ORIGINAL RESEARCH PAPER

GENERAL MEDICINE

STUDY OF CORRELATION OF ECG AND ECHOCARDIOGRAPHY LOCALISATION IN ACUTE MYOCARDIAL INFARCTION

KEY WORDS: Myocardial infarction, electrocardiography , echocardiography

Dr Pothula Rama Rao MD General Medicine, Associate Professor of Medicine, GMC KADAPA.

Dr Prathap Bingi* MD General Medicine, Assistant Professor of Medicine, GMC Kadapa *Corresponding Author

ABSTRACT

Acute myocardial infarction is one of the common diagnosis in hospitalized patients in both developed and developing countries, which is a serious complication of atherosclerotic coronary heart disease. In most patients it results from atherosclerotic occlusion of the related vessel resulting in infarct. Myocardial infarction may occur at any age but the frequency increases progressively with age. Ischemic heart disease is thus a great killer of mankind accounting for 15% of all mortality in India (1) (2). Acute myocardial infarction is characterized by retrosternal chest pain, radiating to ulnar aspect of left arm. In some patients particularly in elderly, acute myocardial infarction is not manifested clinically by chest pain but rather by symptoms of acute left ventricular failure (3). It is observed that various risk factors such as age, male sex, smoking, obesity, hyperlipidemia, diabetes mellitus, hypertension, family history of IHD, type A personality, play a role in the occurrence of myocardial infarction (4). Various methods such as QRS scoring index by ECG & left ventricular EF and wall motion abnormality by 2D Echo help in diagnosis and prognostification of myocardial infarction. These investigations are non-invasive and can be done at less advanced centres. Hence, this study is undertaken to correlate the site of infarction by ECG and 2D Echo.

MATERIAL AND METHODS:

A total of 40 patients of myocardial infarction admitted in CCU , GGH Kadapa were selected for study. Data is collected by taking a detailed history from the patients (as per the performa) particularly keeping the following points in view.

Time of onset of typical chest pain, nature of pain and associated symptoms like excessive sweating, vomiting, breathlessness, giddiness, fatigue and abdominal pain. A history of smoking, alcohol consumption, hypertension, diabetes mellitus, obesity according to BMI, personality type and family history of IHD.

A thorough clinical examination was carried out in each case with special reference to pulse, BP, CVS and respiratory examination for the presence of any cardiac enlargement, S3 gallop, rub, murmur and basal crepitations in the lungs.

Investigations like fasting lipid profile & enzymes like CPK-MB and SGOT were done. ECG is taken at the time of admission for the ECG diagnosis of myocardial infarction, the criteria consisting of ST segment elevation of ≥ 2mm, 0.08 second from J point in ≥2 related electric fields, with typical evolutionary changes or presence of new pathological Q waves.

As soon as feasible, a 2D-Echo was performed by means of commercially available mechanical sector scanner. With the patient in left lateral decubitus position, multiple parasternal long axis views, short axis and apical views were taken to study regional wall motion abnormalities

Inclusion Criteria:

Patients above 20 years of age and WHO criteria for the diagnosis of acute MI are included

a) A history of ischemic type of chest pain
b) Evolutionary changes on serially obtained ECG tracings and
c) A rise and fall in serum cardiac markers.

Exclusion Criteria:

Patients presenting with:

i. Previous history of MI
ii. Subendocardial infarction, true posterior wall infarction.
iii. LVH, hemi-block, bundle branch blocks, intraventricular conduction
iv. defects and complete heart blocks.
v. Valvular heart disease
vi. Cardiomyopathy
vii. Pericardial diseases
viii. Congenital heart disease
ix. Previous cardiac surgeries were excluded from the study.

RESULTS :

Table 1: Site of infarction in ECG

Site of infarction	Total no.of cases	%
Anterior wall	16	40
Inferior wall	15	37.5
Anteroinferior wall	4	10
Antero septal wall	5	12.5
Total	40	100

Table 2: Site of infarction on 2D echo in 16 patients of anterior wall MI

Site of infarction on 2D echo	No. of cases	%
Extensive anterior wall	6	37.5
Anteroseptal and apical	5	31.25
Anterior and apical	3	18.75
Anterior and septal	2	12.5
Total	16	100

Table 3: Site of infarction on 2D echo in 15 patients of inferior wall MI

Site of infarction on 2D echo	No. of cases	%
Inferior wall	8	53.3
Inferior wall and RVMI	4	26.61
Inferior wall and anteroseptal	3	20
Total	15	100

DISCUSSION

In our study, as shown in results in table No.1, 16 patients out of 40 patients had anterior wall myocardial infarction on ECG. Echocardiography in these patients further elaborated that 6 patients had extensive anterior wall infarction, 5 patients had antero-septal and apical wall myocardial infarction, 3 had anterior & apical, 2 had anterior & septal infarction & none of the patients showed no regional wall motion abnormality, thus elaborating the extensive anterior infarction seen on electrocardiography in great details.

15 patients, out of 40 patients had inferior wall myocardial infarction and inferior wall with right ventricle infarction on

ECG. When echo was done in these patients, 8 patients had inferior wall myocardial infarction, 4 patients had inferior wall and right ventricle infarction, 3 patients had inferior wall and anterior- septal myocardial infarction and none of the patients showed no regional wall motion abnormality, again giving a more lucid interpretation.

5 patients out of 40 patients had antero-septal infarction on ECG. On echocardiographic examination in these patients, 3 patients had antero-septal myocardial infarction, 1 patients had anteroseptal apical infarction, 1 patients had antero-septal and interventricular septum infarction, thereby lending credence to the fact that echocardiography delineates ischemic changes more extensively. 4 patients out of 40 patients had antero-inferior wall myocardial infarction on ECG. When echo was done in these patients, 3 patients had global hypokinesia and one patient had anterior, inferior and lateral wall hypokinesia.

According to Penco M et al. (1996) ECG and echo cardiography showed good correlation in evaluating the infarct site, but echo showed larger extension (5). Regarding the infarct site, a good correlation was found in anterior acute myocardial infarction but not in inferior acute myocardial infarction. Our study is in agreement with the above findings. Shah et al.

(1980) in his study agreed that ECG and echocardiography have good correlation to localize the site of infarction, but in echocardiography segmental wall motion abnormalities are frequently more extensive than on ECG and may occur in areas, apparently remote from the putatively infracted zone (6). In our study, this is also seen to be true. According to Scharti et al (1984) 2D echocardiography should be regarded as a supporting method to the ECG but not as an essential one in the diagnosis of acute myocardial infarction (7). According to Kuch (1993) ECG and 2D Echo are compatible methods but not replacable oneS (8). Mahajan Devinder Singh concluded that localization of the site of myocardial infarction on ECG correlated broadly with that seen on Echocardiography and was able to elaborate regional wall motion abnormalities in detail i.e., Echo could detect abnormalities in those areas which could not be shown by ECG (9).

Our study is in agreement with the findings of Penco M (1996) Shah (1980), Scharti et al. (1984), Kuch (1993), Izumi et al. (1995) & Mahajan Devinder Singh (2002), and electrocardiography and echocardiography have a good correlation in localizing the site of infarction but Echo was able to elaborate the site of infarction in much greater detail.

CONCLUSION

Localization of MI with ECG very much correlated with echocardiography findings in our study. Echo was able to elaborate regional wall motion abnormalities in detail than ECG. ECG and Echo serve as two major tools for diagnosis and management of acute MI patients.

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