Coronary Artery Disease in Sudanese Patients with Left Bundle Branch Block and Chest Pain

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Introduction

Left bundle branch block (LBBB) is not an uncommon pattern on the electrocardiogram and is seen in 0.1-0.8% of asymptomatic subjects with incidence increasing with age[1][2] . Its presence on the ECG has been associated with the main cardiovascular diseases specially hypertension (HTN) and coronary artery disease (CAD) [3] and also an increased overall mortality [4].Moreover, diagnosis of CAD through detection of spontaneous or inducible ischemia in these patients is challenging[5].Treadmill exercise electrocardiogram is not reliable in detecting ischemia in LBBB patients [6] [7]and other modalities such as exercise myocardial perfusion imaging with single photon emission computed tomography (SPECT) may show false positive results for ischemia[8].

Coronary angiography being the gold standard for diagnosis of CAD is often used in patients with chest pain and LBBB on ECG to diagnose significant narrowing of the coronary arteries. Cardiac catheterization is a relatively safe procedure but has a well-defined risk of morbidity (1.7%) and mortality (0.1%) [9] .In this study we aim to look into the coronary angiography findings of a sample of Sudanese patients with LBBB and chest pain .

Objectives

1-Study prevalence of significant CAD in patients with chest pain and LBBB referred for coronary angiography in a Sudanese population

2- Study pattern of CAD involvement in patients with significant CAD

3- Distribution of CAD risk factors in our study population.

Methods

This is a retrospective hospital-based study conducted at AlShab Teaching hospital. AlShab hospital is a tertiary referral hospital in the center of Khartoum with a specialized cardiac service and cardiac catheterization suite which performs routine coronary angiography since June 2007. Our study population were all patients with LBBB and chest pain who underwent elective coronary angiography from June 2007 to December 2010. The ECGs of all patients who underwent CAG during the study period were reviewed and those with LBBB on ECG as per the Criteria Committee of the New York Heart Association were included[10]. These were defined as QRS interval ≥120 ms; slurred/notched wide and predominant R waves in leads I, aVL, V_5, and V_6; slurred/notched and broad S waves in V_1 and V_2 with absent or small R waves; no initial Q-wave over the left precordium; and absence of pre-excitation.

Patients with suspected (LBBB equivalent) acute myocardial infarction, paced rhythm or with LBBB referred for CAG for reasons other than chest pain were excluded e.g. preoperative or unexplained dilated cardiomyopathy.

Data was collected using a coded datasheet covering demographic data, risk factors for CAD, indication for and results of coronary angiography as reported by the operator. Coronary angiography findings were classified as normal if no atherosclerotic disease was detected, non-obstructive disease if stenosis is < 50% of luminal diameter and obstructive if stenosis ≥ 50% of luminal diameter in a major epicardial artery or one its branches of a diameter > 2mm. Statistical analysis was performed using The Statistical Program for social Sciences (SPSS version 14). Frequency analysis was done to identify the distribution of variables and data were interpreted in figures and tables.

Results

In the study period 60 patients with LBBB were identified out of a total of 2294 patients who underwent CAG representing 0.03% of all angiography patients . 27 were male (45%), and 33(55%) were female. Mean age was 60 years. Age distribution is shown in figure 1.

Distribution of CAD risk factors namely HTN, Diabetes mellitus (DM), smoking, hyperlipidemia and family history (FH) of IHD amongst study population is shown in figure 2.

The results of CAG were as follows. 26 patients had normal coronary angiograms, 13 patients had non-obstructive disease and 21 patients had significant obstructive disease. Figure 3 illustrates the results.

Figure 4 shows pattern of CAD involvement in patients with angiographically significant disease. Patients were divided according to number of vessels involved into left main stem, one, two or three vessel disease referred to as 1VD, 2 VD and 3 VD respectively.

Distribution of significant stenoses by coronary arteries is demonstrated in figure 5.

Discussion

A mean age of 60 in our sample with the commonest age group of 60-70 is in concordance with other studies looking into LBBB in the general population [(2) (3)].

Of all the cardiovascular risk factors studied in this group, HTN was the most prevalent . This is similar to previous studies which reported prevalence of cardiovascular risk factors in patients with LBBB[(3)(11) (12)].

In our population angiographically detected significant coronary artery stenosis was generally less than figures reported from regional and international studies. A study by Ghaffari et al involving 219 Iranian patients with LBBB and suspected CAD who underwent coronary angiography showed the presence of significant disease in 56.3%

of patients [13]. Another study involving 40 Iranian patients conducted at Tehran Heart Center with LBBB and chest pain showed 75% incidence of significant CAD on angiography [14]. Other studies from Western countries show varying rates from 44% to 54% [11][15]. Such varying figures probably reflect different selection criteria in these studies , different risk strata for CAD in the study population and prevalence of CAD in the community.

More than 50% of the patients had 1VD or 2VD. A minority had 3VD or LMS disease. This is in contradiction to earlier data from the Coronary artery surgery study(CASS) in which Freedman and colleagues reviewed 522 patients with LBBB and CAD who were part of 15609 patients enrolled in the study and found more extensive disease in patients with LBBB than non-LBBB disease patients [16]. In the same study no particular location of coronary artery stenosis or left ventricular wall motion abnormality predominated in patients with bundle branch block. This is similar to our study findings. Though onset of LBBB during acute myocardial infarction is indicative of ischemia in the distribution of the left anterior descending coronary artery , the same does not seem to apply to patients with chronic coronary artery disease and LBBB.

Some new non-invasive modalities offer better diagnostic accuracy. Vasodilator myocardial perfusion imaging (MPI) with adenosine or dipyridamole [17] and 64-slice computed tomography coronary angiography (CTCA) [11]show excellent accuracy in detecting CAD in patients with LBBB. Availability of such non-invasive modalities in Sudan and similar countries in the continent may reduce the need for invasive diagnostic tests in this subset of patients.

Conclusion

Patients with LBBB on ECG referred for coronary angiography represent a very small minority of all cardiac catheterization patients. HTN was the commonest cardiovascular risk factor. Angiographically significant CAD was detected in a significant minority ; however, less than reported regional and international figures. No specific coronary location is predominantly affected in patients with significant CAD and majority have one or two vessel disease.

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