Coronary angiographic findings in patients with complete left bundle branch block in Erbil city /Iraq

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Abstract

Background and objective: The goal of this study was to determine the association of complete left bundle branch block (LBBB), site , severity & risk factors of coronary artery disease (CAD). Complete Left bundle branch block increases the risk of cardiac mortality, and prognosis is primarily determined by the underlying CAD. Because the presence of complete LBBB makes the noninvasive identification of CAD less informative, patients with complete LBBB often are referred for coronary angiography to assess the presence and severity of CAD.

Methods: A total of 150 consecutive patients with complete LBBB admitted to the coronary care unit were enrolled from the age of 27 to 81 years with the mean age of 59.32 ± 10.5. Male 84 (56%), Female (44%). History, basal investigations echocardiography and virology screen were performed. Coronary angiography has been done for all patients for different reasons of presentation.

Results: Critical CAD 70 (46.7%), Left ventricular systolic dysfunction (LVSD) 50 (33.3%). Hypertension found in 83 (55.3%), diabetes mellitus (DM) in 44 (30%), DM& left ventricular systolic dysfunction(LVSD) were more associated with critical CAD.

Conclusion: In our study complete LBBB was more common among hypertensive patients. In DM patients was associated with severe CAD. With Left anterior descending artery being the most common artery involved.

Keywords: left bundle branch block, coronary artery disease.

Introduction

The heart's electrical activity begins in the sinoatrial node (the heart's natural pacemaker), the nerve impulse travels through out the left and right atria and summates at the atrioventricular (AV) node. From the AV node the electrical impulses are then sent down the Bundle of His and divides into the right and left bundle branches [1]. The left bundle branch subdivides into two fascicles: the left anterior fascicle and the left posterior fascicle. Allowing rapid, coordinated, and synchronous physiologic depolarization of the ventricles. When a bundle branch or fascicle becomes injured, this result in extensive reorganization of the activation and recovery patterns of the left ventricle that produces extensive changes in the QRS complex and the ST-T wave [2].The left anterior descending artery provides the primary blood supply for the left bundle branch, particularly for the initial portion [3]. (LBBB) is a common pattern seen on the electrocardiogram (ECG). The incidence of LBBB increases with age [4,5]. In patients with LBBB the condition is often accompanied by left ventricular (LV) dilatation, reduced LV ejection fraction (EF) and septal perfusion defects even in the absence of coronary artery disease[6]. LBBB most commonly associated with atherosclerotic coronary artery disease [7]. Thus, the identification of chronic CAD in

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patients with LBBB is important to stratify the risk of Left bundle branch block and management. Non-invasive stress tests have limited performance,and conventional coronary angiography is usually required to confirm the diagnosis [8]. Treadmill exercise electrocardiogram is not reliable in detecting ischemia according to American College of Cardiology/American Heart Association guidelines in patients with LBBB [9,10]. Myocardial perfusion studies often suffer from false-positive anteroseptal or septal perfusion defects in the absence of LAD stenosis [8,11]. Dobutamine stress echocardiography is a highly specific test, but sensitivity is moderate for septal ischemia in case of abnormal rest septal thickening [12]. In the onset of acute myocardial infarction, LBBB is related to ischemia in the distribution of LAD [13]. LBBB is an independent predictor of all-cause mortality in patients with known or suspected coronary heart disease (CHD)[14], LBBB is an independent risk factor for mortality in patients with heart failure [15].

Aim of the Study:

To determine association between complete LBBB ,CAD severeity, site & CAD risk factores.

