



# Audit

## Secondary Prophylaxis Of Coronary Artery Disease (CAD); Are We Following Standards Of Care Guidelines? An Audit

D.A.J Chandrika<sup>1</sup>

1. Dengue High Dependency Unit, Colombo South Teaching Hospital

Corresponding author: D.A.J Chandrika E-mail: janani1chandrika@gmail.com

### Abstract

Non communicable diseases are becoming more prevalent than communicable diseases worldwide including Asian, Asia- Pacific and South Asian countries<sup>1</sup>. They are getting more common among the socioeconomically lower class than privileged class<sup>2,3</sup>. Non communicable diseases related deaths in South-East Asian region, increased from 6.7 million in 2000 to 8.5 million in 2012<sup>3</sup>. In Sri Lanka, premature non communicable disease mortality was 17.6% in 2012<sup>3</sup>. The leading cause of hospital deaths in Sri Lanka was ischemic heart disease and there were 30 deaths per 100, 000 population in 2014<sup>4,5</sup>. In the Asia- Pacific region in hospital mortality from acute coronary syndrome is more than 5%<sup>1</sup>.

Cardiovascular disease leads to 7 million deaths in each year worldwide with rising trend with in next decade<sup>6,7,8</sup>. Acute coronary syndromes are a spectrum of conditions; i.e. ST Elevation Myocardial Infarction (STEMI), Non ST elevation myocardial infarction (NSTEMI) and unstable angina (UA)<sup>7,8</sup>. Majority of patients present with typical chest pain but some can present with atypical chest pain or no chest pain at all<sup>9</sup>.

Coronary artery disease (CAD) has a high mortality and poor prognosis; one in every patient who survives will die in the first year after acute myocardial infarction (MI)<sup>7</sup>. Therefore, acute treatment as well as secondary preventive measures are very important in CAD. Secondary prevention includes lifestyle modification, regular exercises, healthy diet, smoking cessation and pharmacotherapy<sup>2,3</sup>. There are five drugs recommended for secondary prevention of acute coronary syndrome by local and international guidelines<sup>7,8,10,11,12</sup>. It includes dual antiplatelet therapy, angiotensin converting enzyme inhibitor (ACEi), beta blocker (BB), and statins. However, there is a disparity between the standard therapy and the current clinical practice in secondary prevention of CAD. This care gap has not been adequately assessed in Sri Lanka and may vary in different parts of the country based on the socio economical background of the patients. An audit was conducted among CAD patients in medical clinics in Teaching Hospital Karapitiya, Galle to evaluate the adherence to guidelines.

### Method

Patients admitted with acute coronary disease (STEMI, NSTEMI and unstable angina) were selected for the audit. Study sample was 200 consecutive patients being followed up in five medical clinics in Teaching Hospital Karapitiya, Galle over an 8 months period from August 2012. Forty patients from each medical clinic were selected and data were collected from clinic notes and patient interview. Interviewer administered questionnaire was used for data collection.

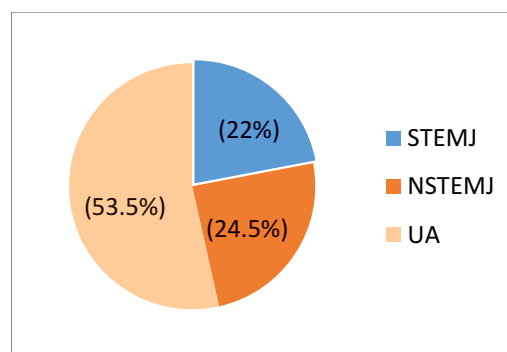


Figure-1: Distribution of type of CAD

### Results

Overall 200 coronary artery disease patients were assessed including 44 (22%) STEMI, 49(24.5%) NSTEMI and 107(53.5%) UA (figure 1). Among them 88(44%) were male (figure 2). Majority of our patients were in the 60-69 year age category. There were 72 patients above seventy years, 76 patients in age 60-69, 36 patients in age 50-59 and 15 patients in age 40-49. Only one patient was below 40 years (Table 1).

