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Original Article

Secondary preventive measures adopted in the management of patients with Acute Coronary Syndrome admitted to the National Hospital of Sri Lanka

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Abstract

Objective

To describe the secondary preventive measures adopted in the management of patients with Acute Coronary Syndrome (ACS) admitted to the National Hospital of Sri Lanka (NHSL), in comparison with standard guidelines.

Methods

A hospital based, descriptive cross-sectional study was carried out in the Cardiology Unit and medical wards of the NHSL during September to October 2009. A sample of 345 patients diagnosed with ACS was included in the study. Medical records were used as the source of data regarding secondary preventive measures during the in-ward period.

Results

Among ACS recruited, 168 (48.7%) were diagnosed with unstable angina, 92 (26.7%) with NSTEMI and 85 (24.6%) with STEMI. Acetyl Salicylic Acid (ASA) was given within 3 hours and documented in only 175 (53.7%). Although a twelve-lead ECG within 20 minutes of arrival at hospital is recommended in the guidelines, ECG was performed after 20 minutes in 203 (59%). In 85 with STEMI 66 (77.6%) received re-perfusion/streptokinase therapy. The time of commencing streptokinase was noted in only 49 (57.6%) and only 9 (18%) received streptokinase within 30 minutes of arrival in hospital. Left ventricular function was assessed in only 53 (15.4%) patients. Continuity of treatment with ACE inhibitors was seen in 298 (86.4%), beta- blockers in 213 (61.7%) and statins in 326 (94.5%). In 337 (97.7%) a maintenance dose of ASA was given during the hospital stay.

Conclusions

Some processes in the management of patients with ACS at NHSL did not meet the standard set by local and international guidelines on secondary preventive measures.

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Introduction

Acute Coronary Syndrome (ACS) encompasses the clinical syndromes of unstable angina, Non-ST Segment Elevation Myocardial Infarction (NSTEMI) and ST Segment Elevation Myocardial Infarction (STEMI)[1]. In ACS, there is inadequate supply of blood and oxygen to the myocardium. The most common cause of myocardial ischemia is atherosclerotic disease in the arteries[2]. ACS typically occurs when there is an imbalance between myocardial oxygen supply and demand. If untreated, the prognosis could be poor and mortality high, particularly

in those with myocardial damaging angina[3]. ACS is the commonest form of heart disease and the single most important cause of premature deaths in the developed world[4].

While ACS has a significant impact in developed countries, many developing countries, like Sri Lanka are experiencing a rapid increase in the incidence of ACS. With the current transition in the demographic profile and increase in life expectancy, incidence of non-communicable diseases, including ACS is on the rise in Sri Lanka[5]. Currently, ischemic heart disease (IHD) is the leading cause of hospital deaths in the country while hospital admission rates due to IHD were as high as 330 admissions per 100,000 in 2009[6]. During the period from 2005 to 2010, the country experienced a 29% increase in hospitalisations due to ischemic heart disease including ACS[7].

Secondary prevention aims to avoid or alleviate serious consequences of ACS by early detection and proper management[8]. Appropriate secondary prevention is important for two main reasons. Firstly, survivors of acute myocardial infarction (MI) carry an increased risk of re-infarction, with a 10% rise in death rate, in the first year following MI and a 5-6 times higher annual death rates thereafter, compared to those without ischemic heart disease[9]. Secondly, the burden of disease due to IHD, especially that due to acute MI, is a major problem throughout the world and an increasing problem in developing countries such as Sri Lanka, as shown in the above statistics.

Timely management of ACS is thought to have a positive effect on preventing recurrences. There is evidence to suggest the existence of a wide practice gap between optimal and actual care for patients with acute MI in hospitals around the world[8]. The objective of this study was to describe selected aspects of secondary preventive measures adopted in the management of patients with ACS, admitted to the National Hospital of Sri Lanka (NHSL).

Methods

This study was a hospital-based cross-sectional study describing selected aspects of secondary prevention care practices of ACS in the medical wards and the Cardiology Unit of the NHSL. Secondary preventive measures to be described were selected based on guidelines for care of in-ward patients published by the Ministry of Health, Sri Lanka and international standard guidelines such as the guidelines of the Canadian Medical Association and the American Heart Association. Secondary preventive care practices assessed were timeliness for detection of the disease, which was assessed by the time taken for an Electro Cardiogram (ECG) to be taken, commencement and timeliness of essential treatment such as streptokinase and aspirin and commencement and continuity of beta blockers, statins and aspirin. Care practices related to cardiac rehabilitation and re-vascularisation were also assessed.

