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Left Bundle Branch Block in the Elderly: Particularities

Larisa Angel [1, *], Cătălina Arsenescu Georgescu [1, 2]

[1] Cardiovascular Diseases Institute, Prof. Dr. George I. M. Georgescu", Iaşi, România
[2] University of Medicine and Pharmacy, Grigore T. Popa", Iaşi, România

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ABSTRACT

Background: Chest pain is less likely in old age and evidence of Coronary Artery Disease (CAD) may be detected in the presence of a new or presumably new Left Bundle Branch Block (LBBB).

Objectives: This study aimed to assess the predictive role of new LBBB in diagnosis of CAD.

Patients and Methods: This prospective study was conducted on 402 patients with LBBB admitted to our institute between January 2011 and June 2013. Among the patients, only 272 had new or presumably new LBBB. The patients were divided into two groups (age ≤ 65 years and > 65 years) and all the demographic, clinical, and procedural characteristics were prospectively recorded. Statistical analyses were performed using the Statistical Package for Social Sciences (SPSS Inc.), version 17.0. Nominal variables were described using frequencies and normal distribution of quantitative variables was tested by means of Kolmogorov-Smirnov test. $P < 0.05$ was considered as statistically significant.

Results: Patients older than 65 years had less common chest pain, lower procedural use (76.47% vs. 84.56%, $P = 0.001$), longer duration of hospitalization, and higher rate of in-hospital mortality. Older patients also had either one or three coronary lesions (27.97%) compared to the younger ones 62.50% of whom had no vessel disease.

Conclusions: Presence of new or presumably new LBBB in elders, and even in those without the classic symptoms of chest pain, may be the first manifestation of CAD.

►*Implication for health policy/practice/research/medical education:*
We anticipate that this manuscript will be of great value, not only to the scientific community interested in basic and clinical cardiology, but also to other researchers in the field of medicine.

1. Background

Coronary Artery Disease (CAD) is the leading killer of older people and half of all heart attack victims are over 65 years. Among patients with CAD, elders represent a distinctive profile, with more frequent co-morbidities, limited life expectancy, and higher mortality rates associated with coronary revascularization (1). It is known that heart problems in elders represent a challenge not only because a heart attack may announce itself without the classic symptom of chest pain, but also because they may affect the length and the quality of life, or both. In some cases, the symptoms are few or none and evidence of coronary artery damage may be detected on an electrocardiogram, such is the presence of a new or presumably new Left Bundle Branch Block (LBBB) (2).

Despite advances in medical therapy, cardiovascular disease remains the leading cause of mortality among older patients and this underlines the relevance of early interventions in order to prevent heart disease and preserve the health and well-being as long as possible.

LBBB should be considered not only an electrocardiographic finding, but also a "cardiac clinical entity". Besides, its effect on patient treatment and outcome is challenging not only in the setting of Acute Myocardial Infarction (AMI), but also in chronic Heart Failure (HF) where it guides the Cardiac Resynchronization Therapy (CRT) (2).

*Corresponding author: Larisa Angel, Cardiovascular Diseases Institute, Prof. Dr. George I. M. Georgescu", Carol I Avenue, 50, Iaşi, România. Tel/Fax: +40-232219270,
E-mail: larisa_med86@yahoo.com

In population studies, LBBB is rare in patients younger than 50 years and its prevalence increases steadily from < 1% at the age of 50 years to 6% by 80 years of age (3). Those who develop LBBB at a younger age (< 45 years) and are free from cardiovascular risk factors do much better than those who develop LBBB during or after their fifth decade and have the associated risk factors (3). Thus, it seems that LBBB can result from either intrinsic conduction system degeneration or an extrinsic insult from a variety of cardiovascular diseases, and the outcome of these two distinct populations with LBBB is divergent. In the absence of consensus guidelines on how to evaluate these patients, a non-invasive assessment for structural heart disease and ischemia is reasonable, especially in patients with known cardiovascular risk factors.

2. Objectives

As appropriate therapy for CAD begins with prompt recognition and intervention, the present study aims to assess the predictive role of new LBBB in diagnosis of CAD in patients over 65 years old compared to those below 65 years of age.

3. Patients and Methods

This study aimed to investigate the current incidence, clinical risk factors, echocardiographic and angiographic findings, and risk of arrhythmias and atherosclerotic CAD in patients with new or presumably new LBBB based on their age. Consecutive patients presenting with LBBB in the Cardiovascular Disease Institute Iasi between January 2011 and June 2013 were enrolled into our study. Overall, 402 patients with LBBB were prospectively studied, but only 272 had new or presumably new LBBB. The patients' demographic, clinical, and procedural characteristics were prospectively recorded on case report forms using standardized definitions for all fields. All the subjects were reviewed for existence of hypertension, diabetes mellitus, hyperlipidemia, smoking, and ischemic and valvular heart disease. Also, all the electrocardiograms were analyzed and the treating physician determined the presence of LBBB. The electrocardiograms were classified according to the standardized guidelines, including LBBB not known to be old (new or presumably new LBBB) or LBBB known to be old. Moreover, chronicity of LBBB was determined by comparison to the most recent previous ECG available. If no prior ECG was available for comparison, the patients were classified as having presumably new LBBB.

