Extensive transmural anterior myocardial infarction (V1 to V6 + DI and aVL) complicate with Complete RBBB.

**Treatment:** Streptokinase intravenously within 4 hours 1,500,000 IU within 60 min.
Name: FSS  Sex: M  Age: 53yo.  Race: Caucasian
Weight: 83Kg  Height: 1,68m  chest pain 3 hours onset
Date: 11/02/2008  Time: 5:50PM

R = 15mm

SIGNIFICATIVE ST-SEGMENT ELEVATION: 8mm

VAT: VERY PROLONGATED 120ms (NORMAL: <70ms)

QR PATTERN

ANTERIOR MYOCARDIAL INFARCTION COMPLICATED WITH COMPLETE RBBB

VAT: VENTRICULAR ACTIVATION TIME
POSIBLE CAUSES OF QR/qR PATTERN IN RIGHT PRECORDIAL LEADS

1) Severe Right Ventricular Enlargement¹ (Supra-systemic Intraventricular pressure inside right ventricle)
2) Right Atrial Enlargement: qR pattern in V₁ may be an indirect sign of RAE
3) Complete RBBB complicated with anterior Myocardial Infarction²;³.
4) Ebstein's anomaly: bizarre and low voltage RBBB with initial q wave⁴.

References
2) Sodi-Pallares D, Bisteni A, Herrmann GR. Some views on the significance of qR and QR type complexes in right precordial leads in the absence of myocardial infarction.
POSSIBLE CAUSES OF QR/qR PATTERN IN RIGHT PRECordial LEADS

1) Congenitally Corrected Transposition: Secondary to inversion of septan activation, RAE, by progressive tricuspid regurgitation that occurs with age and associated with deterioration of RV function.\(^5,6\)

2) Endomiocardiofibrosis\(^7\)

3) Anterior MI or ischemia / injury associated with LSFB. S-T elevation and increase in R-wave voltage “giant R waves” also displayed concomitant shift of the frontal QRS axis toward the locus of injury.\(^8,9,10,11,12,13,14,15,16\)

References
ECG 18 hours later: Thrombolytic therapy without success. Extensive transmural anterior myocardial infarction (V₁ to V₆ + DI and aVL.). Low QRS voltage on frontal plane. Absence of complete RBBB pattern or other dromotropic disorder.
ECG 10 days later: Thrombolytic therapy. Extensive transmural anterior myocardial infarction. Low QRS voltage on frontal plane.
Name: FSS  
Sex: M  
Age: 53yo.  
Race: Caucasian  
Weight: 83Kg  
Height: 1,68m  
Date: 16/04/2008  
Time: 08:16

Medications in use: Carvedilol 25mg 2 times/day + Enalapril 20mg + Furosemide 40mg + Spironolactone 25mg + Sinvastatin 20mg + Aspirin 100mg.

ECG diagnosis Sinus rhythm, HR: 81bpm, P axis +60º, P wave: duration 120ms, prominent negative final component in lead V₄: Left Atrial Enlargement (LAE).
PR interval: Normal 181ms.
QRS axis in-150º, (right axis deviation), QRSd: 129ms, low voltage in frontal leads, old inferior myocardial infarction (significant Q-waves in DII, DIII and aVF), extensive anterior myocardial infarct associated with complete RBBB? (qR pattern from V₁ to V₃), QTc: 491ms.
Prominent Anterior Forces (PAF): R waves with great voltage and sharp-pointed in V₂, progressive decrease of R wave voltage from V₄ to V₆, absence of initial q wave in V₅-V₆: Left Septal Fascicular Block (LSFB).
ECG/VCG FRONTAL PLANE CORRELATION

- Old inferior infarction (significant Q-waves in DII, DIII e aVF)
- Low voltage on frontal plane: 6 frontal leads <5mV
- Complete RBBB
- QRS axis near -150°
- Perpendicular to DIII lead
- LAE
ECG/VCG HORIZONTAL PLANE CORRELATION

INITIAL VECTORS DIRECTED TO BACK AND WITH SLOW INSCRIPTION

ASSAULT AREA

QRSd 129ms

BIATRIAL ENLARGEMENT

FINAL FORCES WITHOUT END CONDUCTION DELAY!!!

