



Risk Factors and Angiographic Findings in Patients with LBBB Who Underwent Coronary Angiography in Duhok Heart Center

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ABSTRACT

The objectives of this study were to determine presenting symptoms, risk factors, echocardiographic and angiographic findings in patients with Left bundle branch block (LBBB), who underwent coronary angiography in Duhok heart center. All patients with symptomatic complete LBBB who attended Duhok cardiac heart center from September 15, 2007 to September 1, 2009 were included. Demographic profile such as age and sex, presenting symptoms, risk factors, echocardiographic and coronary angiographic findings were studied. The study included 75 patients, 41 patients (54.7%) were males and 34 patients (45.3%) were females with a mean age of 56 years. Male patients with LBBB have more incidences of both abnormal coronary angiography (70.3%) and three vessels disease (70%) than female patients. In our study 57.4% of patients with LBBB had hypertension. Patients with 2 or more risk factors showed a higher percentage (47.7%) of having abnormal angiography. Based on echocardiography findings, WMA constitutes the major finding (24, 32%). In the patients with CAD, there were normal ejection fraction (EF) in 7 patients (26%) and depressed EF in 20 patients (74%). In conclusion, hypertension was a major risk factor for LBBB. left anterior descending artery (LAD) artery was the most common vessel disease. Males show an overall higher degree of affection than females in regards with three vessels disease. Patients who had 2 or more risk factors had a higher percentage of having abnormal angiography. Left ventricular EF was lower in LBBB patients who had CAD.

Keywords: LBBB, Risk factor, Angiography.

BACKGROUND

Left bundle branch block (LBBB) usually appears in patients with underlying heart disease, although as many as 12 percent of patients with LBBB have no demonstrable disease. Even among these patients, LBBB is associated with a higher than normal risk of cardiovascular disease and all-cause mortality⁽¹⁾.

The Framingham study showed that the appearance of complete LBBB on a routine ECG was usually associated with underlying hypertension, coronary artery disease (CAD), or cardiomyopathy, conditions that, if not already clinically apparent, would subsequently evolve during follow up⁽²⁾. On the other hand LBBB can be the results of less common conditions that may

affect the cardiac conduction system like myocarditis, hemochromatosis, sclerodegenerative disease and amyloidosis⁽³⁾. Among patients with coronary artery disease, the presence of LBBB correlate with more extensive disease, more severe left ventricular dysfunction, and reduced survival rates⁽⁴⁾. A major impact of LBBB lies in obscuring or simulating other electrocardiographic patterns. In addition to that patients with myocardial infarction who present with LBBB have greater in-hospital mortality (22.6%) than patients without LBBB (13.1%) yet are less likely to receive medications or interventions known to improve survival⁽⁵⁾. Diagnosis of CAD in patients with LBBB is considered challenging because non-invasive evaluations in these patients has several limitations and in general, the non-invasive tests are not reliable in distinguishing CAD from non-ischemic causes of LBBB⁽⁶⁾. Due to delayed relaxation and reduced coronary flow of septum in patients with LBBB, an isolated reversible perfusion defects of the septum may be seen in the absence of stenosis of the left anterior descending artery (LAD)^(7,8). Thus the specificity and predictive value of septal perfusion defect with LBBB are low. However, apical or anterior involvement in septal perfusion defects increases the specificity for CAD⁽⁷⁾. That is why in patients with LBBB undergoing nuclear stress testing, a pharmacologic stressor (vasodilator stress) should be used even if the patient is able to exercise because of the potential for false-positive test owing to a septal perfusion abnormality that may occur with exercise⁽⁸⁾.

Guidelines published jointly by the American College of Cardiology, the American Heart Association, and the American Society of Nuclear Cardiology state that a stress imaging technique should be used for patients with LBBB because exercise induced ischemia cannot be reliably assessed with a stress ECG test⁽⁹⁾. The guidelines further state that, in these patients, "Pharmacologic stress perfusion imaging is preferable to exercise perfusion imaging for purpose of both diagnosis and risk stratification⁽⁹⁾". The objectives of this study were to determine

presenting symptoms, risk factors, echocardiographic and angiographic findings in patients with LBBB who underwent coronary angiography in Duhok heart center.

