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The Galle Medical Journal

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Cavitating left upper lobe pneumonia; a case of Melioidosis

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ABSTRACT

Melioidosis is a bacterial infection caused by *Burkholderia pseudomallei*. The first cases of melioidosis were described in Burma just over a century ago. Since then, the endemic zone has expanded and includes Sri Lanka. The clinical presentation of melioidosis ranges from acute, subacute and chronic manifestations. Due to its protean clinical presentation, a high index of suspicion is necessary for the clinical diagnosis. Diagnosis is confirmed by isolation of *B. pseudomallei* from clinical specimens. A high or rising antibody titre to melioidin antigen is supportive, but not diagnostic. *B. pseudomallei* grows readily in commonly used laboratory media but may not be identified unless laboratory personnel have prior experience with this organism. Treatment is complex and includes a prolonged course of intravenous antibiotics followed by months of oral therapy to ensure eradication of the bacterium. Relapse is common in spite of adequate therapy. A case report of a patient with acute onset pneumonia with a positive sputum culture of *B. pseudomallei* is presented.

Introduction

Melioidosis is a bacterial infection caused by *B. pseudomallei*, an aerobic, Gram-negative, motile bacillus, endemic in the tropical and subtropical regions of South East Asia and Northern Australia. Even though Sri Lanka has been considered as non-endemic for melioidosis in the past, it is now recognised as an emerging infection in the country. The first cases of melioidosis were documented in Burma by Alfred Whitmore and C.S. Krishnaswami in 1912 and the first published report of melioidosis in Sri Lanka was in 1927 (1), in a European tea broker residing in Sri Lanka. Since then several case reports of melioidosis acquired in Sri Lanka have been published (2-4).

Melioidosis is acquired by inoculation or inhalation of soil and water contaminated with the bacterium. Occupational exposure to mud and surface water is a risk factor (5,6). More severe disease is seen among patients with diabetes, chronic kidney disease or liver cell disease. Once the organism enters the body, clinical presentation is varied ranging from acute,

sub-acute to chronic (6). It resembles the clinical manifestations of tuberculosis and may be misdiagnosed as such. In countries where both infections are prevalent, clinicians need a high index of suspicion to diagnose melioidosis.

Once the diagnosis is made, melioidosis is treated by intravenous (IV) meropenem or imipenem for a minimum duration of two weeks (7). In severe cases IV therapy needs to be prolonged for four to six weeks. Once the initiation phase is over, two drugs, from cotrimoxazole, co-amoxyclav and doxycycline, should be given for at least three months to prevent a relapse. It is recommended that the latter part of the induction phase should overlap with the commencement of cotrimoxazole (7).

Case Report

A 25-year-old, previously healthy insurance sales executive from Negombo in the Western Province of Sri Lanka presented to a local hospital with a history of fever with chills and rigors for 4 days and productive cough with intermittent haemoptysis,

loss of appetite, evening pyrexia, and night sweats of two weeks duration. Initial examination at the local hospital was unremarkable except for an elevated temperature. Random blood sugar and fasting blood sugar performed were persistently high and insulin was commenced. His full blood count revealed neutrophil leucocytosis and ESR and CRP were high. His initial chest radiograph showed apical shadowing on the left side (Figure 1).



Figure 1: Chest radiograph showing early left apical shadow

He was started on intravenous cefuroxime and discharged on oral antibiotics once the fever settled. However he was readmitted to the local hospital three days later due to the recurrence of fever. On examination he was febrile, ill looking and examination of the respiratory system revealed a patch of bronchial breathing in the left upper zone. The white cell count and the rising CRP and ESR were suggestive of an unresolving bacterial infection. Repeat chest radiograph revealed left upper zone opacity with cavitation (Figure 2).



Figure 2: Chest radiograph showing left upper zone opacity with cavity formation

He was started on intravenous meropenem 1g 8 hourly after taking sputum and blood for culture and transferred to the National Hospital for Respiratory Diseases (NHRD), Welisara for further management.

On admission to the NHRD, clinical examination revealed an ill looking, febrile patient with a patch of bronchial breathing and crepitations over the left upper zone of the lung fields. There was no evidence of pleural effusion, a cardiac murmur or organomegaly. Three specimens of sputum were negative for acid fast bacilli (AFB) by microscopy and culture and the Mantoux test were negative. Ultrasound imaging of the abdomen revealed no abnormality. Sputum for pyogenic culture grew a bacterium that was identified as a pseudomonas species suggestive of *B.pseudomallei*. Antibody to melioidin by the indirect haemagglutination test (IHA) was positive at a titre of 1:2560 and the diagnosis of melioidosis was made. The isolate was subsequently confirmed to be *B. pseudomallei* by matrix-assisted laser desorption / ionization time of flight mass spectrometry (MALDI-TOF) and PCR at the reference laboratory.

Intravenous meropenem was continued and oral cotrimoxazole 1920mg twice daily was added after one week. Fever settled after one week of therapy. He was discharged on oral cotrimoxazole and doxycycline 100mg twice daily after completing 2 weeks of intravenous therapy. On review, 2 weeks after discharge, he was clinically well with good glycaemic control. His inflammatory markers were normal and a repeat chest radiograph showed resolution of the lung lesion (Figure 3). He is currently on oral cotrimoxazole and doxycycline for a total of three months.



Figure 3: Chest radiograph showing resolved opacity

Discussion

Melioidosis is an emerging infection in Sri Lanka and an increasing number of cases are being reported, probably due to improvement in clinical awareness and the availability of clinical microbiology laboratory facilities. Clinical presentation, similar to tuberculosis, is varied, ranging from acute to chronic or even sub acute, as in our patient.

Our patient was a recently diagnosed diabetic with a sub acute presentation of an unresolving pneumonia with cavity formation. This triad of clinical features is typical of tuberculosis which resulted in his transfer to the NHRD for further investigation. However, both sputum microscopy and culture were negative for acid fast bacilli as was the skin test for evidence of cell mediated immunity to tuberculosis. Pyogenic culture, on the other hand, revealed a pure growth of a Pseudomonas-like bacterium. Due to a high index of suspicion by the clinician and prior experience with *B. pseudomallei* by the microbiologist, melioidosis was suspected and the isolate was sent to a reference laboratory for further identification (2).

The initial identification was made due to the typical colony appearance on blood agar (8) and MacConkey agar. On blood agar, colonies were pinpoint at 24 hours. After 48 hours opaque, creamy white colonies with beta haemolysis were seen (Figure 4). Over the next week the colonies became umbonate (raised centre) and then developed wrinkling. On MacConkey agar colonies had a non-lactose fermenting appearance at 24 hours but by 48 hours had turned the bright pink colour of a lactose fermenter (Figure 5). However it is important to note that a minority of strains show translucent, serous grey colonies with only limited haemolysis on blood agar and have a non-lactose fermenting (NLF) appearance on MacConkey agar.

The isolate had the characteristic earthy smell described for *B. pseudomallei*, typical “safety pin” appearance on Gram stain, a positive oxidase test and gentamicin, polymyxin and colistin resistance coupled with co-amoxyclav sensitivity (2) in the antibiotic sensitivity test (ABST) (Figure 6). Vancomycin was included in the ABST to exclude the possibility of a spore bearer which may also give rise to wrinkled colonies with a safety pin appearance on gram stain. However the spore bearer

(*Bacillus* spp) will be vancomycin sensitive while *Burkholderia* spp are vancomycin resistant.

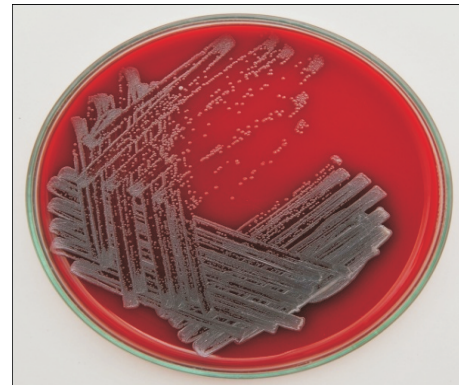


Figure 4: Pinpoint colonies with white opaque appearance in confluent areas seen on blood agar



Figure 5: Pink colonies on MacConkey agar

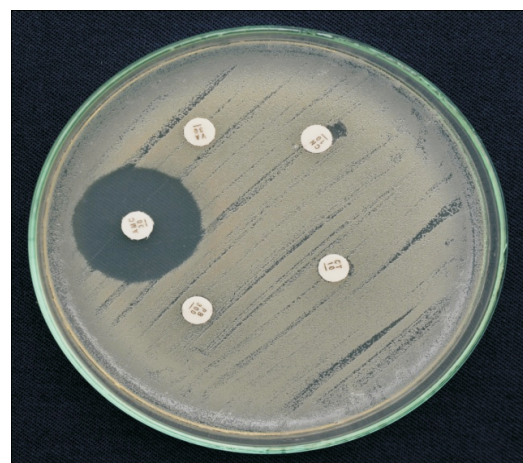


Figure 6: Antibiotic sensitivity pattern with gentamicin, polymyxin and colistin and vancomycin (resistance coupled with co-amoxyclav sensitivity)

Confirmation of identity required real time PCR and MALDI-TOF mass spectrometry which were not available locally and were performed at a reference laboratory (9).

