

Assessment of Risk Factors, Clinical Symptoms, LV Function and Angiographic Finding in Patients with LBBB

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Abstract: ***Background & Objective:** Left bundle branch (LBBB) is common ECG finding. Common causes of LBBB are coronary artery disease (CAD), dilated cardiomyopathy (DCM) and hypertension. The objectives of this study were to determine presenting symptoms, risk factors, echocardiography and angiographic findings in patients with Left bundle branch block (LBBB), who underwent coronary angiography in Rajarajeshwari Medical college and hospital (cardiology dept.). **Material and methods:** All patients with symptomatic complete LBBB who attended OPD/IPD from July 15, 2014 to January 20, 2017 were included. Demographic profile such as age and sex, presenting symptoms, risk factors, echocardiography and coronary angiographic findings were studied. The study included 85 patients, 46 patients (54.1%) were males and 39 patients (45.9%) were females with a mean age of 58 years. Male patients with LBBB have more incidences of both abnormal coronary angiography (70%) and three vessels disease (72%) than female patients. In our study 64% of patients with LBBB had hypertension. Patients with 2 or more risk factors showed a higher percentage (46%) of having abnormal angiography. Based on echocardiography findings, RWMA constitutes the major finding (27, 31.78%). In the patients with CAD, there were normal ejection fraction (EF) in 8 patients (26%) and depressed EF in 22 patients (74%). In conclusion, hypertension was a major risk factor for LBBB. Left anterior descending artery (LAD) artery was the most common vessel disease. **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. 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: Risk Factor, LBBB, Angiography

1. 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). Its presence on the ECG and echocardiography has been associated with the main cardiovascular diseases specially hypertension (HTN) and coronary artery disease (CAD) (2) and also an increased overall mortality (3). Moreover, diagnosis of CAD through detection of spontaneous or inducible ischemia in these patients is challenging (4). Treadmill exercise electrocardiogram is not reliable in detecting ischemia in LBBB patients (5) (6) and other modalities such as exercise myocardial perfusion imaging with single photon emission computed tomography (SPECT) may show false positive results for ischemia (7).

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%) (8). 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 Rajarajeshwari medical college and hospital (Cardiology department).

2. Material and Method

All patients with symptomatic complete LBBB who attended OPD/IPD from July 15, 2014 to January 20, 2017 were included. Demographic profile such as age and sex, presenting symptoms, risk factors. Patients with incomplete LBBB were excluded from the study.

Sgarborra et al. [9] developed criteria for diagnosis of Myocardial Infarction (MI) in patients with LBBB:-

- 1) ST segment elevation of at least 1 mm concordant with the QRS complex.
- 2) ST segment elevation of at least 5 mm discordant with the QRS complex.
- 3) ST segment depression in leads V1-V3.

In cases of doubt, where as 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.

3. Results

Out of 500 patients reviewed, there were 85 patients (3%) with symptomatic complete LBBB. Mean age was 58 years and there were 46 male (54.1%) and 39 female (45.9%). The most common clinical presentation was chest pain (57.69%) followed by dyspnea (27, 31%) (table1).

Fifty five patients (67%) had normal angiographic finding, whereas 30 patients (35.28%) showed abnormal vessel disease (table 2). Out of 30 blood vessels affected, the most common lone affected blood vessel was left anterior descending artery (LAD) (8, 26.0%), right coronary artery (RCA) (3, 11.1%), and left circumflex artery (LCX) (3, 3.7%). Whereas, the blood vessels of remainder patients (18, 59.2%) demonstrated combined pathology including involvement of LAD. Out of 46 males, 21 (46.3%) were affected with CAD; whereas out of 39 females, 9 (23.5%) were involved. In males, the frequency of single, double and triple vessels was 9 (19.5%), 5 (10.81%), and 8 (17.33%), respectively. Whereas in females, the same frequency, in order, was 3 (7.6%), 2 (5.1%), and 3 (7.6%), respectively. The commonest associated risk factors alone or in combination were hypertension (48, 64%), smoking (40, 47%), diabetes mellitus (29, 34.1%), and hyperlipidemia (20, 23.5%) (table1). There were no associated risk factors in 9 patients.

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 (46%) of having abnormal angiography. In comparison, 23.07% of patients with one or none risk factor showed abnormal angiography (table 3). The echocardiographic findings of the patients with LBBB are demonstrated in table 4. In the patients with CAD, there were normal ejection fraction (EF) in 8 patients (26%) and depressed EF in 22 patients (74%). Meantime, in non CAD patients, there were 34 patients (61.8%) with normal EF and 21 patients (38.2%) with depressed EF.

Table 1: Clinical characteristics of the patients

S.No	Total patients	85
1	Male	46(54.1%)
2	Female	39(45.9%)
3	Mean age	58 yrs
4	Hypertensive	48(64%)
5	Smoking	40(47%)
6	Diabetic	29(34.1%)
7	Hyperlipidemia	20(23.5%)

Symptoms

1	Chest pain	58(69%)
2	Dyspnea	27(31%)

Table 2: Angiographic findings of patients with left bundle branch block

S.No	Angiography	Number of patients	Percent
1	Single vessel disease	12	14.11
2	Double vessel disease	7	8.23%
3	Triple vessel disease	11	12.94%
4	Normal	55	64.72
5	TOTAL	85	100

Table 3: Shows angiographic findings in relation to number of risk factors.

S.No	Angiography finding	Number (%) of risk factor			Total
		0	1	>2	
1	Abnormal	0	6(23.07)	23(46)	29(34.11%)
2	Normal	9(100)	20(76.93)	27(54)	56(65.99%)
3	Total	9(100)	26(100)	50	85(100)

Table 4: Echocardiographic findings of patients with left bundle branch block

S.No	Echocardiographic findings	Number of patients	Percent
1	RWMA	27	31.78
2	LVH	17	20
3	DCM	15	17.64
4	LVH & RWMA	05	5.88
5	AVD	02	2.35
6	Normal	19	22.35
7	Total	85	100

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

4. Discussion

Although LBBB usually appears in patients with underlying heart disease, 12% of patients with LBBB have no demonstrable disease (10). In our study, the incidence rate of LBBB was 3%, which is similar to a study performed by Abrol et al, and with a frequency rate of 2.1% (11). In the current study, the mean age of the patients was 56 years, which in agreement with other studies (12, 13). 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 (13, 14). In our 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 (15). 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)

The incidence of abnormal coronary angiography (46.3%) and Triple vessels disease (17.33%) was more common among male patient with LBBB. This could be explained by the fact that male are sustaining more risk factors particularly smoking, hypertension and dyslipidemia. 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. (11). It has been well documented that

LBBB has significantly associated with hypertension (17). In our study, left ventricular EF was compromised in LBBB patient with associated CAD (74%); whereas the same rate was 38.2% in patient with non-CAD. In agreement with our study, Ghaffari et al. showed that left ventricular EF was low in 80% of CAD both abnormal coronary angiography (46.3%) and diseased patient while in patients with normal EF, only 37% showed CAD (13). 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 (11). In the present study, based on echocardiography findings, RWMA constitutes the major finding. This can provide confirmatory evidence that underlying CAD is present (18). There is increased evidence of ischemic LBBB in patients with RWMA. Other findings in our study were LVH, DCMP, AVD and only 19 patients (22.35%) 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 (19). In the present study, we found that 64.72% of the patient had normal coronary angiography. Similarly, Nguyen et al found that 60% of evaluated patient were presenting with normal Angiography (20).

5. 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. 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.

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