Ventricular Tachycardia

General

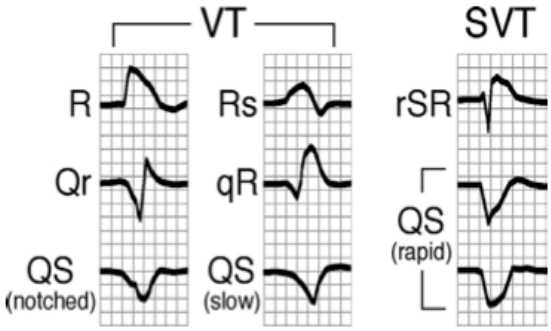
Usually due to re-entrant circuits or increased automaticity.

Monomorphic

Causes: Mostly structural/IHD, but also in HOCM, MVP, drug toxicity (dig, Class I, sympathomimetics)

Features:

- Historical risk factors: Age>35, active angina, previous MI
- Clinical: Often ↓BP, JVP canon a waves, variable S1 intensity
- ECG criteria: ≥3 consecutive ventricular beats at >100bpm (usually >130)
- Differentiation from SVT + aberrant conduction (BBB) [often difficult].
  - QRS>140ms (100ms in children)
  - AV dissociation (P and QRS complexes at different rates)
  - Absence of typical RBBB or LBBB morphology
  - Fusion beats (transmitted atrial beat superimposed on ventricular beat)
  - Capture beats (isolated transmitted atrial complex).
  - Concordance of chest lead QRS complexes (all pos [R] or all neg [QS] complexes)
  - Axis constant – often >40° different from SR. Typically -90 to -180° ("northwest")
  - Brugada's sign – time from the onset of R wave to nadir of S-wave is >100ms
  - Josephson's sign – Notching near the nadir of the descending limb of the S-wave
  - $V_{1\text{-}2}$ RSr' complexes with a taller left rabbit ear (in RBBB the right ear is taller).
  - No change with adenosine (but not 100% reliable)
- Vereckei Criteria – **aVR** only (VT if any yes answer):
  - Is there an initial R wave?
  - Is there a r or q wave > 40 msec (1 small box width)?
  - Is there a notch on the descending limb of a negative QRS complex?
  - Measure the voltage change in the first (v_i) and last 40 msec (v_t). Is v_i / v_t < 1?



Mx: If in doubt treat as VT (more common and more serious)

If pulseless → Rx as for VF cardiac arrest

If sev CP, ↓BP or APO+ → synch DC cardioversion (100J mono or 50J biphasic) 90% success.

Pharmacological ± cardioversion if unsuccessful

- **Procainamide** 25-50mg/min IV until VT ends, ↓BP, ↑QRS>50%, or 17mg/kg max reached. 75% success. Maint. dose 1-4mg/min. NB: -ve ionotrope so avoid in ACS/CCF & if ↑QTc. OR
- **Sotalol** 1.5mg/kg IV over 5mins if BP & QTc ok. 65% success. OR
- **Amiodarone** 150mg IV over 5-10 min. 30% success. Can repeat.Then 1mg/min for 6h OR
- **Lignocaine** 100mg IV 20% success but least toxic. 30% success if get 2nd bolus 50mg IV
- Overdrive pacing

Polymorphic

- Beat to beat QRS morphology variations.

Torsade de pointes

– Subclass of polymorphic VT where ↑QTc (usually>500ms), variable axis. More common in F>M, CCF, bradycardia, digoxin.

Causes of ↑QTc: Electrolytes (↓Mg^{2+}, ↓Ca^{2+}, ↓K^{+}), Heart disease (CM, CCF, IHD, 3° HB, HT), Drugs (Na channel blockers [e.g. phenothiazines, carbamazepine, class I & III antiarrhythmics], Li^{+}, OP, quinolones, terfenadine, methadone,ondansetron[if ↓Mg^{2+} or ↓K^{+}]), Congenital (Romano-Ward [A.Dom], Lange-Jervil-Nielsen [A.Rec, deafness]), ↑ICP (e.g. SAH), Hypothermia, ACS

Mx: DC cardioversion if unstable, keep K^{+} 4.5-5.0, **$MgSO_4$** 2g bolus, Ca^{2+} if hypoCa, ↑HR (from Rautaharju's formula: QT = 656/[1+(HR/100)]) with overdrive pacing or **isoprenaline** (acquired ↑QTc only), **BB** (cong ↑QTc only). Also **atropine** if OP toxic, **sodium bicarbonate** for TCA

Fascicular Tachycardia

– rare. Orig. from post. fascicle. Mimics SVT with aberrant conduction QRS 110-140ms, RBBB+LAD(post.fasc) or +RAD (ant.fasc). Responds to CCB not adenosine.