Effective treatment of the patient and a successful outcome was the result of a high degree of clinical awareness of melioidosis and prior experience with *B.pseudomallei*. It is very likely that melioidosis is more prevalent in Sri Lanka than is currently recognised (2). Many sub-acute and chronic presentations, especially cavitating pneumonia and psoas abscess may be misdiagnosed and treated as tuberculosis, with a fatal outcome. Even if *B.pseudomallei* is isolated in sputum culture it may not be recognised by laboratory personnel due to lack of prior experience. Even in our patient the initial sputum culture was reported as *Pseudomonas* spp but awareness on the part of the clinician and microbiologist led to further investigation.

Conclusions

Melioidosis is a difficult infection to manage, not least because of its capacity to cause a rapidly fatal outcome despite the use of antibiotics. As melioidosis and tuberculosis have similar risk factors and clinical presentations, as in this case, and are prevalent in the same tropical belt, there may be diagnostic difficulties unless a high index of suspicion is maintained. Therefore it is important to raise awareness among clinicians regarding the prevalence and varied clinical presentation of this infection. It is also important to improve bacterial culture facilities and educate laboratory personnel in order to improve the laboratory diagnosis of this infection, especially in laboratories that do not have an on-site clinical microbiologist.

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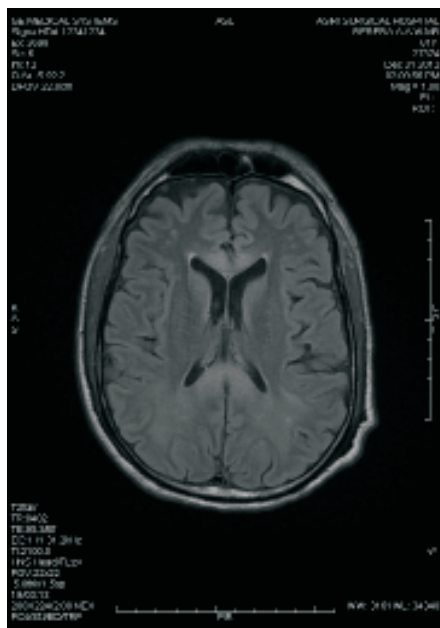


Figure 2: diffuse high T1/ FLAIR signals noted in the corpus callosum-Coronal view

Discussion

The Italian pathologists Marchiafava and Bignami first described this disease following post-mortem brain analysis of three alcoholics, who presented with status epilepticus and coma in 1903. However, it is felt that MBD goes under-reported and under-diagnosed and that its incidence is probably higher than that reported. This disease is due to the demyelination of the corpus callosum and it can be easily detected with MRI imaging. Presenting features of MBD are nonspecific and include confusion, disorientation, psychotic and emotional symptoms, seizures, hemiparesis, dysarthria, ataxia, coma and death (3). The disorder can be divided into two clinical subtypes. The more severe type (Type A) presents with disorder of consciousness, which may lead to coma and eventually death. The second subtype (Type B) has milder symptoms such as irritability and impairment of gait (4). Apathy, violent tendencies, inappropriate sexual demands, dysarthria, apraxia, hemiparesis and aphasia may coexist. While no specific treatment is available, most patients receive thiamin, folate and other B vitamins. The effectiveness of such treatment, however, is doubtful. Furthermore, high dose IV thiamine, IV methyl prednisolone and amantadine

have been used with varying success (5). Type A has a long term disability of 86% and a mortality rate of 21%, Type B has a long term disability of 19% with no excess mortality rate. Based on the clinical information our patient can be categorized to type B disease (5).

Long-term alcohol abusers presenting with neuropsychiatric manifestations is not an uncommon clinical presentation in our medical wards and many conditions associated with chronic alcohol abuse are considered to explain the clinical presentation. MBD, however, is not a common condition included in this differential diagnosis. The diagnosis can be made on the basis of chronic alcohol abuse associated with unresolving neurological symptoms and MRI findings. We suggest that it is important to consider MBD when nonspecific, non-resolving neurological signs and symptoms persist in an alcoholic despite active treatment for common conditions. Early imaging with MRI should be considered in these cases.

Acknowledgement

Dr. (Mrs.) P.S.H. Hettiarachchi, Consultant Radiologist, Asiri Surgical Hospital.

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From Editors,

We are happy to present the March 2014 issue of the Galle Medical Journal. In Sri Lanka, the number of medical journals has increased during the last few years and this can be seen as a positive trend in dissemination of medical knowledge. Most of them are in specialized fields of medicine and have different emphasis. The scope of the Galle Medical Journal, however, will remain unchanged and cover a wide range of issues related to medicine.

With increasing number, the survival of the journals also becomes questionable. Galle Medical Journal, being one of the oldest medical journals, receives many submissions and we have been able to maintain the quality of the content to a reasonable degree. Same time we extend support in many ways to new comers to publish their work. For many, it is the first stepping stone to enter medical publishing.

*Sarath Lekamwasam
Chandrani Liyanage
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The success behind the Dengue Prevention Campaign in Imaduwa MOH area: an inter-sectoral approach

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ABSTRACT

Dengue has become one the most important public health issues in Sri Lanka over the last decade. Galle was noted as a high risk district and Imaduwa MOH area had shown a rising trend of dengue in early part of 2012. MOH office Imaduwa had conducted a successful dengue prevention campaign in line with National dengue week and the key for success was intersectoral collaboration.

Objective of the program was to develop an optimal intersectoral collaboration to strengthen dengue control activities in Imaduwa MOH area by advocating and sensitizing relevant stakeholders, building partnership to implement dengue control activities and raising public awareness on prevention and treatment of dengue.

The program consisted of 5 components. It started with formation of divisional dengue control committee which brought all stake holders together. A public awareness program was done covering the entire MOH area with the active participation of all stakeholders. It was followed by a Shramadana campaign which targeted public places, government offices, private institutes and schools. It attracted a wide public participation. Main intention was to raise public ownership in the activity and deliver the message across community. Home visit campaign to eliminate mosquito breeding places was conducted covering all high risk areas. Selected areas were fogged with the support of Pradeshiya sabha.

All the stakeholders from different sectors gave their fullest support and the program attracted a wide public participation. Reduction of dengue cases in Imaduwa MOH area as a whole and especially in high risk areas were noted following the program. Intersectoral collaboration and building partnership were identified as vital factors for the success of this program.

Introduction

Dengue is a vector borne viral disease which is transmitted by *Aedes* mosquito. It is an *Arbo* virus which causes flu-like illness and occasionally leads to life threatening complications like dengue haemorrhagic fever and dengue shock syndrome. Over the last 50 years dengue has spread over most of the tropical and subtropical areas, worldwide (1).

Dengue has emerged as one the most important public health issues in Sri Lanka over the last decade. Since the year 2000, more than 5000 cases have been reported each year and the year 2009 was marked as the worst year with the highest mortality and morbidity. In 2011, 735 cases were reported from

the Galle district while 28473 cases were reported from the entire country. In the same year four dengue related deaths occurred in the Galle district (2).

Imaduwa is a MOH area in the Galle district which reported relatively less morbidity and mortality over the past few years. But in 2011, 26 cases and one death were reported from Imaduwa showing marked changes in geographical distribution of the disease (3).

Up to the end of April 2012, six cases have been reported from the Imaduwa MOH area. Five of them belonged to Agulugaha PHI area while the other patient was detected from Imaduwa.

There are four PHI areas in Imaduwa; Agulugaha, Dikkubura, Hawpe and Imaduwa. It indicated a clustering of cases as showed by spot map. With the start of South West monsoon we expected a rise of case load.

