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ORIGINAL ARTICLE

Patients Present with Left Bundle Branch Block and its Cardiac Structure Disease during Trans Thoracic Echocardiography

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ABSTRACT

Background and Purpose: Left bundle branch block (LBBB) is a communal electrocardiographic (ECG) finding that may or may not be associated with overt heart disease at diagnosis. The current study was performed to determine the clinical picture and structural abnormalities of the heart diagnosed by transthoracic echocardiography in patients with left bundle branch block.

Methods: This cross-sectional observational study was conducted over a six-month period in the Interventional Cardiology Unit Liaquat University Hospital Hyderabad from July 2021 to December 2021. Adult patients of both sexes with LBBB, symptomatic or asymptomatic, were recruited from an outpatient hospital setting and underwent elective Transthoracic echocardiography (TTE) after demographic / clinical data and informed consent were obtained. The TTE results were recorded and presented as frequency and percentage.

Results: 120 patients were examined; 74 men and 46 women. The study population mean age was 52.7 ± 1.5 years, range (22-76) years. In a history, 10 (8.3%) patients had mild dyspnoea (NYHA class I-II) and 9 (7.5%) severe dyspnoea (NYHA class III-IV). Echocardiograms of only 11 (9.2%) patients were normal. The structural abnormalities observed included abnormal septal motion in 96 (80%), mitral regurgitation in 16 (13.3%), and left ventricular dilatation with left ventricular end-diastolic dimension> 60 mm in 23 (19.2%). LVEF was normal in 80 (66.7%) cases (> 50%); 18 (15%) had a LVEF of 25-35% and 12 (10%) had a LVEF of 35-50%.

Conclusion: The possibility of structural cardiac abnormalities on echocardiography is high in patients with LBBB.

Keywords: Transthoracic echocardiography, Left bundle branch block (LBBB), Structural heart disease.

INTRODUCTION

The occurrence of a left bundle branch block (LBBB) has significant prognostic implications, even in asymptomatic individuals[1-2]. Anatomically, the left branch of His is divided into anterior and posterior fascicle[3-4]. If any of these bunches are damaged (hemi-block), there is no enlargement of the QRS complex[5-6]. The QRS complex duration in LBBB is> 0.12 seconds. Since the initial left septal depolarization is dependent on the left His branch, normal septal depolarization is altered in LBBB cases, resulting in different and different LBBB patterns[7-8]. There is usually a delay in dominant left ventricular vectors resulting in a change in QRS morphology[9]. Septal Q-wave loss in standard leads 1, V5, and V6 with secondary T-wave abnormalities Total LBBB, although rare in healthy subjects; It is often a complication of another heart disease[10]. In the Framingham study, 2,5209 people with LBBB were analyzed, and 18 years of follow-up showed the development of clinical coronary artery disease in patients (48%)[11]. A study by the Royal Canadian Air Force found that people who developed LBBB had a five-year incidence of sudden cardiac death ten times higher than those without LBBB[12]. The goal of the analysis was to govern the frequency of various symptoms and structural heart abnormalities using transthoracic echocardiography in the Pakistani population.

MATERIALS AND METHODS

This cross-sectional study was conducted at the Interventional Cardiology Unit Liaquat University Hospital Hyderabad for six months duration from July 2021 to December 2021. Adult patients of both sexes with symptomatic or asymptomatic LBBB were recruited from the outpatient department of the hospital. Cases diagnosed with ischemic heart disease (IHD), valvular heart disease and heart failure were excluded from the study. LBBB was diagnosed on the basis of the presence of classic ECG changes with a QRS duration> 120 ms and notched or slurred R wave in any of the left-sided leads, ie I, aVL, V5, V6.

All selected patients underwent elective transthoracic echocardiography (TTE). After informed consent, demographic and clinical data were obtained, with particular emphasis on symptoms of dyspnoea, chest pain, dizziness or syncope, and precordial examination. TTE was scheduled as soon as possible, and all standard echocardiography modes (2-D, Continuous Wave Doppler, Color Doppler, Pulse Wave Doppler and M-mode) were used to detect structural abnormalities often associated with LBBB, such as abnormal septal movement (ASM) and cardiomyopathy. Abnormal septal motion has been defined as an early, posteriorly directed motion of the ventricular septum (IVS) in the pre-ejection period followed by abnormal forward movement during the ejection phase1. Left ventricular ejection fraction (LVEF) was estimated using the Simpson two-plane method. All TTE studies were achieved by a single operator. The TTE results were presented and recorded as percentage and frequency. The collected data was analysed using SPSS-21 for Windows.

