SHORT COMMENTARY

# Echocardiographic Findings in an Afro-Caribbean Population Referred for Evaluation of Incidental Bundle Branch Block on Electrocardiogram

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The finding of bundle branch block (BBB) on electrocardiograms (ECG) occurs in 0.6% of the population and in 1 to 2% of patients over 60 years of age; with organic heart disease it is found in 80% and coronary artery disease in 50% of patients (1). Left bundle branch block (LBBB) is seen in 0.01 to 1% of patients and although it may be seen in the absence of heart disease, it is most often associated with hypertensive heart disease, coronary artery disease, myocarditis or aortic valvular disease (1). Right bundle branch block (RBBB) is seen in 0.025% of patients and is more often associated with normal cardiac findings (1). In patients presenting with overt cardiac disease, patients with BBB have a worse outcome than those without BBB (1– 4). The significance of BBB in the absence of overt cardiac disease is less obvious. In one study, isolated BBB was not associated with decreased actuarial survival but LBBB was associated with a higher risk of developing overt heart disease and cardiac mortality (5).

In a selected community study, LBBB was associated with excess total and cardiac mortality but RBBB was not associated with excess mortality (6). Recent data suggest that RBBB may not be as benign as was originally thought (7) but even recent studies find that LBBB is a greater risk for poor outcome (8).

The significance of BBB in an Afro-Caribbean population is not known. Data suggest that coronary artery disease may be less frequent in Antigua and Barbuda than in more developed countries (9, 10), suggesting that cardiac findings associated with BBB might also vary. A retrospective review of echocardiographic (ECHO) findings was performed for all patients referred for incidental BBB in Antigua and Barbuda (population 90% Afro-Caribbean, 8% mixed by census) from 1998 to 2006. Incidental BBB was defined as BBB in the absence of congenital heart disease, cardiac surgery, myocardial infarction or cardiac failure. The pattern of BBB on ECG includes QRS duration of 0.12 seconds or more with delayed intrinsicoid deflection in the area of the affected bundle (11).

M-mode echocardiograms were performed and measured using accepted international standards and normal values (12, 13). Measurements included left atrial dimension (LA), the left ventricular (LV) end-diastolic dimension (LVEDD), the LV end-systolic dimension (LVESD), the intraventricular septal thickness (IVS) and the LV posterior wall thickness (PWT). The LV shortening fraction (SF), a measure of LV systolic function, was calculated. Data abstracted included patient age, gender, LA size (normal < 40 mm), LVEDD (normal < 55 mm), normal < 38 mm, IVS (normal < 12 mm), PWT (normal < 12 mm), LV SF (normal > 0.26) and the presence of any ECHO abnormality. Data from patients having RBBB were compared with those having LBBB using STAT101 software (Ashley-Minitab Inc, Reading Massachu-setts 1993). Comparisons were done using two sample *t* test or chi-square with *p* values > 0.05 reported as non-significant (ns).

A total of 36 patients was found to have isolated or incidental BBB and technically acceptable ECHO, 18 (50%) with RBBB and 18 (50%) with LBBB, with 10/18 (56%) being women in both groups (Table 1). Those patients having RBBB were significantly younger, mean ± standard deviation, 53.6 ± 14.3 *vs* 66.5 ± 16.0 years, $p < 0.02$, did not differ in frequency of LA enlargement (11 *vs* 33%, $p$ = ns) but did have significantly smaller LA (32.4 ± 4.9 *vs* 35.8 ± 5.2 mm, $p = 0.05$). Patients with RBBB were significantly less

Table 1: Comparison of patients with incidental RBBB and patients with incidental LBBB in Antigua and Barbuda.