MOH office Imaduwa planned a special dengue prevention campaign in line with National Dengue week (from 14th May 2012 to 20th May 2012) as guided by the Ministry of Health. The aim of the programme was to enhance the public awareness on the prevention and treatment of dengue and to reduce the incidence of dengue in the area by strengthening inter-sectoral collaboration.

Main objective of this programme was to develop an optimal inter-sectoral collaboration to strengthen dengue control activities in Imaduwa MOH area. Relevant stakeholders were advocated and sensitized to build a good partnership. Public awareness was raised on prevention and treatment of dengue.

Methods

1. Formation of a divisional dengue control committee

In the view of establishing an inter-sectoral collaboration and building partnerships, divisional level stakeholders were convened on 12th May 2012. Firstly, participants were sensitized about the issue. Depth of the problem at national and local levels as well as the need of a coordinated approach to face the challenge was explained by the Additional MOH (AMOH). Advocacy was done to ensure sustainable support from all the stake holders.

Action plan for the Dengue Week was drafted and responsibility of each activity was handed over to each party. Public awareness campaign, Shramadana programme, home visit campaign and fogging were planned and role of each party in carrying out those activities were defined. Strategies were planned according to the principals of integrated vector management, which is known as the most effective approach for vector control activities (4). Date for the next meeting was fixed.

2. Public awareness

Public awareness campaign was carried out during the first two days of the week. Gravity of the problem, importance of eradicating breeding places and basic management steps of dengue patients were included into the message. This was done by using vehicle mounted public addressing systems. Different partners were given the responsibility of conducting public awareness in each PHI area of Imaduwa. A common message was drafted by PHIs and delivered among them.

3. Shramadana campaign

This was done to cover public places, government offices, private institutes and schools. It attracted a wide public participation. All institute heads were requested to continue this once a week even after the Dengue Week.

4. Home visit campaign to eliminate mosquito breeding places

Agulugaha and Imaduwa PHI areas were chosen for house visit programme during the 'Dengue week'. Selection was done based on the geographical distribution of cases in the current year as mentioned above.

Divisional Secretary office coordinated the work force for the campaign. A group of newly assigned graduates (n=120) were recruited. All Gramaniladaris, Samurdi officers and agricultural officers were involved in respective areas. Altogether 141 people involved. Five teams consisting of two members were deployed for each Gramaniladari (GN) division. Special training programme was conducted by AMOH for all the participants prior to the campaign through lecture discussion. They were explained on how to detect mosquito breeding sites and necessary actions to be taken. All households in the area were expected to cover. Pradeshiyasabha sponsored refreshments and printed material.

Each household was given an information leaflet and a check-list which was prepared by MOH office under the guidance provided by Epidemiology unit. Pradeshiyasabha took the responsibility of printing adequate number of copies. People were requested to keep the check

list and mark it weekly. Special stickers were designed for the programme. Blue stickers were pasted in safe houses and red stickers were pasted in at risk houses. Presence of three or more breeding places was considered as 'at risk' household.

We assumed that each team which consisted of two members could visit 20 households and deployed a group consisted of 10 members for each GN division. We expected them to cover minimum of 200 houses in each GN division within one day. Three main government officials who were appointed at the GN level were GN, Samurdhi officer and agricultural officer. They were given the responsibility of coordinating the activity. During the programme 1625 houses in Angulugaha and 599 houses in Imaduwa were visited.

5. Fogging

Selected areas were fogged. The commercial preparation 'Pestguard' (containing Detramethrine and Xyphenothrine) was used. It was carried out with the support of Pradeshiya-sabha. Kerosene (as solvent) and transport facility were provided by them.

Results

1. Formation of Divisional Dengue Committee

A representative of Chairman of Pradeshiya-sabha, a representative of Divisional Secretary, Divisional Director of Education, a representative of the officer in charge of police and public health inspectors participated in the meeting which was chaired by Additional Medical Officer of Health (AMOH) of the Imaduwa MOH area.

2. Public awareness

There are four PHI divisions in Imaduwa MOH area as mentioned above and they were covered as follows. Dikkubura PHI division was covered by police while MOH office took the responsibility of covering Imaduwa PHI area. Pradeshiyasabha carried out public awareness in Angulugaha and Hawpe PHI areas. By dividing the task all areas were easily covered within 2 days.

3. Shramadana programme

Under the coordination of Divisional Secretary office all government offices in Imaduwa area conducted Shramadana on 17th May. PHIs monitored the activity. Shramadana in private offices and factories were done under the guidance of police on the same day. PHIs again supervised them. Shramadana in all maternal and child health clinic centers were carried out by 'Mawusamaja' members (who are a volunteer work force). Public health mid-wives coordinated the activity which happened on 16th May. Under the coordination of Divisional education director all schools in Imaduwa MOH area conducted shramadana with the participation of students and parents on 18th May. PHIs visited all schools and delivered a short health talk on dengue at the morning assembly (as planned before). Twenty out of 23 schools in the Imaduwa MOH area successfully conducted Shramadana. This was a remarkable activity as we intended to use students to deliver the message across community. Pradeshiyasabha took measures to clean up public places like bus stand, cemetery and lands beside main roads.

4. Home visit campaign to eliminate mosquito breeding places

A number of houses 148 from Angulugaha were found as "at risk" places and 96 notices were issued by PHIs. In Imaduwa 30 "at risk" households were detected and 22 notices were distributed. Follow up visits for "at risk" premises were done by PHIs in subsequent weeks.

5. Fogging

Angulugaha and Imaduwa town areas were covered on 17th and 18th May.

Incidence of dengue in Imaduwa MOH area drastically reduced within the next 3 months though numbers of Dengue cases went up in adjacent MOH areas. Only four cases were reported from the entire MOH area and Angulugaha PHI area which showed the highest incidence in the first quarter reported zero incidence.

Table 1: No. of Dengue cases in Imaduwa MOH area in the first half of 2012

PHI Area	Reported cases from Feb – Apr		Reported cases from May – July	
	N	%	N	%
Agulugaha	5	83.3	0	0.0
Imaduwa	1	16.7	1	25.0
Hawpe	0	0.0	1	25.0
Dikkubura	0	0.0	2	50.0
Total	6	100%	4	100%

Discussion

Intersectoral collaboration and building partnership are vital factors for the success of any public health programme. Especially in the case of dengue prevention multi-sectoral approach and community participation become crucial factors. Work force, existing community networks, available funds and legislative powers are essential factors in carrying out a public health intervention which were utilized strategically in conducting the programme. By developing a good collaboration with those stakeholders MOH office is fortified with vast amount of resources.

Though it was not much relevant in Imaduwa area, business community and private sector industries also should be included, wherever relevant. Advocacy and sensitization of key stakeholders helped in ensuring a good support and motivation of all sectors. Public relation skills and communication abilities matter in achieving these. Though they are personal factors they can be trained and it is a part of undergraduate and postgraduate curricula of public health.

Handing over responsibilities to each party made the sense of ownership in the programme. It made sure that all aspects were covered and not to miss any of activity. Principals of intergraded vector management were followed in planning activities. It is regarded as the most effective approach for vector control to yield a maximum output from available resources in a sustainable way. IVM is recommended by the WHO to use in any setting.

Gaining public support and empowering people to take the leadership is very important for success in the battle against dengue. So it was set for first two days of the week. A common message was developed

to maintain the uniformity. Content of the message included sensitization of public and targeted for behavioral change of people. To reduce mortality, secondary prevention was also stressed in the message.

Again Intersectoral collaboration was successfully utilized in carrying out the activity. Because of that we could reach nearly 100% coverage of population within two days. Though just a single dose of message might not enough it had to be concluded within two days due to constrain of resources.

Abundance of breeding places in public premises and offices were identified as a major obstacle for dengue prevention in the recent past. So Shramadana campaign was planned to cover such places. Main intention was to raise public ownership in the activity. Again major stakeholders were given responsibility of coordinating the activity in various sectors and it became a success as well. Divisional secretary was requested to oversee the activity in government offices while police were asked to organize Shramadana in private offices and factories. Rather than directly requesting through MOH, this strategy was implemented to enhance the compliance.

The school Shramadana programme was a remarkable activity as we intended to use students to deliver the message across community. Resources of Pradeshiyasabha were utilized to clean public places where it was difficult to mobilize public. Mawusamaja volunteer work force was also mobilized in this programme. As there is a well established network of Mawusamaja we expected the message to spread to the household level of the community.