PATIENTS AND METHODS

All patients with symptomatic complete LBBB who attended Duhok cardiac heart center from September, 2007 to September, 2009 were included. Demographic profile such as age and sex, presenting symptoms, risk factors. Patients with incomplete LBBB were excluded from the study. The definition of LBBB was based on the following criteria: electrocardiographic criteria for complete LBBB were the following⁽¹⁰⁾: QRS duration ≥ 120 millisecond; broad, notched R waves in lateral precordial leads (V5 and V6) and usually leads I and aVL, small or absent initial r waves in right precordial leads (V1 and V2) followed by deep S waves, absent septal q waves in left-sided leads, and ST-T waves displaced opposite to main QRS deflection. Whereas echocardiographic evaluation included: Left ventricular hypertrophy (LVH). Concentric symmetrical LVH was considered present if the interventricular septum (IVS) or left ventricular posterior wall (LVPW) thickness is above "normal limits" (often > 12 mm in diastole), wall motion abnormalities: include hypokinesia, akinesia, or dyskinesia, Dilated cardiomyopathy: dilatation of all cardiac chambers, increased left ventricular end systolic diameter and left ventricular end-diastolic diameter. Reduced wall thickness and motion, reduced ejection fraction and fractional shortening and reduced motion of IVS and LVPW, aortic valve disease: aortic valve stenosis and/or regurgitation, Coronary angiographic evaluation: a lesion in an epicardial coronary artery was considered significant if there was more than 70% stenosis of the examined vessel or more than 50% of left main stem. Statistical Analysis of the results was performed by entering the data in a binary format as a Microsoft Excel spreadsheet.

RESULTS

Out of 2500 patients reviewed, there were 75 patients (3%) with symptomatic complete LBBB. Mean age was 56 years and there were 41 male (54.7%) and 34 female (45.3%). The most common clinical presentation was chest pain (51, 68%) followed by dyspnea (24, 32%). Forty eight patients (64%) had normal angiographic finding, whereas 27 patients (36%) showed abnormal vessel disease (table 1).

Out of 27 blood vessels affected, the most common lonely affected blood vessel was left anterior descending artery (LAD) (7, 26.0%), right coronary artery (RCA) (3, 11.1%), and left circumflex artery (LCX) (1, 3.7%). Whereas, the blood vessels of remainder patients (16, 59.2%) demonstrated combined pathology including involvement of LAD. Out of 41 males, 19 (46.3%) were affected with CAD; whereas out of 34 females, 8 (23.5%) were involved. In males, the frequency of single, two, and three vessels was 8 (19.5%), 4 (9.7%), and 7 (17%), respectively.

Whereas in females, the same frequency, in order, was 3 (8.8%), 2 (5.9%), and 3 (8.8%), respectively. The commonest associated risk factors alone or in combination were hypertension (43, 57.3%), smoking (35, 46.7%), diabetes mellitus (26, 34.7%), and hyperlipidemia (18, 24.0%). There were no associated risk factors in 8 patients (10.7%). The more the number of the risk factors, the higher the percentage of abnormal angiography. Patients with 2 or more risk factors showed a higher percentage (47.7%) of having abnormal angiography. In comparison, 26.1% of patients with one or none risk factor showed abnormal angiography (table 2).

The echocardiographic findings of the patients with LBBB are demonstrated in table 3.

In the patients with CAD, there were normal ejection fraction (EF) in 7 patients (26%) and depressed EF in 20 patients (74%). Meantime, in non CAD patients, there were 30 patients (62.5%) with normal EF and 18 patients (37.5%) with depressed EF.

Table 1. Angiographic findings of patients with left bundle branch block

Angiographic findings	Frequency	Percent
Single vessel disease	11	14.7
Two vessels disease	6	8
Three vessels disease	10	13.3
Normal	48	64.0
Total	75	100.0

Table 2. Shows angiographic findings in relation to number of risk factors.