Acute Coronary Syndromes (ACS) were defined in accordance with the European Society of Cardiology/ American College of Cardiology guidelines (4, 5). Additionally, CAD was defined as at least one vessel with greater than 70% stenosis or documented AMI (which presumed underlying coronary disease).

The patients were excluded from the study if they were younger than 30 years, did not have an electrocardiogram, or declined authorization for the use of their medical records for research.

The study patients were divided into two groups according to their age at LBBB diagnosis (age ≤ 65 years and > 65 years). This arrangement was made in order to analyze the current incidence and meaning of new LBBB as a predictor of atherosclerotic CAD with differences based on age.

Statistical analyses were performed using the Statistical Package for Social Sciences (SPSS Inc.), version, 17.0. The data are presented as Mean (M) ± Standard Deviation (SD), median (interquartile range), or frequencies and percentages. Comparisons were made among the patients over 65 years old and those below 65 years of age. Because older patients present a distinctive profile with more frequent co-morbidities, limited life expectancy, and higher mortality rates associated with coronary revascularization and patients with new or presumably new LBBB are considered candidates for early reperfusion treatment, they were combined for several analyses. $P < 0.05$ was considered as statistically significant. The study protocol conforms to the ethical guidelines of the 1975 Declaration of Helsinki and written informed consents were obtained from all the patients.

4. Results

This study was performed on 402 consecutive patients admitted to our clinic with LBBB. Among these patients, 272 (67.66%) had new or presumably new LBBB. Baseline characteristics of the patients with new or presumably new LBBB stratified by age groups (≤ 65 years and > 65 years) have been presented in Table 1. In terms of comorbidities, dyslipidemia, diabetes, obesity, and previous HF were observed more frequently in older patients. On the other hand, the younger patients had higher rates of hypertension,

Table 1. Clinical Characteristics of the Patients with New or Presumably New Left Bundle Branch Block

Variable	Age ≤ 65 Years (N = 136)	Age > 65 Years (N = 136)	P value
Male gender	91 (66.91%)	77 (56.61%)	0.052
Hypertension	66 (48.53%)	64 (47.05%)	0.598
Diabetes mellitus	25 (18.38%)	35 (25.73%)	0.094
Obesity	104 (76.47%)	105 (77.20%)	0.514
Current / previous smoker	69 (50.73%)	54 (39.70%)	0.112
Previous congestive heart failure	50 (36.76%)	63 (46.32%)	0.214
Previous myocardial infarction	6 (4.41%)	4 (2.94%)	0.375
Previous angina pectoris	7 (5.14%)	1 (0.73%)	0.033
Previous Percutaneous Coronary	7 (5.14%)	5 (3.67%)	0.385
Intervention (PCI) Chest pain	125 (91.91%)	120 (88.23%)	0.209
Palpitations	13 (9.56%)	20 (14.71%)	0.132
Syncope	6 (4.41%)	20 (14.71%)	0.003
Dyspnoea	97 (71.32%)	107 (78.68%)	0.104

current and previous smoking, and previous CAD. This result suggested that patients with severe uncontrolled hypertension, those suffering from CAD, and those who smoked tended to die earlier from their comorbidities.

Although the mean of Body Mass Index (BMI) was similar in the study groups, the percentage of obesity (BMI ≥ 30 kg/m2) was higher in the older patients.

As expected, the most common indications for testing in both groups were evaluation for chest pain, dyspnoea, or their combination. Nevertheless, chest pain was more common in younger patients because the so-called silent heart attacks are more likely in old age; however, the differences were not statistically significant (P = 0.209).

Almost one in five patients older than 65 years presented for evaluation of a syncope, compared to only one in fifteen patients younger than 65 years (P = 0.003). This may also be explained by the higher proportion of older patients with second and third degree atrioventricular block (13.23% vs. 8.08%, P = 0.06).

In order to study the in-hospital outcome of the patients with new or presumably new LBBB according to their age, an association was found between older age and risk of ventricular tachycardia (25 vs. 14 patients, P = 0.041) and in-hospital mortality (6 vs. 2 patients, P = 0.001).