There are seven Medical wards at the NHSL, supervised by ten consultant physicians (four in the Professorial Unit and one each in the other Medical wards). The Cardiology Unit consists of two sections managed under two consultant cardiologists. The study population consisted of newly diagnosed ACS patients admitted to any of the seven medical wards or the Cardiology Unit of the NHSL and the diagnosis of ACS was made by doctors at the Emergency Treatment Unit (ETU), medical wards or Cardiology Unit. Patients with ACS who were transferred from other hospitals, patients who were suffering from any other cardiac disease in addition to ACS (e.g. rheumatic heart disease, infective endocarditis, congenital heart diseases, cardiomyopathy, etc.) and patients who died due to ACS in hospital were excluded from the study. Sample size for the study was 345. Since it was not possible to identify a sampling frame, a convenient sample of eligible patients was recruited from

September 2009 until the desired numbers of patients was recruited. The average rate of admissions for patients with ACS at NHSL was around eight to 10 patients per day at the time of the study.

Two data record sheets were used as data collecting instruments. One data sheet was used to record treatment given while the other data sheet was used to record the drugs prescribed to the patients during the hospital stay. Two pre-intern medical officers collected the data. Ethical clearance was obtained from the Ethics Review Committees of the NHSL and the Faculty of Medicine, University of Kelaniya.

Results

Of 345 patients, 261(75.7%) were admitted to medical wards while 84(24.3%) were admitted to the Cardiology Unit. Of the 168(48.7%) patients with unstable angina, 128(76.2%) were admitted to medical wards and only 40(23.8%) were managed at the Cardiology Unit. In the study population, 177(51.3%) had MI, of which 85(48.0%) had STEMI amounting to 24.6% of the total sample. A majority of STEMI patients 62(73.0%) were managed in medical wards while 23(2.7.0%) were managed at the Cardiology Unit. A total of 92(26.7%) of the study population had NSTEMI, of which 71(77.2 %) were managed in medical wards. Only 21(22.8%) were managed at the Cardiology Unit.

The majority, 212 (61.5%) were admitted within 12 hours of onset of symptoms and 335 (97.0%) were investigated with a 12-lead ECG during their hospital stay. Time of first ECG was recorded in the bed-head ticket (BHT) in 259(77.3%), of which 106(41.0%) had a 12-lead ECG within 20 minutes and 153(59.0%) had an ECG more than 20 minutes following admission. As many as 326(94.5%) were treated with acetyl salicylic acid (ASA) on admission. In 12(3.5%) cases the notes recorded in the bed-head ticket were unclear (Table 1). Of those who received ASA, time of commencement was noted in 187(57.0%) of which, 175(93.5%) were treated within 180 minutes of admission as per the guidelines and 12(6.4%) after 180 minutes following admission. In 337(97.7%) maintenance dose of ASA was given during hospital stay (Tables 2 and 3).

Table 1: Acetyl salicylic acid given on admission

Indicator	Medical wards N (%)	Cardiology Unit N (%)	Total N (%)
Given	250(72.5)	76(22.0)	326(94.5)
Not Given	2(0.6)	5(1.4)	7(2.0)
Records not clear	9(2.6)	3(0.9)	12(3.5)
Total	261(75.6)	84(24.4)	345(100.0)

Table 2: Time taken to commence acetyl salicylic acid after admission

Indicator	Medical wards N (%)	Cardiology unit N (%)	Total N (%)
before 180 minutes	136 (41.7)	39(12.0)	175(53.7)
After 180 minutes	11 (3.4)	1(0.3)	12(3.7)
Time not indicated	102(31.3)	37(11.3)	139(42.6)
Total	249(76.4)	77(23.6)	326(100.0)

Table 3: Acetyl salicylic acid maintenance dose during hospital stay

Indicator	Medical wards N (%)	Cardiology unit N (%)	Total N (%)
Given	259 (75.1)	78 (22.6)	337 (97.7)
Not given	02 (0.5)	06 (1.8)	08 (2.3)
Total	261(75.6)	84(24.4)	345(100.0)

STEMI was diagnosed in 85 patients of whom 66(77.6%) received re-perfusion/streptokinase therapy during hospital stay. The time of commencing streptokinase was noted in only 49(57.6%) and only 9(18%) received therapy within 30 minutes of arrival in hospital.

