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Cardiology

Diagnosing Acute Coronary Syndrome in Presence of Left Bundle Branch Block- A Case Report

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Abstract	Case Report

Left bundle branch block (LBBB) makes ECG interpretation difficult in acute coronary syndrome. Sgarbossa criteria is usually used for diagnosing myocardial infarction in presence of LBBB. However not all patients fulfil this criterion. Our case, a 66 year old hypertensive & diabetic male who was finally diagnosed as acute coronary syndrome did not fulfil Sgarbossa & modified Sgarbossa criteria. Hence we need a comprehensive ECG analysis in patients with chest pain & new or presumably new onset LBBB. Our algorithmic approach that is demonstrated in our case report, combines multiple criteria with different sensitivities and specificities and can be valuable in diagnosing myocardial infarction in presence of LBBB.
Keywords: LBBB, Sgarbossa criteria, modified Sgarbossa criteria, BARCELONA algorithm.
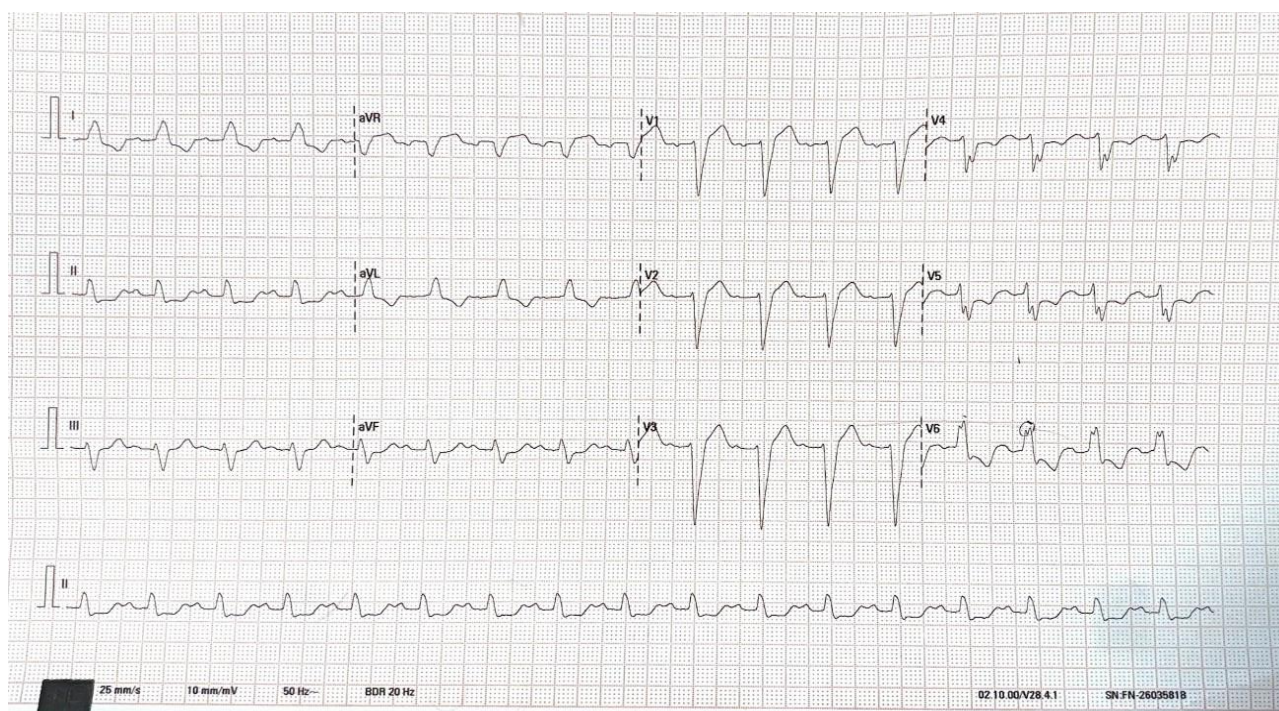
INTRODUCTION

Left bundle branch block (LBBB) makes ECG interpretation difficult in acute coronary syndrome [1]. Contemporary studies suggest that acute LBBB is uncommon because of a transmural infarction [2, 3]. Sgarbossa Criteria has low sensitivity for diagnosing acute MI in presence of LBBB, yet is the most commonly used tool for ECG analysis in these patients. Our case emphasizes the importance of comprehensive ECG analysis & prompt cardiac catheterization in the management of these patients.