Eliminating breeding places is regarded as the mainstay in vector control for *Aedes* mosquito (1). Having recognized that the climax of the dengue week was the home visit campaign to eliminate mosquito breeding places. Rather than covering the entire MOH area we chose Agulugaha and Imaduwa PHI areas which showed a higher risk of an outbreak as mentioned in the introduction. Near complete coverage, which is another important aspect for a successful public health campaign was also kept in mind when deciding to restrict the programme to high risk areas at first leg. Epidemiological information and spot map were used to determine areas for the targeted intervention.

A special training was given to the entire team of graduates and other government officers prior to the programme as explained in the methods. By providing technical knowledge on detecting mosquito breeding places it was expected to enhance the effectiveness of programme and maintain uniformity. A checklist was used to standardize the house visits. Every household was requested to maintain the list by reviewing it weekly. People were advised to produce it whenever a PHI visit. It gave the ownership of the programme to the public.

Space spraying, which is better known as fogging should be used very cautiously in dengue control. In Integrated Vector Management, it is advised to use fogging, minimally in an areas with high case load (4) as it only kills adult mosquitoes while causing a significant harm to human health and animal life. It should be used as a supplementary to cleaning activities. Due to this, fogging was done in Imaduwa and Agulugaha town areas on the day prior to respective house visit campaigns. Intersectoral collaboration with district health authorities and local government authority made this activity a success.

In conclusion, Intersectoral collaboration can be successfully used at divisional level for dengue prevention. A good partnership between MOH and other government authorities at divisional level is a crucial factor in achieving a success. The effectiveness of all the control measures we routinely practice can be enhanced with intersectoral collaboration. Advocacy and public relation skills are important in developing this at any level.

The success of this approach may changed when it is implemented in a different setting with poor relationship between stakeholders and larger geographical area. Maintaining the enthusiasm and partnership is a challenge. Sustainability of the programme can be assessed only after tracking the results over a longer period of time.

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Factors related to wife-battering; a medico-legal analysis

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ABSTRACT

Introduction: Wife-battering has not been adequately studied from a medico-legal aspect in Sri Lanka. This study was carried out to describe the types of abuses as well as to explore the consequences, management strategies and impact on criminal justice system.

Methods: A descriptive study involving 4838 Medico-Legal Examination Forms (MLEFs) reported to a tertiary care hospital in Colombo from January 2011 to December 2012 was conducted. Out of 4838 MLEFs, 116 reports of wife battering were studied. The judicial responses of all cases were studied from relevant police records.

Results: Forty one percent of victims were less than 30 years of age. Majority (87%) had faced repeated incidents. All had been abused verbally and psychologically. All had physical, psychological or sexual consequences. Majority (60%) had head injuries. Eighty seven percent were non-grievous injuries. Twenty eight percent who directly reported to hospital, refused informing police. The judicial responses were completed in all except two attempted murder cases.

Conclusions: Wife-battering is not uncommon in Sri Lanka and many have faced repeated events. The pattern of injuries and their consequences are significant and the vigilance of clinicians is needed to identify them. The victim's choice in taking legal action should be retained. Activation of criminal justice system was mainly based on interpretation of injuries.

Keywords: Wife battering, Medico-legal analysis, Sri Lanka

Introduction

Wife-battering in Sri Lanka has not been studied in details from a medico-legal point of view. A study done by Saravanapavanathan (1982) mainly described the weapons and injuries associated with wife battering (1). A study by Samarasekera (1988) described associated factors and injury patterns of the survivors of wife-battering (2).

Though the life time prevalence of wife battering was 20-60% in 2011 in Sri Lanka (3), only few victims seem to have reported to authorities. Majority of the victims of wife battering may have presented to hospitals with various other unrelated complains and may have gone unnoticed. Therefore, 'wife battering risk assessment tools' must be

available to the clinicians to identify victims. Further, an evidence-based intervention program is needed for holistic management, to reduce morbidity and mortality, and to strengthen the criminal justice system to curb this issue.

The current study was designed to describe the various types of abuses, their consequences and risk factors, to identify the factors important for the management and to describe the impact on criminal justice system.

Methods

A descriptive, cross-sectional study was conducted at a tertiary care hospital in Colombo from 1st January 2011 to 31st December 2012.

All (4838) Medico-Legal Examination Forms (MLEFs) of five consented forensic medical practitioners out of nine were perused to identify reports of wife battering. Demographic factors, factors related to the incidents were collected using a data collection form. Data of husbands were also extracted from the MLEFs. The judicial responses were studied from relevant police records.

As secondary sources, BHTs, medical reports, police reports and court records, were also used.

Results

Out of 4838 MLEFs, 116 (2.4%) wife battering cases were identified. Age of the victims ranged from 18-72 years. The median age was 32 years and IQR was 27-39 years. Forty one percent (n=48) of the victims were less than 30 years. Age distribution is shown in Table 1.

Table 1: Age distribution

Age groups	Frequency	Percent
= < 30 years	48	41
31 - 40 years	45	39
41 - 50 years	17	15
51 - 60 years	05	04
> 60 years	01	01

Age of the husbands ranged from 20-73 years. The median age was 36 years and IQR was 30-41 years. Forty percent (n=47) were between 31-40 years. The mean age difference between the ‘husbands’ and victims was 3 years.

According to the life time prevalence, 13% (15) had faced a single incident, 28% (32) 2-10 incidents and 59% (69) more than 10 incidents. Repeated incidents (2 or more) had been faced by 87% (n=101).

Fifty six percent assaults occurred during daytime and 95% at home. Minor physical assaults included pushing (100%) and slapping (95%). Major physical assaults included punching/kicking (52%), strangling (09%), assault with a blunt weapon such as club, bed pole, firewood, broomstick etc (73%, n=84) and cut, stabbed or burned with a hot iron (06%).

Of 116 incidents reported attacks targeting head was

reported in 70 instances, upper or lower limbs in 65 times and trunk in 28 times.

Abrasions (Figure 1), contusions (Figure 2) and lacerations (Figure 3) were considered as ‘minor injuries’. Most common minor injury was contusion (69%). Black eyes (Figure 4), fractures (Figure 5), slap marks (Figure 5), tramline contusions, ear injuries, bite marks and burns were considered as ‘major injuries’. The most common major injury was black eye (15%).

Majority (87%) had non-grievous injuries and the severity of injuries is shown in Table 2.

Table 2: Severity of injuries

Severity	Frequency	Percent
No injuries	03	02
Non-Grievous	101	87
Grievous injuries	10	09
Endanger life	01	01
Fatal in the ordinary course of nature	01	01
Total	116	100



Figure 1: Abrasions



Figure 2: Contusions



Figure 3: Lacerations



Figure 4: Black eye



Figure 5: Fracture



Figure 6: Slap Mark eye

Majority (96%) of the victims were married and 05 were living together. Seventy two percent of victims were unemployed. Majority (63%) lived within the municipal council limits (considered as urban) and the rest were rural. Eighty five percent had one or more children and 17 did not have children. One victim was reported to have an extra-marital affair.

Seventy eight percent husbands were unemployed or temporally employed. Sixty nine percent of husbands consumed alcohol regularly, 02 were drug addicts and 03 had extra-marital affairs.

All victims were verbally and psychologically abused and in 17 victims their daily activities were controlled by husbands. Sexual abuse included refusal of sexual activities by husband (06) and in 02 instances purposely deprived of sexual intercourse for 2 years. One husband assaulted wife when she refused to have sex.

As the consequences of abuse, victims suffered pain, blurring of vision, hearing loss, mobile teeth, etc and 08 victims had physical disabilities such as fractured teeth, deformed fingers, facial scars and hearing impairment. Eight victims attempted suicide. Though all had some form of psychological or emotional effect, 03 were referred to psychiatrists and 04 were referred to protective services such as Children and Women's bureau or to volunteer organizations. There were no referrals to social services. Three children avoided schooling.

Regarding retaliation, 24 retaliated verbally, 23 assaulted back, 18 with body parts and 05 with blunt weapons.

The impact of the submission of duly filled police copy of the MLEF on the criminal justice system was also analysed.

Three "no injuries" and 94 non-grievous injuries due to blunt weapons were reported under 'Law of voluntarily causing hurt' and were referred to mediation board. Of them, 08 with risk to life and multiple incidents were reported under "prevention of domestic violence Act" and obtained "protection orders" and were referred for "mandatory family counseling".

Non-Grievous injuries due to sharp force trauma (07) were reported under 'Law of voluntarily causing hurt by dangerous weapons'. Five (05) were given suspended sentences and 02 were settled by the mediation board.

