

Reversal of Acute Pacing-Induced Cardiomyopathy by Cardiac Resynchronization Therapy in Setting of Post-TAVR Heart Block

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Introduction

- Transcatheter aortic valve implantation (TAVR) has emerged as a viable alternative to surgical aortic valve replacement.
- Due to the anatomical relationship to atrial-ventricular (AV) node and valve implantation site, high grade AV block may happen necessitating pacemaker implantation.
- Pacing-induced cardiomyopathy may result from sustained, chronic right ventricular (RV) pacing causing electrical dyssynchrony and redistribution of myocardial strain, with subsequent development of left ventricular (LV) systolic dysfunction.
- Time to onset of heart failure is typically months to years, with rare instances in a matter of days.

Case Presentation

- A 70-year-old woman with history of severe symptomatic aortic stenosis, pulmonary hypertension presented for elective TAVR. Baseline left ventricular ejection fraction (LVEF) was 60-64%. Pre-operative QRS duration was 170 ms (Figure 1). The procedure was complicated by complete atrial-ventricular block for which a dual chamber pacemaker was implanted emergently.
- A transthoracic echocardiogram (TTE) performed post-operatively day 1 showed dramatic interval decrease in LVEF from 60-64% to 25-29% with significantly increased end diastolic volume (EDV) and end systolic volume (ESV) suggesting LV dilation (Table 1 and Figure B).
- Investigations for potential causes were unrevealing for obvious culprits, including absence of prosthesis dysfunction, unchanged patent coronary anatomy on repeat invasive coronary angiogram.
- After exclusion of reversible causes, the patient underwent cardiac resynchronization therapy (CRT) with a bi-ventricular implantable cardioverter-defibrillator (ICD) on post-operative day 10.

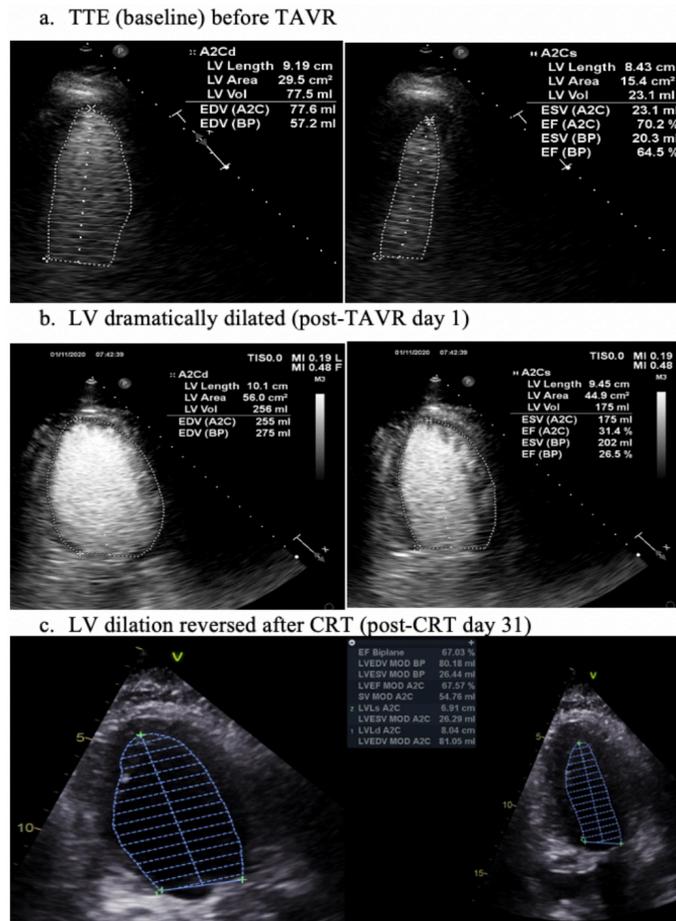


Fig A - TTE (baseline) before TAVR
B - LV dramatically dilated (post -TAVR day 1)
C - LV dilation reversed after CRT (post-CRT day 3)

- Her symptoms improved and patient was discharged. At one-month follow up, updated TTE showed recovered LVEF of 55-60% with reversal of LV dilation (Table 1 and Figure c).
- Electrocardiography (ECG) showed appropriate biventricular pacing (Figure 2). Device interrogation showed 97% bi-ventricular paced.

Conclusion

- Early recognition of cardiomyopathy induced by pacemaker implantation after TAVR allows prompt appropriate therapy that can reverse the cardiomyopathy process.

| TTE Parameters | End-diastolic volume (ml) | End-systolic volume (ml) | LVEF (%) |
|-------------------|---------------------------|--------------------------|----------|
| Pre-TAVR | 57 | 20 | 64.5 |
| Post-TAVR (day 1) | 275 | 202 | 26.5 |
| Post-CRT (day 31) | 80 | 26 | 68 |

Table 1

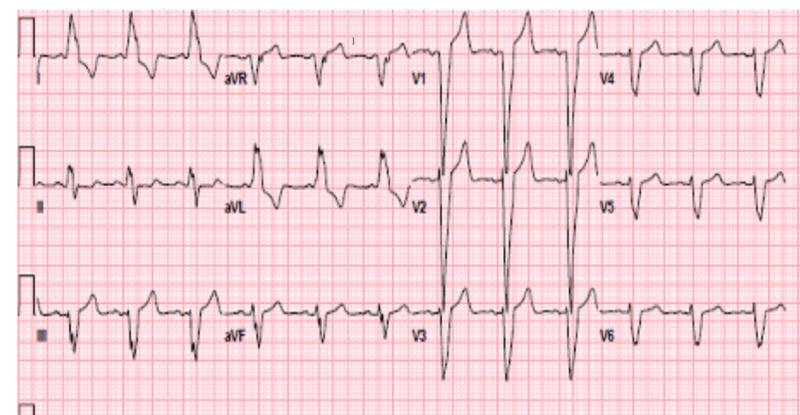


Figure 1. EKG before TAVR with wide QRS duration and underlying LBBB

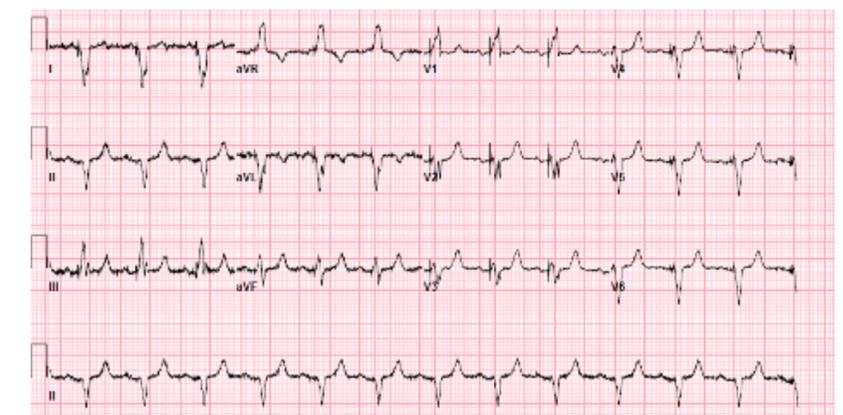


Figure 2. EKG after CRT therapy with shortened QRS duration