CASE PRESENTATION

66 year old male presented with chief complaints of Exertional chest discomfort from 15 days. His comorbidities were Hypertension & Diabetes mellitus. There was no significant past history. His general physical and systemic examination was normal. Baseline Investigations revealed anemia with Hb- 11.7g/dl, TLC- 9.6 /L, MCV-85.8 fL, MCH- 28.3 pg, platelet- 190/L. His renal function test revealed urea- 42.8mg/dl, creatinine- 1.11 mg/dl, eGFR- 72.7 ml/min/1.73 sqm BSA. High sensitive trop I was 26 ng/ml. HbA1c was 9.3%, Na- 131 mmol/L, K- 4.16 mmol/L, Cl- 102 mmol/L, HCO3- 16.9 mmol/L, Ca- 9.02 mg/dl. His liver function test was normal. His ECG was showing LBBB (Figure 1). He was not fulfilling Sgarbossa's criteria for MI, however he was fulfilling BARCELONA algorithm & Chapman's & Cabrera's sign were present (Figure 1). Echocardiography was done showing Severe LV dysfunction with LVEF of 25% & hypokinetic LAD territory. There was Grade III diastolic dysfunction with mild MR. Patient was shifted to cath lab & coronary angiography was done showing 50% disease in left main with ostioproximal tight 90% lesion in LAD (Figure 2). Primary percutaneous coronary intervention (PCI) was done from left main to LAD with hemodynamic support as per standard practice and nice final result was achieved (Figure 3). Immediate post PCI ECG showed resolution of LBBB, QRS narrowed to 100 msec (Figure 4). Patient had an uneventful hospital course & was discharged from the hospital on day 3. At his 9 month follow up his echocardiography showed LVEF- 55% and he continued to do well.

