Acute Coronary Care in a General Hospital

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Nearly thirty years ago the first coronary care units were established,[1-3] initiating an attempt to reduce mortality associated with acute myocardial infarction (MI).

Walloopillai et al[4] describes acute coronary care in the Cardiology Unit at the Colombo General Hospital. This paper from a recently established General Hospital compares this study and describes the results of a study over a five year period, from January 1986 to December 1990.

Materials and Methods

The study population consisted of all patients admitted to the Coronary Care Unit at Sri Jayawardenapura General Hospital with confirmed or suspected myocardial infarction.

Patients were included in the myocardial infarction study if they satisfied at least two out of three diagnostic criteria. These criteria consisted of a history of prolonged chest pain unrelieved by rest or nitrates; elevation of serum levels of creatine kinase or its isoenzyme subfraction, or of aspartate aminotransferase or lactic dehydrogenase; and serial electrocardiographic tracings showing S-T segment changes or Q waves (or both) typical of acute myocardial infarction.[5]

The complications of myocardial infarction were assessed on the basis of information available from the clinical charts. Cardiogenic shock was indicated by a systolic blood pressure level below 80 mm Hg in the absence of hypovolaemia, and associated with cyanosis, cold extremeties, changes in mental status, persistent oliguria, or chronic heart failure.[6] Ventricular fibrillation (VF) was clasified as either primary or secondary based on whether the VF occurred without (primary VF) or with heart failure or cardiogenic shock (secondary VF).[7]

Of the 536 patients admitted to the Coronary Care Unit, an analysis of patients who were subsequently found not to have an infarction was also done.

Findings

During the five year period of study (January 1986 to December 1990), 343 patients with confirmed myocardial infarction (MI) were admitted to the Coronary Care Unit (CCU). 321 (93.6%) were first infarctions and 22 (6.4%) were recurrent infarctions.

Sex

Of the 343 patients, 265 (77.3%) were males and 78 (22.7%) were females.

Age

The age group varied from 22 years to 74 years. The largest group of 106 patients were in the 51 - 60 age group. The second largest group of 90 patients were in the 61 - 70 age group. Four patients were below 30 years of age. (Table 1)

Risk Factors

75 (21.9%) of the patients had a history of hypertension; 74 (21.6%) had diabetes mellitus; 68 (19.2%) gave a history of smoking cigarettes; 35 (10.2%) had a previous history

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of ischaemic heart disease (IHD); and 18 were obese (5.2%). 124 (36.2%) patients had hyperlipidaemia. Of these, 102 had elevated total serum cholesterol, 12 patients had elevated low-density lipoprotein fraction only, and 10 patients had hypertriglyceridaemia. (Table 2)

Duration of Stay

Average duration of stay in the CCU was 3.90 days. Average duration of stay in the medical ward was 6.2 days.

Type of Infarct

175 (51%) patients had anterior Q-wave infarction; 51 (41.9%) had anterior non-Q wave infarct; 92 (26.8%) had inferior Q-wave infarction; 19 (5.5%) had inferior non-Q wave infarction; 5 (1.5%) had right ventricular infarction and 1 (0.3%) had both anterior and inferior infarction. (Table 3)

Complications

Of the 343 patients, 196 (57.1%) developed complications. (Table 5) These were heart failure cardiogenic shock, tachyarrhythmias, bradyarrhythmias and embolism. 1 patient with heart failure developed a pulmonary infarction.

Table 1

Age Distribution

Year	*No: of* Patients	*21 - 30* Years	*31 - 40* Years	*41 - 50* Years	*51 - 60* Years	*61 - 70* Years	> 70 Years
1986	80	2	7	18	25	19	9
1987	62		4	14	16	19	9
1988	64	1	7	9	27	16	4
1989	64		9	17	16	14	8
1990	73	1	6	14	22	22	8
Total	343	4(1.2%)	33(9.6%)	72(21%)	106(30.9%)	90(26.2%)	38(11.1%)

Table 2

Risk Factors

Year	*No: of Patients*	*HT*	*DM*	*SM*	*H/O Angina*	*OB*	*HL*
1986	80	24	19	15	12	5	30
1987	62	10	9	18	9	3	22
1988	64	16	10	12	1	3	22
1989	64	18	17	15	8	3	24
1990	73	7	19	8	5	4	26
Total	343	75(21.9%)	74(21.6%)	68(19.8%)	35(10.2%)	18(5.2%)	124(36.2%)

