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CONTENTS

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Editorial

Publishing your work

In the recent years, we have observed a keen interest among junior medical officers to engage in research and this certainly a healthy development in the country. Although the renewed interest in research could partly be due to the remuneration it brings, a genuine interest among these doctors to search for new information cannot, entirely, be ruled out.

It is, however, somewhat disheartening to note that many of these research projects do not progress to publications and mostly end up with meeting abstracts. This limits the dissemination of the knowledge and more importantly their applications.

The lack of knowledge on scientific writing appears to be the most plausible explanation for this failure. It is important to introduce the basic principles of scientific writing and improve the writing skills of junior medical officers.

Flaws in research methodology are another limiting factor seen in these studies. Insufficient samples to make firm conclusions, errors in measurements and not controlling confounders are the common mistakes committed. Periodic training sessions in research methodology will help to overcome this situation.

It is encouraging to note that research projects conducted by medical offices mostly are clinical research and address practical issues we come across in day to day work. They can potentially make an immediate impact on current services and patient care practices. Hence, it is a duty of the professional organisations to conduct periodic training sessions on medical research and scientific writing targeting junior medical officers in this country to overcome this situation.

Sarath Lekamwasam
Eisha Waidyarathne
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 submitted 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. Case report should have a clear message or learning point and this should be highlighted adequately. Rarity of the case does not mean it is suitable for publication. Written consent of the patient should be submitted together with the case report, especially when photographs are used.

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.

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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 and all soft copies should be sent to *gmathk@gmail.com*

Nutritional status of elders in Galle district, Sri Lanka

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ABSTRACT

Introduction: Geriatric population in Sri Lanka is a potentially vulnerable group for malnutrition. The present study was carried out to assess the nutritional status of elderly in Galle and to identify the relationships of their nutritional status with gender, age, area of residence, level of education and income.

***Methods*:** A cross sectional study was done using a sample of elders aged 60 years and above living in Galle district. An interviewer administered questionnaire was used to collect data. Mini Nutritional Assessment (MNA) tool was used to assess nutritional status.

***Results*:** A total of 396 elders participated in the study. Mean age of the participants was 69 years ($SD = 7.2$) and the majority were females (n = 268, 67.7%). MNA showed that 0.5% elderly were malnourished and 30.8% were at risk of malnutrition. Older age ($p < 0.05$), lower monthly family income ($p < 0.01$), low level of education ($p < 0.01$), and living in rural areas ($p < 0.05$) were found to be possible risk factors of malnutrition.

***Conclusions*:** Nutritional status is considerably poor in the elderly in Galle district. Therefore, geriatric nutritional interventions in low income older age elders in rural population segments in the area are needed.

***Keywords*:** Elders, nutritional status, Sri Lanka

Introduction

Ageing is a universal phenomenon. The number of elders (aged 60 years or over) is increasing rapidly worldwide (1). Globally, the number of elders is expected to be more than doubled, from 841 million people in 2013 to about 2 billion in 2050, and about two thirds of the world's elders live in developing countries (1, 2). Sri Lanka, a country which has shown an increasing life expectancy at birth and declining mortality rates in the past few decades, is likely to experience a significant increase in its elderly population in the near future (3). In 2012, the proportion of the population aged 60 years and older in Sri Lanka was approximately 12.2% (4). It is estimated that this proportion would increase up to 16.7% by the year 2021 and by 2041, 1 out of every 4 individuals in the country will be an elderly person, making Sri Lanka's population the oldest in the South Asia region.

The World Health Organization (WHO) states that nutrition has a profound influence on morbidity and mortality in the elderly across the world. About two third of the elderly population globally is at risk of nutritional deficiencies (5). In many developing countries, there is a double burden of malnutrition that includes a high prevalence of both underweight and overweight or obesity (6). In Sri Lanka, a study on prevalence of under-nutrition and low dietary diversity revealed that about 30% of institutionalized elders were undernourished (7). Another study on the prevalence of adult obesity in Sri Lanka has shown that a considerably high proportion of elders were

overweight or obese and that the overweight or obesity in elderly women (60.0%) was higher than that of elderly men (43.8%) making elderly women a highly vulnerable group to experience poor health status (8). Thus, nutrition is an important element of health which affects the aging process in elders. Hence, the aim of the study was to describe nutritional status and associated factors in the elderly population in Galle district, Sri Lanka. Such data are imperative to design cost effective nutritional strategies to improve the overall health and well-being of elders in the country.

Methods

Community-based descriptive, cross sectional study design was used in this study. Throughout the study an older person was defined as those *who are 60 years or more*. In the government as well as most of the private institutions in Sri Lanka the retirement age is between 55 and 60 years and this is the reason for taking 60 as the cut-off age in this study. An interviewer administered questionnaire was used to collect data. A previous study conducted in Kandy had indicated that 37% of elders have good nutritional status (9). Based on that, the sample size required for the study was 350 (10). A multistage, stratified random sampling method was used to recruit the subjects. Out of the total of 19 Assistant Government Agent (AGA) divisions in the district of Galle, one urban and two rural AGA divisions were selected randomly for the survey considering the socio-cultural differences between urban and rural elders. Only 3 AGA divisions in the district were run by town councils and those AGA divisions were generally considered as urban AGA divisions. Two Grama Niladhari Divisions (GND) were selected randomly from each AGA divisions selected, and from the lists of the households at each selected GND, approximately 66 elders were randomly selected for the survey.

The questionnaire consisted of basic socio-demographic variables and Mini Nutritional Assessment (MNA) scale (11). MNA is an effective, easily administered, validated and widespread tool designed to identify elders who are malnourished or at risk of developing malnutrition. It has 18 questions in four dimensions; anthropometric assessment, general assessment**,** dietary assessment and self assessment. The total score of MNA is 30; scores above 23.5 are considered as well-nourished, 17 to 23.5 as risk of malnutrition and <17 as malnourished (11). The MNA has been translated into Sinhala, and validated and used in Sri Lanka (9). Ethical clearance for the research was obtained from the Ethics Review Committee, Faculty of Medicine, University of Ruhuna, Galle.

Results

A total of 396 elders participated in the study. The minimum age of the participants was 60 years and maximum age was 93 years. The mean age of the participants was 69 years (*SD* = 7.2). It was observed that the majority of the study subjects were in the age group of 60-69 years (n = 224, 56.6%) while 43.4% (n = 172) were in the age group 70-100 years. Majority of the subjects were females (n = 268, 67.7%) and Sinhalese (n = 393, 99.2%). About 66% (n = 262) were from rural areas.

The mean score of the nutritional status as measured by the MNA was 24.7 (*SD* = 2.6) with a range of 16 to 29. Based on this assessment two subjects (0.5%) fell into mal-nourished category and another 122 (30.8%) subjects into "at risk of being malnourished" category.

The results presented in the table 1 show that a slightly higher percentage of elderly men were at higher risk of being malnourished compared to elderly women. However, there was no significant difference between the groups. Senior elders (those aged 70 years and above) were at higher risk of being malnourished compared to the elders aged between 60-69 years ($\chi^2 = 5.70, p < .01$). Also, the elders who were residing in rural areas were at higher risk of being malnourished compared to the elders who were residing in urban areas ($\chi^2 = 3.73, p < .05$).

Analysis of Variance (ANOVA) was used to investigate whether nutritional status was associated with level of education, monthly income and dependency status (Table 2). Elders who had good income and higher educational qualifications were less likely to have poor scores of nutritional status. Those elders who were not economically dependent on others had a good nutritional status compared to the elders who were economically dependent on others.

Table 1: Nutritional status of the subjects by gender, age and residential area

Character	Malnourished	Risk of being malnourished	Normal
Gender			
Male (n = 128)	1 (0.8%)	43 (33.6%)	84 (65.6%)
Female (n = 268)	1 (0.4%)	79 (29.5%)	188 (70.1%)
Age			
60-69 yrs (n = 224)	0 (0.0%)	58 (25.9%)	166 (74.1%)
70-100 yrs (n = 172)	2 (1.2%)	64 (37.2%)	106 (61.6%)
Area of residence			
Urban (n = 132)	0 (0.0%)	32(24.2%)	100 (75.8%)
Rural (n = 264)	2 (0.8%)	90(34.1%)	172 (65.2%)

Table 2: Mean scores of nutritional status by levels of education, income and dependency status

Variables	Categories	N	Mean	SD	p value*
Educational level	No education	26	23.98	2.12	0.001
	Up to grade 1 - 5	114	24.00	2.53	
	Up to grade 6 - 10	135	24.80	2.77	
	Passed O/L	80	25.50	2.57	
	Passed A/L	36	25.18	2.18	
	Degree Level	05	26.60	0.96	
Monthly income	No income	46	24.07	3.18	0.001
	Less than 5000	184	24.37	2.52	
	5000 - 10000	74	24.95	2.69	
	10001 - 20000	44	25.14	2.46	
	More than 20,000	48	25.89	1.95	
Dependency	Not a dependent	136	25.19	2.33	0.001
	On children	215	24.54	2.59	
	On husband	27	25.07	2.49	
	On wife	05	22.60	4.61	
	On relations	10	23.40	3.76	
	On others	03	20.50	3.46	

* One way ANOVA

Discussion

Adequate and balanced diet is vital for maintaining good nutritional health in the elderly, because the physiological changes that occur in the body as people get older may pose a threat to their health if their nutritional status is poor. Results of this research indicate that about 31% of elders in the sample were at risk of malnutrition. This finding is somewhat low compared to the observed findings in the region; in an Indian study the rate was 60.4% and in an Iranian study conducted on the elderly living in nursing homes the rate was 38.7% (12, 13). Further, no gender difference in the rate of malnutrition was observed in our study although many studies conducted on nutritional status of elders in South Asia had shown gender differences of nutritional status in the elderly (12-14). For example, a study conducted in Assam, India (14) found that the elderly women were at higher risk of being malnourished compared to the elderly men (45.6% vs 21.7%). Non-discriminatory attitudes of Sri Lankan towards women, financial independence experienced by a significant proportion of elderly women who had been engaged in paid jobs before retirement and gender equality in the participation in the formal educational system in the country may have been the reasons for this observation (15), but further research is needed to confirm our assertions.

As seen in studies conducted in other countries in the region (14, 16, 17) an increasing age is found to be independently associated with poor nutritional status in our study too. Aging is associated with the decline in a number of physiological functions that can impact nutritional status, including impaired digestion, difficulties in chewing and swallowing, loss of sensory perception, and impaired metabolism (1, 5, 6). These physiological changes together with psychological health issues such as depression, dementia and anxiety and social issues such as social isolation and bereavement can diminish the nutritional status of senior elders (1, 5-7). It appeared that the elders who were not economically dependents were less vulnerable to poor nutritional status probably because those elders may have decision making powers in food intake (14). Elders living in rural areas seem to be a disadvantaged group. It has been reported that poverty is one of the root causes of malnourishment found among the elderly in many of the developing countries (14, 18) and Sri Lanka is no exception (19, 20).

The Sri Lankan Government provides many services and facilities to improve the health of the elderly through government institutions, Provincial Councils, Local Government Institutions and Non Government Organizations (NGO) despite severe resource constraints which is common to many developing countries. In this study, rural senior elders were found to be at higher risk of being malnourished. Our observations support one of the policy decisions taken by the national nutrition policy in Sri Lanka. This policy has emphasized the need of nutritional interventions for underserved rural and plantation communities in the country (3, 7).

Conclusions

The MNA among elderly in the present study revealed that, nearly one third of the sample was at risk of malnutrition. Findings indicate that poverty, age and living area are among the vital issues that would need consideration in the development of evidence base strategies and policies for improving the nutritional status of elders in Sri Lanka.

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References

1. World Health Organization. A global movement for the right of the older people: Global aging statistics. Geneva: 2012.
2. Arai H, Ouchi Y, Yokode M, Ito H, Uematsu H, Eto F. Toward the realization of a better aged society: messages from gerontology and geriatrics. *Geriatrics and Gerontology International* 2012; **12**: 16-22.
3. Ministry of Health. Annual Health Bulletin in Sri Lanka 2012. Medical Statistics Unit. Ministry of Health, Colombo: 2012.
4. De Silva WI. Population Projections for Sri Lanka: 1991 - 2041, Institute of Policy Studies, Human Resource Development Series. Institute of Policy Studies, Colombo: 1997.

5. World Health Organization. Aging across the World. Global Aging Statistics. Geneva: 2009.

6. Shukla HC, Guptha PC, Mehta HC, Hebert JR. Descriptive Epidemiology of body mass index of an urban adult population. *Journal of Epidemiology and Community Health* 2002; **56**: 876-80.