Ten (10) grievous hurt cases were charged under 'Law of voluntarily causing grievous hurt' and punished with suspended sentences. Of them 02 were charged under DV act and the victims were offered "protection orders" and "mandatory family counseling".

The 'Endangering life' (01) and 'Fatal in the ordinary course of nature' (01) were indicted at high courts under 'Law of attempt to murder' and were awaiting trial.

Out of 64 (55%) who directly got admitted to hospital, 18 refused informing police.

Discussion

In this study, the prevalence of wife-battering among the reported medico-legal cases was 2.4%. In Sri Lanka, life time prevalence of wife battering is 20-60% (3). This indicates either the victims are reluctant to report the authorities or the clinicians are unable to recognize the victims. Development of an evidence-based risk assessment tool for wife battering will improve this situation.

Similar to the findings of Hofner et al. (2005) (4), the victims were younger. According to Roy (1981), 75% of the husbands were between 26-50 years (5) and in this study too, majority were between 30-50 years.

The difference of ages of victim and 'husband' was about 03 years. According to Lawoko et al., (2007) the age gap between the victim and husband has relevance to the type of abuse. When the age gap of the couple is less than 10 years, more sexual violence was reported and when the age gap is equal or less than 03 years more physical violence was reported than the couples with age gap more than 04 years (6).

MacLeod (1980) showed wife battering is almost equal in rural and urban households (7). Contrary to that, in this study, majority were urban families. One possible explanation may be the location of this tertiary care hospital in an urban area.

Similar to a study done by Chan, Chiu and Chiu in Hong Kong (8), higher proportion of victims were unemployed and therefore, they were depended on husbands. Similar to Koenig et al. (9), few were unmarried.

Linda and walker (1989) observed majority of events to occur at night (10). Contrary to that, in this study,

majority occurred during the day time. This discrepancy needs some examination. In this study, 78% husbands were without a permanent occupation and would have stayed at home during the day time.

Similar to Saravanapavananthan (1982) (1) there was no intention of the husband to cause severe injuries and majority were non-grievous.

The most common site of injury was the head and similar to Saravanapavananthan's observations (1) the most common significant injury was black eye.

Similar to MacLeod (7), majority faced more than one episode of assaults. Ideally the number of episodes should have been converted to a rate by dividing the number of incidents by total period of time.

Studies done by Straus and others (2001) in USA, found that 82% of women use weapons against men and 25% men use weapons against women (11). Contrary to that, very few victims used weapons against men. Cultural differences may have contributed to the different observations we made in the current study.

Similar to study done by Kraanen and others (2013) (12), majority of husbands consumed alcohol regularly and it had a statistically significant association with the number of incidents ($p < 0.01$). Similar to study done by Tsui et al (13), only few husbands were drug addicts.

Though Koenig et al. (2006) found that having an extra-marital relationship is associated with increase incidences of wife battering (9), in this study, one victim reported an extra-marital affair. This low figure may not reflect the true situation of the extra-marital affairs of Sri Lankan married women and may be due to the fact that the victims are reluctant to admit an extra-marital affair due to social stigma.

In psychological abuse, similar to Koenig and others (9), the victims continued to suffer the effects of controlling behaviour of the husband. Similar to Hofner and others (5), a woman's rage was directed toward herself in the form of suicidal attempts or towards her children. Few children turned violent and some stopped schooling. Similar to Knapp (14), violence or threat of violence limited a woman's ability to negotiate safer sex with her partner.

It is believed that neither short or nor longer custody arrests are effective in curbing wife battering especially in the long run (15). In Sri Lanka, most

cases were settled by non-custodial methods such as mediation boards or suspended sentences.

In USA, to rehabilitate the perpetrators, a special programme called 'Battering Intervention and Prevention Program' (BIPP) (16) is used and individual counseling is done. Similarly, under DV act, 'Mandatory family counseling', is done in Sri Lanka.

It was found that the activation of different responses of criminal justice system in wife battering is mainly based on the medico-legal opinion on injuries. The cases reported as 'no injuries' or 'non-grievous' were referred to mediation board and cases reported under grievous hurt, endangering life or fatal in the ordinary course of nature were not referred to mediation board.

Medico-legal opinion can be used to decide whether to request 'protection order' or not. In this study, only few such requests had been made and this highlights the importance of raising the awareness among community as well as police officers to request more and more protection orders on DV Act (17).

Currently, the main objective of the medico-legal examination is to collect evidence from victims for the purpose of prosecution of the husbands in court of law. Most victims had consequences due to physical, psychological or sexual abuses but few were referred to psychiatrist or counseling, and none to social services. Health care provider should not consider the victim as a "case" but as a "member of a family" and adopt multidisciplinary approach. Victims need 'emotional support' to reduce recurrent morbidity and mortality. It is important to refer all victims of wife battering, in government as well as private sector to a 'Health Care Provision Centre' / 'Mithuru Piyasa' at the nearest hospital for counseling, befriending and holistic management.

We need to change our attitudes towards these victims. Out of 64 direct admissions, 18 requested the forensic medical practitioner not to inform police. We are bound to uphold the victims' rights of self-determination. Adult, sound mind, victims of criminal cases has a right to refuse informing to police. Wife battering has not been listed under the offences that public should give information mandatorily (section 21 of the criminal procedure code of Sri Lanka) (18). Therefore, health care providers are not bound to report such violence to police or magistrate without victim's consent.

The survivor's choice in initiating legal action should be retained considering the implications of family disputes.

In conclusion, when providing medico-legal services, need of focusing beyond satisfying the legal requirement is reiterated. Evidence-based interventions should be arranged to reduce the risk to life and it is important to establish "Health Care Provision centres / Mithuru Piyasa" in each hospital.

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Fluctuations of high-sensitivity C-reactive protein in acute coronary syndrome

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ABSTRACT

Background: Atherosclerosis is associated with low-grade vascular inflammation that can be measured with high sensitivity-C reactive protein (hs-CRP). Acute coronary syndrome (ACS) events are thought to occur due to plaque rupture which is induced by the inflammatory process. Therefore with the onset of ACS there is a rise of hs-CRP from the baseline levels. This study was carried out to observe the fluctuations in serum hs-CRP concentrations after ACS and to determine the optimal time for blood sampling for hs-CRP that represents the baseline value.

Methods: Serial estimates of serum hs-CRP were done in patients admitted with ACS by turbidimetry. Samples were taken, on admission, day three, five, 24 and 84 from the onset of symptoms.

Results: Eight male patients (mean age 53, SD 5 yrs) with ACS (five with ST- elevation myocardial infarction and three with unstable angina) were included. Serum mean (SD) hs-CRP level on admission was 3.06 (1.3) mg/L. Then levels rose to 6.17 (2.6) mg/L on day three; was significantly different from on admission value ($p = 0.013$). Then it declined to 4.37 (1.8) mg/L on day five and on 24th day to 3.21 (1.2) mg/L. The value on 84th day was 3.12 (1.4) mg/L. No significant difference was observed between the mean hs-CRP level on admission and on day five ($P = 0.20$), on day 24 ($p = 0.81$) and on day 84 ($p = 0.93$), respectively.

Conclusion: Serum hs-CRP fluctuates after ACS, peaked on day three, returns to the basal level by day five following the acute event. Therefore basal level is more reliably reflected by the on admission sample.

Key words: High sensitivity C-reactive protein; Acute Coronary Syndrome

Introduction

Atherothrombosis of the coronary and cerebral vessels is understood as a disorder of inflammation and a disorder of lipid accumulation (1). Atherogenesis is a process of cellular adhesion, monocyte and macrophage attachment, and transmigration of immune cells across the endothelium. In the later stages, there is transition of mature stable plaque to unstable plaque, rupturing at the time of acute thrombosis (2).

C-reactive protein, a sensitive marker of the acute-phase response, has attracted increasing attention in

recent years because many epidemiologic studies have shown consistent positive associations between high-sensitivity CRP (hs-CRP) concentrations in the peripheral circulation and the risk of future cardiovascular events, independently of established risk factors. There is clinical evidence demonstrating that many biomarkers of inflammation are elevated years in advance of first ever myocardial infarction (MI), and that these biomarkers are highly predictive of recurrent MI, recurrent stroke and cardiovascular death (3, 4).

In clinical practice, the inflammatory biomarker in widest use is hs-CRP. When interpreted within the context of usual risk, levels of hs-CRP < 1, 1 to 3, and > 3 mg/L denote lower, average, and higher relative risk for vascular events (5).

