FREQUENCY OF HIGH DEGREE AV BLOCKS IN ACUTE INFERIOR MYOCARDIAL INFARCTION AND THEIR IMPACT ON CLINICAL OUTCOMES

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ABSTRACT

Objective: To evaluate the frequency of high degree AV block in acute inferior wall myocardial infarction and to compare in hospital clinical outcomes in patients with inferior wall MI with and without AV Block.

Study Design: Cross sectional descriptive study.

Place and Duration of Study: Study was carried out at Armed Forces Institute of Cardiology, National Institute of Heart Diseases (AFIC-NIHD) Rawalpindi from Nov 2011 to June 2012, on patients admitted with acute inferior MI.

Patients and Methods: Standard 12 lead ECG was recorded immediately after admission. Diagnosis of acute inferior wall MI was made in the presence of ST elevation >0.1 mv (1mm) in two or more of leads II, III and aVF. Continuous bed side cardiac monitoring was carried out. Two groups were made out of 193 patients. *GROUPA (AVB+)*=Patients having acute inferior wall infarction with AV block, *GROUPB (AVB-)*Patients having acute inferior wall infarction without AV block. Each group was compared for different variables. Data analysis was done by SPSS 17 statistical software.

Results: AVB was found in 54 of 193 patients with inferior wall MI (28%). Five patients (9.25%) of group A and 2 patients (1.43%) of group B died during hospital stay showing significantly higher mortality in patients with AVB (p=0.009).

Conclusion: Heart blocks are frequent among patients with inferior wall MI and are accompanied with a variety of in hospital complications. These complications can be minimized by early recognition and timely management including interventions like temporary cardiac pacing.

Keywords: Inferior MI, High degree AV block.

INTRODUCTION

Conduction disturbances and Bradyarrhythmias are well documented complications of myocardial infarction (MI)[1]. Complete atrio-ventricular (AV) blocks occur in more than 5% of myocardial infarction (MI) patients[2]. Inferior wall infarcts account for half of all the ST-segment elevation MI[3]. High degree atrioventricular blocks are documented in 23.6% of patients with inferior wall MI[4]. Patients with acute inferior or posterior MI are more likely to develop conduction system abnormalities when compared to patients with an anterior or lateral acute MI[5]. High degree AV blocks are accompanied with increased mortality, which is seen within the first 30 days. Among 30 day survivors, subsequent mortality does not appear to be increased[1].

Conduction abnormality in myocardial infarction is influenced by the location of infarction. In 90 percent of cases high degree AV blocks in inferior wall MI occur above the bundle of HIS. Therefore heart block in inferior MI is associated with bradycardia and junctional escape rhythm having heart rates above 40 beats per minute. AV node receives blood supply from LAD from first perforator artery and AV nodal artery which originates from either RCA or Lcx. This results in absence of severe necrosis of AV node despite of interruption of blood flow to the dominant vessel[7]. Two mechanisms explain origin of heart block i.e. blood supply to AV node is severed and vagal tone is increased due to Bezold-Jarisch reaction[8]. Presence of complete AVB in inferior wall MI represents large infarct size.

In hospital mortality is reported to be 13.4% in patients having acute inferior wall MI

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with AV block as compared to no mortality in patients without AV blocks. Post MI angina is documented in 40% of patients with inferior wall MI with AVB as compared to 21.42% patients without AV block, whereas syncope and pre syncope are documented in 16.6% of patients with inferior wall MI with AV block as compared to 4.28 % of those without AV block[9].

The purpose of conducting the study is to determine the burden of AV block in patients with inferior wall MI along with impact of conduction disturbances on the course of inferior MI as early recognition and timely management of such patients will reduce in hospital morbidity and mortality.

MATERIAL AND METHODS

This crosss sectional descriptive study was carried out at AFIC-NIHD Rawalpindi from Nov 2011 to June 2012. Patients of either gender between 30 to 75 years of age presenting with inferior wall MI were included. Patients with previous angioplasty/ MI, preexisting documented AV blocks, sick sinus syndrome, concomitant anterior MI and hyperkalemia (K>6mmol/l) were excluded. The study included 193 patients using non-probability purposive sampling.

Permission was taken from Hospital ethical committee. Patients fulfilling the inclusion and exclusion criteria were included in study after taking informed consent from patients. A brief history was taken from each patient. Clinical exam was carried out with emphasis on signs of cardiac failure and post MI complications.

Standard 12 lead ECG was recorded immediately after admission. Diagnosis of acute inferior wall MI was made in the presence of ST elevation >0.1 mv (1mm) in two or more of leads II, III and aVF. Presence or absence of any rhythm disturbance was recorded at the time of admission and afterwards during hospital stay. Continuous bed side cardiac monitoring was carried out. Temporary pacemaker was considered if any type of bradycardia causing symptoms and signs of low perfusion was observed. Thrombolytic therapy was employed to patients in absence of known contraindications. Patients were monitored for in hospital complications by trainee researcher. Among the patients having AV blocks, degree of block and its duration was recorded. Two groups were made out of 193 patients.