7. Ratnayake KM, Wimalathunga MPMM, Weech M, Jackson KIMG, Lovegrove JA. High prevalence of under nutrition and low dietary diversity in institutionalized elderly living in Sri Lanka. *Journal of Public Health Nutrition* 2015; **18**(15): 2874-80.

8. Katulanda P, Jayawardana MA, Sheriff MH, Constantine GR, Mattews DR. Prevalence of overweight and obesity in Sri Lankan adults. *Obesity Reviews* 2010; **11**: 751-6.

9. Wijesinghe DGNG, Fernando WHKN. Assessment of Nutritional Status and Disease Prevalence among Elderly Population in Elderly Homes in Kandy. *Journal of Tropical Agricultural Research* 2010; **21**(3): 229-37.

10. Lwanga SK, Lemeshow S. Sample size determination in Health studies. A practical manual. World Health Organization, Geneva: 1991.

11. Secher M, Soto ME, Villars H, Abellan G. The Mini Nutritional Assessment after 20 years of research and clinical practice. *Reviews of Clinical Gerontology* 2007; **17**: 293-310.

12. Lahiri S, Biswas A, Santra S, Lahiri SK. Assessment of nutritional status among elderly population in a rural area of West Bengal, India. *International Journal of Medical Science and Public Health* 2015; **4**(4): 569-72.

13. Saeidlou S, Merdol TK, Mikaili P, Bekta Y. Assessment of the nutritional status of elderly people living at nursing homes in northwest Iran. *International Journal of Academic Research* 2011; **3** (1): 463-72.

14. Agarwalla R, Saikia AM, Baruah R. 2015. Assessment of the nutritional status of the elderly and its correlates. *Journal of Family and Community Medicine* 2015; **22**(1): 39-43.

15. Herath HMA. Place of women in Sri Lankan society: Measures for their empowerment for development and good governance. *Vidyodaya Journal of Management* 2015; **1**(1): 1-14.

16. Forster S, Gariballa S. Age as a determinant of nutritional status: A cross sectional study. *Nutrition Journal* 2005; **4**(28). [doi:10.1186/1475-2891-4-28.]

17. Wadhwa A, Sabharwal M, Sharma S. Nutritional status of the elderly. *Indian Journal of Medical Research* 1997; **106**: 340-8.

18. Hun Y, Li S, Zheng Y. Predictors of nutritional status among community - dwelling older adults in Wuhan, China. *Public Health Nutrition* 2009; **12**: 189-96.

19. Rathnayake S, Siop S. Quality of life and its determinants among older people living in the rural community in Sri Lanka. *International Journal of Gerontology* 2015; **29**(2): 131-53.

20. Perera B. Health of Our Elders, *Ceylon Medical Journal* 1997; **42(2)**: 91-3.

Acute confusional state in hospitalised older adults; a preliminary study of the causes and associated factors

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ABSTRACT

Introduction: Acute confusional state is common among hospitalized elderly. It causes considerable expenses to the healthcare system and distress to the patients and caregivers. Identification of causes of acute confusional state can facilitate its timely and optimal management, thereby reducing its adverse consequences. The objectives of this study were to determine the causes and associations of acute confusional state among hospitalised older adults in Teaching Hospital, Karapitiya.

Methods: A cross-sectional study was conducted among 105 patients, aged 50 years or more, with acute confusional state admitted to Teaching Hospital, Karapitiya. An interviewer-administered questionnaire was used to collect data from patients and other relevant data were extracted from patients' records. Chi-square test was used to assess the association between variables.

Results: Mean (SD) age of the sample was 70.9 (6.5) years, with nearly equal numbers of males and females. Approximately 37% had some chronic disease. Cerebral causes accounted for 52.4% of the cases of acute confusional state, including meningitis (14.3%), intra-cerebral haemorrhage (10.5%) and cerebellar infarction (9.5%). Common non-cerebral causes included urinary tract infections (15.2%) and hepatic encephalopathy (8.6%). Majority (59%) required inward care for 1-2 weeks. There was no significant difference between the proportion of cerebral and non-cerebral causes. Acute confusional state due to cerebral causes was associated with prolonged hospital stay ($p<0.01$).

Conclusions: This study identified common causes for acute confusional state among hospitalized elderly. Health professionals can use this information for early identification of predisposing factors, facilitating timely diagnosis and management of these patients.

Keywords: Acute confusional state, delirium, elderly

Introduction

Acute confusional state is a common occurrence among the elderly patients admitted to hospitals and a significant course of distress to the patients and their caregivers (1, 2). It is a disorder of consciousness which is also identified by several synonyms including 'delirium', 'organic brain syndrome', and 'acute cerebral insufficiency' (2). Patients with confusional state have deterioration of cognitive functions and the level of consciousness (3), which may be a residual effect of an organic disease (4).

The prevalence of acute confusional state reported in the literature varies from 14% to over 50% (2,5). In Intensive Care Units (ICU), this figure may even go up to 80% (5). Although often overlooked,

acute confusional state or delirium is now considered to be a major contributory factor for increased morbidity and mortality among patients treated in ICU, making it necessary to monitor all ICU patients for this condition (5).

The consequences of acute confusional state can affect not only the patients and their caregivers, but also the health care system of a country (2). Patients with acute confusional state cause the healthcare system considerable expenses as they may need prolonged hospital stays (5-7). The development of delirium in a hospitalised patient can cause disturbances in his or her management, disrupt ward routine and may result in injury to the patient leading to medico-legal complications (7-9). These patients can have lower six-month survival compared to patients without delirium (5). According to Girard *et al.,* recent evidence point to an association between acute confusional state and cognitive impairment which persists months to years following discharge from the hospital (5). Thus, in addition to individual suffering, this condition causes a significant impact on their caregivers due to these consequences. Therefore, early diagnosis and treatment of its underlying cause/s are essential to prevent the excess burden on patients, carers and health systems (9).

Lorenzl *et al.,* describe common precipitating factors of acute confusional state or delirium among elderly patients. They include noxious substances and hospitalization-related factors (triggers) such as acute illnesses (infections), operations, catheters, diagnostic procedures, sedatives, anticholinergic drugs, sensory deprivation, psychosocial stress, physical restraints, moves from one room to another, changes of the treating staff, surgical complications, iatrogenic complications of any kind (new pressure sores, catheter-related complications), acute metabolic derangements, and more than three new medications (2). Other co-morbid conditions such as dementia, cerebrovascular and cardiopulmonary disease and cancers are also known to aggravate the risk of delirium in patients (10).

The diagnosis of delirium is based on clinical observations, cognitive assessment, physical, and neurological examination (2,9). Despite the increasing understanding of pathophysiological mechanisms and risk factors of this clinical condition, delirium is frequently under recognised and often misdiagnosed by health professionals (9).

Timely and optimal management of delirium in hospitalised patients is of paramount importance in reducing its adverse outcomes and minimising the unnecessary costs to the patients and the healthcare system. Early identification of possible underlying causes contributes to the successful management of these patients (9). This study aimed to describe the underlying causes of acute confusional state among older adults admitted to medical and surgical wards in a Sri Lankan setting and to identify their association with some factors such as age, gender and presence of co-morbid conditions. Studies on the causes and associated factors of acute confusional state among patients in general medical and surgical wards are sparse even in the western literature; therefore, the findings of this study will add further evidence to the existing knowledge. This information will be useful to make health professionals aware about the common causes of this grave and debilitating condition in the local settings and facilitate identification of high risk groups, early diagnosis and timely management.

Methods

This cross-sectional study was conducted in the Teaching Hospital (TH), Karapitiya, as a preliminary study to identify the causes of acute confusional state and some of its associations. The patients with acute confusional state admitted to the medical and surgical wards of TH, Karapitiya over a period of one year were recruited. The sample included 105 patients with a confirmed diagnosis of acute confusional state, aged above 50 years. The standard diagnostic algorithm from Practical Geriatric Assessment authored by Howard M. Fillit and Gloria Picariello was used to diagnose acute confusional state. Investigations such as mid-stream urine sample, urine culture, full blood count, erythrocyte sedimentation rate, serum electrolytes, serum calcium, TSH, T4, renal function, liver function, blood glucose, CT scan brain, EEG and ECG were carried out in all patients selected for the study.

An interviewer-administered questionnaire was used to collect data on sociodemographic characteristics of the participants. Data pertaining to the clinical condition including cause for the acute confusional state, co-morbidities and the duration of hospital stay were extracted from case notes and other relevant clinical records using a data extraction sheet.

The data collection team comprised of the principal investigator and two post-intern medical officers. All data collectors were adequately trained prior to data collection, to minimise interviewer bias and to ensure quality of data.

All medical and surgical wards were visited daily by the data collecting team to identify the patients fulfilling diagnostic criteria. Identification was done using the information available in the Case notes, diagnosis cards and/or clinic records. The socio-demographic details of the patients were obtained from the principal caregiver, after obtaining written informed consent. Other relevant clinical details were extracted from the Case notes and relevant clinical records. The study was carried out after obtaining ethical clearance from the Ethical Review Committee, Faculty of Medicine, Galle.

Permission was obtained from the Director, Teaching Hospital, Karapitiya and the consultants in charge of the medical and surgical wards, prior to data collection.

All data were coded and entered in to a database created using SPSS (version 17.0). Chi square test was used to determine the statistical significance of the associations between variables.

Results

Sample characteristics: Nearly 95% of patients with acute confusional state in this sample were above 60 years. The majority came from rural areas (61.0%). The sample consisted of approximately equal numbers of males and females. Further, 34.3% of patients had no formal education. Nearly 37% of patients had some co-morbidity such as diabetes mellitus, hypertension or liver disease (Table 1).

Causes of acute confusional state: The causes of acute confusional state among these patients were determined according to the clinical presentation of the patients, examination findings and investigation results. According to the findings, the causes were categorised into six main categories, i.e. intracranial infections, intracranial haemorrhage, intracranial infarctions, cerebral metastasis, infections of other (non-cerebral) sites and metabolic causes. The cases that did not come under above categories were included as a miscellaneous group under non-cerebral causes (Table 2).

Table 1: Distribution of basic characteristics of the patients admitted with acute confusional state (N=105)

Basic characteristics	No.	%
Age (in completed years)		
50-60	6	5.7
61-70	51	48.6
Above 70	48	45.7
Mean (SD) age = 70.9(6.5) years, Median = 70 years		
Gender		
Male	53	50.5
Female	52	49.5
Sector		
Urban	41	39.0
Rural	64	61.0

Nearly 48% of the cases of acute confusional state were due to non-cerebral causes, while 52% were due to cerebral causes, thus making it the more prevalent form. To determine whether the cerebral causes were more prevalent than the non-cerebral causes among the patients admitted to medical and surgical wards, we used Chi-square test assessing 'Goodness of fit'. According to the analysis, there was no statistically significant difference in the prevalence of cerebral causes and non-cerebral causes of acute confusional state ($p>0.05$).

A miscellaneous group of causes including acute myocardial infarction, deep vein thrombosis, acute urine retention and multiple medical problems accounted for acute confusional state in 9.5% of the patients.

Association between selected patient characteristics and causes of acute confusional state: The associations between causes of acute confusional state (cerebral vs non-cerebral) and selected patient characteristics such as age, gender, presence of co-morbid conditions and duration of hospital stay were assessed using Chi-square test (Table 3).

According to the findings, there were no significant associations between the cause of acute confusional state and age or gender of the patient ($p>0.05$). Similarly, the presence of co-morbidities did not show an association with the cause. However, there was a statistically significant association between the cause of acute confusional state and the duration of hospital stay of the patient ($p<0.01$). Patients who had a cerebral cause for acute confusional state were more likely to be hospitalised for a longer duration.