Of the 345 patients, only 5(1.5%) were subjected to Percutaneous Trans luminal Coronary Angioplasty **(**PTCA) during the study period and only 7(2%) were referred for cardiac rehabilitation conducted by a cardiology center. Left ventricular function (LVF) was assessed in 53(15.4%). Continuity of selected medications during hospital stay is shown in Table 4. Continuity of treatment with ACE inhibitors was seen in 298(86.4%), beta-blockers in 213(61.7%) and statins in 326(94.5%).

Table 4: Drug treatment during hospital stay

Name of the drug	N (%)
ACE (Angiotensin converting enzyme) inhibitors	298(86.4)
Beta-blockers	213(61.7)
Statins	326(94.5)

Of 345 patients, 322(93.3%) were given a bed on admission and 17(5%) more received a bed within one hour of admission. The remaining 6(1.7%), admitted to the Cardiology Unit did not get a bed during their hospital stay. Furthermore, of the 84 patients admitted to the Cardiology Unit 15(17.9%) were discharged home one day after admission. Median duration of hospital stay was three days (range 1-12 days).

Discussion

Considering the limited availability of resources, 339(98.3%) being given a bed within one hour is satisfactory. The six patients who never got a bed were all among those admitted to the Cardiology Unit. This may be because the Cardiology Unit admits patients who are more ill than those admitted to medical wards and the number of beds that can be vacated at short notice is much less.

It is recommended that all patients with suspected ACS be assessed with a 12-lead ECG as soon as possible and that the reading is interpreted by an experienced clinician[10,11,12]. A total of 335(97.0%) patients had a 12-lead ECG recorded sometime during their hospital stay. However, only 259(77.3%) had information on the timing of the investigation recorded in the BHT and only 106 of them (41%) had a 12-lead ECG within 20 minutes of arrival at hospital which is a disappointing figure which falls far below the recommendation[13]. The American Heart Association (AHA) guidelines specify that the ECG should be taken within 10 minutes of

patient's arrival at hospital in cases of ongoing chest pain. A study in Australia found that 61% of patients were subjected to timely ECGs[14].

Re-perfusion treatment should be considered in all those with definite ACS and STEMI, irrespective of age, gender and level of consciousness[12]. Guidelines further specifies that all patients with ST segment elevation/findings consistent with true posterior MI in 12-lead ECG should be rapidly assessed for re-perfusion therapy and re-perfusion strategy should be promptly outlined[15,12]**.** For those with STEMI presenting within 12 hours of the onset of symptoms, fibrinolytics should be started as soon as possible, preferably within 30 minutes of admission. Those admitted 12 hours after onset of symptoms are not eligible for re-perfusion therapy[15,16]. In 85 patients with STEMI, 66(77.6%) received re-perfusion/streptokinase therapy during their hospital stay. Time of commencing streptokinase was noted in only 49(74.2%) and only 9(14%) received treatment within 30 minutes of arrival at hospital[16,15]. Denaro reported that intravenous fibrinolytics was administered in 32% of patients with STEMI during hospital stay[17], while in this study 66(77.6%) STEMI were treated with fibrinolytics.

All patients with ACS should be initially given ASA as soon as possible after arrival in hospital in the absence of clear evidence suggesting aspirin hypersensitivity[12,15,10,18,13]. Treatment should then be continued indefinitely in those who tolerate it[12,15]. According to the Canadian Medical Association (CMA), starting ASA therapy within 3 hours of arrival at hospital is acceptable[16]. According to the guidelines of the Ministry of Health, Sri Lanka, NICE and AHA, ASA should be started as soon as possible, at least within 1 hour of admission, preferably within 30 minutes[10,18,12,15]. According to our findings 326(94.5%) received ASA therapy following admission. However, information regarding timing was available in only 187(57.4%). Only 175(53.7%) received ASA within three hours of arriving at hospital. In a study published in 2009, 82% were given ASA therapy within 24 hours of admission to hospital[19]. Three hours following admission, is a considerably long time interval, considering that immediate commencement of ASA therapy is recommended. Since no information was available on how many were treated within 30 minutes or one hour after admission it was difficult to determine the degree of adherence to guidelines. In our study, a maintenance dose of ASA was given during hospital stay in 337(97.7%). According to the 2002 Clinical Practice Guidelines of Sri Lanka, all patients should continue ASA, while the 2008 CMA guidelines recommend that ASA should be continued in at least 90%[16].