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Summary Figure

Figure 1: ECG of the patient at presentation, showing Sinus rhythm with LBBB. QRS duration is 150 msec, q waves are absent in I, V5 & V6. There is a notch in upslope of V6 (Chapman's sign). There is slurring of upslope of S wave in V3 & notching in the upslope of S wave in V4 (Cabrera's sign)
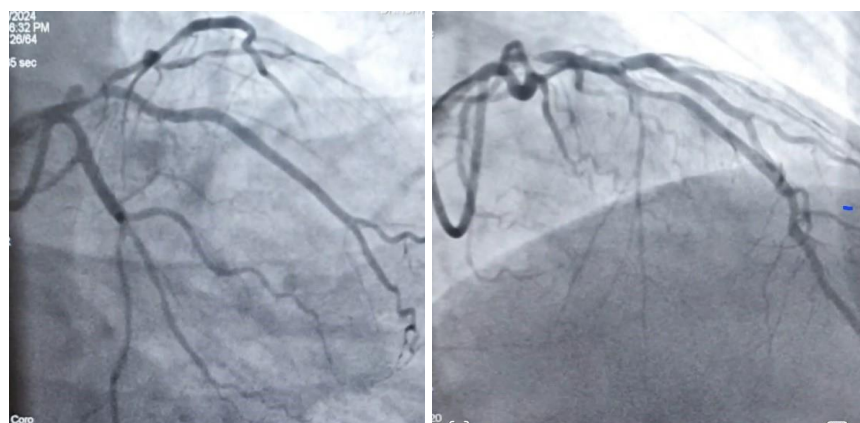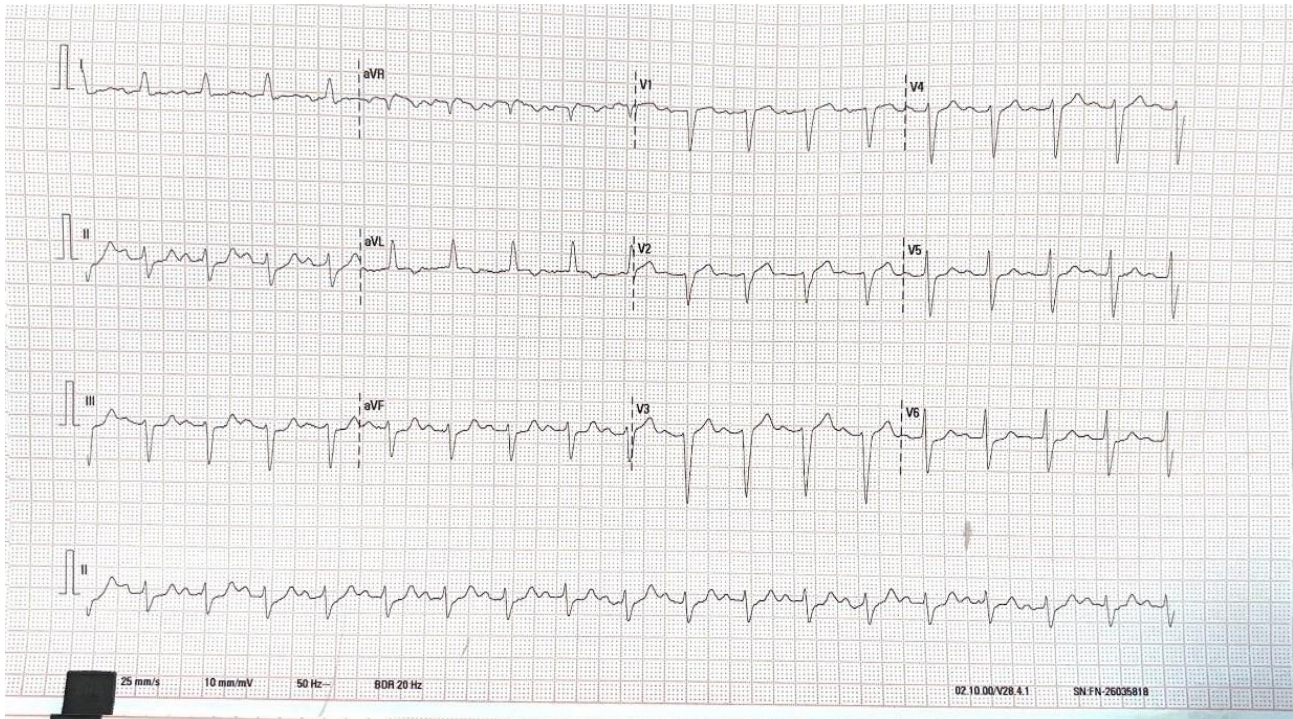