PSEUDO CRBBB

LEFT ATRIAL ENLARGEMENT

QR

PSEUDO -COMPLETE RBBB

+ EXTENSIVE ANTERIOR MYOCARDIAL INFARCTION

PROEMINENT ANTERIOR FORCES:
LSFB
R waves with great voltage and sharp-pointed in $V_2$ (PAF)
Intrinsicoid deflection in $V_2 > 50\%$ of total QRSd and final forces without delay: Pseudo Complete RBBB
Progressive decrease of R wave voltage from $V_4$ to $V_6$
Absence of initial q wave in $V_5$-$V_6$.: Left Septal Fascicular Block.
RIGHT SAGITTAL PLANE ECG/VCG CORRELATION

Old inferior infarction: significant Q-waves in aVF and QRS loop with superior Displace.

PAF: Prominent Anterior Forces

INITIAL VECTORS DIRECTED TO BACK AND WITH SLOW INSCRIPTION: ANTERIOR INFACTION.

R WAVES WITH GREAT VOLTAGE AND SHARP-POINTED IN V2

FINAL QRS FORCES WITHOUT SIGNIFICATIVE END CONDUCTION DELAY: PSEUDO RBBB

LSFB

QR

P

LAE

PAF

R

P

LAE

LSFB

R

P

LAE

LSFB

R

P

LAE

LSFB
FINAL CONCLUSIONS

1) BIATRIAL ENLARGEMENT: ONLY VCG
2) EXTENSIVE ANTERIOR MYOCARDIAL INFARCTION
3) OLD INFERIOR MYOCARDIAL INFARCTION
4) PAF: SECONDARY TO LSFB WITHOUT COMPLETE RBBB: ONLY VCG
5) ABSENCE OF COMPLETE RBBB: ONLY VCG

COMMENTARIES: IN THIS CASE VCG IS SUPERIOR TO ECG FOR THE APPROPRIATE DIAGNOSIS.

THEORICAL EXPLANATIONS IN NEXT SLIDE
THEORICAL EXPLANATIONS

• The coexisting RBBB and MI are individually recognizable in the VCG and ECG because the electrical effects of two conditions appear at different times in the QRS interval. The vector loop of RBBB, therefore, can be divided into an initial portion representing the activation of the left ventricle (LV) and a terminal portion representing activation the right ventricle (RV). Since most infarctions involve the LV and produce changes during the initial portion of the QRS complex/loop, their recognition is not hampered (with exception of lateral infarction: In the near past named strictly dorsal).

• In truly complete RBBB associated with anterior MI the terminal late forces of the horizontal plane are directed to the right and anteriorly with characteristic terminal “finger like” appendage of the QRS loop, whose average orientation is along the +120° (between +140° to +100°) axis of the horizontal reference frame which is writing slowly: A CONDUCTION DELAY REPRESENTED BY THE CLOSE SPACING OF THE TIME DASHES IN THE TERMINAL PART OF THE QRS LOOP. This late final forces are correspondent to the activation of basal wall of RV and/or septum.
VCG CRITERIA OF UNCOMPLICATED COMPLETE RBBB

QRS LOOP IN THE HP FORMED BY: initial vector, efferent branch, afferent branch, main body and terminal appendage with delay.
The terminal late forces of the horizontal plane are directed to the right and anteriorly with characteristic terminal “finger like” appendage of the QRS loop,
UNCOMPLICATED COMPLETE RBBB VENTRICULAR ACTIVATION

I: Middle third of left septal surface;
II: LV free wall from endo to epicardium;
III: Slow trans-septal vectors;
IV: RV outflow tract (RVOT).
COMPLETE RBBB COMPLICATED WITH EXTENSIVE ANTERIOR MYOCARDIAL INFARCTION