Table 2: Distribution of causes of acute confusional state among the sample (N = 105)

Causes of acute confusional state	No.	%
Intracranial infections (N = 24)		
Meningitis	15	14.3
Encephalitis	9	8.6
Intracranial haemorrhage (N = 19)		
Intracerebral haemorrhage	11	10.5
Subarachnoid haemorrhage	5	4.8
Subdural haemorrhage	3	2.9
Intracranial infarctions (N = 11)		
Cerebral infarction	1	0.9
Cerebellar infarction	10	9.5
Cerebral metastasis	1	0.9
Infections of other sites (N = 28)		
Pneumonia	7	6.7
Urinary tract infections	16	15.2
Cellulites	5	4.8
Metabolic causes (N = 12)		
Hypoglycaemia	1	0.9
Diabetic ketoacidosis	2	1.9
Hepatic encephalopathy	9	8.6
Miscellaneous (N = 10)		
Acute myocardial infarction	2	1.9
Deep vein thrombosis	2	1.9
Acute urine retention	1	0.9
Multiple medical problems	5	4.8

Table 3: Association between the cause of acute confusional state (cerebral and non-cerebral) and selected patient characteristics

Characteristic	Cause of acute confusional state		Total	p value
	Cerebral	Non-cerebral		
	N (%)	N (%)	N (%)	
Age				
Between 50-70 years	34 (59.6)	23 (40.4)	57 (100.0)	*p>0.05*
Above 70 years	21 (43.8)	27 (56.2)	48 (100.0)	
Gender				
Male	32 (60.4)	21 (39.6)	53 (100.0)	*p>0.05*
Female	23 (44.2)	29 (55.8)	52 (100.0)	
Co-morbidities				
Absent	36 (54.5)	30 (45.5)	66 (100.0)	*p>0.05*
Present	19 (48.7)	20 (51.3)	39 (100.0)	
Duration of hospital stay				
1-2 weeks	24 (38.7)	38 (61.3)	62 (100.0)	*p<0.001*
3-4 weeks	31 (72.1)	12 (27.9)	43 (100.0)	
Total	**55 (52.4)**	**50 (47.6)**	**105 (100.0)**	

Discussion

Acute confusional state or delirium is a common occurrence among hospitalised elderly patients, which can have serious consequences for the well-being of the patient. Reported prevalence of acute confusional state varies from 14% to as high as 80% (2, 5), which could partially explain the increasing attention of researchers on the subject. However, different investigators have used different assessment scales such as NEECHAM scale and DSM-III-R criteria to diagnose this condition (7, 10, 11), which would have contributed to the reported variation in prevalence in different settings. In contrast to above methods of diagnosis, the present study used the standard diagnostic algorithm from Practical Gaeriatric Assessment authored by Howard M. Fillit and Gloria Picariello (12).

Despite being a familiar condition in a clinical setting, there are only a few studies published on this subject; virtually none among the Sri Lankan medical literature. In many of the published studies, the main objective of the authors was to identify the predictors for development of acute confusional state (7, 13). Although this aspect was not looked into in the present study, its findings would undoubtedly shed light on an unknown facet - the causes and associations of acute confusional state among the patients receiving care from general medical and surgical wards in the local setting.

In our sample, the majority of patients who had developed acute confusional state were above 60 yrs (95%), from rural areas (61%) and were of lower socio-economic status. The sample consisted of same number of males and females. Presence of co-morbid conditions was seen only among 37.2% of patients suggesting that patients without co-morbidity are also susceptible to this condition. However, we were unable to find previous local studies for a meaningful comparison.

The common causes of acute confusional state described in the literature include, prescription medications (anticholinergic, narcotics and benzodiazepines),drug abuse (alcohol, opiates, ecstasy, ketamine and cocaine), metabolic conditions (hypoglycaemia, hyperglycaemia, hyponatraemia, hypothermia, hyperthermia,

pulmonary failure, cardiac failure, hepatic encephalopathy, vitamin deficiencies, dehydration and anaemia), infections (urinary tract infections, pneumonia, skin and soft tissue sepsis), endocrine conditions (hyper and hypothyroidism, hyper-parathyroidism and adrenal insufficiency), cerebrovascular disorders (global hypoperfusion states, hypertensive encephalopathy, ischaemic and haemorrhagic strokes and cerebral metastasis), autoimmune disorders, seizure related disorders, neoplastic disorders and prolong hospitalisation (14). In the present study, among infections, the majority were due to urinary tract infections (15.2%), followed by meningitis (14.3%). Metabolic conditions accounted for 11.4% of all cases. In 4.8% of the cases, multiple medical problems were observed, which could have lead to the acute confusional state.

Several researchers have attempted to find predictors of acute confusional state or its associated factors. Williams *et al.* and Nikoletti *et al*. found a significant association of age with development of delirium (11, 13). Errors on a mental status test or cognitive impairment, level of pre-injury activity, presence of urinary catheter, presence of co-morbidities, depression and alcoholism were also found to be associated with this condition (7, 10, 11, 13,). Aldemir and co-researchers found a significant association of male sex with development of acute confusional state among patients in surgical intensive care units of a hospital in Turkey (10). Their study also revealed that there is a significant association between the development of delirium and the duration of hospital stay. However, there were no comparable studies that looked into the association between causes of acute confusional state and patient characteristics such as age, gender, presence of co-morbidities and the duration of hospital stay as described in the present study.

Conclusions

This study was conducted as a pilot study to identify common causes of acute confusional state and associated factors. According to the findings, nearly half of patients had an extracranial etiology. Clinicians can use this information for early identification of predisposing factors, facilitating timely diagnosis and management of these patients. Although limited by the small sample size, the findings of this study will guide the researchers to design methodologically superior studies in future involving increased sample sizes and more variables which are relevant for the management of the patient.

References

1. Meaqher DJ. Delirium: Optimising management. *BMJ* 2001; **322**(7279): 144-9.
2. Lorenzl S, Fuzgen I, Noachtar S. Acute confusional state in the elderly - diagnosis and management. *Dtsch Arztebl Int* 2012; **109**(21): 391-400.
3. Brown TM, Boyle MF. Delirium. *BMJ* 2002; **325**(7365): 644-7.
4. Gleason OC. Delirium. *Am Form Physician* 2003; **67**(5): 1027-34.
5. Girard TD, Pandharipande PP, Ely EW. Delirium in the intensive care unit. *Critical Care* 2008; **12**(Suppl 3): S3.
6. Korevaar JC, van Munster BC, De Rooi SE. Risk factors for delirium in acutely admitted elderly patients: a prospective cohort study. *BMC Geriater* 2005; 1356.
7. Pompei P, Foreman M, Rudberg MA, Inouye SK, Braund V, Cassel CK. Delirium in hospitalised older persons:outcomes and predictors. *J Am Geriat Soc* 1994; **42**(8): 809-15.
8. Lipowski ZJ. Delirium (Acute confusional state). *JAMA* 1987; **258**(13): 1789-92.
9. Martins S, Fernandes L. Delirium in elderly people: a review. *Front Neurol* 2012; **3**: 101.
10. Aldemir M, Özen S, Kara IH, Sir A, Baç B. Predisposing factors for delirium in the surgical intensive care unit. *Critical Care* 2001; **5**: 265-70.
11. Nikoletti S, Smith V, Helmes E, Marriott R & McPhee I. Acute confusional state in general surgery patients: A pilot study to determine characteristics and feasibility of measurement. Available from

    http://www.supportiveandpalliativecare.org.au/
12. Fillit HM, Picariello G. Practical Gaeriatric Assessment. 1998; London: Greenwich Medical Media.
13. Williams MA, Campbell EB, Raynor WJ, Musholt MA, Mlynarczyk SM, Crane LF. Predictors of acute confusional states in hospitalised elderly patients. *Research in Nursing & Health* 1985; **8**(1); 31-40.

A comparison of resection margins and lymph node clearance in laparoscopic vs open anterior and abdomino-perineal resections for carcinoma of rectum

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ABSTRACT

Introduction: Laparoscopic anterior and abdomino-perineal resections for carcinoma rectum are associated with a lower morbidity than open surgery. It is important to evaluate laparoscopic resections against open surgery for tumour free resection margins and lymph node clearance.

Methods: A retrospective analysis of resection margins and number of lymph nodes harvested at anterior and abdomino-perineal resections performed by laparoscopy and open surgery was done.

Results: There was no statistically significant difference in the tumour free resection margins while lymph node clearance was significantly higher in the laparoscopy group.

Conclusion*:* Laparoscopic surgery for carcinoma rectum provides a satisfactory oncological outcome with regards to clear resection margins and lymph node harvest.

Keywords: Abdomino-perneal resection, laparoscopy, rectal carcinoma

Introduction

Anterior resection and abdomino-perineal resection are the curative resections for carcinoma of the rectum. Anterior resection is possible when the anus and sphincters can be preserved while having a resection margin of 3cm. Minimal access resections reduce the length of exposure incision while having a clear vision with magnification facilitating the resection (1). The first laparoscopic assisted left hemicolectomy performed in 1991 reported to have reduced morbidity (2). The problems associated with the new learning curve became less over time, whilst providing clear benefits (1, 3-6). The blood loss is lesser as well as post-operative ileus (7). The post-operative morbidity is reduced allowing early mobilization, early feeding and discharge (1, 7). Oncologically acceptable resection margins and satisfactory lymph node clearance have also been reported (7, 8). This study was designed to evaluate resection margins and lymph node clearance of laparoscopic anterior resections and abdomino-perineal resections performed in our unit.

Methods

A retrospective analysis of resection margins and number of lymph nodes harvested at anterior resection and abdomino-perineal resections performed from January 2014 to April 2016was done and compared with open surgeries performed during the same period. Even though laparoscopic approach is currently preferred in our unit, some patients have to undergo open surgery due to the unavailability of laparoscopy theatre time.

All laparoscopic resections were performed in standard head low and left lateral tilt. Five ports were used. The dissection was performed with a combination of ultrasonic dissector, bipolar and monopolar diathermy. High ligation of inferior mesenteric artery was performed in all cases. A total mesorectal excision was performed. In case of anterior resection laparoscopic stapled anastomosis was performed. In three anterior resections where tumour was situated at 4 cm from the anal verge a pull through coloanal anastomosis was done.

Open resections were done in the standard way through the midline laparotomy.

Results

Thirty four patients were operated during this period and 24 patients underwent laparoscopic procedure. There were twenty anterior resections (LAR) and four abdomino-perineal resections (LAPR) in the laparoscopy group.

Ten patients underwent open surgery which included six anterior resections (AR) and four abdomino-perineal resections (APR).

The mean operating times were as follows; LAR - 210min, AR - 220min, LAPR - 200min, APR - 180min. The mean blood loss were; LAR - 100ml, AR - 400ml, LAPR - 150ml, APR - 500ml.

All patients except one were discharged within 10 days. One patient after APR had a prolonged ileus and was discharged on 14th day. One AR patient developed a superficial wound infection but responded to dressings and oral antibiotics.

The results of distal resection margin and lymph node harvest were as follows.

Resection margins

A comparison of tumour free distal resection margin in laparoscopic anterior resection and open anterior resection is summarised in table 1. In nineteen out of 20 laparoscopic anterior resections, the distal resection margins were clear. In 17 of laparoscopic resections, the tumour free distal resection margin was more than 3 cm.

In the open surgery group all anterior resections had negative resection margin of >3cm. The mean distal resection margins were 4.4cm and 4.75cm for the laparoscopic and open surgery groups respectively and the difference was not statistically significant (p=0.66).

Table 1: A comparison of distal resection margin in laparoscopic vs. open anterior resections

Tumour free distal resection margin	> 5cm	3-5cm	1-3cm	Involved by tumour
Laparoscopic	3	14	2	1
Open	1	5	0	0

Lymph node clearance

The mean lymph node clearance in laparoscopic and open surgery groups were 20.3 and 17.2 respectively and the difference was statistically significant (p<0.001).

The number of lymph nodes harvested in laparoscopic vs. open surgery is summarised in table 2).

Table 2: A comparison of lymph node clearance in laparoscopic vs open anterior and abdomino-perineal resections

Number of lymph nodes dissected	14-16	17-19	19-21
Laparoscopic	1	2	21
Open	3	7	0

Discussion

There is an increasing trend for laparoscopic anterior and abdomino-perineal resections worldwide. In most of the studies it is proven that the resection is comparable with open surgery achieving acceptable oncological requirements (7, 8) whilst providing benefits of reduced morbidity (1-7). The criteria to assess oncologically acceptable resection, is the number of lymph nodes harvested and tumour free distal resection margin. However, distal resection margin does not apply in abdomino-perineal resections.

In 95% (19/20) of the patients in laparoscopic anterior resection group, the distal resection margin was clear from tumour. In 85% of them, the distal resection margin was more than 3cm. The two patients who had tumour free resection margins of 2cm and 2.5cm underwent a total laparoscopic mobilization, resection and a pull through coloanal anastomosis. The patient who had an involved resection margin was a 72 year old male with a large villous adenoma at 4cm from anus. Biopsies showed high grade dysplasia. He underwent laparoscopic resection and pull through coloanal anastomosis as per anal resection was attempted and failed. His histopathology revealed an adenocarcinoma within a villous adenoma and the resection margin showed high grade dysplasia. He was treated with post operative chemo-irradiation and being followed up.

