, none of the studies have recommended fluroquinolones (e.g. ciprofloxacin) for the management of open fractures (3).

Some authors feel that antibiotic cover needs to be altered based on the type of contamination e.g. additional anaerobic cover in a strong soil contamination or a cover for the possible nosocomial infections during treatment in a hospital setup especially Gustillo type III open fractures (14).

Mauffrey *et al*. suggested that even though prophylactic antibiotics are commenced in the emergency room based on the external appearance and radiological findings, the real assessment of the injury would be possible only during the first debridement, therefore the final antibiotic prophylaxis protocol should not be based on the initial open wound size but rather should be chronologically based, following an algorithm with a prophylaxis tailored to the surgical management of the open wound, the fracture, the associated bone, and vascular and muscle injury (1).

Controversy still remains about the duration of antibiotics. In a recent RCT comparing prophylaxis with IV cephalosporin for 24 hours vs. 5 days showed that there is no added benefit of prolonged prophylaxis for more than 24 hours, (15) but many authors suggest antibiotics for 3-5 days. (4,5,6,14,16) Based on the current evidence British recommendations describe the continuation of antibiotic prophylaxis for 24 - 48 hours for type I fractures and 72 hours or until the definitive soft tissue closure or whichever is shorter for type II and III fractures (5).

Surgical debridement

The rule of mandatory wound debridement within six hours derived as a result of studies in pre-antibiotic era which showed infection threshold of 10^5 organisms per gram of tissue reached in at an average of 5.17h (17). Subsequent clinical studies also have supported the importance of early debridement including Gustillo and Anderson (2,17,18). Some studies, however, have shown poor outcome resulted due to the initial surgical debridement performed in an unnecessary urgency by inexperienced non-orthopedic surgical teams under sub-optimal surgical environments (1,3). Thorough debridement by an experienced surgeon appears to be better than an inadequate performance in suboptimal conditions within 6 hours (19). Thus the initial debridement should be performed by senior plastic and orthopedic surgeons working together on scheduled trauma operating lists within normal working hours and within 24hours of the injury unless there is gross contamination eg: marine, agricultural or sewage contamination, compartment syndrome, vascular injury and multiple injuries (5).

Technique of Debridement and Irrigation

Careful Surgical debridement and thorough irrigation are the main pillars of a successful management of an open fracture. These steps would make the management of open fractures different from just another wound debridement (Table). Removal of contaminating debri would reduce the risk acute and chronic infection of the wound. Irrigation will reduce the risk by diluting the content of organisms in the lesion based on the concept of "Dilution is the solution to pollution".

For the irrigation, high pressure pulse lavage is discouraged due to the evidence which suggests possibility of inoculation of dirt and bacteria to the soft tissues and bone, with micro architecture damage to the tissues. Thus low or medium pressure lavage would be the ideal (4,5,20).

Ideal solution to be used in irrigation is still unclear and in many instances 0.9% saline solution is used. AO suggests it is better to use optimally balanced salt solution, such as Ringer-lactate (4). Addition of antiseptics or antibiotics to the lavage fluid has not been effective (5). The volume of lavage solution has not been addressed in BAPRAS/BOA guidelines. But some institutions still use the popular protocol of 3, 6, 9 Liters of normal saline for type I to III fractures, respectively (21).

Table: Technique of wound proper debridement in The Standards for the Management of Open. Fractures of the Lower Limb 2009 by The British Association of Plastic Reconstructive and Aesthetic surgeons and The British Orthopedic Association

- Limb washed with a soapy solution and a tourniquet is applied.
- Limb 'prepped' with an alcoholic chlorhexidine solution, avoiding contact of the antiseptic with the open wound and pooling under the tourniquet.
- Soft tissue debridement/excision (excision of all devitalized tissue - except neurovascular bundles)
- Visualization of the deeper structures , by wound extensions along the fasciotomy lines
- Systematic assessment of tissues from superficial to deep and periphery to the centre
- Classify the injury
- Remove non-viable skin, fat, muscle and bone
- Careful surgical delivery of bone ends through the wound extension for circumferential assessment.
- Fracture ends and larger fragments which fail to demonstrate signs of viability are removed.
- Major articular fragments are preserved as long as they can be reduced and fixed with absolute stability.
- Definitive reconstruction planned jointly by the senior members of the orthopaedic and plastic surgical teams
- If definitive skeletal and soft tissue reconstruction is not to be undertaken in a single stage, then a vacuum foam dressing (or antibiotic bead pouch if significant segmental bone has been lost) is applied until definitive surgery is performed.

Skeletal stabilization

In open fractures it is important to achieve provisional or definitive stability of the fractured bones as early as possible. This may protect the soft tissues around the zone of injury from further damage from fractured ends of bone, while restoring the length, alignment, rotation of the limb.