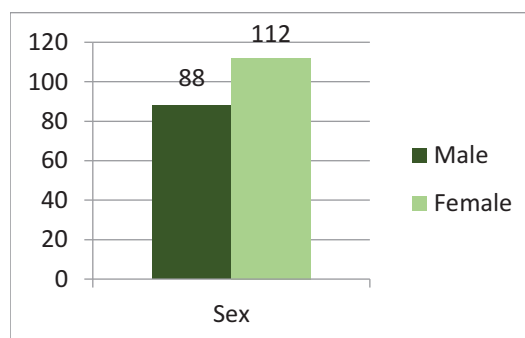


Figure-2 Gender distribution of the sample



| Age   | Total |
|-------|-------|
| 30-39 | 1     |
| 40-49 | 15    |
| 50-59 | 36    |
| 60-69 | 76    |
| ≥ 70  | 72    |

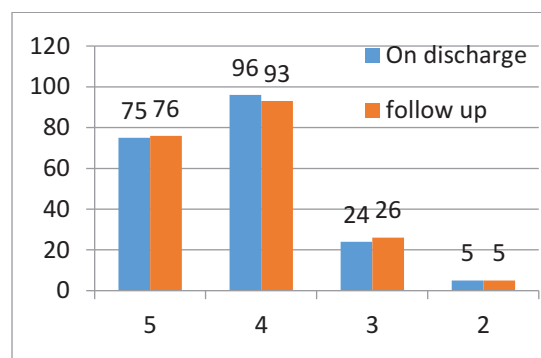
**Table -1** Age distribution of subjects

Nearly half of the patients had primary education. Ninety patients (45%) were educated up to primary school and 71(35.5%) had secondary education. Only a very few patients had tertiary education, 8(4%). Number of uneducated patients was important. A total of 31(15.5%) had not attended school.

Monthly income was categorized to four levels: less than Rs. 5000, Rs. 5000-20,000, Rs. 20,000-50,000, and above Rs.51,000. In 137, income was less than 5000 rupees. Forty six had incomes in Rs. 5000-20,000 category and 14 in Rs.21, 000-50,000 income category. None had monthly income above Rs.50, 000.

According to risk factor analysis almost 50 % of them had hypertension and the second commonest risk factor was diabetes mellitus. There were 99(49.5%) patients with hypertension and 58 (29%) patients with diabetes mellitus. Number of smokers and alcohol users were equal (41, 20.5%). When considering the number of risk factors (figure 3), 51 had one risk factor, and 61 had two risk factors, 26 had three risk factors and 4 had more than three risk factors. Fifty six (28%) patients developed CAD without any identifiable risk factors.

On discharge 75 (37.5%) were on all five drugs including dual anti platelets therapy, BB, ACEI, and statins (figure 3). In addition, there were other combinations 96 (48%) on four drugs, 24(12%) on three drugs, 5 (2.5%) on two drugs on discharge. At six months follow up 76(38%) were on the same five drug combination. Furthermore, 93(46.5%) patients were on four drugs, 26 (13%) on three drugs, 5(2.5%) on two drugs at six months follow up (figure 3). None of them were on single drug on discharge or at six months follow up.

