

Evaluation of the Acute Myocardial Infarction Patient by Holter Monitoring Day after Acute Phase of Coronary Care Unit

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Abstract

Original Research Article

Background: Cardiovascular diseases occupy the first rank in worldwide mortality and acute coronary represents a global epidemic. The evaluation of the patients of ischaemic heart disease has emerged as one of the common indication for the use of Holter monitoring or ambulatory electrocardiography. **Aim and objective:** To ascertain the effectiveness of Holter monitoring in the evaluation of the acute myocardial infarction, after an acute phase of coronary care unit. **Material and Method:** Descriptive type of cross sectional study was conducted on 50 patients of AMI after obtaining written informed consent. Trillium 3000 Digital Holter Cardiology system manufactured by Forest Medical was used in present study. **Observation and Results:** In present study 78% (39) were males and 22% (11) were females. Maximum incidence of AMI was seen in 5th decade of life. Out of 50 patients 39 (78%) patients showed complication on Holter monitor and 11 (22%) were uncomplicated cases. In our study ventricular ectopics (46%) found to be most common complication of AMI after acute phase. Other commonest finding noted were supraventricular ectopics (38%), sinus tachycardia (26%) and ST displacement (re-elevation in same leads again) in 26% of cases. **Conclusion:** Holter monitoring can be is a useful modality of for the evaluation of AMI patients after acute phase of coronary care unit.

Keywords: Myocardial infarction, Holter monitor, Ambulatory electrocardiography, Ventricular ectopic.

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INTRODUCTION

Cardiovascular diseases occupy the first rank in worldwide mortality. Much of which is due to heart disease caused by ischemia, usually caused by the obstruction of a coronary artery secondary to the rupture of an atherosclerotic plaque[1]. As per a report of World Health Organization (WHO) in 2005, cardiovascular disease (CVD) caused 17.5 million (30%) of the 58 million deaths that occurred worldwide [2]. India is in the transition stage, facing dual burden of communicable and non-communicable diseases [3]. An alarming increase over the past two decades in the prevalence of CAD and cardiovascular mortality in India and other south Asian countries has been noticed. Affluence, progressive aging, industrialization, and changes in lifestyle have worsen the situation.

The continuous record of an individual's electrocardiogram's, usually for the period of several hours is known as electrocardiography and its technology is known as Holter recording to commemorate the name of its inventor, Normal J. Holter, D. Sc, of Helena, Montana[4]. The majority of cardiovascular mortality occurs outside the hospital and are sudden and unexpected. The probable mechanism of

the most such sudden death is thought to be attributable to myocardial electrical instability resulting in severe dysrhythmias especially ventricular fibrillation which has predilection for the ischemic myocardium. Examination of continuous electrocardiogram for alteration of rhythm, waveform and heart rate provides an accurate documentary 'movie' of the changing cardiovascular responses of the ischemic heart disease patient.

Ambulatory electrocardiography is a diagnostic procedure that records the electrical activity of the heart using Holter recording technology. The evaluation of the patients with ischaemic heart disease has emerged as one of the common indication for the use of ambulatory electrocardiography. With the medical emphasis during the past decade turning to the earlier diagnosis from the narrow perspective of assessing ventricular arrhythmias to the evaluation of ST segment changes and heart rate which was not possible otherwise when the patient moves away from hospital to home. With this background, present study was conducted at tertiary care teaching hospital, to study the effectiveness of Holter monitoring in the

evaluation of the acute myocardial infarction, after an acute phase of coronary care unit.

MATERIAL AND METHODS

Institutional Ethics Committee (IEC) permission was sought before commencement of study. A descriptive type of cross sectional study was conducted at tertiary care teaching hospital of medical college of western Maharashtra. Hospital has a state of art infrastructure to provide comprehensive health care services to rural people. This study was conducted over the period of two years in the department of medicine. Total 50 cases of acute myocardial infarction admitted in the cardiac care unit (C.C.U) was included after written informed consent. All patients of both sexes in any age group sustaining ST elevation MI with acute presentation coming within the time frame of thrombolysis were included in the study. Patients who were not willing to participate and having co-morbidities like advanced heart failure, renal failure, history of coronary artery bypass grafts etc. were excluded from the study.

In every case detailed history was obtained from patients. History included the information of presenting symptoms (chest pain, dyspnea, giddiness, etc.) including risk factors like diabetes, smoking, hypertension and previous history of ischemic heart disease etc. A thorough physical examination was done. Standard 12-lead electrocardiogram was recorded and blood samples for cardiac enzymes, complete blood count, and renal function were collected. All patients were considered for thrombolytic therapy (streptokinase) in the absence of any contraindications and were managed according to standard treatment

protocols. Daily changed in sign and symptoms were carefully noted.