Limb length restoration may indirectly reduce the risk of infection by reducing the soft tissue dead space of the limb. Early skeletal stabilization may also facilitate the access to the surrounding soft tissues, thus facilitating their early recovery with an additional support for the relief of pain (22,23).

Based on the evidence on the management of lower limb open fractures, it was clear that when the fracture is minimally contaminated or the fracture is uncomplicated eg: without a bone loss/multilevel fractures, if primary soft tissue cover can be achieved, definitive skeletal stability with internal fixation at the same time of initial wound debridement would be the better option. Otherwise an external fixation (eg: multiplanar/circular fixators) need to be carried out. Whenever the primary soft tissue cover is impossible the provisional stabilization with a spanning fixator can be achieved with the plan for early conversion to definitive stabilization with wound closure. Recommended time period for conversion would be 72 hours. Long leg plaster slabs or traction has been discouraged as modes of provisional stabilization (5).

Wound closure

In spite of inadequate RCT to decide on primary vs delayed secondary wound closure (24) many authors have emphasized the value of early closure unless there is heavy contamination as it may decrease infection rates, risk of re-operations, and the time for bony union of open tibial fractures (5,25,26) but the exact time limit for soft tissue closure is yet to be determined.

Some authors have suggested immediate soft tissue cover at the time of definitive fixation of the bone e.g. Fix & Flap concept (32) Gustillo type I, II and some of the IIIA cases would be suitable for primary closure (3) but this may not be practical unless there is a dedicated well experienced microsurgical team available throughout the day.

If wound is left opened in cases of heavy contamination so-called "second look" on the Zone of injury in 48 hours time after the initial debridement has been suggested by some authorities in order to assess the viability or further excision of soft tissues and to wash out any accumulated blood clots, tissue fluid coagulum or remaining foreign material (4).

Since Microsurgery is best performed before the vessels become friable and fibrosed which usually happen after 1 week, soft tissue reconstruction should be undertaken within 7 days from the injury (5). Bhattacharyya *et al*, agreed with this similar time limit as he observed the increased deep infection rate of open fractures when there was a delay more than 7 days for the soft tissue reconstruction even though the wounds were managed with negative pressure foam dressings (27).

Negative pressure dressings

Negative pressure dressings may reduce the rate of infection by reducing tissue desiccation as well as avoiding the pooling of serous fluid. It will also increase the local blood flow thus the speed of healing (4,5,28) But the literature recommends that they should never be used as a substitute for meticulous surgical wound excision for coverage of exposed fractures with vascularised flaps (5).

Local antibiotic therapy

Local antibiotic delivery is commonly done for extensively contaminated wounds with an "antibiotic bead-pouch" construct formed with antibiotic powder and polymethyl methacrylate (PMMA) cement. These can be easily made in the operating room via recommended technique using form beads over 24-gauge wire with 3.6g of tobramycin mixed with 40g of PMMA cement (5,29). The beads are counted and then placed into the wound and covered with an impermeable dressing. In use with systemic antibiotics this technique have shown 9% drop in infection rate of sever open fractures (30).

Conclusions

In spite of many arguments regarding the precise management of lower limb open fractures, it is well

clear that early administration of appropriate antibiotics, planned surgical debridement, proper skeletal stabilization and early soft tissue cover will determine the outcome in any set up. It is mandatory to develop one's own multidisciplinary management protocol for the institution, based on current evidence, in order to achieve a favorable outcome in the management of lower limb open fractures. Such protocol and the knowledge on proper initial handling of an open fracture will be equally important for General surgeons as well as for Orthopedic surgeons since initial management of open fractures are left in the hands of both these groups.