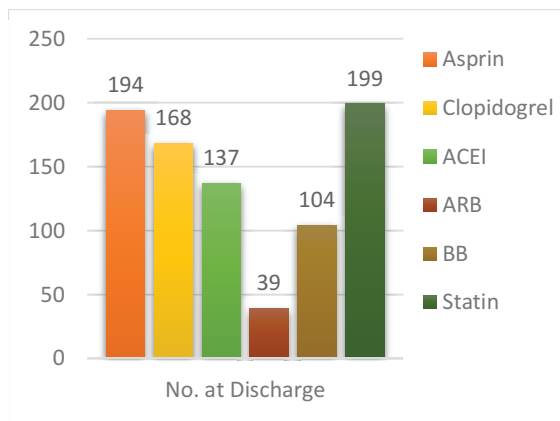


**Figure -3** Secondary prophylaxes on discharge and at 6 months

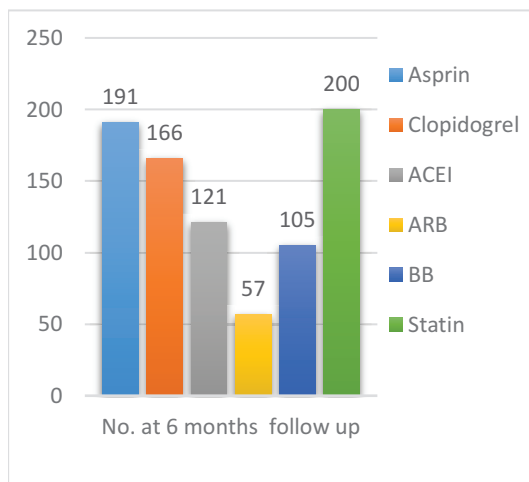
In the selected study sample, majority were treated with aspirin on discharge and were on aspirin at six months follow up. There were 194 (97%) patients on aspirin, 168 (84%) on clopidogrel, 137(68.5%) on ACEI, 39(19.5%) on angiotensin receptor blocker (ARB), 104(52%) on BB and 199(99.5%) on statins on discharge (figure 4). At six months follow up 191(95.5%) were on aspirin, 166(83%) on clopidogrel, 121(60.5%) on ACEI, 105(52.5%) on BB, 57(28.5%) on ARB and all 200(100%) patients were on statins (figure 5). However, number of drop outs were as follows: aspirin 3, clopidogrel 2 and ACEI 16.

Some of the study subjects were on additional drugs with or without recommended secondary prophylaxis. 52(26%) patients were on calcium channel blocker, 12(6%) nicorandil, 6(3%) warfarin, 5 (2.5%) or proton pump inhibitor (PPI).

The reasons for discontinuation were grouped into four categories: ie, due to side effects of drugs, financial difficulties, and non-availability in the hospital or some other reason. Out of these four categories, main reason for withdrawal of drugs were the side effects. Aspirin was withdrawn from 7 patients, clopidogrel in 13 patients, ACEI in 14 patients and BB from 35 patients due to side effects. None of them had developed side effects for statins. The highest number of side effects reported with BB. There were 42 patients who were unaware why they are not on drugs and not documented in the clinic notes about the reason. Discontinuation of drugs due to economic reasons or non-availability of medication in the hospital were not found.



**Figure-4-** Secondary prevention medications on discharge

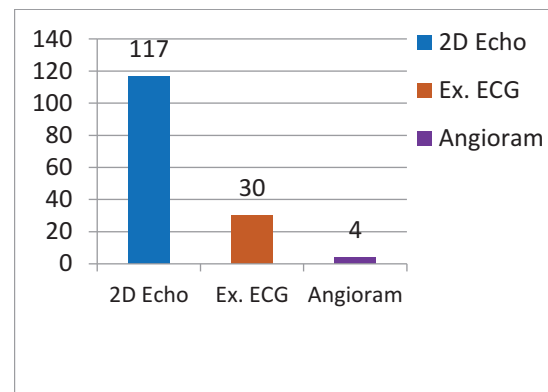


**Figure-5-** Secondary prevention medications at 6 months

In the less than Rs. 5000 income group, aspirin and clopidogrel was discontinued in three patients, ACEI in one patient and BB in eight patients. There were 3 patients who were not on aspirin, in Rs.5000-20,000 income level. Similarly, 4 clopidogrel, 2 ARB, 4 BB discontinued in income Rs.5000-20,000 patients.

Comparative assessment of the level of education and drug discontinuation revealed 11 patients with primary education, 9 patients with secondary education and 6 uneducated patients and, 0 patients with tertiary education.

Of these thirty-seven (18.5%) had heart failure, 13(6.5%) had arrhythmias 8(4%) structural heart disease. Only one case of left ventricular thrombus formation and cardiogenic shock following acute coronary event was found.



