ECG variants of ‘outflow tract’ PVC/VT

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RVOT PVCs:

RVOT VT:
Sustained MMVT
Characteristics of outflow tract PVC/VT:

1. Presentation – PVCs, NSVT or sustained VT
2. Exercise or emotion triggers the OT PVC/VT
3. ECG – inferior axis, often LBBB like
4. Young, structurally normal heart
5. Triggered activity – delayed after depolarizations
6. Adenosine, βblockers or Ca^{++} channel blockers
7. Benign prognosis except
   a. Tachycardiomyopathy
   b. PVC triggered PMVT
8. RF ablation is curative
Outflow tract PVC/VT

- RVOT (70%)
- LVOT (10-15%)
- Supra-valvar
  - Pulmonary cusp
  - Aortic cusp: left or right
- Tricuspid annulus: Para-Hisian
- Mitral annulus: LV summit
Outflow tract anatomy

[Diagram a] Ao, PT, LAA, RA, RV, RVOT, LV

[Diagram b] PT, LAA, L, N, R, RAA, MV, TV
Outflow tract PVC/VT

Diagram showing:
- RVOT
- LCC
- RCC
- NCC
- Mitral annulus
- Tricuspid annulus
ECG localization of OT PVC/VT

- II, III & avF – strongly positive
- avL & avR – negative
- I – negative to positive from left side RVOT to right of RVOT
- V₁ – predominantly negative & ‘r’ wave becomes dominant as we go from RVOT to LVOT
- Precordial transition – RVOT from LVOT
- QRS width (narrower QRS – septal location)
- **Anterior RVOT (1):** a typical LBBB morphology in lead V1
- (2), (3) : between the anterior right coronary cusp (RCC) of the aortic valve and the posterior RVOT. A small but variable R wave is seen in lead V1.
- (4) : more posteriorly in the region of the left coronary cusp (LCC)/aortic mitral continuity (AMC) /noncoronary cusp (NCC) characterized with a distinct R wave in V1.
- Even more posterior and leftward origin (the **posterior mitral annulus**): RBBB morphology.
Leads II, III, and aVF

- All outflow tract arrhythmias show a **positive** deflection in leads II, III, aVF.
- The ratio of positivity (R-wave amplitude) : a clue to the site of origin.
- **Suprapulmonary** valve arrhythmia: a **taller R wave** in lead III than in II.
  (the anatomic leftward location of the PV and lead III being an inferior and rightward lead)
Leads aVR and aVL (Both leads are superior leads.)

- **Outflow tract VT** (right or left) in a superior location: negative (QS complexes) deflections in aVL and aVR
- **Peri-His bundle region** in the RVOT (most rightward and inferior portion): lead aVL (a left-sided lead) becomes isoelectric or slightly positive, lead aVR (a right-sided lead) remains negative
- **Supraventricular VT** (anatomic location of the site in the left side of the body): greater amplitude negatively in the aVL compared to aVR
Aorta
Differential diagnosis of OT PVC/VT

1. ARVC
2. Cardiac Sarcoidosis
3. Myocarditis
4. RV papillary muscle / moderator band
5. BBRVT
What defines idiopathic nature of PVC/VT?

1. Normal echo
2. No family h/o sudden cardiac death
3. Benign outcomes
4. RV VT r/o ARVC – Cardiac MR, RV angio
5. Septal or LV VT – r/o Sarcoid & TB (Cardiac MR, CT chest & LN biopsy)