Figure 2: AP caudal view showing around 50% disease in left main with 90% lesion in proximal LAD. 60-70% disease is noted in mid LAD as well. LCX has mild ostioproximal plaquing
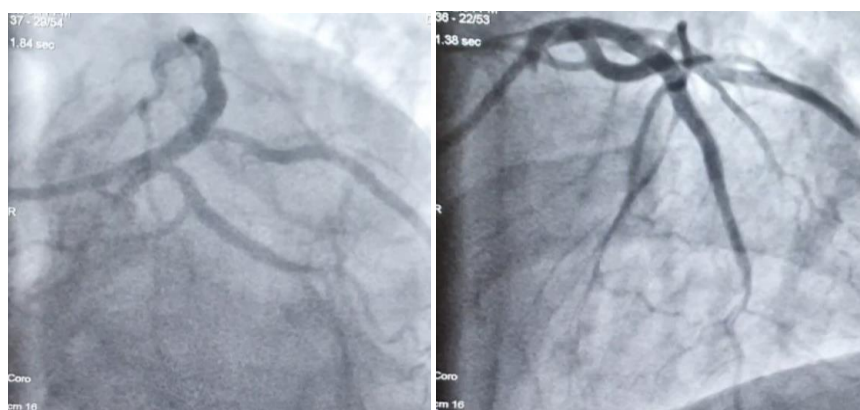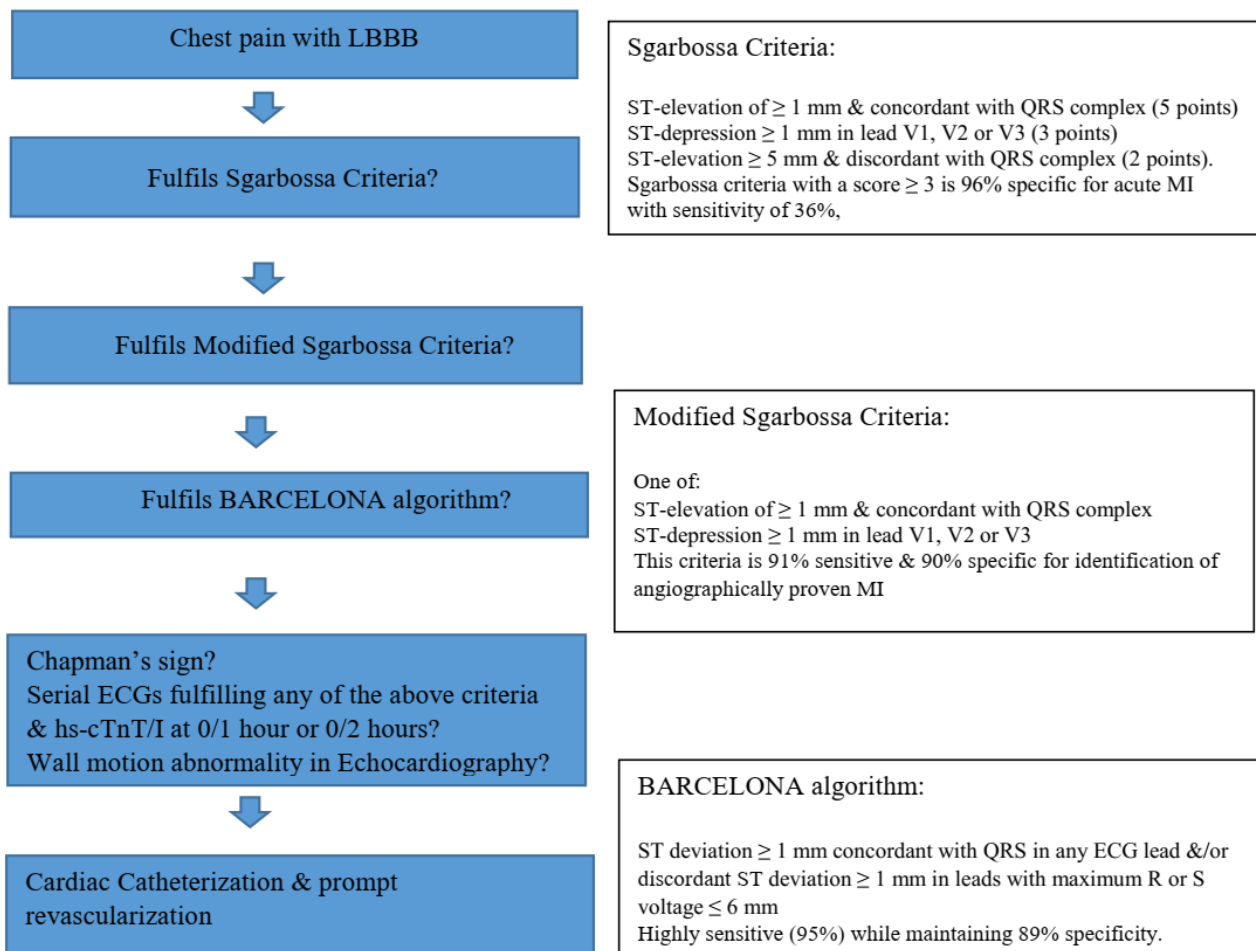