Methods

During the period of September 2008 to February 2011, among all angiographies performed in Hawler cardiac centre 150 patients with LBBB were collected from both sex and different age group, in retrospective study complete medical history, basic investigations (urea, creatinine, sugar level, CBC ESR and virology screen) with some other complementary investigations like echocardiography and angiographies reports. All patients who were revealed complete LBBB on ECG ought to be included in the study. Patients having pacemaker were excluded from the study disregarding to the cause of implantation. DM Patients regarded as diabetic if fasting plasma glucose was ≥126 mg/dl or random glucose level ≥ 200 mg/dl with symptoms [16]. Hypertension diagnosed when systolic BP were above 140 mmHg and/or diastolic BP above 90 mmHg[17] left ventricular systolic function(LVSF) were assessed both angiographically and depending on echocardiography reports in patients not having LV angiography for any reason. Patients regarded as having LVSD when ejection fraction by echocardiography was less than 50 % [18]. Complete Left bundle branch block was recorded on a 12-lead electrocardiogram (ECG) and defined as set by the Criteria Committee of the New York Heart Association. QRS interval ≥120 ms; slurred/notched wide and predominant R waves in leads I, aVL, V5, and V6; slurred/ notched and broad S waves in V1 and V2 with absent or small R waves, M-shaped QRS variants with occasionally wide R waves in V5 and V6; no initial Q-wave over the left precordium; and absence of pre-excitation [19]. The coronary arteriography had been performed by the selective technique of Judkins', lesion equal or more than 70 % stenosis regarded as significant in LAD, Circumflex and RCA and lesion equal or more than 50% in LMS regarded as significant stenosis [20].SPSS version 15.0 computer programs was used to analyse the data using, Chi square test were used to find the significance of the findings. only DM, hypertension& age were taken because of unavailability of other risk factors on patient records

Results

Among all angiographies performed at Hawler cardiac center from the period of 2008 to February 2011, 150 cases were found to have LBBB both in male and female. Age ranged from 27 to 81 years with the mean age of 59.32 years ± 10.5.

Table 1: Demographic distribution of the patients.

Variables	No. (%)	
Hypertension	83	(55.3 %)
DM	44	(30 %)
Chest pain	96	(64 %)
SOB	41	(27.3 %)
Preoperative assessment	13	(8.7 %)

Old patients were significantly associated with coronary lesion than younger population as 58% of patients above 60 year had critical CAD while only 40.5 % had CAD below that age group P=0.005, Table 2.

Table 2: Age groups and association with critical CAD.

Age groups		Critical CAD Absent No. (%)	Present No. (%)	
=< 40	No. (%)	7 (100.0%)	0 (0.0%)	7 (100.0%)
41-60	No. (%)	44 (59.5%)	30 (40.5%)	74 (100.0%)
>60	No. (%)	29 (42.0%)	40 (58.0%)	69 (100.0%)
Total	No. (%)	80 (53.3%)	70 (46.7%)	150 (100.0%)

Old ages were significantly associated with LVSD disregarding to the indications of angiography, Table 3, P=0.04.

Table 3: Age groups and its association with LVSF.

Age group		LVSD Present No. (%)	Absent No. (%)	
=< 40	No. (%)	2 (28.6%)	5 (71.4%)	7 (100.0%)
41-60	No. (%)	18 (24.3%)	56 (75.7%)	74 (100.0%)
> 60	No. (%)	30 (43.5%)	39 (56.5%)	69 (100.0%)
Total	No. (%)	50 (33.3%)	100 (66.7%)	150 (100.0%)

Critically stenosed coronaries were significantly associated with the presence of DM as a risk factor P= 0.006, Table 4.

Table 4: Association of DM with critical CAD.

History of DM		Critical CAD Absent No. (%)	Present No. (%)	
Absent	No. (%)	64 (60.4%)	42 (39.6%)	106 (100.0%)
Present	No. (%)	16 (36.4%)	28 (63.6%)	44 (100.0%)
Total	No. (%)	80 (53.3%)	70 (46.7%)	150 100.0%)

Hypertension was not significantly associated with presence of coronary lesions in patients with LBBB, P value = 0.53, Table 5.

Table 5: Association of hypertension with critical CAD.

History of Hypertension		Critical CAD Absent No. (%)	Present No. (%)	
Absent	No. (%)	36 (53.7%)	31 (46.3%)	67 (100.0%)
Present	No. (%)	44 (53.0%)	39 (47.0%)	83 (100.0%)

3-D.Presence of critical coronary lesion was strongly associated with LVSD P=0.036, Table 6.

