LBBB associated with coronary artery disease

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1) The diagnosis of MI is more difficult, the criteria being very specific but having a sensitivity < 50%. (Deharo JC. Left bundle branch block. Electrocardiographic and prognostic aspectsArch Mal Coeur Vaiss. 2000; 93):31-37).

2) When electrocardiography was starting, Wilson postulated that the S wave of V6 in the CLBBB associated to lateral infarction was due to the sensing by the exploring electrode of V6 of intracavitary potential of the LV (RS): it is called the "electric window" of Wilson. The appearance of the wide and notched S wave in V6 in CLBBB associated to lateral MI, is due to a dislocation to the right of the Z line of the afferent branch of QRS loop and not to the sensing of the intracavitary potential. The fact that the wide and notched S wave appears broadened (>40 ms) and with a notch, reinforces this position.

3) In non complicated CLBBB Ratio of QRS/ST-T amplitude, 2:1. ST upwardly concave

4) In complicated CLBBB Ratio of QRS/ST-T amplitude 1:1. ST upwardly convex.

5) "THE DOME AND DART QRS COMPLEX CONFIGURATION": It is Characterized by a QRS complex observable in V6, formed by initial q wave followed by a positive deflection of low voltage of the "dome and dart" type, and final s wave. It indicates CLBBB complicated with extensive anterior or antero-lateral infarction. (Schamroth L. The Electrocardiology of Coronary Artery Disease. Oxford: Blackwell Scientific Publications Ltd. 1975)

6) SIGN OF CABRERA OF CLBBB ASSOCIATED TO ANTERIOR INFARCTION: Notch of 50 ms in the ascending ramp of S wave of V3 and V4.

7) SIGN OF CHAPMAN OF CLBBB ASSOCIATED TO ANTERIOR INFARCTION Notch in ascending ramp of R wave in DI, aVL, V5 and V6.

8) CRITERIA BY SGARBOSSA FOR THE DIAGNOSIS OF CLBBB ASSOCIATED TO INFARCTION IN THE ACUTE PHASE: 1) ST segment elevation of 10 mm or more when matching the QRS complex; ST segment depression = or > 1 mm matching QRS or more in V1, V2 or V3; Elevation of 5 mm or more when not matching the QRS complex in V1 and V2 (negative QRS).

9) LBBB is present in 3.% to 4% of cases in acute MI.(lower than that referred in the pre-thrombolytic era). Patients with AMI and LBBB are older and had a more prevalent history of diabetes, angina, myocardial infarction and heart failure compared to the patients without LBBB. LBBB is associated more frequently with female gender and poor left ventricular ejection fraction. (Melgarejo Moreno A, Galcera Tomas J,et al.The incidence, clinical characteristics and prognostic significance of a left bundle-branch block associated with an acute myocardial infarctRev Esp Cardiol. 1999; 52:245-252).

10) The independent ECG signs of acute MI during LBBB among patients with chest pain or history of coronary disease are:
1) ST elevation = or >1 mm in leads with a positive QRS; 2) ST-depression = or > 1 mm in V1 to V3, and; 3) ST elevation = 5 mm in leads with a negative QRS. The presence of any of these ECG signs is associated with a sensitivity of 44 to 79% and a specificity of 93 to