In contrast, all six patients who underwent open anterior resections had a tumour free distal resection margin of more than 3cm. However in all of them tumours were located more than 5cm from anal verge. According to our findings there was no statistically significant difference in tumour free distal resection margin between the laparoscopic and open surgery groups.

The mean lymph node clearance in laparoscopic surgery was significantly higher than that of open surgery performed in our unit. Pechlivanides G, *et al* has shown in their study that laparoscopic resection of the rectum can achieve similar lymph node clearance to the open approach (8).

By performing a high ligation of inferior mesenteric vessels and a total mesorectal excision it is possible to achieve the oncological principles of resection. A clear advantage of laparoscopic resection is the clarity of vision provided by magnification and zooming closer to area of dissection (1). The combination of ultrasonic dissector, bipolar and monopolar diathermy allows a dissection with minimal blood loss.

Conclusions

Laparoscopic anterior resection and abdomino-perineal resection have provided satisfactory tumour clearance with negative resection margins in a large majority of cases. Even though open surgery achieved clear resection margins in all patients operated, the difference was not statistically significant. Meanwhile, the lymph node clearance was significantly higher in laparoscopic surgery group comparable to open surgery group.

References

1. Beat M Kunzil, Helmut Friess, Shailesh V Shrikhande. Is laparoscopic colorectal cancer surgery equal to open surgery? An evidence based perspective. *World Journal of Gastrointestinal Surgery* 2010; **2**(4): 101-8.
2. Redwine DB, Sharpe DR. Laparoscopic segmental resection of the sigmoid colon for endometriosis. *J Laparoendoscopic Surg* 1991; **1**(4): 217-20.
3. Monson JR, Hill AD, Darzi A. Laparoscopic colonic surgery. *British Journal of Surgery* 1995; **82**(2): 150-7.
4. Decanini C, Milson JW, Bohm B, Fazio VW. Laparoscopic oncologic abdomino-perineal resection. *Dis Colon Rectum* 1994; **37**(6): 552-8.
5. Ziprin P, Ridgway PF, Peck DH, Darzi AW. The theories and realities of port site metastases: a critical appraisal. *J Am Coll Surg* 2002; **195**(3): 395-498.
6. Stocchi L, Nelson H, Young-fadok TM, *et al.* Safety and advantages of laparoscopic vs open colectomy in the elderly, matched control study. *Dis Colon Rectum* 2000; **43**(3): 326-32.
7. MM Reza, JA Blasco, E Andradas, R Cantero, J Mayol. Systematic review of laparoscopic versus open surgery for colorectal cancer. *British Journal of Surgery* 2006; **93**: 921-28.
8. George Pechlivanides, Nicolaos Gouvas, John Tsiaoussis, *et al.* Lymph node clearance after total mesorectal excision for rectal cancer: Laparoscopic versus open approach. *Digestive diseases* 2007; **25**: 94-99.

Gestational diabetes mellitus: In search of better screening and diagnostic pathway for Sri Lankan women

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Introduction

Gestational diabetes mellitus (GDM) is defined as carbohydrate intolerance resulting in hyperglycemia of variable severity, with onset or first recognition during pregnancy. It is associated with increased risk of several adverse infant and maternal outcomes, and its early clinical recognition can reduce these risks (1).

With the exponential rise in the prevalence of Type 2 Diabetes Mellitus (T2DM) during past few decades especially in Indian Subcontinent, there is a dramatic increment in the incidence of GDM (2). The prevalence of GDM varies widely across the globe ranging from 3-11% and in Sri Lanka it was reported to be around 11% in 2010 (3,4). As the age at onset of T2DM and pre-diabetic state is moving downwards, the possibility of pregnant women having impaired glucose tolerance at much younger age has also increased. Higher prevalence of obesity associated with sedentary life style and changes in dietary practices have contributed to insulin resistance, thus making them susceptible to gestational diabetes and T2 DM later in their life (5).

GDM is associated with a number of adverse perinatal outcomes, such as neonatal hypoglycemia, macrosomia with increased risk for shoulder dystocia, and the need for neonatal intensive care (6). Maternal complications of GDM include an increased risk of caesarean delivery and pre-eclampsia. Furthermore, women with GDM have up to 60% risk of developing T2DM within 5-15 years of delivery, and it has been suggested that children prenatally exposed to a diabetic milieu have an increased risk for the development of T2DM later in life (6, 7). There are several studies showing a significant reduction of these adverse effects when prompt and proper interventions were taken to diagnose and treat GDM early (1, 6).

However**,** there is a dilemma over the best diagnostic approach for GDM. Some advocates universal testing (testing everybody) while others recommend limiting testing to women having risk factors for GDM (8). The American Diabetes Association (ADA) guideline reccommends to screen only the high risk women having one or more risk factors for GDM (9). However, one of the risk factors given in this guideline is South Asian ethnicity. Approach of International Association of the Diabetes and Pregnancy Study Groups (IADPSG) is more flexible and it recommends either the universal or the selective approach on the basis of the background prevalence of abnormal glucose metabolism in the population (10). At present there is no consensus over the most suitable method to screen GDM in Sri Lanka.

In addition, there is also a lack of international consistency with regard to the most sensitive and practical test to diagnose GDM. While a 75g glucose tolerance test (GTT) is considered as the gold standard test to diagnose GDM, fasting glucose challenge test (GCT) with different cutoff values is also widely used throughout the world. Diabetes in Pregnancy Study Group India (DIPSI) has recommended non-fasting 75g GCT with diagnostic criterion of 2h PG $\geq$ 7.8 mmol/L based on several studies conducted in India (11, 12). Nirogi Lanka diabetes prevention task force in Sri Lanka and Sri Lankan College of Obstetricians & Gynecologists (SCOG) too has recommended non fasting GCT with the same cutoff value to

diagnose GDM in Sri Lanka (13). However, this recommendation is based on few studies done in India and this method as well as the cutoff values has not been validated for Sri Lankan women.

In addition to lack of consensus over the best approach and best test in GDM, the diagnostic process is further impeded by the lack of agreement on the best method of GDM diagnosis. The two steps method with combination of GCT and GTT is widely accepted as the best method. In this method, all pregnant women are screened with GCT followed by GTT for those with positive GCT. However, complexity of this procedure is a limiting factor (11, 14). One-step approach using GTT has been recommended by IADPSG based on results of the landmark study, Hyperglycemia and Adverse Pregnancy Outcomes (HAPO) (6). Several professional bodies including American Diabetes Association (ADA) had endorsed this approach (3, 7). As mentioned previously, one step approach using non fasting GCT has been recommended by DIPSI and the recommendation of Nirogi Lanka diabetes prevention task force and SCOG is also similar to the recommendation of DIPSI.

As there is lack of uniformity in GDM screening, diagnostic tests and methods used in Sri Lanka, author of this oration conducted a series of research in order to answer the following questions.

1) What is the current practice with regards to GDM screening in a tertiary care setting in Sri Lanka?
2) As suggested by some local professional bodies, can non-fasting GCT be used effectively in diagnosing GDM in Sri Lankan women?
3) What is the best screening strategy to diagnose GDM; Universal screening or selective risk factor based screening?
4) What is the current prevalence of GDM using the newer diagnostic criteria in a tertiary care setting in Sri Lanka?
5) What is the reliability of GTT as a diagnostic test over a decade?
6) In addition to the traditional risk factors, can other clinical parameters especially gestational weight gain be used to predict GDM?

As the first step towards finding an ideal screening and diagnostic strategy for GDM, author of this oration was interested to know the current practices of GDM screening in a tertiary care setting. The first study which is presented here was undertaken to investigate the adequacy of GDM screening in a Tertiary Care Hospital.

STUDY 1

Adequacy of Gestational diabetes mellitus (GDM) screening in a tertiary care hospital; are we missing GDM in big ways?

Aim

Aim of this study was to investigate the adequacy of GDM screening in a tertiary care hospital and to assess the prevalence and predictors of macrosomia**.**

Methods

This was a hospital based cross sectional study carried out in Teaching Hospital Mahamodara from 15th March to 15th May 2015. The data were gathered from post-partum women using an interviewer administered questionnaire. Data on GDM screening were collected from hospital and patients records.

Results

Out of 254 women studied, prevalence of GDM was 26.4% (67/254). Of the type of GDM screening tests, the most commonly used test was PPBS 38.6% (98/254) followed by GTT (19.3%). Urine sugar was the only screening test in 13% (33/254) of women. Prevalence of macrosomia was 18.5% (47/254) and of women who delivered macrosomic babies, only 36% (17/47) were found to have GDM with the available tests. GDM screening with the gold standard GTT was performed only in 25% (11/47) women who delivered macrosomic babies.

Conclusions

For screening GDM, a variety of tests are used in Teaching Hospital, Mahamodara. Surprisingly only 20% of women had undergone GTT as a screening test. There was higher prevalence of macrosomia which may indicate that GDM was missed in some women.

The finding of this study was presented at annual academic session of Galle Medical Association in 2015 (15).

A previous community based study conducted in Anuradhapura district too showed similar findings of inadequate screening of GDM at community level (16). In this study urine dipstick was the main screening method in majority of women (97%) and GTT was performeds only in 1% of the study sample. This suboptimal practice was against the recommendation of Ministry of Health and Nutrition of Sri Lanka. The practice guideline of Ministry of Health and Nutrition recommends two hour postprandial blood sugar (2h PPBS) as the screening test at booking visits for those with risk factors for GDM. It further states that if 2h PPBS is >130 mg/dL to proceed to 75g glucose tolerance test (GTT) at 24-28 weeks of gestation. However, it is clear that this guideline was not followed in managing majority of these women. One would expect the screening method to be better at tertiary care settings. Even though the findings of our study was not as bad as one conducted in Anuradhapura district, it was far below the standard practice.

We believe practices observed in our study epitomize the inadequate screening practices for GDM at all levels in Sri Lanka. ADA as well as many other professional organisations do not recommend urine testing for glucose as a screening method. However, around 13% (33/254) of women in our study had only urine testing as the sole screening method. Our study also revealed that only 25% of women who delivered macrosomic babies had undergone proper GDM screening with GTT. Previous studies had shown that women especially of Asian ethnicity had a trend towards increased odds of macrosomia in the presence of GDM compared to those without GDM. This may indicate that some women with macrosomia in our study might have undiagnosed GDM. The finding of this study will be a real eye opener for health authority to take necessary action to improve the GDM screening strategies.

After having the understanding about current practices of GDM screening and methods used, the author of this oration was interested in finding the most suitable screening test for GDM in local setting. Out of many screening tests, glucose challenge test (GCT) is considered as the preferred test by professional organizations such as DIPSI and Nirogi-Lanka in Sri Lanka. Both of the organisation have recommended non-fasting GCT over gold standard GTT to screen GDM.

Therefore, the second study was undertaken to ascertain the validity of non-fasting GCT to diagnose GDM in pregnant women in Sri Lanka.

STUDY 2

Is non-fasting glucose challenge test sensitive enough to diagnose gestational diabetes mellitus?

Aim

The aim of this study was to investigate the sensitivity and specificity of GCT when compared to GTT for diagnosing GDM.

Methods

Pregnant women in period of gestation between 24-28 weeks were recruited by simple random sampling method. Non fasting 75g GCTs were performed in all followed by fasting 75g GTTs within a week's time. IADPSG criteria of GTT were used as the reference test to diagnose GDM and 2h values of GCT were compared.

Results

Table 1 shows the baseline characteristics of the 274 women who completed the study. On average, pregnant women were relatively old with mean age of 31.4 ± 6.7 years and of average pre-conception BMI (21.7 ± 4.6 kg/m^2). The differences of the baseline characteristics between subjects with and without GDM (based on IADPSG criteria) and GCT $\geq$ 140 and <140 are shown in table 1.

According to IADPSG criteria of the 75g GTT, 21.5% (59/274) subjects in the sample were diagnosed to have GDM; however, only 13.1% (36/274) were detected to have GDM with GCT using 2h cutoff value $\geq$ 140 mg/dL. Out of the 36 cases detected by 2h value $\geq$ 140 mg/dL, 12 women were found to have normal GTT (false positive). Thus, only 24 cases of GDM were diagnosed by GCT with 2h value of $\geq$ 140 mg/dL, giving the sensitivity of 40.6% and specificity of 94.4%. Close to 60% (35/59) of patients with true GDM were missed by GCT.