RESULTS

120 patients were examined; 74 men and 46 women. The study population mean age was 52.7 ± 1.5 years, range (22-76) years. In a history, 10 (8.3%) patients had mild dyspnoea (NYHA class I-II) and 9 (7.5%) severe dyspnoea (NYHA class III-IV).

Table 1: shows the demographic features and clinical presentation of the patients.

Males	74(61.7%)
Females	46(38.3%)
Mean Age	52.7 ± 1.5 years
Mild dyspnoea	10(8.3%)
severe dyspnoea	9(7.5%)
atypical chest pain	17(14.2%)
dizziness and presyncope	23(19.2%)

A history of nonspecific atypical chest pain was reported in 17 (14.2%) patients, and 23 (19.2%) patients at some point reported dizziness and presyncope. Echocardiograms of only 11 (9.2%) patients were normal. The structural abnormalities observed included abnormal septal motion in 96 (80%), mitral regurgitation in 16 (13.3%), and left ventricular dilatation with left ventricular end-diastolic dimension> 60 mm in 23 (19.2%). LVEF

was normal in 80 (66.7%) cases (> 50%); 18 (15%) had a LVEF of 25-35% and 12 (10%) had a LVEF of 35-50%.

Table 2: shows Echocardiograph findings among patients

Normal	11 (9.2%)
abnormal septal motion	96(80%)
mitral regurgitation	16 (13.3%)
left ventricular dilatation	23(19.2%)

Table 3: shows the Left ventricular ejection fraction among patients

Normal > 55%	80 (66.7%)
LVEF 25-35%	18 (15%)
LVEF 35-50%	12 (10%)

DISCUSSION

The anomaly of septal movement in patients with LBBB was first described by echocardiography by McDonald more than forty years ago[13]. By careful observation of M-mode echocardiograms in patients with LBBB, three types of septal movement have been identified: Type A: early and sudden SVI retrograde movement in the pre-ejection period followed by anterior movement, B: early posterior movement and IVS during the anterior ejection period, as follows movement, C akinesia or dyskinesia IVS throughout the contraction[14-15]. These observational data from one center showed that the majority (91%) of LBBB patients had abnormal ultrasound scans, and the most common abnormality observed was abnormal septal movement[16]. This observation is insimilar with many preceding studies. Abbasi et al described that 14 (82%) of 17 LBBB patients had MSA and none of the patients had posterior wall movement disorders. Grines et al. Found that 89% (16/18) of patients had abnormal septal movement[17-18]. Martin reported the histological significance of bundle branch block in the African-Caribbean population and compared echocardiography in patients with right bundle branch block (RBBB) and LBBB[19-20]. The echocardiogram was abnormal in 89% of the LBBB patients compared with 33% of the LBBB patients. We observed some degree of LV dysfunction (LVEF <50%) in 25% of our patients. Lee et al found that in a cohort of patients with isolated LBBB, LVEF was reduced by -7.3 +/- 12% per year over a mean follow-up of 52 +/- 45 months. In this analysis, we do not question the duration of LBBB as most of our patients did not have a pre-existing ECG, it is very likely that our left ventricular dysfunction patients have had LBBB for a long time and are asynchronous[21]. Left ventricular contraction ultimately results in a measurable left ventricle dysfunction. Another important observation was a history of dizziness / forward syncope in 19.2% of patients. A study of middle-aged Swedish men showed that LBBB is strongly associated with future risk of developing high-grade AV block: hazard ratio = 12.89 (99% confidence interval: 4.13-40 0.24)[22]. Dizziness is likely and, in our patients, the syncope was caused by intermittent high-degree AV block. One-fifth of our patients had LV dilatation, and in some patients, LBBB may be in the early stages of dilated cardiomyopathy, meaning our group with LV dilatation has already passed that early stage. We observed mitral regurgitation (MI) in 13.3% of our study group. The association of LBBB with MR has been reported in patients with normally contracting hearts and poorly contracting heart from the mitral valve. Cardiac resynchronization therapy (CRT) is known to reduce the severity of functional mitral regurgitation in patients with poor LV systolic function by partially eliminating the LV dissonance associated with LBBB[23-24].

CONCLUSION

In conclusion, LBBB is associated with structural heart abnormalities in most LBBB patients and is an indication for action to be taken to prevent possible future events.

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