HT - Hypertension, DM - Diabetes Mellitus, SM - Smokers, Ob - Obesity, HL - Hyperlipidaemia

Table 3

Type of Infarct

Year	*No: of Patients*	*Ant - Q*	*Ant Non-Q*	*Inf - Q*	*Inf Non-Q*	*Ant + Inf*	*Right Ventricular*
1986	80	44	19	15	2	-	-
1987	62	37	5	15	4	-	1
1988	64	25	12	25	1	1	-
1989	64	31	6	18	7	-	2
1990	73	38	9	19	5	-	2
Total	343	175(51%)	51(14.9%)	92(26.8%)	19(5.5%)	1(0.3%)	5(1.5%)

Table 4

Complications

Year	*No: of Patients*	*Heart Failure Alone*	*Tachyarrhythmias Alone*	*Tachyarrhythmias With HF*	*Tachyarrhythmias With CS*	*Bradyarrhythmias Alone*	*Bradyarrhythmias HF*	*Bradyarrhythmias Shock*	*Shock Alone*	*Shock With HF*	*Embolism Alone*	*Embolism HF*	*Embolism CS*
1986	48	33	3	-	1	3	-	-	5	1	1	-	1
1987	44	26	3	3	1	1			9	-	-	1	
1988	26	12	5	2	-	3	1	-	3	-	-	-	-
1989	38	19	2	8	3	3	-	-	1	-	2	-	-
1990	40	17	3	5	4	1	-	-	10	-	-	-	-

HF - Heart Failure, TA - Tachyarrhythmias, CS - Cardiogenic Shock, BA - Bradyarrhythmias

Of the 196 patients, 129(65.8%) patients had left ventricular failure. 95 had an anterior infarct, 33 an inferior infarct and 1 had a right ventricular infarct.

39 (19.9%) patients had cardiogenic shock. 24 patients had an anterior infarct, 12 an inferior infarct, 2 a right ventricular infarct, and 1 patient had both anterior and inferior infarction.

12 (61%) patients had bradyarrhythmias. 7 patients had sinus bradycardia, 1 patient had sick — sinus syndrome, 1 patient had first degree heart block, 2 had second degree heart block and 1 had complete heart block. 10 patients had inferior infarcts; 2 had anterior infarcts.

43 patients (22.4%) had tachyarrhythmias. Of these, 36 were ventricular tachycardias. 13 patients had ventricular extrasystoles, 3 had ventricular tachycardias corrected by DC conversion, 7 had primary ventricular fibrillation and 13 had ventricular fibrillation secondary to heart failure or shock. Of these, 36 patients, 25 had an anterior infarct and 11 had an inferior infarct.

7 patients had supraventricular tachycardias. 5 patients had sinus tachycardia and 2 patients had atrial fibrillation. 5 patients had an anterior infarct and 2 patients an inferior infarct.

12 patients had intraventricular conduction blocks. 6 had right bundle branch block,

(RBBB) 4 had left bundle branch block, (LBBB) and 2 had left anterior hemiblock with right bundle branch block.

4 patients had cerebral embolism following admission to the CCU; 1 patient had pulmonary embolism.

Deaths

66 (19.2%) of the 343 patients died. 46 (69.7%) were male patients and 20 (20.3%) were female. The largest number of deaths were in the 61 - 70 age group. (Table 5)

46 patients had anterior infarcts; 18 patients had inferior infarct; 1 patient had both anterior and inferior infarcts and 1 patient had right ventricular infarction.

31 patients had heart failure, 22 patients had cardiogenic shock. Of the 66 patients, 15 had terminal ventricular fibrillation and 51 had ventricular asystole. (Table 6)

Of the 196 patients who had complications of myocardial infarctions, 55 (28%) died. Of the 147 patients with uncomplicated myocardial infarction, 11 (7.5%) died.

Table 5

Deaths: Distribution of Age, Sex

Year	*No: of Patients*	*No: of Deaths*	*Sex* *Male*	*Female*	*Age* *31-40*	*41-50*	*51-60*	*60-70*	*70*
1986	80	10(12.5%)	6	4	-	-	5	3	2
1987	62	18(29.0%)	13	5	1	3	2	7	5
1988	64	20(15.6%)	5	5	-	1	4	5	-
1989	64	10(15.6%)	8	2	1	3	1	5	-
1990	73	18(24.6%)	14	4	-	2	5	6	5
Total	343	66(19.2%)	46	20	2	9	17	26	12