| | RBBB | LBBB | *p*-value |
|---|---|---|---|
| Gender (female) | 58% | 58% | ns |
| Age (years) | 53.6 ±14.3 | 66.5 ± 16.0 | < 0.02 |
| Large LA (> 39 mm) | 11% | 33% | ns |
| LA size (mm) | 32.4 ± 4.9 | 35.8 ± 5.2 | < 0.05 |
| Large IVS PWT (> 11 mm) | 28% | 78% | < 0.01 |
| IVS size (mm) | 11.1 ± 2.5 | 13.3 ± 2.9 | < 0.02 |
| PWT size (mm) | 10.6 ± 1.4 | 12.4 ± 2.1 | < 0.01 |
| LVEDD (> 55 mm) | 6% | 22% | ns |
| LVEDD size (mm) | 46.8 ± 8.6 | 46.8 ± 9.4 | ns |
| LVESD size (mm) | 29.2 ± 8.4 | 31.1 ± 8.4 | ns |
| Decreased LV SF (< 0.27) | 6% | 17% | ns |
| Abnormal ECHO | 33% | 89% | < 0.001 |

See text for abbreviations

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likely to have increased IVS or PWT (28 *vs* 78%, $p < 0.01$) and had significantly thinner IVS (11.1 ± 2.5 *vs* 13.3 ± 2.9 mm, $p < 0.02$) and PWT (10.6 ± 1.4 *vs* 12.4 ± 2.1 mm, $p < 0.01$). Patients with RBBB and LBBB had no difference in LVEDD enlargement (6 *vs* 22%), LVEDD (46.8 ± 8.6 *vs* 46.8 ± 9.4 mm) and LVESD (29.2 ± 8.4 *vs* 31.1 ± 8.4 mm). There was no difference in frequency of decreased LV SF (6 *vs* 17%). Patients with RBBB were significantly less likely than those with LBBB to have an abnormality seen on ECHO (6/18, 33% *vs* 16/18, 89%, $p < 0.001$). Abnormalities seen with RBBB included four patients with increased IVS or PWT (1 with decreased LV SF), one patient with IVS/PWT > 1.3, suggesting asymmetric septal hypertrophy (ASH) and one patient with increased right ventricular (RV) dimension.

Abnormalities seen with LBBB included 12 patients with increased IVS or PWT (3 with pericardial effusion, two with decreased LV SF and one with segmental hypokinesis), two with IVS/PWT > 1.3 suggesting ASH (1 with increased RV), one with decreased LV SF and one with pericardial effusion.

The finding of BBB in association with overt cardiac disease carries an unfavourable prognosis (1– 4). The finding of incidental or isolated BBB on ECG does not appear to be as great a problem. Although incidental RBBB does not appear to be associated with higher overall morbidity or mortality (14), incidental LBBB is associated with increasing risk of overt cardiovascular disease, cardiac mortality and all-cause mortality (5, 6). The ECHO results seen in this Afro-Caribbean population with incidental BBB demonstrate significant differences in patients with RBBB and LBBB. Patients with incidental RBBB were significantly less likely to have ECHO abnormality, only 33% compared with 89% of those with LBBB. Although there were no significant differences in measures of LV systolic function, patients with RBBB had less LV wall thickening, less ASH and pericardial effusion than those with LBBB. The finding of ASH was seen in 1/18 (6%) of patients with incidental RBBB and in 2/18 (11%) of patients with incidental LBBB. An abnormal electrocardiogram may be the only presentation in 9% of cases of ASH (15) and may include both RBBB and LBBB (16).

The finding of incidental RBBB is probably benign in most Afro-Caribbean patients. In a population of United States Air Force members, incidental RBBB was associated with coronary artery disease in 3% and hypertension in 2% of patients as compared with 9% and 7% of patients with LBBB (17). On follow-up, patients with RBBB were less likely to develop hypertension (6%) than those with LBBB (9%) [18]. The finding of incidental LBBB is associated with higher risk of developing cardiac related morbidity in patients with hypertension, diabetes and high cholesterol than incidental RBBB (8). Incidental LBBB was associated with the development of LV systolic dysfunction (19), high degree atrioventricular block and sudden death (20) and higher mortality from cardiac failure independent of age, gender and underlying disease (21) compared with incidental RBBB. A recent study suggests that LBBB is less often associated with coronary artery disease in patients of African ethnicity than those of Caucasians in the United States of America (22).

This report suggests that incidental RBBB in this Afro-Caribbean population in Antigua and Barbuda is not associated with a high incidence of ECHO abnormalities, similar to other patient populations reported. The finding of incidental LBBB in Caribbean patients may represent a group at risk.

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