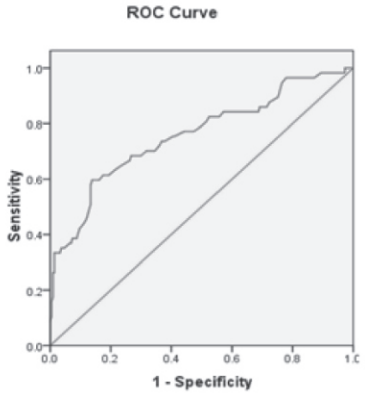
Table 1: Baseline characteristics of subjects with and without GDM

		GCT =140	GCT <140	with GDM*	without GDM*
Age in years	<20	2	11	2	11
	20 - 30	9	77	8	78
	>30	24	151	49	126
Parity	1	11	72	12	71
	2	8	69	18	59
	=3	16	98	29	85
POG[1]		26.86 ± 3.9	25.93 ± 4.7	25.56 ± 4.73	26.19 ± 4.42
BMI	<18	4	47	8	43
	18 - 24.9	20	149	35	134
	25 - 29.9	10	35	15	30
	>30	1	8	1	8
Past history of GDM		3	6	4	5
Family Hx. of GDM		17	66	23	60
Past Hx. of macrosomia		6	28	8	26

Table 2: Comparison of GCT with GTT using IADPSG criteria in diagnosing GDM

GCT = 140 mg/dL	GTT using IADPSG criteria as gold standard		Total
	Positive	Negative	
Positive	24	12	36
Negative	35	203	238
Total	59	215	274

The area under the ROC curve for the ability of GCT to predict GDM detected by GTT was 0.758 (SE 0.039) (Figure 1). The best cut-off point of 2h value to predict GDM occurred at 120 mg/dL (sensitivity of 64.9%, specificity 76.5%) (Figure 1). If the cut-off of 2h value of GCT is increased to 140 mg/dL, sensitivity dropped 37% and specificity increased 96% and this is a clear indication that GCT with cut-off 2h value of 140 is not sensitive enough to diagnose GDM compared to the gold standard GTT (Figure 1).



2 -hour value mg/dL	sensitivity	1-specificity
100.50	.842	.571
110.50	.737	.378
120.50	.649	.235
130.50	.456	.120
139.50	.368	.065
145.50	.333	.018

Figure 1: ROC curve of 2h value to predict abnormal FBS and 1h value

Conclusions

GCT with 2h cutoff value $\geq$ 140 mg/dL is not sensitive enough to diagnose GDM recognised by GTT.

The finding of this study was published in International Archives of Medicine (IAM), a peer reviewed indexed medical journal, in 2015 (17).

DIPSI and some of the experts in Sri Lanka have recommended non-fasting GCT to diagnose GDM based on studies carried out in India (12, 13, 18). However, in these studies GCT was not compared with standard GTT and the cut-off value was justified on the basis of equal prevalence of macrosomia in GDM group and non GDM group. Equal prevalence is thought to be due to appropriate recognition and treatment of GDM cases in these studies. However, prevalence of macrosomia as the surrogate marker to diagnose GDM is not accurate as many factors including success of the treatment can confound the prevalence of macrosomia. There are other studies showing poor sensitivity of GCT in diagnosing GDM (19, 20). A recent study conducted by V Mohan, *et al.* in India showed a very low sensitivity of non-fasting GCT when compared to the IADPSG criteria (sensitivity 22.6%, specificity 97.8%) (21). Other studies done in South Asian ethnicity as well as in Caucasians too have revealed poor sensitivity of 50g and 75g GCT (19, 22, 23).

In summary, the results of the second study clearly indicated that the non-fasting GCT has a poor sensitivity (40.6%) when compared to gold standard GTT. Therefore, the current recommendation of using non-fasting GTT with 2h cut-off of 140 mg/dL as a screening and diagnostic test for GDM may need to be revisited. In order to obtain international standardisation, we recommend that, wherever possible, a single-step fasting GTT using the IADPSG criteria be used, with the two-step procedure remaining a viable option.

Having observed the poor sensitivity of GCT against the gold standard GTT, author of this oration was interested to know the most appropriate method to screen GDM in local setting. A community based study conducted in 2012 in Anuradhapura district showed inadequacy of the risk factor based approach to detect GDM (4). However, the most appropriate method to detect GDM depends largely on underlying prevalence of risk for GDM. In a cross sectional community based study one would expect to find both pregnant women with and without risk factors for GDM. However in practice, pregnant women are screened at antenatal clinic, not at the community level. It is a known fact that women with no or minimal risk are followed up in community clinics whereas high risk women are followed up in tertiary care clinic settings. Therefore, the author argues that the best setting to study the most appropriate method for GDM screening should be at antenatal clinic settings rather than at the community settings. With that in mind, the third study was carried out to evaluate the best method to screen GDM in a tertiary care clinic setting.

STUDY 3

Screening for gestational diabetes mellitus (GDM) in a Tertiary Referral Center in Sri Lanka; Universal versus Selective approach

Aim

To evaluvate whether universal screening is superior to that of selective risk factor based screening for GDM.

Methods

This study was conducted as a clinic based cross sectional study in a tertiary care hospital. Pregnant women with period of gestation between 24 to 28 weeks were recruited by convenience sampling method. Data on their demography and risk factors for GDM was collected using a predesigned questionnaire. All those who selected for the study underwent 75g Oral Glucose Tolerance Test (OGTT) during 24-28 weeks of gestation. Diagnosis of GDM was made according to IADPSG (International Association of the Diabetes and Pregnancy Study Groups) criteria.

Results

Out of all 452 pregnant women, 105 were found to have GDM and thus if universal screening was adopted, 23.2% (105/452) would have been detected as having GDM. For the selective risk factor based screening, 356 women with at least one risk factor for GDM were selected. Among them, 91 women were found to have GDM with the overall

prevalence of 20.1% (91/452). Compared to universal screening, the selective risk factor approach missed 14 cases (3%) of GDM who did not have any of the risk factors for GDM.

in a community antenatal clinic where majority has no or few risk factors for GDM it is likely that many women will be spared from GDM screening.

Table 3: Prevalence of risk factors in the study population

Risk factor	N	%
Past history of GDM	15	3.3
Maternal age =35 years	179	39.6
Pre conceptional BMI =23 kg/m^2	178	39.3
Bad obstetric history- miscarriages, still births, IUD etc.)	108	23.8
Delivering large babies (>3.5 kg)	42	9.2
History of T2DM / GDM among first degree relatives	138	30.5

Of the risk factors of GDM assessed, the commonest risk factor was maternal age $\geq$35 years followed by BMI $\geq$23 kg/m^2 at booking visit (Table 3).

Conclusions and recommendations

Even though, risk-based screening will reduce the necessity of screening by 20% (from 452 to 356), the detection rate of GDM would drop by 3% (from 23% to 20%). Based on this study we can recommend universal screening as the best strategy to detect GDM at tertiary level. However, if the facilities are limited, selective risk factor based screening also can be used with success in community clinics where women are less likely to have multiple risk factors for gestational diabetes mellitus.

Findings of this study were presented at annual academic session, Ceylon Collage of Physician in 2013 and published in International Journal of Preventive Medicine in 2016 (24).

The third study in this oration clearly indicated that the universal screening method is superior to the selective risk factor based screening method. Furthermore, universal screening appears to be the most practical approach for GDM screening in tertiary care settings as 80% of pregnant women had at least one risk factor for GDM. Therefore, majority (80%) would any way require GDM screening even if selective screening is chosen. On the other hand, if the selective risk factor based screening is practiced

Therefore, the pragmatic utility of applying selective risk factor–based screening will largely depend on the frequency of these risk factors in the screened population. Therefore, universal screening is the most suitable strategy for GDM screening in tertiary care setting and the selective risk factor based screening is an option for GDM screening at the community based antenatal clinics.

We also reviewed the prevalence of GDM in a tertiary care setting in this study. It revealed that the prevalence of GDM was 23.2% which is higher than the prevalence reported in previous studies in Sri Lanka (3, 5). The main reason for higher prevalence observed in this study is the setting where the study was carried out. As mentioned earlier it is likely that more patients with risk factors for GDM are followed up at antenatal care clinic in a tertiary care setting than in a community. Therefore, GDM prevalence is expected to be higher in a tertiary care setting than in a community. The rise of GDM prevalence may also reflect the substantial increase in the community prevalence of obesity and type 2 diabetes over last several years. Other reason for the dramatic rise in the prevalence of GDM in our study is the adoption of new diagnostic criteria (IADPSG). Previous studies too had reported that the change in diagnostic criteria from the previously utilised criteria to the new IADPSG criteria would increase the prevalence of GDM by 4% - 5% (25, 26).

The forth study present here was designed to evaluate the diagnostic performance of GTT over a period of 10 years. This study was conducted in Mornington Peninsula, Victoria, Australia.

STUDY 4

Change of pattern of Oral Glucose Tolerance Test (OGTT) in pregnant women with gestational diabetes mellitus (GDM) in Mornington Peninsula, Victoria over 10 year period.

Introduction

With the increased incidence of type 2 diabetes mellitus (T2DM) in the community, we predicted that the glycaemic abnormalities of the OGTT in women with GDM will have altered to favour elevations of FBS over elevations of the 2h value over last 10 years.

Aim

Aim of the study was to evaluate the changes of glycaemic abnormalities detected by OGTT over a period of a decade.

Methods

We retrospectively analysed 2h, 75g OGTT done in pregnant women in year 1994 - 1997 and 2006 -2007. Abnormal OGTT results on the basis of Australasian Diabetes in Pregnancy Society (ADIPS) criteria were selected for further analysis. Twenty seven and 84 OGTT were selected for 1994-7 and 2006-7 year period respectively. According ADIPS, FBS equal or more than to 5.5 mmol or 2h value equal or more than 8 mmol were considered as diagnostic of GDM.

Results

Even though, the mean FBS for 2006-7 (4.97) was higher than mean FBS for 1994 - 1997 (4.75) there was no significant difference between these two values (p=0.15). Even though there was no statistical difference (p=0.39), the similar increment pattern was observed for mean 2h value for 2006-2007 (8.90) in comparison to 1994-1996 (8.82). According ADIPS, 2h values of OGTT have higher sensitivity for GDM detecting 77/85 in 2006-7 and 22/27 in 1994-97. FBS has the least sensitivity, detecting only 5/27 in 1994-97 and 19/85 in 2006-7. Although the proportion of women diagnosed on the basis of the FBS was greater in 2006-7 this difference was not significant. The mean gap between fasting and 2h values (delta) was 4.06 for 1994-7 and 3.71 for 2006-7 with no statistically significant difference (p=0.25) between these two values.

Conclusions

Parameters of OGTT in pregnant women diagnosed with GDM had not significantly changed over last 10 years. The baseline FBS in women with GDM did not change over last 10 years although there was a trend for this to increase. Further study with a large sample may be necessary to confirm our hypothesis further.

Finding of this study was presented at the Annual Academic Session of the Peninsula Health, Victoria, Australia (27).

This study revealed that the glycemic abnormalities detected by GTT had not changed over a period of decade even though we postulated alteration of glycaemic abnormalities in favour of elevation of FBS over 2h value. This means that GTT can be used to diagnose GDM with more or less similar cut off values even if the underlying prevalence of T2DM and GDM has risen in recent past.

After knowing the reliability of GTT over a period of time, we were interested in looking for new predictors of the GDM detected by GTT. The traditional risk factors that have been associated with an increased risk of GDM include past history of GDM, hypertension, maternal age $\geq$ 35 years, pre conception BMI $\geq$ 23 kg/m^2, bad obstetric history (miscarriages, still births, IUD etc.), history of delivering large babies ($\geq$ 3.5 kg), and family history of first degree relatives with diabetes mellitus or GDM. The third study presented in this oration revealed around 3% of GDM cases were detected in the absence of any of these traditional risk factors.

Previous studies have revealed that excessive gestational weight gain (GWG) was associated with abnormal glucose tolerance in GTT in the third trimester of pregnancy (28). However, it is unclear whether excessive GWG can be used as a surrogate marker of GDM among pregnant women in Sri Lanka. Therefore we designed the fifth study with a view of looking for association between excessive GWG and risk of GDM.

STUDY 5

Can Body Mass Index at booking visit and weight gain during mid-trimester predict Gestational Diabetes Mellitus?