With regards to treatment strategy, older patients were less likely to undergo diagnostic angiography (76.47% vs. 84.56%, P = 0.001) and Percutaneous Coronary Intervention (PCI) (84.56% vs. 76.47%, P = 0.063) compared to the younger patients. Moreover, the majority of older patients with new or presumably new LBBB had either one or three coronary lesions (27.97%) compared to the younger ones 62.50% of whom had no vessel disease. When CAD was present, it was frequently localized on the left descendent artery in both groups, but without statistically significant differences (32.35% vs. 30.15%, P = 0.397) (Table 2).

Another important finding of our study was that almost half of the older patients had final diagnosis of stable angina (42.64%) unlike the younger ones more than two thirds of whom had either non-cardiac chest pain or stable angina (66.18%) (Table 3).

5. Discussion

The results of our study demonstrated that 50% of the patients with new or presumably new LBBB addressed to our clinic were above 65 years old. Besides, there were more men at advanced ages, which is similar to the previous reports (6).

The elders had more severe coronary lesions and more extensive comorbidities in comparison to the younger patients in this study. On the other hand, the prevalence of hypertension, current and previous smoking, and previous CAD was significantly lower in the older patients, which is consistent with the previous studies on elders (7, 8). These results suggest that patients suffering from severe hypertension, those with previous CAD, and those who smoke tend to die earlier from their comorbidities.

The angiographic success rate was similar in both groups. However, the older group had lower procedural use and success rate, longer duration of hospitalization, and higher rate of in-hospital mortality compared to the younger group. Previous reports also showed that the elders who underwent PCI had a higher rate of in-hospital mortality, ischemic events, complications, and longer duration of hospitalization compared to the younger ones (7, 8). A recent study, too, indicated that in-hospital mortality was significantly higher in patients over 85 years than in those under 85 years of age (6.93% vs. 1.20%, P < 0.0001) (9).

A recent study revealed that the rate of cardiovascular mortality was higher in patients with CAD and concomitant

Table 2. Procedural Characteristics of the Patients with New or Presumably New Left Bundle Branch Block

Variable	Age ≤ 65 Years (N = 136)	Age > 65 years (N = 136)	P value
Conventional coronary angiography, Number of diseased vessels on angiography	115 (84.56%)	104 (76.47%)	0.001
Without coronary lesions	85 (62.50%)	88 (64.71%)	0.127
1 coronary artery disease	18 (13.23%)	25 (18.38%)	
2 coronary artery diseases	20 (14.71%)	12 (8.82%)	
3 coronary artery diseases	13 (9.56%)	13 (9.56%)	
LAD disease	44 (32.35%)	41 (30.15%)	0.397
RCA disease	29 (21.32%)	21 (15.44%)	0.137
LCX disease	21 (15.44%)	23 (16.91%)	0.435
Overall PCI use	115 (84.56%)	104 (76.47%)	0.063
PCI on LAD	17 (12.50%)	16 (11.76%)	0.853
PCI on RCA	11 (8.09%)	3 (2.21%)	0.025
PCI on LCX	7 (5.15%)	6 (4.41%)	0.777

Abbreviations: LAD, left descendent artery; LCX, left circumflex artery; RCA, light coronary artery; PCI, percutaneous coronary intervention

Table 3. Final Diagnosis of the Patients with New or Presumably New Left Bundle Branch Block

Final Diagnosis	Age ≤ 65 Years (N = 136)	Age > 65 Years (N = 136)	P value
Acute coronary syndrome	33 (24.26%)	28 (20.59%)	0.505
Stable angina	45 (33.09%)	58 (42.64%)	0.032
Cardiac diagnoses other than coronary	13 (9.56%)	14 (10.29%)	0.853
Artery disease Non-cardiac chest pain	45 (33.09%)	36 (26.48%)	0.001

LBBB compared to those without LBBB (3). This underlines the importance of an effective method to identify CAD in patients with LBBB. However, identification of CAD in subjects with LBBB is problematic with non-invasive methods, including those that employ electrocardiography, echocardiography, and nuclear scintigraphy. Consequently, coronary angiography is usually required in these patients to provide definitive diagnosis (10).

Similar to the study performed by Ghaffari et al. (11), our findings showed that the elders had higher rates of CAD and left ventricular systolic dysfunction with an ejection fraction less than 50%. Although the evidence is not as strong since the elders are usually under-represented in most randomized clinical trials, they are a high-risk population and ACS treatment should be the same as that for other age-groups. Thus, advanced age alone must not be a contraindication for performing coronary angiography and PCI when clear indications are present.

Our study revealed that presence of new or presumably new LBBB in elders, and even in those without the classic symptoms of chest pain, may be the first manifestation of CAD. Therefore, coronary angiography should be performed in elders without hesitation and the decision should be made according to comorbidities rather than age itself.

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Authors' Contribution

Study concept and design, Acquisition of data, Analysis and interpretation of data, Drafting of the manuscript, Critical revision of the manuscript for important intellectual content, Statistical analysis, Administrative, technical, and material support: both authors.

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