Angiographic finding	Number (%) of risk factor			Total
	0	1	≥ 2	
Abnormal	0 (0)	6 (26.1)	21 (47.7)	27 (36%)
Normal	8 (100)	17 (73.9)	23 (52.3)	48 (64%)
Total	8 (100)	23 (100)	44 (100)	75 (100%)

Table 3. Echocardiographic findings of patients with left bundle branch block

Echocardiographic findings	Frequency	Percent
WMA	24	32.0
LVH	15	20.0
DCMP	13	17.3
LVH & WMA	5	6.7
AVD	2	2.7
Normal	16	21.3
Total	75	100.0

WMA: Wall Motion Abnormalities; LVH: Left Ventricular Hypertrophy;
DCMP: Dilatated Cardiomyopathy; AVD: Aortic Valve Disease,

DISCUSSION

Although LBBB usually appears in patients with underlying heart disease, 12% of patients with LBBB have no demonstrable disease ⁽¹¹⁾. In our study, the incidence rate of LBBB was 3%, which is similar to a study performed by Abrol et al. with a frequency rate of 2.1% ⁽¹²⁾. In the current study, the mean age of the patients was 56 years, which is in agreement with other studies ^(13,14). Also, we found that LBBB was more prevalent in male than female. In support of our finding, other studies documented similar finding of male predominance ^(14,15). In the present study, we found that 64% of the patient had normal coronary angiography. Similarly, Nguyen et al found that 60% of evaluated patient were presenting with normal angiography ⁽¹⁶⁾. However, in contrast to our finding, most researchers have shown higher percentage of CAD in patients with LBBB ^(12,16). An explanation for the low prevalence of CAD in LBBB patients observed in our study was the lack of non invasive diagnostic test such as SPECT study, pharmacological or exercise-induced stress echocardiography of CAD in patients attending our center. In this study 26% of CAD patients had LAD disease as a single vessel disease and 59.2% in association with other vessels disease. Our findings were in favor to other studies that documented a 60% of LAD disease ⁽¹⁷⁾. Generally, the presence of LBBB in patients with coronary artery disease is mostly due to ischemia in the distribution of LAD artery ⁽¹⁸⁾. The incidence of both abnormal coronary angiography (46.3%) and

three vessels disease (17%) was more common among male patient with LBBB. This could be explained by the fact that male are sustaining more risk factors particularly smoking and hypertension. In the study, hypertension was a major risk factor for LBBB, which was in concordance to results of Risteard et al. ⁽²¹⁾, and Abrol et al. ⁽¹²⁾. It has been well documented that LBBB has significantly associated with hypertension ⁽²⁾. In the current study, the higher number of risk factors was linked with increase prevalence of CAD diagnosed by coronary angiography. Our finding was consistent with other researchers ⁽¹²⁾. In the present study, based on echocardiography findings, WMA constitutes the major finding. This can provide confirmatory evidence that underlying CAD is present ⁽¹⁹⁾. There is increased evidence of ischemic LBBB in patients with WMA. Other findings in our study were LVH, DCMP, AVD and only 16 patients (21.3%) showed normal echocardiography finding. Bhardwaj observed a comparable rate with our study among patients with LBBB and only 15% of patients reported normal echocardiography in his study ⁽²⁰⁾. In our study, left ventricular EF was compromised in LBBB patient with associated CAD (74%); whereas the same rate was 37.5% in patient with non-CAD. In agreement with our study, Ghaffari et al. showed that left ventricular EF was low in 80% of CAD diseased patient while in patients with normal EF, only 37% showed CAD ⁽¹⁴⁾. In conclusion in keeping with recorded literatures, hypertension was

a major risk factor for LBBB. left anterior descending artery (LAD) artery was the most common vessel disease. Males show an overall higher degree of affection than females in regards with three vessels disease. Patients who had 2 or more risk factors had a higher percentage of having abnormal angiography. Left ventricular EF was lower in LBBB patients who had CAD.

ACKNOWLEDGMENT

We would like to thank all the staff at the Duhok heart center their serious cooperation in this work.

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