When the patient was transferred from cardiac (coronary) care unit to ward on day 4 to 6. Holter monitoring was done for 24 hours. After completion of monitoring, the report was analyzed and removal of artifacts were done and report was made as per data recorded by the Holter monitor. Trillium 3000 Digital Holter Cardiology system manufactured by Forest Medical was used in present study.

Statistical analysis

Data sheet were checked for the completeness and data entry and coding was done in Microsoft excel. Descriptive statistics like proportion, mean and standard deviation were calculated.

RESULTS

In present descriptive cross sectional study 50 patients of acute myocardial infarction (AMI) admitted in CCU sequentially were studied after acute phase on day 4 to 6 after moving to general ward with Holter monitor. Out of all patients 78% (39) were males and 22% (11) were females. (Table 01) The mean age group of male and female participants was 52.02 ± 12.58 and 59.36 ± 9.01 respectively. Maximum incidence of AMI was seen in 5th decade of life. Chi square test (χ^2) in between age groups and gender found to be statistically non-significant. (χ^2 :7.48 d.f: 6 P:0.27 Non significant). Out of all, 80% patients have history of either one or combination of risk factors. Chest pain (71%) was the most common chief complaint of patients followed by dyspnea (16%) and epi-gastric pain (10%).

Table-01: Age and gender wise distribution of the participants (n=50)

Sr. No.	Age groups (Yrs.)	Gender		Total
		Male	Female	
1.	21-30	02	00	02 (04.00%)
2.	31-40	05	00	05 (10.00%)
3.	41-50	09	03	12 (24.00%)
4.	51-60	15	03	18 (36.00%)
5.	61-70	07	04	11 (22.00%)
6.	71-80	00	01	01 (02.00%)
7.	81-90	01	00	01 (02.00%)
	Total	39 (78%)	11 (22%)	50 (100%)

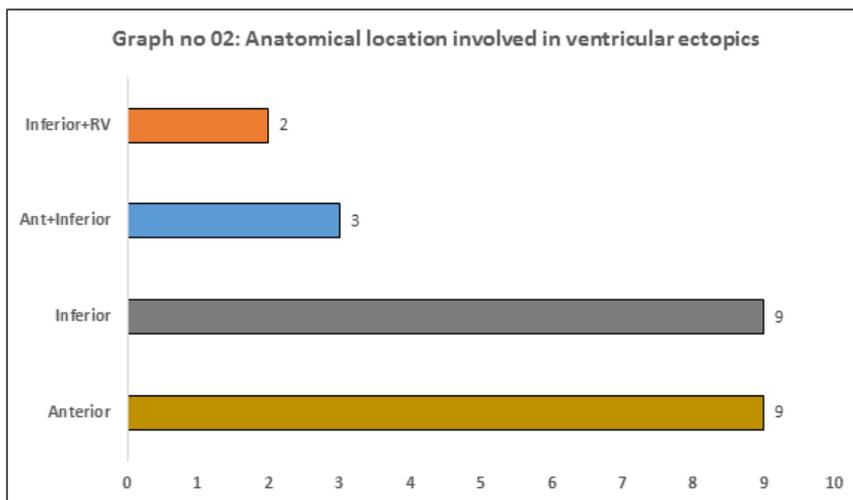
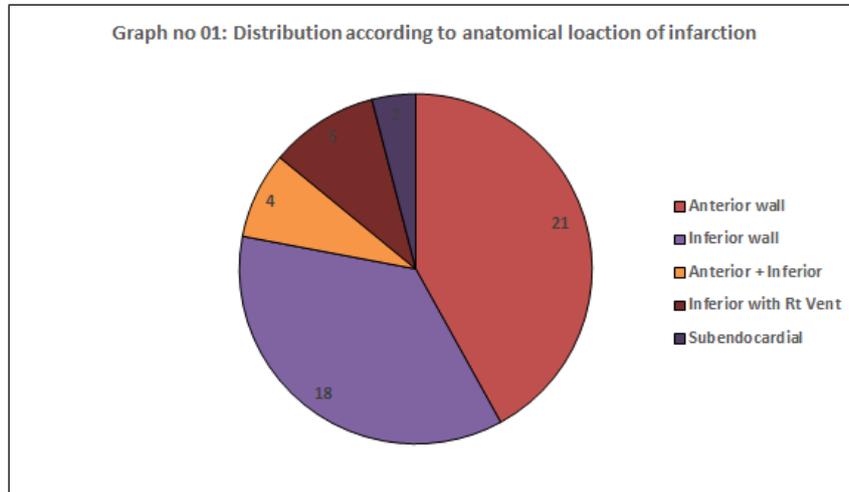
Chi square (χ^2) test: 7.48 d.f: 6 P:0.27 Non significant

