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Purpose

- **Trans-venous cardiac pacing** is potentially life-saving.
- It involves **two components**: Obtaining a **central venous access**, and **intra-cardiac placement** of a pacing wire.
- This case study describes our experience with trans-venous catheter placement in a small series of patients who needed emergent temporary cardiac pacing in the Emergency Department (ED).
- We attempt to answer the **pressing question**: Does a trained Emergency Physician (EP) in a structured ED with the skills to perform a trans-venous cardiac pacing make a difference?

Literature Review

Literature suggests **reduced mortality and improved prognosis** in patients with early re-establishment of normal hemodynamics that are acutely compromised in this setting.^{1,2}

Why trans-venous pacing (TVP) in the ED?³

- A bridge to permanent cardiac pacing.
- Time-sensitive.
- Restores effective cardiac depolarization and myocardial contraction.
- Generates adequate cardiac output.
- Avoids hypo-perfusion to vital organs until definitive therapy.

Indications for TVP in the ED are:

1. Profound symptomatology
2. Shock
3. High degree AV nodal block
4. Sick sinus syndrome

The accepted consideration of cardiac pacing in an emergent situation lies with **trans-cutaneous pacing** (TCP). However, the following challenges persist with TCP^{4,5}:

- 40- 50% ventricular capture rate
- Patients are often diaphoretic
- Most sedatives cause additional hypotension
- Might need airway protection

Where do Tintinalli, and Rosen stand?

- *Tintinalli's Emergency Medicine* describes TVP as time consuming.
- *Rosen's Emergency Medicine* describes both TCP and TVP as emergent pacing options, but doesn't weigh in on the timing.
- Recent studies show average time for TVP insertion in ED to be between 15-45 minutes depending on the number of complexities.⁶

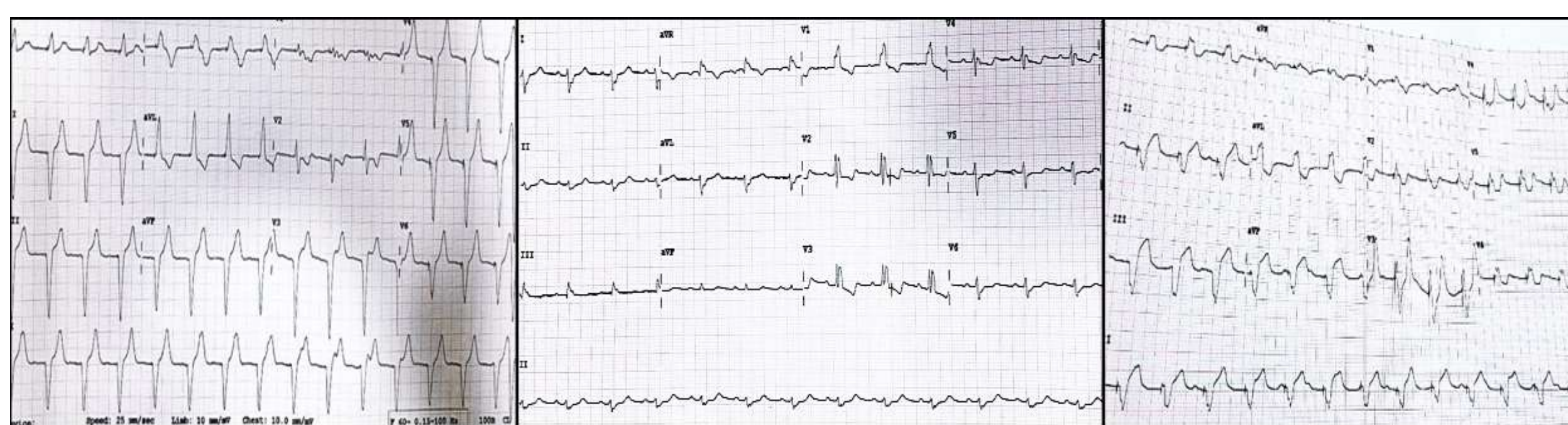


Figure 2: Adequate ventricular pacing noted in 3 out of 5 patients; in one there was failure-to-capture, whereas in another, the post-capture ECG was lost.

Case Study

- Five patients with a mean age of 63 years (range 47-71 years) were treated by the same team of trained and certified Emergency Physicians within a six-month period. Presenting symptoms included syncope with associated high degree AV nodal dissociation. 12-channel ECGs were used to identify the degree of heart block (**Fig 1**).
- All patients were treated with transcutaneous pacing followed by temporary transvenous pacing. A standard ultrasound-guided approach was utilized to insert the cordis through the right internal jugular vein, and a sub-xiphoid assisted ultrasound view to guide the tip of the pacing wire into the right ventricle. Ventricular capture was documented by repeating a 12-channel ECG (**Fig 2**).