Group A (AVB+): Patients having acute inferior wall infarction with AV block.

Group B (AVB-): Patients having acute inferior wall infarction without AV block.

Each group was evaluated for different variables including post MI angina, syncope, cardiogenic shock, reinfarction and death.Data analysis was done by SPSS 17 statistical software. Means and standard deviations were calculated for numerical variables i.e. age, blood pressure and cardiac enzymes. Frequency and percentages were recorded for categorical variables including gender and conduction defects. Chi square test and Fisher's exact test were used to compare the categorical data. *p* value <0.05 was considered significant.

RESULTS

Group A (with AVB) included 54 of 193 patients with inferior wall MI (28%).Whereas group B (without AVB) comprised 139 of the 193 patients. Heart block reverted to sinus

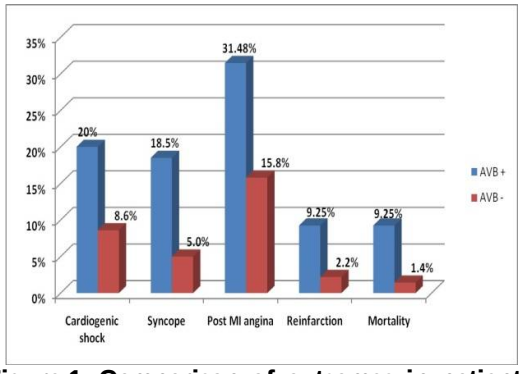

Figure-1: Comparison of outcomes in patients with acute inferior MI with or without atrioventricular block (AVB).

rhythm after atropine in 11of the 54 patients (20.3%), while after SK in 05 of 54 patients (9.25%) ofgroup A. Temporary pacing was performed in 29 (53.7%) patients with AVB (in group A).One hundred sixty three of the total 193 patients (84.5%) received thrombolysis.

Overall 23 patients developed cardiogenic shock. In Group A, 11 patients while in group B, 12 patients developed cardiogenic shock, showing a significantly higher incidence of cardiogenic shock in patients with AVB (p= 0.024). Syncope was observed in 17 of all patients. In group A, 10 patients had syncope while in group B, 7 patients had it showing a significantly higher incidence of syncope in patients with AVB (p= 0.003). Post MI angina occurred in 17 patients of Group A and 22 patients of Group B (p=0.045). Reinfarction was observed in 5 patients in Group A and 3 patients in Group B, again showing increased incidence of this complication in Group A (p=0.040). 5 patients in group A and 2 patients in group B died during hospital stay showing significantly higher mortality in patients with AVB (p=0.019).

DISCUSSION

A number of studies have determined the incidence of CAVB and its effects on prognostic implications in inferior wall MI, but little is known about their pattern and impact in our population.

Incidence of AVB is about 12% in western studies[10]. However reported incidence of AVB is 30%, and incidence of CAVB IS 21% in our population[9]. Incidence of high degree AVB is reported to be 23.6%[4] and 29.4% in other studies[11]. AVB developed in 28% in current study which corroborates with recent local literature.

Significant mortality complicates the otherwise benign course of inferior wall MI. Documented mortality is about 7.1%[10], 23% and 18.6%[4] with high degree AV block and 29% with third degree heart block[12]. Patients in present study with complete AVB exhibited higher in-hospital mortality (9.25% of AVBgroup) and had higher incidence of other in hospital complications including cardiogenic shock, syncope, post MI angina and reinfarction as compared to those without AVB which is consistent with current literature[9].

In inferior MI, most advanced AV blocks are transient. Thrombolysis improves the prognosis of patients with AV blocks[2]. Percutaneous coronary intervention may help reversal of complete AV block in cases of acute inferior MI not recovering spontaneously[13]. Persistence of complete AV block beyond the hospital course is an indication for permanent pacing, which is required in less than 1.9 percent of patients with STEMI[14]. The low incidence is due to ACC/ AHA Guidelines which recommend permanent pacing for only persistent complete AV block[14]. Placement of temporary pacemaker is lifesaving especially if arrhythmias do not respond to atropine[15].

In our study 163 patients (84.5% of total) were thrombolysed. Sinus rhythm was restored after atropine in 11 patients (20.3%) of group A and after thrombolysis in 5 patients of groups A(19.25%). TPM implanted in 29 patients (53.7%) of group A with AVB .Permanent pacing was required in only 02 (3.7%) patients of group A with persistent AVB.

CONCLUSION

Patients with high degree AV block had higher incidence of in hospital complications including cardiogenic shock, syncope, post MI angina, reinfarction and mortality.

CONFLICT OF INTEREST

This study has no conflict of interest to declare. Abstract and results of this study were accepted and presented in an oral presentation at the International conference on Medical Education, organised by Association for Excellence in Medical Education (AEME) held on 07th - 09th March 2014 at University of Health Sciences (UHS) Lahore, Pakistan. No funding was received from any agency or institution.

AUTHORS CONTRIBUTION

Sobia Mehreen, Adeel Ahmed, collection of data, Muhammad Tahir, interpreation of data.

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