Cardiac rehabilitation is a prescriptive exercise training programme for patients with heart diseases. High risk patients should be referred to a centre where cardiac rehabilitation facilities are available. The NICE guidelines recommend that all patients should be offered enrollment to a cardiac rehabilitation programme with an exercise component while the guidelines of AHA advises patients with STEMI, with moderate to high risk of recurrence, to enroll in a supervised exercise/cardiac rehabilitation programme[18,11]. In the AHA guidelines cardiac rehabilitation is considered more important in those with multiple modifiable risk factors[12]. In our study, cardiac rehabilitation was considered only for patients treated in medical wards and only 7(2.7%) of 261 patients were referred for cardiac rehabilitation. No information was available regarding the proportion of high risk patients or those with multiple modifiable risk factors. Yet it is clear that referral to cardiac rehabilitation is dismally low and that practices are widely different from those recommended internationally. However in Sri Lanka, facilities for cardiac rehabilitation are limited due to the shortage of trained paramedic staff and physical resources. This may be a reason for the observed wide deviation from internationally accepted practices.

The AHA recommends that all patients with STEMI should undergo LVF assessment while the NICE guidelines recommend its use in all patients with MI and unstable angina[12,11]. In our study of 345 cases, 260(75.4%) with unstable angina or NSTEMI and 85(24.6%) with STEMI, only 53(15.4%) underwent LVF assessment which is 62.3% of STEMIs and 29.9% of total MIs. Therefore, the adherence to guidelines for LVF assessment was lower than recommended.

Guidelines recommend continuity of drugs with proven benefits unless contraindicated because they reduces morbidity and mortality, magnitude of infarction, rate of re-infarction and recurrent ischemia[20]. According to the NICE guidelines, all patients should be offered four types of drugs following acute MI; ACE inhibitor, aspirin, beta-blockers and statins[18]. In our study 61.7%, 86.4%, and 94.5% were treated with beta-blockers, ACE inhibitors and statins respectively during their hospital stay. Further, prescription rates in our study are much higher than the percentage of acute MI case. This means that the majority of patients with acute MI received these drugs. However, the rate of treatment of acute MI cases cannot be determined. AHA guidelines recommend that drugs required to control ischemia during hospital stay following MI, should be continued after discharge from hospital in patients who do not undergo re-vascularisation procedures, in those with failed re-vascularisation process and in those with recurrent symptoms following re-vascularisation process[12].

It is recommended that PTCA should be performed within 90 minutes after arrival in hospital in eligible patients. Only 5(1.5%) patients had PTCA during the study period. Case selection for PTCA depends on the eligibility of patients and the severity of coronary artery obstruction. These low figures may be due to a lack of eligible patients or a delay in detection of severity of coronary artery obstruction. In previous studies per-cutaneous coronary intervention rates varied from 13%, 8% to 4% in different settings[17,14]. The low rate in our study may be related to the difficulty in determining eligibility of patients for PTCA.

This study had several limitations. The study was based in the medical wards and Cardiology Unit of the NHSL. Therefore, it may not be possible to apply these findings to other regions. The use of a non-probability sampling technique may have resulted in some study bias. Data recording in BHTs and ECGs was poor. Therefore, data pertaining to patient management (e.g. time of first ECG) may not be accurate. Missing data was also an issue in assessing the process of care and management of patients. Some indicators of standard guidelines could not be measured due to feasibility issues (e.g. in-ward mortality, smoking cessation advice at the time of discharge).

Conclusions and recommendations

Nearly 25% of all ACS cases were acute STEMIs. Use of ASA was not in accordance with the guidelines as only 175(53.7%) received ASA within three hours of arriving at hospital. Timely ECG, according to guidelines, was not performed, as only 106(41%) had an ECG within 20 minutes of arrival in hospital. Although treatment with fibrinolytics, given in 66(77.6%) of acute STEMIs, can be considered satisfactory, in 40(60.6%) fibrinolytics were given 30 minutes after arrival in hospital, indicating a definite delay and non-adherence to guidelines. Assessment of LVF and referral to cardiac rehabilitation was very poor when compared with the recommendations. Drugs with proven benefits for secondary prevention were given appropriately.

Regular audits with regard to adherence to clinical practice guidelines should be performed at the NHSL and corrective measures taken. Education of staff should be prioritised and the importance of adherence to guidelines emphasised. Proper instructions must be given to

healthcare workers. A data sheet will improve clarity and regularity. To minimise delay of ECG, each unit/ward should be provided with an ECG machine and healthcare workers trained to use it. Attention to improving cardiac rehabilitation is important.

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