The hs-CRP is involved in the inflammatory process linked to ischemic myocardial damage and necrosis and there are reports that C-reactive protein levels increase during acute myocardial infarction (AMI) and unstable angina (UA) (6, 7).

A patient admitted with an ACS may have a variable course with respect to the serum hs-CRP concerned. Therefore it is important to determine the optimum time to obtain the sample of blood that reflects the basal level of hs-CRP in these patients. There are few reports on serial measurements of hs-CRP during the period after acute myocardial infarction and the findings are inconsistent.

Therefore this study was carried out to study the fluctuations in serum hs-CRP concentrations after ACS and to determine the optimal time for blood sampling for hs-CRP that represents the baseline value.

Methods

This research was conducted as a part of a larger study investigating the association of total testosterone and hs-CRP with coronary artery disease and its severity in men. The ethical clearance was obtained from the Ethical Review Committee of Faculty of Medicine, University of Ruhuna, Galle. The protocol for this study was approved by the authorities of Teaching Hospital, Karapitiya, Galle. Informed written consent was obtained from all participants of the study. Study subjects included were male patients admitted to the Emergency Treatment Unit and the Coronary Care Unit with acute coronary syndrome.

Diagnosis was made on the basis of typical history and electrocardiographic changes and all recruited patients fulfilled the American College of Cardiology/American Heart Association criteria for acute coronary syndrome (8).

Consecutive male patients in the age range of 30-73 years were included within a period of three months. During the baseline interview on discharge from the hospital, information was gathered using an

interviewer - administered questionnaire. Height and weight were also recorded. The hospital stay of the patient varied from three to five days.

The level of serum hs-CRP was estimated in eight male patients with ACS, which included five patients with ST-segment-elevation-myocardial infarction, and three patients with unstable angina. Three samples of blood were collected during the hospital stay; first sample on admission, second sample on day three and a third sample on day five from the onset of symptoms. Following discharge from the hospital, two further samples were obtained on day 24 and on day 84 (12 weeks) after the acute ischaemic episode. The on admission sample was obtained around mean of 8.8 hours from the onset of symptoms. Blood samples (5ml) were drawn by venipuncture and serum was separated by centrifugation and stored at - 70°C until assayed.

Serum hs-CRP was measured by commercially available test kit based on turbidimetry (DIAGAM, Rue du Parc Industrial, 7822, GHISLENGHIEN Belgium). The analytical range of the test kit was 0.005-16.00 mg/L, and intra-assay and inter-assay coefficient of variations were less than 1 %. Assays were performed blind with respect to the information of the study subject. Total serum cholesterol and plasma glucose were measured by enzyme-based colourimetry methods using commercially available test kits (ProDia International, UAE).

Data were analyzed by Minitab software (version 15 for Windows). Raw data were inspected for normality and were presented as mean \pm SD. Serum hs-CRP levels at different time intervals were analyzed by two samples *t*-test.

Results

One patient died of recurrent myocardial infarction before the final sample was obtained and three patients dropped out from 12 patients who were initially recruited. The data of eight patients were presented. All patients with ST-elevation myocardial infarction (STEMI) received thrombolytic therapy with streptokinase. There were no patients who developed heart failure, serious arrhythmias or re-infarctions. The basic characteristics of patients are shown in Table 1.

Table1: Characteristics of eight subjects admitted with acute coronary syndrome

Variable	Mean (SD)
Age (yrs)	53 (5)
Body mass index (kgm ⁻²)	21 (3)
Total cholesterol (mmol/L)	4.9 (0.6)
Fasting blood sugar (mmol/L)	5.8 (1.9)
Systolic blood pressure on admission (mmHg)	147 (20)
Diastolic blood pressure on admission (mmHg)	90.7 (17)
Ejection Fraction on 2DEcho	52.5 % (0.1)
Pulse rate on admission (beats/min)	73 (19)
<i>Presence of risk factors on admission</i>	
	(Number)
Current smokers	5
Diabetes mellitus	2
Hypertension	3
Hypercholesterolaemia/dyslipidaemia	2

Data as mean \pm SD, 2DEcho: 2 Dimensional echocardiography

Mean (SD) serum hs-CRP concentration on admission was 3.06 (1.3) mg/L. Then concentration rose to 6.17 (2.6) mg/L on day three and peaked. The concentration declined thereafter to 4.37 (1.8) mg/L on day five appeared returning to the values seen on admission. The mean hs-CRP concentration on day 24 and 84 were 3.21 (1.2) mg/L, 3.12 (1.4) mg/L respectively. Fluctuations of mean serum hs-CRP concentration at different time intervals were demonstrated in Figure 1.

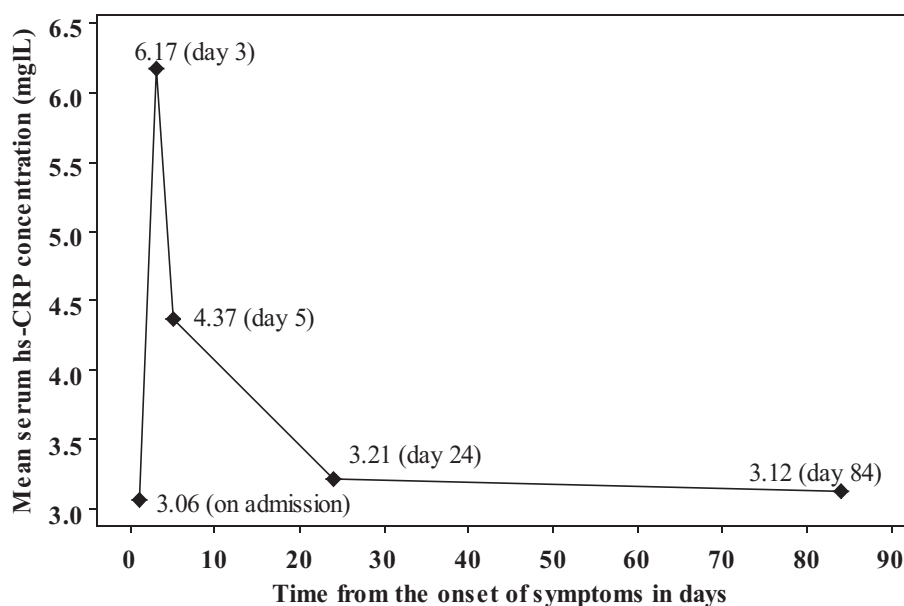
**Figure 1: Fluctuations of serum hs-CRP in acute coronary syndrome**

Figure 1. The hs-CRP concentration on admission (3.06 mg/L), on day five, (4.37 mg/L), on day 24 (3.21 mg/L) and on day 84 (3.12 mg/L) were not significantly different. Peak concentration (6.17 mg/L) was achieved on day three.

The highest concentration was achieved on day three (6.17mg/L) and was significantly different from the concentrations on admission (6.17 mg/L vs. 3.06 mg/L, $p=0.013$), on day 24 (6.17 mg/L vs. 3.21 mg/L, $p=0.017$), on day 84 (6.17 mg/L vs. 3.12 mg/L, $p=0.015$), but it is not significantly different from day five concentration (6.17 mg/L vs. to 4.37 mg/L $p=0.17$).

It was noted that no significant difference was observed between the mean hs-CRP concentration on admission and on day five (3.06 mg/L vs.4.37mg/L, $p=0.20$), day 24 (3.06 mg/L vs. 3.21 mg/L, $p=0.81$), day 84 (3.06 mg/L vs. 3.12 mg/L, $p=0.93$), respectively.

Discussion

In the present study serial estimation of hs-CRP in a group of patients with ACS from admission to 12 weeks (84 days) showed significant fluctuations. The hs-CRP level peaked on day three and declined to the on admission level (basal level) by day five and remained relatively unchanged thereafter up to 12 weeks (84 days).

The acute-phase response of C-reactive protein is considered to be non-specific and reflects cytokine-mediated hepatic production triggered by inflammation, infection, and tissue injury (1). Plasma levels of CRP usually start to rise about 6 hours after an acute stimulus, reaching a peak by 48 hours. The level then decreases at a rate close to the measured plasma half-life of CRP of about 19 hours (9) with the abrupt cessation of the stimulus. Evidence suggests that inflammation within the atherosclerotic plaque contributes to its destabilization and subsequent disruption (2).

The results of our study are in keeping with other studies which report that C-reactive protein levels increase in acute coronary syndrome (6, 7, 10). Majority of studies showed that hs-CRP usually peaks from 48 hours to 72 hours from the onset of symptoms of ACS (6, 11, 12). These study findings are in line with our study, which revealed 72 hours (day three) as the time when hs-CRP peaks following ACS.