Table 6: association of LVSF with coronary angiography.

LVSF		Critical CAD Absent No. (%)	Present No. (%)	
LVSD	No (%)	21 (42.0%)	29 (58.0%)	50 (100.0%)
Normal LVSF	No. (%)	59 (59.0%)	41 (41.0%)	100 (100.0%)
Total	No. (%)	80 (53.3%)	70 (46.7%)	150 (100.0%)

LAD was the most common artery involved in patient with complete LBBB as shown in Table 7.

Table 7: LAD involvement in critical CAD

Critical CAD		Critical LAD lesion Absent No. (%)	Present No. (%)	
Absent	No. (%)	80 (100.0%)	0 (.0%)	80 (100.0%)
Present	No. (%)	4 (5.7%)	66 (94.3%)	70 (100.0%)
Total		84 (56.0%)	66 (44.0%)	150 (100.0%)

Discussion

Notably in this study 70 patients (46.7 %) of the over all 150 patients indicates underlying critical coronary artery disease which was nearly comparable to the Framingham Study, as 45% of patients with LBBB were reported to have coronary artery disease [21], as well as Rajjit Abrol; Jeffrey C Tros, found that 54% of 336 patients studied by angiography had critical CAD [22]. LBBB was common among old age groups in this study (58%). Which was close to that illustrated by Eriksson P; Hansson P.O in a prospective study of 855 Swedish men in the general population the incidence was 0.4 percent at age 50, 2.3 percent by age 75, and 5.7 percent by age 80 [4]. Old age groups were associated with LVSD in contrary to the younger patients which may be explained by occurrences of critical coronary stenosis among old patients as found in this study and this can be explained by increased in the risk factors among the olds as HT and DM. Risk factors were assessed to find out the strength of association between the studied risk factors with presence of coronary lesion, although hypertension was the most common risk factor present in LBBB (55.3%) but was the least to be associated with significant coronary narrowing this might be because HT itself may be the cause of LBBB as it is a well-known cause of LBBB [23], however, DM was more strongly associated with coronary lesion (63.6%) as found in a comparable study [22],as well as found by Ozeke O, Aras D, Deveci B et al. as they prospectively analyzed data of 51 patients with type 2 diabetes mellitus with left bundle branch block (LBBB), 51 patients with type 2 diabetes mellitus without LBBB, and 51 patients with isolated LBBB matched for age and gender. Patients with diabetes and LBBB had significantly higher scores for the severity of CAD and more risk for three vessel disease [24]. Lesion sites studied in patients with critical coronary lesion and found that LAD was significantly associated with LBBB than other branches of coronary (94.3%). This was consistent with another study in which the group of 21 patients diagnosed with coronary heart disease patients, 18 patients (85.7%) coronary angiography showed the presence of left anterior descending artery disease, consistent with the reports of Mohammed Alshami 51 [25], this is because septal branches of LAD thought to be main blood supplier to left conductive tissues, although in patients with normal coronaries the defected tissue is due to global degenerative disorder that affect the whole heart [13]. On the other hand, patients with critical coronary artery disease were more associated with LVSD than normal

coronaries, this was also found in comparative study by Hamby RI, Weissman, as, clinical, coronary arteriographic, and hemodynamic studies were performed in 55 patients with left bundle branch block (LBBB) and coronary artery disease and were compared with 110 patients consecutively matched for age and sex with ischemic heart disease but without LBBB [15].The major weakness of this study is its reliance on chart abstraction. We did not interview patients with LBBB to determine the presence and character of their symptoms (including chest pain and SOB), severity ,duration of DM& HT.

Conclusion

1-LBBB was more common in old, male and hypertensive patients.2-LBBB was significantly associated with critical coronary lesion in old& diabetics so these group are strong predictor of CAD in LBBB. 3-The most common artery site involved was proximal and mid LAD lesions in patients with CAD.

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