Aim

The aim of this study was to determine whether body mass index (BMI) at 9-12 weeks of booking visit and weight gain in mid-trimester can predict glycaemic abnormalities in glucose tolerance test (GTT).

Methods

In this prospective study, 452 women underwent 75g GTT at 24-28 weeks of gestation. BMI at booking visit (9-12 weeks of gestation) and weight gain in mid-trimester were recorded. Excessive gestational weight gain (GWG) was determined using the Institute of Medicine (IOM) guidelines. Student's t-test and multivariate logistic regression were used to find associations.

Results

Mean age and BMI were 31.3 years (SD 6.3) and 22.0 kg/m^2 (SD 4.6). Thirty eight point nine percent had excessive GWG in mid-trimester with no statistically significant difference across BMI categories. Excessive GWG was associated with higher risk of GDM. The odds of GTT results above GDM threshold were 31% higher in the excessive GWG group [adjusted OR 1.3 (95% CI 1.1 - 1.5)]. The odds of GDM were 22% higher among women with booking visit BMI $\geq$ 25 kg/m^2 [OR 1.2 (95% CI 1.1 - 1.4)].

Conclusions and recommendations

Booking visit BMI and mid trimester excessive GWG can be used to predict GDM. We recommend to calculate BMI at booking visit and look for excessive gestational weight gain in mid trimester and consider GTT for all women with BMI $\geq$ 25 kg/m^2 or/and excessive GWG.

Abstract based on the finding of this study was presented at Annual Academic Sessions of Sri Lanka Medical Association in 2015 (29).

Identification of mid trimester excess gestational weight gain is important as it is associated with higher risk of GDM. It would also provide an opportunity for intervention early in pregnancy. Even though most women with excessive GWG had traditional risk factors for GDM in our study, excessive GWG without traditional risk factors also had higher odds of having GDM. Therefore, it can be used as a predictor of GDM in our setting.

Summary & conclusions

From the series of clinical research on diagnostic tests and methods, author of this oration would like to draw following conclusions and would also like to argue against some of the existing management of GDM in Sri Lanka**.**

1. Results of our first study clearly indicated that the current GDM screening practices at tertiary care setting is far below the standard practice. Therefore, educating the health care professionals on GDM screening is an urgent need to improve maternal and child health services in Sri Lanka.
2. The second study revealed that the non-fasting GCT had a poor sensitivity (40.6%) and poor specificity when compared to GTT with IAPDSG criteria. Therefore, the current recommendation of Nirogi Lanka-diabetes prevention task force and Sri Lankan College of Obstetricians & Gynaecologists on GDM screening using a single-step non-fasting GTT with 2h cutoff of 140 mg/dL as a screening and diagnostic test for GDM may need to be revisited.
3. Instead we would suggest a single-step 75g GTT using the IADPSG criteria over GCT as the most appropriate method for GDM screening for our settings.
4. As for the most appropriate method for GDM screening, we would recommend universal screening as the best strategy at tertiary care settings. However, if the facilities are limited, selective risk factor based screening also can be used with success in community clinics where women are less likely to have multiple risk factors for GDM.
5. Booking visit BMI and mid trimester excessive gestational weight gain can be used to predict GDM. We recommend to calculate BMI at booking visit and look for excessive gestational weight gain in mid trimester and intensive look for GDM in women with BMI $\geq$25 kg/m^2 or/ and mid trimester excessive gestational weight gain.

References

1. Metzger BE and Coustan DR. Summary and recommendations of the Fourth International Workshop-Conference on Gestational Diabetes Mellitus. The Organising Committee. *Diabetes Care* 1998. 21(Suppl 2): p.B161-7.
2. Sridhar GR, V Putcha, G Lakshmi. Time trends in the prevalence of diabetes mellitus: ten year analysis from Southern India (1994 - 2004) on 19,072 subjects with diabetes. *J Assoc Physicians India* 2010; **58**: p.290-4.
3. Siribaddana SH, *et al.* The prevalence of gestational diabetes in a Sri Lankan Antenatal Clinic. *Ceylon Med J* 1998; **43**(2): p.88-91.
4. Dahanayaka NJ, *et al.* Inadequacy of the risk factor based approach to detect gestational diabetes mellitus. *Ceylon Med J* 2012; **57**(1): p.5-9.
5. Senanayake H, *et al.* Screening for gestational diabetes mellitus in Southern Asian women. *J Obstet Gynaecol Res* 2006; **32**(3): p. 286-91.
6. Group HSCR. Hyperglycemia and Adverse Pregnancy Outcome (HAPO) Study: associations with neonatal anthropometrics. *Diabetes* 2009; **58**(2): p.453-9.
7. Maresh M. Screening for gestational diabetes mellitus. *Semin Fetal Neonatal Med* 2005; **10**(4): p.317-23.
8. Lapolla A, *et al.* New International Association of the Diabetes and Pregnancy Study Groups (IADPSG) recommendations for diagnosing gestational diabetes compared with former criteria: a retrospective study on pregnancy outcome. *Diabet Med* 2011; **28**(9): p.1074-7.
9. Vambergue A. Gestational diabetes: diagnosis, short and long term management. *Presse Med* 2013; **42**(5): p.893-9.
10. Lieberman N, Kalter-Leibovici O, Hod M. Global adaptation of IADPSG recommendations: a national approach. *Int J Gynaecol Obstet* 2011; **115**(Suppl 1): p.S45-7.
11. Balaji V, *et al.* Diagnosis of gestational diabetes mellitus in Asian-Indian women. *Indian J Endocrinol Metab* 2011; **15**(3): p.187-90.
12. Seshiah V, *et al.* Gestational diabetes mellitus-Indian guidelines. *J Indian Med Assoc* 2009; **107**(11): p.799-802, 804-6.
13. Goonewardene M, Dias T. Antenatal care: paradigm changes over the years. *Ceylon Med J* 2013; **58**(2): p.47-50.
14. Alberti KG, Zimmet PZ. Definition, diagnosis and classification of diabetes mellitus and its complications. Part 1: diagnosis and classification of diabetes mellitus provisional report of a WHO consultation. *Diabet Med* 1998; **15**(7): p.539-53.
15. Herath HMM, Weerarathna TP. Adequacy of Gestational diabetes mellitus (GDM) screening in a tertiary care hospital; are we missing GDM in big ways? *Galle Medical Journal* 2015; **20**: p.82.
16. Dahanayaka NJ, *et al.* Screening for gestational diabetes mellitus in Anuradhapura district. *Ceylon Med J* 2011; **56**(3): p.128-9.
17. Herath M, Weerarathna TP, Umesha D. Is Non Fasting Glucose Challenge test Sensitive Enough to Diagnose Gestational Diabetes Mellitus? *International Archives of Medicine* 2015; **8**:
18. Anjalakshi C, *et al.* A single test procedure to diagnose gestational diabetes mellitus. *Acta Diabetol* 2009; **46**(1): p.51-4.
19. van Leeuwen M, *et al*. Glucose challenge test for detecting gestational diabetes mellitus: a systematic review. *BJOG* 2012l; **119**(4): p.393-401.
20. Crete JE, Anasti JN. Diagnosis of gestational diabetes mellitus: can we avoid the glucose challenge test? *J Am Assoc Nurse Pract* 2013; **25**(6): p.329-33.
21. Mohan V, *et al*. Comparison of screening for gestational diabetes mellitus by oral glucose tolerance tests done in the non-fasting (random) and fasting states. *Acta Diabetol* 2014.
22. Montagnana M, *et al*. Glucose challenge test does not predict gestational diabetes mellitus. *Intern Med* 2008; **47**(13): p.1171-4.
23. Hansarikit J, Manotay S. Sensitivity and specificity of modified 100-g oral glucose tolerance tests for diagnosis of gestational diabetes mellitus. *J Med Assoc Thai* 2011; **94**(5): p.540-4.
24. Meththananda Herath HM, Weerarathna TP, Weerasinghe NP. Is Risk Factor-based Screening Good Enough to Detect Gestational Diabetes Mellitus in High-Risk Pregnant Women? A Sri Lankan Experience. *Int J Prev Med* 2016; **7**: p.99.
25. Avalos GE, *et al.* Applying current screening tools for gestational diabetes mellitus to a European population: is it time for change? *Diabetes Care* 2013; **36**(10): p.3040-4.

26 Morikawa M, *et al.* Change in the number of patients after the adoption of IADPSG criteria for hyperglycemia during pregnancy in Japanese women. *Diabetes Res Clin Pract* 2010; **90**(3): p.339-42.

27. Herath HMM. Change of pattern of Oral Glucose Tolerance Test (OGTT) in pregnant women with gestational diabetes mellitus (GDM) in Mornington Peninsula, victoria over 10 year period. *Proceedings of AAS, Pennisula Health, Victoria* 2008; **1**: p.14.

28. Kim SY, *et al*. Association of maternal body mass index, excessive weight gain, and gestational diabetes mellitus with large-for-gestational-age births. *Obstet Gynaecol* 2014; **123**(4): p.737-44.

29. Herath HMM, Weerarathna TP. Can Body Mass Index at booking visit and weight gain during mid-trimester predict Gestational Diabetes Mellitus? *Proceedings of AAS, Sri Lanka Medical Association* 2015; **1**: p.223.

Disseminated histoplasmosis with oral manifestations

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Introduction

Histoplasmosis is fungal infection caused by dimorphic fungus *Histoplasma capsulatum*. The disease is known to be endemic in some parts of North and Central America (1) but it is a very rare disease in Sri Lanka. According to the severity of the signs and symptoms and organs affected; acute, chronic, disseminated and African sub types can be identified.

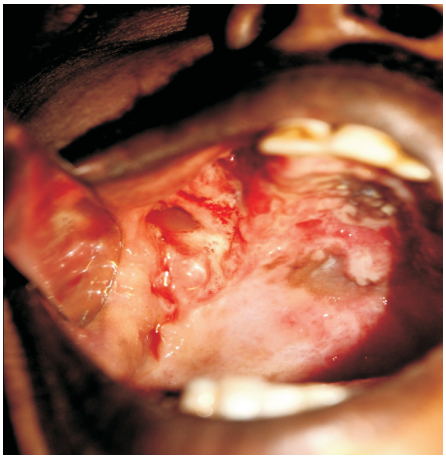

Figure 1: Ulceration in the upper buccal sulcus and the hard palate

Figure 2: Chest ulcers and rashes

Figure 3: Rashes in the arms

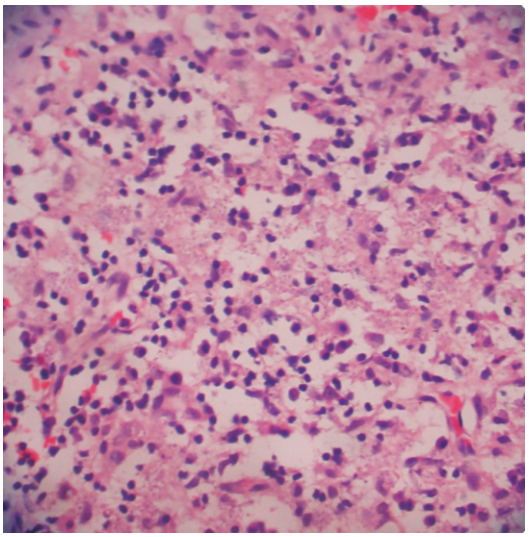

Figure 4: Photomicrograph showing macrophages with intracellular microorganisms

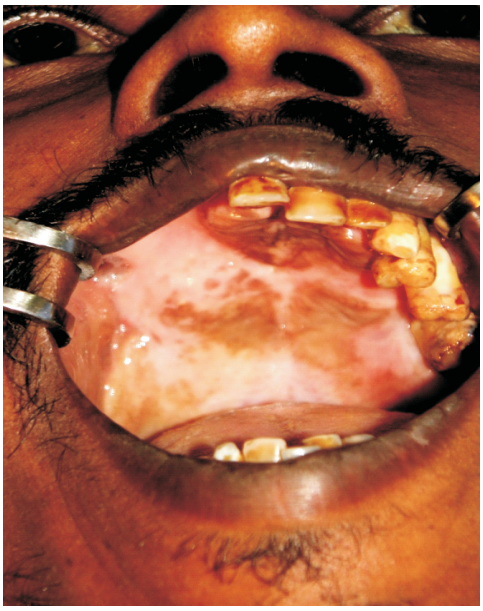

Figure 5, 6: Completely healed intra-oral ulcer, chest ulcers and rashes after the medical treatment, 3 months later

Case Report

A 35-year old man presented to the Oral and Maxillofacial Unit, Teaching Hospital Karapitiya with the chief complaint of multiple oral ulcers with intermittent fever. This was associated with night sweating, anorexia and weight loss of about 15kg. The patient did not complaint of cough or expectoration. The patient had attacks of fever once or twice a day without chills and there was no arthralgia or myalgia.