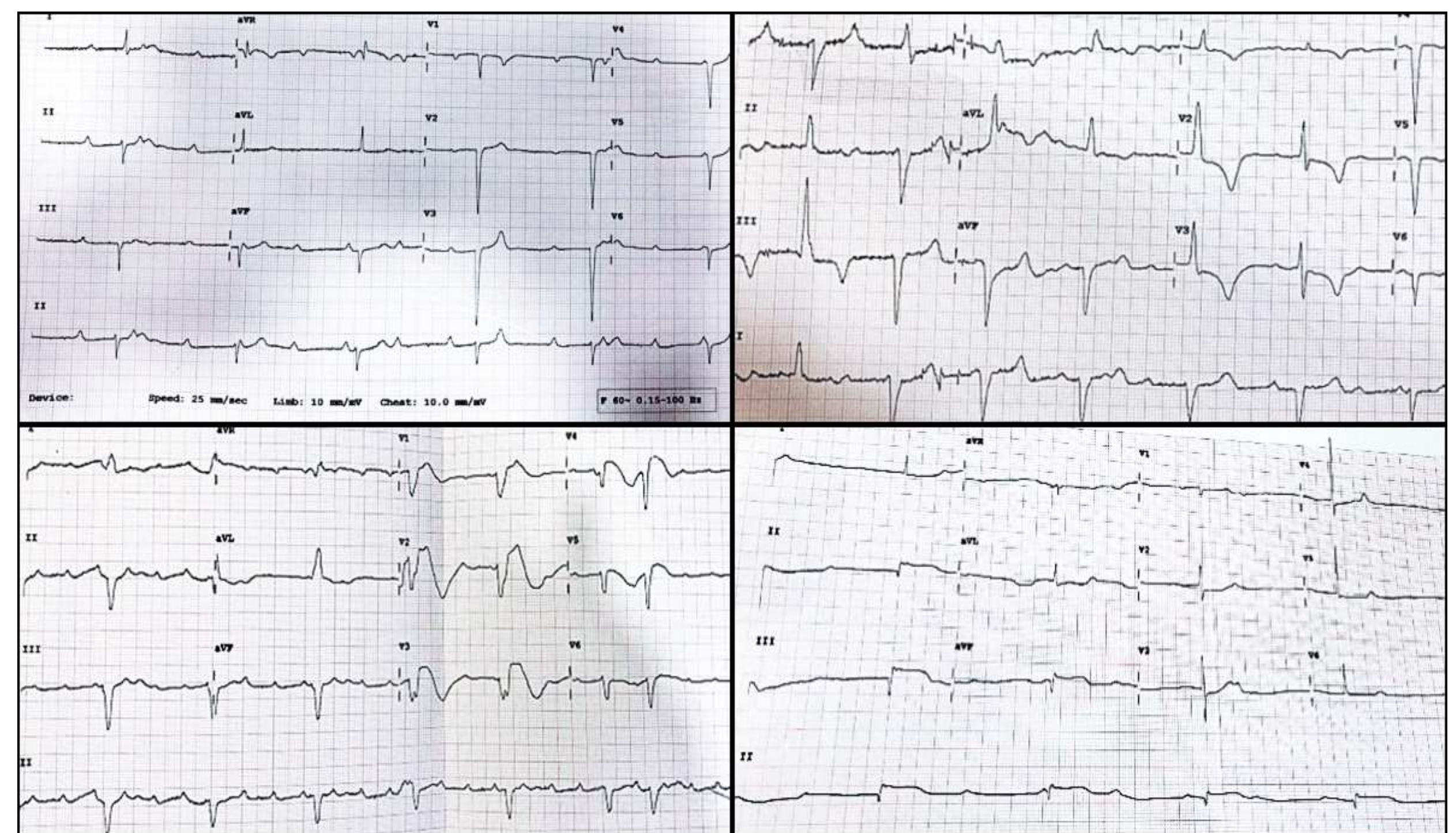


Figure 1: 12-channel ECGs showing high degree AV nodal dissociation.

Analysis & Discussion

- All patients were adequately paced, except one in whom failure-to-capture was noted.
- There were no procedure related complications.
- All patients were shifted to Cath Lab /ICU with hemodynamic stability and secure airway.
- Etiologies were heterogeneous like acute myocardial infarction, electrolyte imbalance, and degenerative sinus node dysfunction.
- 3 out of 5 patients showed good outcome, and were discharged from the hospital.
- 2 of them underwent permanent pacemaker insertion (PPI).
- In-hospital mortality:
 - Mortality 1 – PPI withheld in view of financial constraints.
 - Mortality 2 – Extensive trans-mural infarction with high degree AV nodal block with ill-sustained ventricular tachycardia.

Conclusion

- Transvenous pacing should find a place in the armamentarium of the Emergency Physician (EP).
- Most EPs in India often have limited exposure to transvenous pacing in their careers; however, it is well within their scope of practice.
- With appropriate training, EPs can be proficient in the skill of prompt recognition of pacing indications, and in providing stable, effective and rapid TVP.
- TVP can appear particularly valuable in hospitals where Cath Labs are not available.
- Our attempt is to bridge the interdepartmental gap for successful use of this critical procedure in the ED.

Contact

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