**Figure-6** Post CAD work up

Post ACS follow up was also analyzed: 117(58.5%) of patient had undergone 2D echo cardiography. Thirty (15%) patients were assessed with exercise ECG and only 4(2%) further investigated with coronary angiograms (figure 6). Altogether 83 patients did not undergo any investigation following CAD. Although more than 50% of patients had under gone at least one further investigation none of them had intervention.

## Discussion

Four major non-communicable diseases cardiovascular diseases (including heart disease and stroke), diabetes, cancer and chronic respiratory diseases) are the leading causes of death worldwide creating serious social and economic consequences particularly for the poor and disadvantaged populations <sup>(2,3,6)</sup>. Ischemic heart disease and stroke account for majority of the cardiovascular disease related deaths <sup>(3,13)</sup>. Therefore, secondary prevention of CAD is important in reducing mortality and morbidity <sup>(7,10)</sup>. It will reduce the economic burden of developing countries like Sri Lanka <sup>(2)</sup>. The aim of secondary prevention of CAD is to prevent complications and further clinical events in the future <sup>(7,8,11)</sup>.

There are guidelines prepared by local authorities and international bodies regarding the secondary prevention of coronary artery disease <sup>(8,11)</sup>. Both Sri Lankan and NICE guidelines recommend five drugs to be continued lifelong to avoid further coronary events. According to the guidelines a patient with established CAD should be on dual anti platelet therapy, ACEI, statins and beta blockers unless there are contraindications.



However, many patients with CAD are not on all five types of drugs due to a number of reasons such as side effects and cost<sup>(10,12,14)</sup>. More than half the study population (68.5%) had a monthly income below Rs. 50 000, and therefore unable to afford drugs when they are not available in the hospital pharmacy. They were also unable to afford second line drugs or side effect relieving medications (PPI) from private sector. This was a contributing factor for not reaching the audit targets in the study population.

Data reveals that only approximately 40% of patients were on all recommended drugs for secondary prevention of CAD on discharge as well as at six months follow up. This is thoroughly inadequate and suboptimal. Therefore, doctors should pay more attention and should strictly adhere to NICE and Sri Lankan guidelines for the secondary prevention of coronary artery disease following acute coronary syndromes. The local and international guideline target is that all patients must be on five drugs for prophylaxis following acute coronary syndrome<sup>(10,11)</sup>. “Fulfill this target” awareness programs for doctors should be conducted in the form of presentations at clinical meetings. In addition, we may provide easy access to guidelines via the internet and keep copies in each ward for reference. The hospital management should provide updated copies of local guidelines to each ward.

An awareness program and continuous update of new management strategies for doctors is crucial in achieving the guideline targets. Therefore, free access to international guidelines and journals should be provided through a library internet facility.

According to the data, commonest reason for drug withdrawal was development of side effects. This can partially be overcome by addition of another drug with same therapeutic effect, e.g. calcium channel blockers instead of beta blockers. Doctors should be updated on second line drugs which are helpful in the secondary prevention of coronary artery disease.

Documentation is very important in clinical practice, especially when drugs are omitted or withdrawn. The documentation should be in clear precise language in the medical notes with indications, contraindications and outcome. It can prevent future adverse drug reactions and interactions.

Forty-four patients in the study population were unaware about the reasons for drug withdrawal and the reason was not even mentioned in the clinic books. It is very important to update the patients about their treatments before their discharge.

Data collection in the Sri Lankan setting is difficult because of limited time to spend with individual patients on these issues due to large numbers. Patient education should be done individually as much as possible but in difficult situations groups of patients can be updated on discharge. In each clinic visit drugs must reviewed and attention paid to possible side effects, adverse reactions or interactions. If side effects are noted a second line drug should be introduced after taking superior opinion if necessary. All these details should be recorded in the clinical notes appropriately after discussing with the patient. Moreover, mass awareness programs for secondary prevention of CAD can be arranged through the community health team.