Figure 3: Post PCI images showing nice final angiographic result

Figure 4: Immediate post PCI ECG showing resolution of LBBB, QRS has narrowed to around 100 msec. Cabrera's & Chapman's sign are no longer present

Figure 5: Showing our suggested approach to acute chest pain with new onset or presumably new onset LBBB

DISCUSSION

Our case emphasizes that comprehensive ECG analysis is paramount in patients with chest pain & new or presumably new onset LBBB. Following one single diagnostic criterion may miss the diagnosis in these patients which could potentially lead to delay in revascularization & poor outcomes.

Electrocardiographic diagnosis of evolving acute myocardial infarction in presence of LBBB was studied by GUSTO-1 investigators & proposed Sgarbossa criteria which has been described above in the summary figure (Figure 5). Sgarbossa criteria with a score ≥ 3 is 96% specific for acute MI & sensitivity of 36%, meaning that presence of the criteria is informative but its absence does not exclude acute MI [4]. Smith *et al*., proposed modified Sgarbossa criteria described above (Figure 5). This modification improved the sensitivity of Sgarbossa criteria to 91% for identification of angiographically proven MI but decreased the specificity from 98 to 90% [5]. Further Andrea Di Marco *et al*., worked more on it & proposed BARCELONA algorithm (Figure 5) which was shown to be highly sensitive (95%) while maintaining 89% specificity [6]. Cabrera's sign refers to notching in the first 40 msec in the ascending portion of the S wave in lead V3 or V4. It has poor sensitivity but is highly specific for the diagnosis of an old MI. Chapman's sign is used to diagnose acute MI in LBBB & includes notching in the upslope of R wave in lead I, avL or V6. It also has low sensitivity but high specificity.

Our patient was not fulfilling Sgarbossa & modified Sgarbossa criteria. However it was fulfilling BARCELONA algorithm as there was 1 mm & 2 mm concordant ST deviation in V4 & V5 respectively. Chapman's sign was present as there was notching in the upslope of R wave in lead V6. Cabrera's sign although originally described for old MI was also present as there was notching in the ascending portion of S wave in lead V4. Echocardiography in our patient showed hypokinetic LAD territory with LVEF of 25%. Coronary angiography showed left main & ostioproximal LAD disease as described above. PCI led to immediate resolution of LBBB in the post PCI ECG.

To conclude any patient of new onset or presumably new onset LBBB who presents with chest pain should be evaluated for acute coronary syndrome. One diagnostic criterion may not be enough. ECG as an investigation has several limitations & Sgarbossa criteria has low sensitivity yet is the most commonly used criterion. Patients not fulfilling Sgarbossa criteria should be screened by modified Sgarbossa criteria & BARCELONA algorithm to increase the sensitivity. Cardiac markers may be negative initially, hence serial evaluation should be done. Further these patients can present with wall motion abnormality with proximal LAD lesion on coronary angiography. Revascularization will lead to immediate resolution of LBBB & narrowing of QRS complex.

Learning points
- Sgarbossa Criteria has low sensitivity for diagnosing acute MI in presence of LBBB.
- Combining Sgarbossa criteria with modified Sgarbossa Criteria & BARCELONA algorithm has improved sensitivity & specificity for diagnosis of acute MI in LBBB
- Revascularization leads to immediate symptom relief & resolution of LBBB

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