100%. (Sgarbossa EB.Value of the ECG in suspected acute myocardial infarction with left bundle branch block.J Electrocardiol. 2000;33 Suppl:87-92). The criteria of Sgarbossa are too insensitive to be used as screening (roule out) test to determine which patients with an LBBB do not have an AMI. The Sgarbossa criteria are, highly specific and can be used reliably as confirmatory test to rule in AMI in patients with LBBB.There are not perfect diagnostic tools allowing early diagnostic of AMI in patients having LBBB. Currently the best justified strategy is to follow AHA/ACC recommended guidelines to administer thrombolysis to all patients with LBBB presenting with chest pain, particularly if serum biomarkers are elevated. (Jakuitis A, Statkeviciene A.The importance of left bundle branch block in the diagnosis of acute myocardial infarction Medicina (Kaunas). 2003;39:15-20.) Thrombolytic treatment is under-utilized in patients with LBBB and AMI, and those who are thrombolysed endure lengthy delays before treatment. Patients with any of the predictive criteria should be thrombolyzed immediately. When the diagnosis is in doubt, serial ECGs may demonstrate evolving ischaemic change. (Edhouse JA, Sakr M, Angus J, Morris FP.Suspected myocardial infarction and left bundle branch block: electrocardiographic indicators of acute ischaemia. J Accid Emerg Med. 1999;16:331-5). To validate ECG Sgarbossa et al criteria for the detection of MI in patients with LBBB and suspected ischemia. A retrospective cohort study was performed at an urban teaching hospital. All patients admitted with suspected ischemia and LBBB were eligible. MI was defined as an elevated creatine kinase (CK) isoenzyme MB (>14 IU/L) that was at least 5% of total CK level. ECGs were interpreted by 2 physicians blinded to patient outcome. Interpreters were asked to rate ECGs for the presence of each of the 3 criteria proposed by Sgarbossa et al:

(1) ST-segment elevation greater than or equal to 1 mm concordant with the QRS complex;

(2) ST-segment elevation greater than or equal to 5 mm discordant with the QRS complex; and

(3) ST-segment depression in leads V(1) through V(3).

Interobserver agreement was assessed. Of 190 eligible patients, 25 (13%) had MI. Sensitivities of the 3 criteria varied from 0 to 16%, with specificities of 93% to 100%. Only the first criterion demonstrated a clinically useful likelihood ratio (positive likelihood ratio=16 [95% confidence interval 4 to >100]). Patients with new LBBB were more likely to have MI. Interobserver agreement among ECG interpreters ranged from 93% to 98%. The criteria of Sgarbossa et al cannot be used to exclude MI in patients with LBBB because of low sensitivities and poor negative likelihood ratios. ST-segment elevation concordant with the QRS complex had a high positive likelihood ratio for identification of MI. Patients with new LBBB and suspected ischemia are 5 times more likely to have MI than patients with LBBB of chronic or unknown duration.(Li SF, Walden PL, Marcilla O, et al. Electrocardiographic diagnosis of myocardial infarction in patients with left bundle branch block. Ann Emerg Med. 2000;36:561-565.)

11) The diagnosis of healed inferior MI in patients with LBBB) is difficult because there are no established criteria. There may be a reduction in the amplitude of the QRS complex, the amplitude being reduced to 5mm or less. The manifestation may be obsvious if serial ECG are recorder. The presence in lead aVF of Q-wave or QS of at least 30-ms duration or T-wave inversion was seen in 30 of 35 patients with inferior MI (sensitivity of 86%) compared with only 12 of 131 patients with uncomplicated LBBB (specificity 91%). Thus, these criteria are potentially useful for the diagnosis of inferior MI in patients with LBBB. (Laham CL, Hammill SC, Gibbons RJ. New criteria for the diagnosis of healed inferior wall myocardial infarction in patients with left bundle branch block.Am J Cardiol. 1997;79:19-22.)

12) The simple prolongation of the averaged QRS duration > 160 ms in patients with RBBB and > 170 ms in patients with LBBB after MI and syncope is a significant poor prognostic factor. However, this sign is not predictive of sudden death. (Brembilla-Perrot B, Suty-Selton C, Houriez P, et al. Prolongation of the averaged QRS complex. A simple prognostic factor in patients with post-infarction bundle branch block and a history of syncopeArch Mal Coeur Vaiss. 2000;93:1285-1289.)

13) Stable ST-segment elevation in + 1 of left precordial ECG leads, with predominantly positive QRS complexes (an ECG criterion for the diagnosis of ventricular aneurysm (VA)

in the presence of LBBB). The sensitivity of this ECG criterion for the diagnosis of VA was 18.5%, and the specificity was 100%. (Madias JE, Ashtiani R, Agarwal H, et al. Diagnosis of myocardial infarction-induced ventricular aneurysm in the presence of complete left bundle branch block.J Electrocardiol. 2001; 34:147-154.)