References

1. Mauffrey C, Bailey JR, Bowles RJ, Price C, Hasson D, Hak DJ, Stahel PF. Acute management of open fractures: proposal of a new multidisciplinary algorithm. *Orthopedics*, 2012; **35**(10): 877-81.
2. Gustilo RB, Anderson JT. Prevention of infection in the treatment of one thousand and twenty five open fractures of long bones: retrospective and prospective analysis. *J Bone Joint Surg Am,* 1976; **58**(4):453-458.
3. Cross WW 3rd, Swiontkowski MF. Treatment principles in the management of open fractures. *Indian J Orthop*, 2008; **42**(4): 377-86.
4. Hessmann M, Nork S, Sommer C, Twaddle B. Principles of management of open fractures. [Internet]. 2008 [cited 15 January 2015]. Available from: https://www2.aofoundation.org/wps/portal/surgery?showPage=diagnosis&bone=Tibia&segment=Distal.
5. Nanchahal J, Nayagam S, Khan U, Moran C, Barrett S, Sanderson F, Pallister I. (2009) Standards for the management of open fractures of the lower limb. A Short Guide. BOA/BAPRAS. ISBN: 978-1-85315-911-4.
6. Patzakis MJ, Wilkins J, Moore TM. Considerations in reducing the infection rate in open tibial fractures. *Clin Orthop Relat Res,* 1983; **178**: 36-41.
7. Gosselin RA, Roberts I, Gillespie WJ. Antibiotics for preventing infection in open limb fractures. *Cochrane Database Syst Rev,* 2004; **1**: CD003764.
8. Patzakis MJ, Bains RS, Lee J. Prospective, randomized, double blind study comparing single agent antibiotic therapy, ciprofloxacin, to combination antibiotic therapy in open fracture wounds. *J Orthop Trauma,* 2000; **14**: 529-33.
9. Bergman BR. Antibiotic prophylaxis in open and closed fractures: a controlled clinical trial. *Acta Orthop Scand,* 1982; **53**(1): 57-62.
10. Braun R, Enzler MA, Rittmann WW. A double blind clinical trial of prophylactic cloxacillin in open fractures. *J Orthop Trauma,* 1987; **1**(1): 12-7.
11. Carsenti-Etesse H, Doyon F, Desplaces N, *et al.* Epidemiology of bacterial infection during management of open leg fractures. *Eur J Clin Microbiol Infect Dis,* 1999; **18**(5): 315-23.
12. Hoff W, Bonadies J, Cachecho R, *et al.* East practice management guidelines work group: update to practice management guidelines for prophylactic antibiotic use in open fractures. *J Trauma*. 2011; **70**(3):751-4.
13. Patzakis MJ, Wilkins J. Factors influencing infection rate in open fracture wounds. *Clin Orth Rela Res,* 1989; **243**: 36-40.
14. Templeman DC, Gulli B, Tsukayama DT, Gustilo RB. Update on the management of open fractures of the tibial shaft. *Clin Orthop Relat Res,* 1998; **350**: 18-25.
15. Dellinger EP, Caplan ES, Weaver LD. Duration of preventive antibiotics administration for open extremity fractures. *Arch Surg,* 1988; **123**(3): 333-9.
16. Zalavras CG, Patzakis MJ. Open fractures: Evaluation and management. *J Am Acad Orthop Surg,* 2003; **11**: 212-9.
17. Robson MC, Duke WF, Krizek TJ. Rapid bacterial screening in the treatment of civilian wounds. *J Surg Res,* 1973; **14**(5): 426-30.
18. Kindsfater K, Jonassen EA. Osteomyelitis in grade II and III open tibia fractures with late debridement. *J Orthop Trauma,*1995; **9**(2): 121-7.
19. Penn-Barwell JG, Murray CK, Wenke JC. Early antibiotics and debridement independently reduce infection in an open fracture model. *J Bone Joint Surg Br,* 2012; **94**(1): 107-12.
20. Bhandari M, Thompson K, Adili A, Shaughnessy SG. High and low pressure irrigation in contaminated wounds with exposed bone. *Int J Surg Investig,* 2000; **2**: 179-82.
21. Anglen JO. Wound irrigation in musculoskeletal injury. *J Am Acad Orthop Surg,* 2001; **9**: 219-26.
22. Merritt K. Factors increasing the risk of infection in patients with open fractures. *J Trauma,* 1988; **28**: 823-7.
23. Worlock P, Slack R, Harvey L, Mawhinney R. The prevention of infection in open fractures: An experimental study of the effect of fracture stability. *Injury,* 1994; **25**: 31-8.

24. Eliya MC, Banda GW. Primary closure versus delayed closure for non bite traumatic wounds within 24 hours post injury. *Cochrane Database Syst Rev,* 2011; **9**: CD00857

25. Gopal S, Majumder S, Batchelor AG, Knight SL, De Boer P, Smith RM. Fix and flap: The radical orthopaedic and plastic treatment of severe open fractures of the tibia. *J Bone Joint Surg Br,* 2000; **82**: 959-66.

26. Hertel R, Lambert SM, Muller S, Ballmer FT, Ganz R. On the timing of soft-tissue reconstruction for open fractures of the lower leg. *Arch Orthop Trauma Surg,* 1999; **119**: 7-12.

27. Bhattacharyya T, Mehta P, Smith M, Pomahac B. Routine use of wound vacuum-assisted closure does not allow coverage delay for open tibia fractures. *Plast Reconstr Surg,* 2008; **121**(4): 1263-6.

28. Ubbink DT, Westerbos SJ, Nelson EA, Vermeulen H. A systematic review of topical negative pressure therapy for acute and chronic wounds. *Br J Surg,* 2008; **95**(6): 685-92.

29. Zalavras CG, Patzakis MJ, Holtom P. Local antibiotic therapy in the treatment of open fractures and osteomyelitis. *Clin Orthop Relat Res,* 2004; **427**: 86-93.

30. Ostermann PA, Seligson D, Henry SL. Local antibiotic therapy for severe open fractures. A review of 1085 consecutive cases. *J Bone Joint Surg Br,* 1995; **77**: 93-7.