A change in QRS morphology in right ventricular apical pacing: is it a red flag sign?

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ABSTRACT
A 74-year-old man with symptomatic complete heart block underwent right ventricular apical permanent pacemaker implantation. The postoperative ECG showed, as expected, completely paced left bundle branch block QRS morphology. However, at the 2-month follow-up examination, his ECG showed paced right bundle branch block (RBBB) QRS morphology, although the patient was asymptomatic. On evaluation, pacemaker functioning was normal with no evidence of lead displacement. This case report highlights that RBBB morphology of paced QRS complex is not always a red flag sign.

INTRODUCTION
Lead perforation is one of the feared complications after transvenous permanent pacemaker implantation, which can occur during or after the procedure. Usually, a left bundle branch block (LBBB) pattern on a surface 12-lead ECG recording is observed after right ventricular (RV) apical pacing. The presence of a right bundle branch block (RBBB) pattern raises the suspicion of lead perforation. However, it can be a normal finding in RV apical pacing. Here, we report a case of an RBBB pattern on ECG after RV apical permanent pacemaker implantation, which raised a red flag, but was later found to be a needless concern.

CASE DESCRIPTION
A 74-year-old man with symptomatic broad complex complete heart block with baseline RBBB QRS morphology underwent successful RV apical permanent pacemaker implantation (VVI mode, bipolar lead; St Jude Medical) with an uneventful postoperative period. A 12-lead ECG showed full capture with the expected LBBB QRS morphology (figure 1A). The ventricular capture threshold was 0.5 V and lead impedance was 674Ω. At routine follow-up at 2 months, ECG showed all captured beats but with RBBB QRS morphology (figure 1B). The QRS axis in the frontal plane was −80°. The patient was stable and had no presyncopal or syncopal events. He was admitted for evaluation and pacemaker interrogation, as lead perforation and displacement was strongly suspected. His haematological and biochemical evaluations were normal.

CONCLUSION
We report a case of RV apical pacing where the QRS morphology shifted from RBBB to LBBB raising the suspicion of lead perforation. However, the frontal plane QRS axis of −80° suggested correct RV pacing. This was also supported by an appropriate pacemaker lead position on chest fluoroscopy.
X-ray, echocardiography and fluoroscopy with no significant changes in pacemaker parameters on pacemaker interrogation. Careful analysis of the surface ECG may obviate unnecessary hospitalisation.

Figure 1  (A) Postoperative 12-lead ECG showing full capture with the expected left bundle branch block QRS morphology. (B) Right bundle branch block QRS morphology with QRS axis on the frontal plane of around −80°, V1 and V2 showing R and Rs complex, respectively.

Figure 2  Chest X-ray posterior–anterior view (A) and left lateral view (B) taken on the third postoperative day showing the pacemaker lead at the right ventricular (RV) apex. Chest X-ray posterior–anterior view (C) and left lateral view (D) taken at the 2-month follow-up showing the appropriate RV apical position of the pacemaker lead and no evidence of lead displacement.

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