A case of permanent pace maker implantation - woes during and after...

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Introduction: Patient was a six year old girl who had a small ASD and a small VSD. Both were kept for medical follow up from infancy. During the course of follow up, she was found to have complete heart block. (See Figure 1). She had one episode of syncope and her echo showed mild LV dysfunction. She was planned for a permanent pacemaker at our hospital. We opted for a rate responsive single chamber pace maker (considering small kid) - a VVI-R pacemaker.

Methods: Patient being a kid, we programmed the pulse generator to 80 bpm in VVI-R mode prior to implantation of pace maker. Lead was screwed in at the RV apical septum and threshold of lead was being checked. The trouble started then. The R wave and impedance were good and EGM showed more than 50% injury. But the lead was not capturing 1:1 at even high out puts. It showed 2:1 capture. (See Figure 2) We were planning to change lead position to another location assuming threshold was not good at the implanted site. At this point we could make out that, apart from CHB, there was significant QT prolongation in the basal ECG. We realised that alternate pacing beats were not captured because they fell on the refractory period of the myocardium due to prolonged QT interval.

Result: We started pacing at a slower 70 bpm rate. (See Figure 3). At 70 bpm, same lead position showed consistent 1:1 capture. Threshold at the same lead position was 0.8V and hence we did not have to change the lead position. The issues did not settle there. We had programmed the pacemaker pulse generator to 80 bpm in VVI-R mode prior to implantation. This pre-programmed pulse generator was connected and at 80 bpm per minute capture was inconsistent. And as the child woke up from general anaesthesia, rate responsive pacemaker was increasing heart rate to 100 bpm, further affecting the capture. So we had to re-programme the pace maker to 70 bpm VVI mode. (Rate responsiveness was switched off as well).

Conclusion: The QT prolongation in this kid is due to long duration of bradycardia and this is potentially reversible with correction of heart rate. We observed the child for 3 more days in ICU. Beta blockers were started to reduce the QT dispersion. See the surface ECG on the next day of implantation (Figure 4) and pre discharge interrogation of pace maker. (Figure 5) We could observe that the myocardium which was not capturing 1:1 at 100 bpm 3 days back, once QT got corrected, capturing at 120 bpm now. We programmed pacemaker again to VVI-R at 80 bpm at discharge. Our plan with beta blocker was to continue it for 1 more month.