Anterior wall (42%) and inferior wall (36%) were the commonest anatomical location for infarction in present study (Graph 01). Out of 50 patients 39 (78%) patients showed complication on Holter monitor and 11 (22%) were uncomplicated cases. Incidence of angina symptoms after AMI was seen in 26% (13) patients and 74% (37) patient found to be free from post AMI angina symptoms. In this study 46% (23) patients had ventricular ectopics. Out of them 09 had anterior wall infarction, 09 had inferior wall infarction, 03 had

anterior + inferior wall infarction and 02 had inferior + right ventricular infarction. (Graph 02) Next to ventricular ectopics other commonest finding noted were supraventricular ectopics (38%), sinus tachycardia (26%) and ST displacement (re-elevation in same leads again) in 26% of cases. All ST displacement and post infarction angina patients were advised coronary angiography and SOS intervention.

Among the sustained arrhythmias Paroxysmal supraventricular tachycardia (PSVT) and ventricular tachycardia (VT) were noted in 16% and 04% of cases respectively. Out of 02 patients of VT 01 patient had infarction in the inferior wall and other had anterior + inferior wall infarction. Supraventricular ectopics and ventricular ectopics were found to predispose to

supraventricular tachyarrhythmias in 04 patients out of 19 patients and ventricular tachyarrhythmias in 02 patients out of 23 patients respectively. In present study sinus bradycardia, heart block of any degree, arterial flutter, arterial and ventricular fibrillation were not seen in any 50 cases after acute phase of AMI.



DISCUSSION

Present study was conducted on 50 patients, with an aim to ascertain the effectiveness of Holter monitoring in the evaluation of acute myocardial infarction after acute phase. Male to female proportion in this study was 3.5:1. In a study conducted by Rajhans R *et al.* [1] male to female proportion was 2.33:1, which was less as compare to our study. In this study maximum incidence of AMI was seen in 5th decade of life. Study of Rajhans R *et al.* [1] reported the maximum incidence of AMI in the age group of 41-70 years (88%) and only 2% of the cases were below 40 years of age. A study done in by Martin TC *et al.* [5] *et al.* showing incidence of 85% between ages 35 to 75 years. In our study almost 80% patients gave history of either one or more than one combination of risk factors. Chest

pain (71%) reported as the commonest chief complaint in our study. Rajhans R *et al.* [1] reported that 76% participants of their study had one or more than one risk factors of myocardial infarction and chest pain (66%) as commonest complaint followed by giddiness and syncope.

In present study anterior wall and inferior wall myocardial infarction was 42% and 36% respectively. In a study conducted by Rajhans *et al.* [1] in Pondicherry reported overall 56% incidence of anterior wall myocardial infarction (anterior + anterolateral + anteroseptal) and 44% of inferior wall myocardial infarction. In our study ventricular ectopics (46%) found to be most common complication of AMI after acute phase. Ventricular ectopics incidence was seen more common with anterior wall infarction and inferior

wall infarction. Study conducted by Julian *et al.* [6] and Stock *et al.* [7] reported 67% and 65% incidence of ventricular ectopics respectively. Rajhans *et al.* [1] reported VPB (66%) and AIVR (42%) as the most common arrhythmias followed by NSVT (30%) and Ventricular bigeminy/couplets (30%).

In our study next to ventricular ectopics other commonest finding noted were supraventricular ectopics (38%), sinus tachycardia (26%) and ST displacement (re-elevation in same leads again) in 26% of cases. Julian *et al.* [6] reported 25% and 43% incidence of supraventricular tachycardia and sinus tachycardia respectively. Braunwald *et al.* [8] reported 20-30% incidence of post infarction angina and ST displacement. In this study Paroxysmal supraventricular tachycardia (PSVT) and ventricular tachycardia (VT) were noted in 16% and 04% of cases respectively. Julian *et al.* [6] reported 4% and 2% incidence of PSVT and VT respectively.

CONCLUSION

Present study concluded that Holter monitoring can be used for the evaluation of HR changes, symptomatic and asymptomatic ST segment changes and arrhythmias of various natures. Holter monitor can be used to predict SVT and VT in post AMI patient after acute phase and this subject can be subjected for anti-arrhythmic treatment as done in present study. Symptomatic or asymptomatic ST-T changes continuing after acute care can be assessed better by Holter monitoring. Thus a decision for coronary intervention can be better assessed at the earliest.

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