There are other factors that may also influence the rise and variation of serum hs-CRP. Thrombolysis therapy and early reopening of the infarct-related artery in AMI patients can lead to low CRP levels or a smaller rise than expected in some patients (13). It is reported that elevation of hs-CRP can be lowered with the treatment of statin (14) and aspirin (15). C-reactive protein may also be used as a surrogate marker of infarct size (13).

Therefore there is indisputable evidence of a rise of CRP in ACS. The fluctuations depend on the type and size of myocardial infarction and are also influenced partly by treatment, which may affect the time of peaking.

In conclusion, serum hs-CRP fluctuates after ACS, peaked at day three, returns to the basal level by day five following ACS. Therefore basal level is more reliably reflected by the on admission sample.

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Introducing Modern Nursing to Sri Lanka: Rockefeller Foundation and Colombo School of Nursing

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ABSTRACT

This paper examines the Rockefeller Foundation's nursing program at the Colombo School of Nursing from 1948 to 1952. With a \$20,000 grant and two North American nursing instructors, the Rockefeller Foundation sponsored a modern nursing education program in Sri Lanka. The project succeeded in spite of many obstacles.

Key words: Colombo School of Nursing, Rockefeller Foundation

Introduction

In the early 1930s, the Rockefeller Foundation's overall focus shifted from disease control and public health programs to training professional health workers. In particular, the Foundation started training professional nurses in countries where it had established community health units. The Foundation's official position was that the sustainability of health units was dependent upon the availability of skilled personnel. Although nursing never became a priority of the Foundation, it succeeded raising the professional standard of nursing due to a group of dedicated women who were involved in the program (1).

In Sri Lanka, the Rockefeller Foundation had an extensive public health campaign in the twentieth century. It undertook several studies to determine the educational standard of nursing on the island. Immediately after the opening of the first health unit at Kalutara in 1926, W. P. Jacocks, the Foundation's representative in South Asia, carried out the first study, which was followed by another by W. S. Carter. Both these studies stressed that if the health unit program in Sri Lanka were to succeed the country must have a sufficient number of well-trained public health nurses. However, these reports failed to produce any result.

In 1932, Mary Beard, the director of the Foundation's nursing program, re-ignited the interest in nursing education in Sri Lanka. In a report titled, "Note on Public Health Nursing in Ceylon," she observed that: "In Colombo there is every facility for creating an excellent School of Nursing. The General Hospital with its 900 beds has recently opened a new block of wards admirably adapted for teaching nurses... It is the common opinion that there would be no difficulty in attracting a good class of students and in sufficient numbers if such a school were established"(2). Thus, Beard suggested that it would be helpful if the Foundation could arrange a nursing leader to "come to Ceylon for a period of three years" to initiate a program. Following this report, a new round of negotiations between the Foundation's officials and the Colombo government continued for several years.

Fifteen years later, in January 1947, S.F. Chellappah, the Director of Medical and Sanitary Services, submitted a proposal to the Foundation requesting assistance to reorganize the Colombo School of Nursing. He specifically requested two American nursing instructors for a period of six years, and the financial assistance of the Foundation. Chellappah wrote that: "One of them would be placed in charge of the work, [while] the other to assist her. I would therefore be very grateful if Miss Tennant [Mary

Elizabeth Tennant, the director of the nursing division] will make every effort to induce 2 nurses to come out here” (3).

In response to this request, the Foundation decided to undertake a fresh review of the Sri Lanka's nursing requirements. Accordingly, in June 1947, Janet D. Corwin, the Foundation's nursing coordinator for South Asia visited the island and prepared a detailed report of the nursing situation in Sri Lanka. She examined a range of issues including the existing training procedures, employment, and the “structure” of the nursing hierarchy, curriculums, and the “leadership” role in the nursing profession. She described the entire system as closely “intertwined” with the broader colonial setup on the island, and it was to this particular structure of nursing that her report demanded the most urgent attention, if nursing were to be placed in the hands of “educated Ceylonese women.” Her general impression about the island's socio-economic conditions and, in particular, the level of education among women was highly positive. She contended that it was ideal for the Foundation to become involved in the nursing program on the island: “Ceylon is a fairly wealthy island, and one of the most advanced of the British Colonies... .Present government policy is against the importation of personnel from outside Ceylon except in special instances... .Women’s education is fairly widespread and there is quite a large proportion of girls who complete the studies required for the Junior School Leaving Certificate or for Matriculation. Therefore, there is a reasonable number of young women with education to approximately University entrance level from which the nursing profession should be able to draw recruits” (4). Most importantly, she noted that there were no cultural barriers for women entering the field of nursing and that there was a considerable interest in public health among women in the country.

Colonial Structure in the Nursing Profession

The report identified two groups of nurses on the island: (1) English-speaking nurses, and (2) Sinhala and Tamil-speaking nurses. The former received training at the Colombo School of Nursing, while the latter received training at the Lady Ridgeway and the Lady Havelock Hospitals at Colombo, and the Kandy General Hospital. Although the Colombo

School of Nursing offered a 3-year program with an emphasis on theoretical education, it was still an “apprenticeship” course with limited preparation for nursing. The Sinhala and Tamil-speaking nurses received even lesser professional training with significantly inadequate facilities.

Besides these two groups of nurses, there was a one-year midwifery program conducted in vernacular at the Colombo Lying-in-Hospital, followed by six-months field training at the Kalutara health unit. The report praised it as a “good” program that produced midwives, who provided “good, reliable” services across the country. Public health nursing was considered to be a “post-graduate” qualification open to both nurses and midwives upon the completion of 3-year nursing diploma, followed by six months training at Kalutara. According to the report, there were 80 public health nurses on the island for a population of six million. It estimated that approximately 700 were needed for the health units alone if it were to succeed.

The report painted a grim picture of nursing, and described it as “stagnating.” The reasons for this were: (1) political interference, (2) medical domination, and (3) the lack of leadership in the profession.

The report criticized the government for continuing expansion of health services without consulting the nursing profession, which strained the already limited supply of nurses. In the absence of an independent professional body of nurses, the medical profession spoke for nurses. The report argued that these shortcomings could have been easily overcome had there been strong “nursing leaders” in the country; those who controlled the nursing had no long-term interest. The European nurses, “who were mediocre by any standards,” controlled the profession, and did not want to relinquish their power. They prevented the development of leadership qualities among the local nurses. The report pointedly noted that those in charge of the nursing education on the island had no knowledge of modern curriculums, or new methods of teaching; the materials they used were outdated (5).

According to the report, the recruitment of European nurses for senior administrative and teaching positions of the School had effectively demoralized the local nursing students and staff, who could not

foresee any chance of furthering their career. There was a widespread resentment among the Sri Lankan nurses, who felt that there were two classes of nurses: “the poor psychology being practiced of frequent condemnation of the work of Ceylonese nurses, and the difficulty of obtaining advancement after entering the profession.” The point was that the existing system prevented local nurses gaining leadership skills, and maintained European nursing instructors and administrators in a superior position. Because of these, the report argued, the Colombo nursing program failed to attract students of high caliber (6).

Proposals to Modernize the Nursing Education

The report made several recommendations to improve the nursing education in Sri Lanka. Among them, the most urgent need was to create independent Council of Nurses and Midwives to maintain their educational and professional standards, and to monitor their training. Further, it proposed the appointment of an administrative assistant to the Director of the Department of Medical and Sanitary Services to make recommendations on nursing matters.

What is particularly noteworthy was the recommendation to end the practice of recruiting senior nursing personnel from Europe: “The Ceylonese nurses should be capable of leadership themselves and the present political tenor in all phases of the national life makes for a situation which is psychologically against acceptance of large-scale importation.” It is important to note that this particular recommendation was in line with one of the Foundation's core policies in promoting “local leadership” in all public health programs it sponsored around the world. Corwin argued that nursing could become a “creative” profession only when it could attract women of good educational backgrounds and social standing: “The course must be developed along lines which will stimulate the interest of this group of young women and attract them to nursing in large numbers.”

Following Corwin’s report, the Foundation agreed to provide two North American nursing instructors for a period of four years along with a financial grant of \$20,000 to help reorganize the Colombo School of Nursing (7). While these negotiations were in progress, Sri Lanka gained political independence

from Britain in February 1948. In the same year, the Foundation recruited two nursing instructors, Martha Crawford and Dorothy Sutherland, both of whom had an impressive record of international experience in public health. Crawford was a graduate from the University of Toronto, and Sutherland was from the Yale University (8). By recruiting two experienced graduates from these pioneer nursing schools that the Foundation considered to be “models” or “lighthouses” of modern nursing, the Foundation ensured that the Colombo School of Nursing would be able to establish the highest standards in nursing education (9).