His remaining medical history was unremarkable and he denied any sexual misconduct. He was a farmer who occasionally involved in Chena cultivation and used to sleep in the rock cave which has been inhabited by bats. The patient was a non-smoker but consumed alcohol occasionally. He also had chewed betel quids with all four ingredients for more than ten years.

On admission, there was an ulcerative growth at right upper alveolus involving palate and buccal sulcus, 4cm x 3cm in size with everted margins (Figure 1). In addition to that, he had chronic ulcers on his chest, legs, penis and there was a generalised skin rash (Figures 2 and 3). Laboratory investigations did not reveal any significant abnormality including HIV 1 and 2 antibodies.

Incisional biopsy from the oral lesion was performed. Histopathology with haematoxylin and eosin stained sections and special stains PAS-D (periodic acid schiff-diastase) and Grocott stain concluded granulomatous inflammation due to histoplasmosis (Figure 4).

Abdominal CT and ultrasonography (USS) revealed hepatosplenomegaly. Colonoscopy showed mucous membrane of the colon severely inflamed and apthoid ulcers scattered throughout the mucous membrane. Biopsy of the colon mucosa demonstrated granulomatous inflammation induced by mycotic infection, consistent with histoplasmosis. The condition was diagnosed as progressive disseminated histoplasmosis.

The patient was started with intravenous amphotericin B for 30 days. Then it was followed by oral itraconazole 200 mg mane for 15 days. After completion of the treatment, patient's appetite improved. All the skin rashes diminished and oral, penis and chest ulcers healed completely (Figure 5, 6).

The follow up CT scan showed spleen returned to normal size. Upper and lower gastrointestinal endoscopy performed 2 months after the treatment revealed healing ulcers in the mucous membranes.

Discussion

Histoplasmosis is caused by a dimorphic fungus known as *Histoplasma capsulatum* that lives in acidic, damp environments and caves where bats or birds reside (2). This dimorphic fungus remainsin mycelia form in the ambient temperature and grows as yeast form in the human lungs. The severity of the disease depends on the quantity of the spores inhaled and the immune state of the patient (3). Disease intensity is influenced by the interaction between innate / adaptive immunity and fungal virulence factors (4).

Four clinical sub types have been described in the literature: acute pulmonary, chronic pulmonary, disseminated and African type. Disseminated form is characterised by progression of the disease to extra pulmonary siteswhich is predominantly seen in the immunocompromised patients such as HIV positive individuals, patients with hematolymphoid malignancies, solid organ transplants and patients who received chemotherapeutic and immuno-suppressive agents (5). It can also be developed in 1 case per 2000 cases in adults who are immunocompetent (6).

The disseminated histoplasmosis has different extrapulmonary manifestations such as oral cavity, skin, liver, spleen, adrenal glands, lymph nodes, gastrointestinal tract, kidney and central nervous system (3).

Common extra pulmonary presentation of disseminated histoplasmosis is oral cavity lesions. Up to 66% of the patients who presented with oral manifestation have disseminated disease (3). The tongue, palate and buccal mucosa are more common sites for oral manifestations (3).Cutaneous dissemination is observed in 38% to 85% cases (7). The treatment of choice for disseminated histoplasmosis is intravenous amphotericin B but still there is 7% to 23% of mortality rate (3). Azole antifungal agents such as itraconazole also can be used as alternative to amphotericin B or alternate maintenance therapy.

Conclusions

Disseminated histoplasmosis rarely occurs in an immunocompetent patient as in this case. The oral presentation is easily misdiagnosed for a neoplasm due to the nature of the ulcer and the rarity. Therefore, it is a challenge to make the correct diagnosis and provide proper treatment.

References

1. Kauffman CA. Histoplasmosis. *Clin Chest Med.* Jun 2009; **30**(2): 217-25.
2. Iqbal F, Schifter M, Coleman HG. Oral presentation of histoplasmosis in an immunocompetent patient: a diagnostic challenge. *Australian Dental Journal* 2014; **59**: 386-8.
3. Rodolfo N Epifanio, Robert B Brannon, Brian C Muzyka. Disseminated histoplasmosis with oral manifestation: *Special Care in Dentistry* Nov 2007; **27**(6): 236-9.
4. Isadora Peres Klein, Marco Antonio Trevizani Martins, Manoela Domingues Martins, Vinicius Coelho Carrard. Diagnosis of HIV infection on the basis of histoplasmosis-related oral ulceration. *Special Care in Dentistry* 2016: **36**(2): 99-103.
5. Manoj Harnalikar, Vidya Kharkar, Udyakhopkar. Disseminated cutaneous Histoplasmosis in immunocompetent adult. *Indian Journal Dermatology* 2012; **57**(3): 206-9.
6. Cuellar-Rodriguez J, Avery RK, Lard M, Budev M, Gordan SM, Shrestha NK, *et al*. Histoplasmosis in solid organ transplant recipients: 10 years of experience at a large transplant center in an endemic area. *Clin Infect Dis* 2009; **49**(5): 710-6.
7. Tobon AM, Agudelo CA, Rosero DS, *et al*. Disseminated histoplasmosis: a comparative study between patients with acquired immunodeficiency syndrome and non-human immunodeficiency virus-infected individuals. *Am J Trop Med Hyg* 2005; **73**: 576-82.

Dengue fever with myositis; a rare presentation

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Introduction

Dengue fever is a common arthropod borne tropical infection caused by four serotypes of the dengue virus. Up to 50 million infections occur worldwide annually with1% developing dengue haemorrhagic fever (1). Rarely patients develop expanded dengue syndrome which is characterised by isolated organopathy (1).

Dengue fever associated with myositis with or without rhabdomyolysis and acute renal failure is extremely rare (2, 3). Here we report a 12-year old boy who presented with dengue fever complicated with severe myositis.

Case Report

A previously healthy 12-year old boy presented with fever for 5 days associated with severe myalgia. At the onset of the illness he also complained of headache, arthralgia, retro-orbital pain, nausea, vomiting and abdominal pain. He developed red coloured urine which settled by the 3rd day of the illness and was found to be positive for dengue Ns1 antigen.

His vital signs were normal with a temperature of 99.4 ^{0}F. His cardiovascular, respiratory, abdominal and central nervous system examination was normal. There were no bleeding manifestations or features of leakage.

Full blood count done on the 5th day of illness showed a WBC count of 5.17 x 10^3/uL with neutrophil predominance and platelet count was 239 x 10^3/uL. His initial creatine phosphokinase (CPK) was 38,840 U/L and aspartate aminotransferase (AST) and alanine aminotransferase (ALT) values were 2,866 U/L and 611 U/L, respectively. During the hospital stay CPK value rose to 40,310 U/L. Repeat AST and ALT were 2,843 U/L and 764 U/L, respectively. His serum creatinine remained normal throughout the illness and urine analysis was normal. Dengue IgM done by chromatographic immunoassay was positive on day 7 of the illness. At discharge on day 9, his CPK, AST and ALT were 16410 U/L, 707 U/L and 384 U/L, respectively. They all were normal at the follow up visit at 1 month. A summary of his investigations done during the hospital stay is given in the table.

Table: Investigations done during the hospital stay

Date	11/01/16	12/01/16	13/01/16	14/01/16	15/01/16
White cell count (10^3)	5.17	3.8	3.4	3.21	3.85
Platelet count (10^3)	239	144	133	185	230
AST (U/L)	2866	2843	2186	1460	707
ALT (U/L)	611	764	632	511	384
CPK (U/L)	38840		40310		16410

During the hospital stay patient was closely monitored for features of rhabdomyolysis and acute renal failure while continuing with the management of dengue fever. Aggressive fluid resuscitation, which is indicated in the prevention of rhabdomyolysis induced renal damage was not practiced. The fluid was administered at a controlled rate according to the National dengue guidelines to achieve a minimum urine output according to body weight. Patient did not develop acute renal failure and he recovered from dengue fever without further complications.

Discussion

Myositis, rhabdomyolysis and acute renal failure are known to occur as a sequel of severe viral infections like influenza A and B virus, HIV, coxsackie viruses, and cytomegalovirus (4). Direct viral invasion of the muscle fibers and generation of myotoxic cytokines such as tumour necrosis factor have been described as the possible mechanism for dengue virus associated myositis (5). Muscle biopsy has revealed nonspecific perivascular mononuclear infiltration (4). Though the patients with dengue fever commonly present with myalgia, associated myositis may go undiagnosed due to the lack of clinical suspicion and necessary investigations. Myositis seen in dengue fever is usually acute onset, short lasting and benign. Few present with elevated CPK levels and they rarely go on to develop rhabdomyolysis and acute renal failure (4). A few cases of dengue fever associated acute myositis with or without rhabdomyolysis which was confirmed by muscle biopsy and EMG has been reported in the past (4).

We report a case of myositis associated with very high CPK levels. The patient did not develop rhabdomyolysis and/or acute renal failure and recovered fully without any complications.

Conclusions

Myositis and rhabdomyolysis associated with dengue fever are recognized complications. Clinical suspicion and necessary investigations at the appropriate time can prevent life-threatening complications like acute renal failure. All the dengue fever patients presenting with severe myalgia should undergo measurement of CPK and early appropriate interventions to prevent hazardous outcomes.

References

1. Impact of Dengue. WHO. [cited 2016 Feb 1]. Retrieved from: http://www.who.int/csr/disease/dengue/impact/en/
2. Gomes M, Muller K, Busch H, Uhl M, Kelly T, Huzly D, *et al.* An unusual cause of acute rhabdomyolysis. In: Rheumatology (Oxford). March 2006; **45**(5): 643-4.
3. R Rengaraj, T Arulmozhi, M Dhanaraj. Acute Myositis. *Journal of the Association of Physicians of India* 2006; **54**: 149-50.
4. HK Aggarwal, Deepak Jain, Sunil Pawar, Promil Jain, Anshul Mittal. Dengue fever presenting as myositis: an uncommon presentation. Research 2014; **1**: 985. (DOI - //dx.doi.org/10.13070/rs.en.1.985)
5. Gagnon SJ, Mori M, Kurane I, Green S, Vaughn DW, Kalayanarooj S, *et al.* Cytokine gene expression and protein production in peripheral blood mononuclear cells of children with acute dengue virus infections. *J Med Virol* 2002; **67**: 41-6.

Challenges of managing *Enterobacter* endocarditis; a review of two cases

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Introduction

Infective endocarditis (IE) carries significant mortality and morbidity and *Streptococci* and *Staphylococci* are the common causative organisms Apart from the HACEK group (*Haemophilus, Actinobacillus, Cardiobacterium, Eikenella and Kingella),* IE due to other gram-negatives are rarely reported. Risk factors of IE by non-HACEK group include intravenous drug abuse, healthcare contact and the presence of prosthetic cardiac devices (1). Here we report a review of two cases of complicated *Enterobacter* endocarditis.

Case Report 1

A 46-year old male drug addict from Elpitiya, Galle with the history of rheumatic carditis in childhood presented in February 2016 with sudden onset slurred speech and left upper limb numbness for one day and intermittent fever with loss of appetite for 2 weeks.

He was febrile (103^0F) and had a systolic murmur in the mitral area. Total white cell count (WCC) was 16.3 x 10^9/L with 76% neutrophils. C-Reactive Protein (CRP) was 202 mg/L and ESR was 40 mm/1^{st} hr. IV penicillin and gentamicin were started empirically after 3 blood cultures. 2D Echocardiogram revealed 10 x 10 mm size mitral valve vegetation. Within 24 hours incubation, all blood cultures became positive for Gram-negative bacilli and IV penicillin was replaced with IV ceftriaxone. The isolate was a lactose fermenter on MacConkey agar and gave acid/acid reaction with gas production in the Kligler iron agar test. All had the same colony morphology and the same antibiotic sensitivity pattern showing sensitivity to amikacin, meropenem and ceftriaxone and resistance to ampicillin, co-amoxiclav and cefuroxime. The isolate was identified as *Enterobacter cloacae* by the typical colony morphology, Kligler iron agar reaction and the RapID commercial kit of biochemicals.