Table 6

Deaths

Year	*No: of Deaths*	*Type of Infarct* *AQ*	*ANQ*	*IQ*	*INQ*	*RV*	*A + I*	*Heart Failure*	*Cardiogenic Shock*
1986	10	4	4	2	-	-	-	3	4
1987	18	12	2	3	1	-	-	9	6
1988	10	3	3	3	-	-	1	4	3
1989	10	6	-	2	1	1	-	9	1
1990	18	10	2	4	2	-	-	6	8
Total	66	35	11	14	4	1	1	31	22

AQ - Ant Q-Wave, ANQ - Ant Non-Q Wave, IQ - Inf Q, INQ -Inf Non-Q
RV - Right Ventricular, A+I - Ant Inf

Analysis of Non-Infarct Patients admitted to CCU

Of the total of 536 patients admitted to the CCU with suspected or confirmed myocardial infarction, 193 were subsequently found to have no infarction. Of these, 143 patients (74.1%) had electrocardiographic evidence of IHD. A further 11 patients had ECG evidence of cardiovascular disease in whom an etiology of IHD could not be conclusively made. A total of 154 patients (79.8%) therefore had evidence of cardiovascular disease.

8 patients had costochondritis; 11 patients had evidence of peptic ulcer, later confirmed by endoscopy; I patient had hypereosinophilic syndrome and 1 patient had chronic obstructive airways disease. 18 patients (9.3%) had no clinical abnormality.

Discussion

Ischaemic heart disease is a leading cause of hospital deaths in Sri Lanka. The objectives of this study were to analyse the mortality of patients admitted to a Coronary Care Unit in a General Hospital, to assess the incidence of myocardial infarction in all patients admitted with chest pain, and to evaluate the usefulness of a Coronary Care Unit.

The average stay in the CCU was 3.9 days and the average hospital stay was 10 days. This is comparable with reports elsewhere.[9,10] The rationale for reducing length of stay in the CCU is based on the available literature which indicates that upto 96% of acute infarctions are detected within 24 hours. Furthermore, the risk of arrhythmic death falls with time after onset of infarction. The current literature recommends that patients who have not had complications of infarction after 48 hours, should be transferred from the CCU.[10]

Pacemaker insertion was necessary in only one of 343 patients and this was done at the Institute of Cardiology of the General Hospital, Colombo.

We would have liked to have done stress tests in all the survivors, and this is planned for the immediate future.

Deaths in our study were highest among males. This is in keeping with other studies.[4,11,12] Deaths were greatest in the age group above 60 years. This is comparable with other studies which show that mortality increases with age[11,12]. As in previous studies, patients with anterior infarcts had a significantly higher mortality than patients with inferior infarcts[4,13].

The high case fatality rate of patients with left ventricular failure complicating myocardial infarction is noted.[14,15] The incidence of cardiogenic shock with myocardial infarction in our study was 11.4% and is similar to statistics reported elsewhere, as is the high case fatality rate in such patients.[6,15,16]

15 out of 22 patients dying of cardiogenic shock had no arrhythmias, indicating pump failure resulting from the size of the infarct.[15,17] Intra-aortic balloon counterpulsation has been used since 1968 to treat infarction and its complications.[10] In our unit this was not used because of lack of evidence for its efficacy.[6,10,15]

The objectives in the establishment of Coronary Care Units to reduce mortality from myocardial infarction has evolved since 1962. Whereas the initial goals were rescuscitation of patients with arrhythmias after acute MI and prevention of primary ventricular fibrillation, present goals include diagnosis and exclusion of acute MI, treatment of pump failure and ongoing ischaemia, and limiting of infarct size by thrombolysis and/or angioplasty.[10]

The hospital mortality in the literature[3] for patients with myocardial infarctions prior to the advent of coronary care units was 30 - 40%, The mortality in patients treated in coronary care units is 12 to 25%.[10,18] The mortality after myocardial infarction in our study is 19%.

36% of patients admitted to the CCU did not have acute MI. However, 74.1% of them had evidence of Ischaemic heart disease. Of the 536 patients in the study, 39 (7.3%) had non-cardiac chest pain. This compares favourably with other studies.[19]

The current goals for coronary care units include exclusion of acute myocardial infarction. However, a CCU is an expensive place to exclude infarction. A suitable alternative may be found in the concept of a pre-coronary care area, or a coronary observation unit,[10] where patients with suspected infarction can be monitored for 24 hours while serial enzyme assys are used to exclude the diagnosis of myocardial infarction.

This study gives support to the establishment of Coronary Care Units in all General Hospitals.

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