The audit revealed that post coronary artery disease assessment is sub optimal: only 58.5 % had echo, 15 % had exercise ECG and only 4 patients (2%) had undergone coronary angiograms. Therefore, medical teams should pay more attention to this issue and joint management planned and carried out with the Cardiology team.

In conclusion, approximately only 40 % of the patients were on all five prophylaxis drugs on discharge and at 6 months follow up. This is inadequate. The majority were on dual anti platelet therapy and statins. But the use of beta blockers and ACEI were sub optimal. Main reasons for drug withdrawal were side effects of drugs, financial difficulties, and inability to provide drugs by the hospital. Patients developed more side effects for beta blockers compared to other drugs. Statins were tolerated by the study group without any side effects.

Doctors needs to be updated on secondary prevention of coronary artery disease and also regarding adding second line drugs when patents develop side effects or contra indications. Easy access to national and international guidelines should be provided. Doctors should pay more attention to documentation in clinical notes.



Awareness programs for patients regarding prophylaxis for coronary artery disease need to be enhanced. Remedial action have been showed to be important to improve the quality of management. Re audit should be conducted in one years time to check the progress.

#### Acknowledgement:

1. Dr. Wasantha Kodikara Arachchi, Consultant Physician , Teaching Hospital Karapitiya
2. All the Consultant Physicians in the Medical wards in Teaching Hospital Karapitiya.
3. All participants

#### Reference

1. Chan MY, Du X, Eccleston D, Ma C, Padinhare P, Mohanan et al. Acute coronary syndrome in the Asia-Pacific region. *International Journal of Cardiology*. 2015;202(2016):861-869.
2. Vedanthan R, Seligman B, Fuster V. Global Perspective on Acute Coronary Syndrome: A Burden on the Young and Poor. *Circulation Research*. 2014;114(12):1959-1975.
3. World Health Organization, Global Status Report on Noncommunicable Diseases 2014. World Health Organization. 2014, Geneva, Switzerland.
4. Medical Statistics Unit. Ministry of Health Sri Lanka, Annual Health Bulletin 2014: Colombo, Ministry of Health Sri Lanka: 2014.
5. Medagama A, Bandara R, De Silva C, Galgomuwa M. Management of acute coronary syndromes in a developing country; time for a paradigm shift? an observational study. *BMC Cardiovascular Disorders*. 2015;15(1):1-8
6. Ohira T, Iso H. Cardiovascular Disease Epidemiology in Asia. *Circulation Journal*. 2013;77(7):1646-1652
7. Harrison T, Kasper D, Fauci A, Hauser S, Longo D, Jameson J et al. Harrison's principles of internal medicine. 18<sup>th</sup> edn, New York: McGraw-Hill; 2012.
8. Clinical practice guidelines. Management of acute coronary syndrome. Colombo: Ministry of Health; 2002.
9. Lankamali S. Factors associated with the presentation of Acute Coronary Syndrome. *Australasian Medical Journal*.2010;11:723-727.
10. Rajapakse S, Rodrigo PC, Selvachandran J. Management of acute coronary syndrome in a tertiary care general medical unit in Sri Lanka: how closely do we follow the guidelines? *J Clin Pharm Ther*. 2010;35(4):421-427.
11. National Institute for Health and Clinical Excellence clinical guideline. MI: secondary prevention, secondary prevention in primary and secondary care for patient following a myocardial infarction, 48, May 2007;04-16.
12. Ariyaratne N, Abeysena H. Secondary preventive measures adopted in the management of patients with Acute Coronary Syndrome admitted to the National Hospital of Sri Lanka. *Journal of the Postgraduate Institute of Medicine*. 2014;1:E2:1-7.
13. Lozano R, Naghavi M, Foreman K, et al. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet*.2012;380:2095-2128.
14. Constantine GR, Herath JI, Chang AA, Suganthan P, Hewamane BS,Thenabadu PN. Management of acute myocardial infarction in general medical wards in Sri Lanka. *Postgrad Med J*. 1999;75(890):718-720