On the 4^{th} day, duplex scan was performed due to pain in the left calf and it revealed left femoral artery embolus and embolectomy was done. Contrast enhanced CT scan showed right basal ganglia infraction. By this time, fever had not responded to ceftriaxone and patient was clinically deteriorating with rising total white cell count (23.9 x 10^9/L).

After identification of the organism as *Enterobacter cloacae* by the 5^{th} day, IV meropenem was started in place of ceftriaxone and gentamicin was continued. Following the change, there was a dramatic response of fever and the clinical condition improved with reduction of vegetation size (6 x 8 mm) and inflammatory markers. After 4 weeks of treatment, total white cell count was 8.34 x 10^9/L with CRP of 8 mg/L, along with the vegetation size of 2 x 3 mm and the clinical response. Antibiotics were continued for 8 weeks in total.

Case Report 2

A 73-year old previously healthy, male admitted with intermittent low grade fever, loss of appetite, loss of weight and fatiguability for 3 weeks. During his 10 days of hospital stay, he was investigated extensively for anaemia with haemoglobin 9 g/dL and the bone marrow biopsy was done to exclude any myelodysplastic syndrome. 2D echocardiogram was normal. He had culture positive urinary tract infection with *Enterococcus faecalis* and fever subsided with co-amoxiclav.

After 2 months he presented with the same symptoms and this time there was a grade IV pansystolic murmur at the cardiac apex. On the day of admission he developed gross painless haematuria. 2D echocardiogram revealed multiple vegetations attached to posterior leaflet of the mitral valve with the largest measuring 13 x 8 mm. Two of the three blood samples became positive within 24 hours of collection for *Enterobacter aerogenes.* The organism was sensitive to co-amoxiclav, cefuroxime, ceftazidime, ceftriaxone, co-trimoxazole, ciprofloxacin, amikacin, gentamicin and meropenem while resistant to ampicillin.

His haemoglobin was 4.8 g/dL with platelet count of 96 x 10^9/L and white cell count was within normal limits with lymphocytic predominance. ESR was 161 mm/1^{st} hour and CRP was 96 mg/L. Blood picture showed bicytopenia with normochromic normocytic anaemia and thrombocytopenia. His bone marrow biopsy showed hypoplastic marrow. Immunohistochemistry studies excluded the possibility of a lymphoma. Meanwhile his Anti-Nuclear Antibody (ANA), Double Stranded DNA (DsDNA), Serology for hepatitis and HIV were negative and liver and renal functions remained within normal limits. His chest radiograph, CT brain and ultrasound scan of the abdomen showed no abnormality.

The patient was initially treated with IV ceftriaxone 2 g daily and IV gentamicin for 16 days. During the first 12 days his fever and other symptoms settled with reduction of CRP from 96 to 50 and then 33). However, fever recurred on 13^{th} day and CRP increased from 33 to 56). Septic screening were negative while repeat echocardiogram showed only a slight reduction of the size of the largest vegetation (From 13 x 8 mm to 7 x 5 mm). Suspecting probable cephalosporin resistance, ceftriaxone was replaced with IV meropenem 1g 8 hourly the patient showed a marked improvement. He developed an episode of neutropenia on 9^{th} day of IV meropenem which completely recovered with GM-CSF 5 µg/kg for three days.

After completing 8 weeks of meropenem, his CRP and white cell count became normal. However, the echo findings suggested persistent vegetations without further regression. He refused to have IV antibiotics further and was counseled to undergo vegetectomy and valvular repair in one month.

Discussion

Enterobacter spp. are a member of the family Enterobacteriaceae and are mucoid lactose fermenters mimicking *Klebsiella* morphology. They are motile and have the acid slant with acid butt and gas reaction in the Kligler iron agar test. It is known to cause pyelonephritis, intra-abdominal infections, chest infections, bone, joint and soft tissue infections and sepsis including various types of nosocomial infections but only very few cases of endocarditis have been described in the medical literature.

According to an *Enterobacter* endocarditis case report published by Tunkel *et al* (1992), about 10 out of 17 cases had mitral valve involvement while four others had aortic valve disease (2). Among the published cases the mortality rate was 44.4% (2). *Enterobacter* are capable of forming biofilms and of secreting some cytotoxins such as enterotoxins, hemolysins, and pore-forming toxins which can be important for its pathogenicity (4).

It is a great challenge to treat IE caused by *Enterobacter* with the various mechanisms of antibiotic resistance of the organism and with the toxic effects of the antibiotics in the long term therapy. Combination therapy with a beta lactam (penicillins, cephalosporins or carbapenems) and an aminoglycoside is effective for non-HACEK group endocarditis (2). Despite the in-vitro sensitivity to cefotaxime or ceftriaxone, some bacteria such as *Enterobacter* species can develop inducible resistance to 3^{rd} generation cephalosporins due to their inherent AmpC beta-lactam gene resulting in therapeutic failures (2, 3).

In these patients we initially continued IV ceftriaxone according to our primary ABST. However, after we confirmed the identity of the organism and with the poor clinical response we replaced ceftriaxone with IV meropenem and IV gentamicin for 8 weeks which led to a remarkably good outcome. Most of the patients with Gram negative infective endocarditis need surgical intervention as in our second case, though a few might recover with antibiotic therapy alone.

Therapeutic success in infective endocarditis often shows how vigilant and knowledgeable the clinician is. Patient's understanding and corporation is required as it needs a longer duration of antibiotics which can result in toxicity, side effects, risk of

secondary infections, increased cost and poor compliance. The clinician needs to anticipate such problems and detect them early with strict monitoring of haematological and biochemical parameters. Regular echocardiograms, communications with other members of the team and patient also required.

References

1. Moon J, Smith T, Sahud AG, Bhanot N, An unusual etiology of infective endocarditis: *Enterobacter cloacae*. *J Infect Chemother* 2012; **18**(6): 925-30.
2. Tunkel AR, Fisch MJ, Schlein A, Scheld WM, *Enterobacter* endocarditis, *Scand J Infect Dis*, 1992; **24**(2): 233-40.
3. Yoshino Y, Okugawa S, Kimura S, Makita E, Seo K, Koga I, Matsunaga N, Kitazawa T, Ota Y, Infective endocarditis due to *Enterobacter cloacae* resistant to third and fourth-generation cephalosporins, *Journal of Microbiology, Immunology and Infection*, 2015; **48**(2): 226-8.
4. Anne Davin-Regli, Jean-Marie Pagès. *Enterobacter aerogenes* and *Enterobacter cloacae*; versatile bacterial pathogens confronting antibiotic treatment. *Front Microbiol* 2015; **6**: 392.

Severe anaemia and multiple ecchymoses in a postpartum female due to acquired haemophilia A

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Introduction

Acquired haemophilia A (AHA) is a rare acquired bleeding disorder with a worldwide incidence of 2 per million of the population (1). It has a bimodal age distribution including postpartum period and adults over 50 years while the latter being most frequent (2). We report a case of AHA in a postpartum young female. We were unable to trace previous cases of the same condition reported in Sri Lanka.

Case Report

A 26-year old previously healthy lactating mother presented at postpartum 8th week with gradual onset left hip joint pain for 2 weeks duration.

Four weeks prior to this presentation she had developed multiple bruises over lower limbs and a painful swelling of the left calf which resolved spontaneously. She denied any pain involving other joints while left hip pain was progressive leading to difficulty in walking.

New bruises had appeared over forearms and thighs with an intermittent low grade fever for one week prior to admission.

There was no history of easy bruising or any bleeding disorder in her past or in the family. No excessive bleeding occurred following trauma or surgery in the past.

On examination she was pale, anicteric, afebrile with multiple ecchymoses and bruises over forearms and thighs. She was keeping left lower limb flexed at hip joint demonstrating psoas muscle irritation. Abdomen was soft and non-tender with well healed LSCS scar. No hepatosplenomegaly or pelvic masses were felt. Examination of cardiovascular, respiratory and nervous system was unremarkable.

On admission, haemoglobin was 5.9 g/dL, white cells 12,000 /mm^3 and platelets 631,000 /mm^3. Blood picture revealed severe normochromic normocytic anaemia with evidence of acute bleeding. Reticulocyte count was 7.8%. Prothrombin time was 11.4 seconds (control 11.4 sec). Activated Partial Thromboplastin Time (APTT) was 96 seconds (control 44 sec). Bleeding time was normal (6 minutes).

APTT correction studies and inhibitor screening were performed.

APTT after 50 : 50 mixing with normal plasma: 57 sec (corrected)

After 2 hour incubation at 37 ^{0}C,

APTT of pre mixed sample : 85 sec

APTT of fresh mixed sample : 66 sec

Results were concluded as presence of time and temperature dependent coagulation inhibitor and AHA was diagnosed by the characteristic time and temperature dependent nature of factor VIII (FVIII) inhibitors.

Ultrasound scan (USS) revealed a large haematoma in the left psoas muscle (24 cm × 5 cm × 3 cm). Liver, renal functions and UFR were normal. CRP 112 mg/dL, ESR 120 mm in the 1sthour while all the cultures were sterile. ANA, Rheumatoid factor were negative. Complement levels were within normal limits.

Soon after the diagnosis she was started on oral prednisolone 1 mg/kg/day in order to eradicate the inhibitor. She required recombinant factor VIIa 90 μg/kg two doses for the prevention of further bleeding. Supportive care was given with Red cell transfusion (1,500 mL), tranexamic acid, iron and folate. Response was assessed clinically,

ultrasonographically and haematologically(Table 1).

She achieved a remarkable clinical response by 4th day of therapy with US showing evidence of resolving haematoma.

Table 1: Progress of APTT & Ab

Day of steroid therapy	Day 1	Day 2	Day 3	Day 4	Day 5	Day 10
APTT (sec)	96	87	68	57	48	35
Haemoglobin (g/dl)	5.9	9.6	9.6	10.0	10.3	11.2

Prednisolone was continued in same dose for 3 weeks and tapered. No recurrences were detected and the patient remained asymptomatic at the end of 3 months after discharge.

Discussion

AHA is a rare potentially life threatening disease caused by the development of autoantibodies against FVIII protein resulting in impaired function of FVIII. It is associated with systemic autoimmune disorders, haematological malignancies, drugs, pregnancy, postpartum and sometimes idiopathic (3).

Bleeding pattern is distinct from congenital haemophilia with mucocutaneous and muscle bleeding in contrast to haemarthrosis.

AHA should be suspected in the presence of recent onset bleeding in an adult together with isolated prolongation of APTT and normal bleeding time. Further, mixing studies including 2h incubation at 37 ^{0}C are necessary to identify time and temperature dependent FVIII inhibitors.

Goals of therapy are inhibitor eradication and prevention of further bleeding. Corticosteroids or/and cyclophosphamide are recommended as the first line treatment while rituximab with immune suppressives are used as the second line. By passing agents are used to control bleeding. Activated Prothombin Complex Concentrates and recombinant FVIIa have equal efficacy (4). Our patient was treated with the latter as it was freely available to us. High dose FVIII combined with plasmapheresis and immunoadsorption is considered in refractory cases (4).

Postpartum AHA is very rare but carries a good prognosis (5). There is a possibility of recurring in subsequent pregnancies and cases with recurrent AHA are rarely reported (6).

Patients require close followup for the initial 6 months and thorough haemostatic assessment prior to any invasive procedure.

Even though it may be challenging, this case report highlights the importance of high degree of clinical suspicion for early diagnosis and prompt treatment of AHA in order to prevent life threatening outcomes.

Conclusions

Although rare, AHA could present with life threatening bleeding during postpartum period. Prompt recognition and treatment is necessary to prevent adverse outcomes.

References

1. P. Giangrande. Acquired Hemophilia *WFH.ORG* November 2012; 1186.
2. Lan Mo and George C Bao. Acquired factor VIII deficiency: two case reports and a review of literature. *Exp Hematol Oncol*. 2017; 6-8.
3. Sara J Grethlein, Craig M Kessler. Acquired Haemophilia: Practice essentials, Background, Pathophysiology. *emedicine.medscape.com/article*/211186.
4. Peter W Collins. Diagnosis and management of acquired coagulation inhibitors: a guideline from UKHCDO. *British Journal of Haematology* 2013 September; **162**: 758-73.
5. Prognostic factors for remission of and survival in acquired hemophilia A: results from the GTH-AH 01/2010 study. *Blood* 2015; **125**: 1091-7.
6. Mulleiz SM, Vantilburgh A, Devreese KM. Acquired Hemophilia: a case report and review of the literature. *Int J Lab Hematol* 2014 Jun; **36**(3): 398-407.