However, it soon turned out that the main challenge throughout the project was to find a middle ground between the Foundation's insistence on the “quality” of nursing education and the political pressure to provide more nurses for the expanding rural health services in post-independent Sri Lanka.

Quality or Quantity: That's the Problem

In 1948, a meeting was called at the Ministry of Health, attended by Anna Mary Noll and Robert Briggs Watson of the Foundation, and S.W.R.D. Bandaranaike, the new Minister of Health, and W. G. Wickremesinghe, Director of the Department of Medical and Sanitary Services, to thrash out the specifics of nursing reform in Sri Lanka. During the meeting, the Minister acknowledged that the government was “burdened” by the demand for essential health services from the rural masses, and that they must increase the number of nurses available for rural hospitals and health centers. By contrast, the Foundation’s representatives reminded the Minister that the Foundation's mission in Colombo was to promote the “quality” of nursing education that would ensure well-trained future nursing leaders. The Minister argued that the government needed “to improve the standard of living including the medical and health care for the people, [and that it] got to beat the communist threat...” (10). The Minister was apparently trying to win concessions from the Americans, who were unsympathetic to the government's concern.

In the end, the Minister seemed to have succeeded: “[The Minister] impressed me,” wrote Watson, “as being a person of high moral integrity, sincerely interested in his job and both eager and anxious to carry out his responsibilities... The change from the

former incumbent is refreshing. He wants to start quantity production of nurses at once and one gets the impression that quality is of secondary consideration.” In fact, Watson agreed with the Minister that Sri Lanka “desperately needed” more nurses, and felt that there was a good political atmosphere in the country for a productive collaboration between the Foundation and the government.

The two American nursing instructors, who arrived on the island in 1948, presented a plan that included *short-term* and *long-term* steps to be taken to modernize the Colombo nursing program. As *short-term* steps, they proposed: (1) Fifty students be admitted to the program twice a year; (2) During the first three months, they would learn elementary nursing arts, anatomy and physiology, microbiology and hygiene, nursing history, nutrition and cookery; (3) During the second three months, they would work on the wards, maximum of three hours a day, while continuing to study the above subjects; (4) The classroom lessons and the ward-practices were to be coordinated and supervised; (5) Students were to gain experience in the medical, surgical, and gynecological wards, and the outpatient and operating theaters; (6) They would be assigned sister-tutors, who would monitor their ward services.

Concurrent with these changes, the new program also recommended changing the entrance requirement from Junior School Certificate (grade 8) to Senior School Certificate (grade 10), and prior to the admission, the prospective students were to undergo a complete physical examination. It also recommended recruiting three new sister-tutors to the School, and expanding the library and other facilities at the School.

As for the *long-term* plan, they proposed a new 3-year curriculum with a view to achieving high academic standards. Crawford wrote: “Only when the educational needs of the students take precedence over the service needs of the hospital can the Nurses Training School be considered an educational institution. Therefore, as rapidly as possible the assignment of students to the wards of the hospital must be made on the basis of the students' need primarily” (11). The new program, without any doubt, designed to elevate the academic standards, and to create strict guidelines for ward experience and classroom learning.

Ample time was allowed for the new procedures to become fully integrated into the training program. Writing to Crawford at the Colombo Nursing School, M.C. Balfour, the Foundation's representative in Asia, stated that, “If this [program] is carefully done and put on a time schedule, recognizing that all changes may not be accomplished immediately but rather at given interval of six months, one year, two years etc., you may achieve what is desired.” Having spent a long period in the East, Balfour cautioned his American colleagues in Colombo against pushing for quick results, and urged them to find a balance between the quality of training and the political pressure to supply more nurses a major challenge that the nursing program had to tackle during this period (12).

The Foundation's representatives closely monitored the progress in the implementation of the program, and frequently urged the government to resist employing students for the wards' duties beyond their learning requirements. In 1949, writing to the Director of the Department of Medical and Sanitary Services, Balfour insisted that the “quality” of the training must be the School's priority: “There is such a demand for nurses that the quantitative need seems overpowering. The growth of hospitals and provision of beds has certainly developed beyond the personnel available for staffing purposes. If nursing in Ceylon is to be put on a satisfactory footing there must be a distinction between quality training and other measures to meet quantity needs. Our interest is in the quality aspects of nursing” (13).

What was happening in the cooperative nursing project at this juncture was that the Foundation's representatives were trying to remain “focused” on the original objective of reorganizing the nursing program on a scientific basis, so that Sri Lanka would have well-trained nursing leaders capable of running the program in the future. As Balfour pointed out, the Foundation's main purpose was to provide assistance to produce a “small number of well trained nursing leaders” capable of undertaking the “administrative and teaching” duties of a modern nursing program at Colombo. It was not a part of the Foundation's agreement with the Colombo government to ensure an adequate supply of nurses. But the government's officials did not think about the matter on those same lines; instead they tried to train as many nurses as possible to employ in government's hospitals.

There were several reasons for this lack of clarity, or misunderstanding, on the part of the government: First, besides the political pressure to expand health care facilities, which hindered the scientific education of nursing, the colonial bureaucracy in the health care system did not fully appreciate the new approach to nursing education. As Corwin's report highlighted, the British colonial policy was to "import" senior nurses from Europe who, in turn, recruited local women as nurses. That program, as discussed earlier, was not based on a modern scientific training of nurses, but an apprenticeship system in which women, who worked as nurses were treated as "extra hands" for the doctors. Neither the doctors, nor the European nursing administrators considered nursing as a modern health care profession that required a proper training.

Against this background, the Foundation's attempt to introduce modern nursing standards and curriculums received lukewarm support from the medical profession. As mentioned in Corwin's report, nursing came under the Ceylon Medical Service, which was a branch of the British Medical Service at that time. The Ceylon Medical Service seemed to have had doubts about the relationship between public health and medicine. The government's medical service was polarized between curative and preventive branches, and those who belonged to the former resisted the preventive and public health strategies of the Department (14). Writing to the Director of the Department of Medical and Sanitary Services, Balfour tried to enlighten the medical profession about the Foundation's program in nursing: "May we express the sincere hope that any temporary uncertainty regarding the proper relationship of public health and medical services will be adjusted on a sound basis" (15).

Second, the colonial bureaucracy of the Department of Medical and Sanitary Services was unwilling to accommodate North American trained public health nurses in senior positions. A case in point was Jainu Deen, a Sri Lankan public health nurse trained at the University of Toronto, who could not secure a senior administrative position in the Department. The Department's reluctance to appoint her to a senior position was a concern to the Foundation's officials, who had repeatedly raised the matter with their counterparts in Colombo. The Foundation expected that students it had trained in North America would promote modern scientific methods of health

services that they had learned upon their return to home countries: "Mrs. Jainu Deen, has returned from advanced study in Canada on a Foundation fellowship. She made an excellent record and will be of great value in stimulating further developments. However, she could not serve as Director of the School of Nursing because of existing conditions" (16). The administrative positions were granted to those who were in the rank of "matrons," whereas Jainu Deen designated as a public health nurse was appointed to the Kalutara health unit to train public health nurses. The Foundation's representatives made several representations to the Department of Medical and Sanitary Services on her behalf without success.

This situation was by no means unique to Sri Lanka. The Foundation encountered similar obstacles in India, where the colonial medical system and bureaucracy opposed the Foundation's effort to develop professional nursing. The problems were exacerbated by the Indian social and cultural values that discriminated against women. Discouraged by numerous obstacles, Balfour reportedly argued that the Foundation's campaign to promote professional nursing would not succeed in India, if it insisted on promoting professionalism among Indian nurses. Instead, he suggested that the Foundation train Indian nurses abroad, who would promote the new knowledge and skills among local nursing students when they returned to India. However, as Shirish Kavadi argues, even this approach did not succeed in India because the foreign trained nurses could not garner enough local support to implement their knowledge and training. He concluded that the Foundation's effort "did not bring about any perceptible change in the basic attitude of the people concerned," and thus failed to initiate fundamental changes in the nursing education in India (17). In this respect, Foundation's impatience to turn things around in nursing in these former British colonies, where changes came only gradually, undermined the potential opportunities to promote modern education and training.

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