Supraventricular Tachycardia

Terminology

SVT includes all tachycardias involving the atria (due to either re-entrancy or automaticity). Atrial flutter, atrial tachycardia, MAT, AF, AV node re-entrant tachycardia & AV re-entrant tachycardia. *Atrial flutter, atrial tachycardia & MAT described in Arrhythmias & AF in Atrial Fibrillation.*

AV node re-entrant tachycardia (AVNRT)

- 60% of SVTs
- Micro re-entrant circuit in AV node.

Management

- ABCs, O_2,
- DC cardiovert if unstable, or stable and failed pharmacological options. Otherwise:
- Vagal manoeuvres
- Pharmacological options:
  - **Adenosine**: 6mg (can repeat at 12mg) rapid bolus IV. **SE:** bronchospasm (so avoid in asthma). Theophylline blocks it. **CI:** post cardiac transplant (→cardiac arrest).
  - **Verapamil**: 1mg IV q5 min (don't use β-blocker concurrently) to 15mg
  - β-blockers, **amiodarone** and **flecainide** may also be used
- Prophylaxis: β-blockers, **sotalol**, **verapamil**, or **digoxin**

AV re-entrant tachycardia (AVRT)

- 30% of SVTs
- Pre-excitation syndrome e.g. WPW syndrome, LGL syndrome & Mahaim fibre pathway.
- Conducting accessory pathways bypassing Atria-AV node-His bundle-Perkinje fibres.

Wolff-Parkinson-White Syndrome

- Bundle of Kent – accessory pathway between an atrium & ventricle, by-passing AV node
- ~1:1000 pop (50% symptomatic), M>F. Assoc with Ebstein's/Tricuspid anomalies, HOCM.
- Conduction down accessory pathway may be anterograde, retrograde or both.
- ECG:
  - Normal i.e. concealed WPW, if only retrograde conduction possible via accessory pathway [or if conduction is currently faster through AV node (low vagal tone)]
  - Else: δ wave (faster antegrade accessory conduction but slower depolarisation of ventricular myocardium compared to AV node-His → early but less steep init part of QRS), PR<120ms. Slightly ↑QRS (>110ms), discordant ST & T changes. May show pseudo-Q or -infarction patterns (neg δ wave in inf/ant leads, prom R wave in V_{1-3})
- Types: Type A or C - pos δ wave & R>S in V_1. Type B has neg δ wave or R<S in V_{1-2}.
- Tachyarrhythmias (HR 200-300) may be generated by:
  - Re-entry circuit involving accessory pathway (AVRT) [70-80%]
  - AF or atrial flutter direct conduction to ventricles via accessory pathway, bypassing AV node (WPW+AF) [~20% AF, ~7% flutter]
- When in AVRT, conduction may be:
  - Orthodromic (~90%, anterograde through AVN) is narrow like AVNRT & no δ waves
  - Antidromic (10%, resting ECG likely to show δ waves) usually broad. Could → VF
- When in WPW+AF or WPW + atrial flutter:
  - Irregular (AF) or regular (flutter) antidromic broad complex tachycardia. Risk$^+$ of → VT, VF. QRS complexes change in morphology. Rate may be close to 300bpm.

Lown-Ganong-Levine

- James Pathway connects atria to AV node, His or fascicles.
- Short PR (<120ms), but no δ wave and QRS normal duration.
- Some dispute over existence.

Mahaim fibre pathway

- Right sided pathway connects AV node to ventricles, fascicles to ventricles or atria to fascicles.
- Pathway only allows antegrade conduction.
- ECG may appear normal when not in AVRT as AV node conduction preferred unless high vagal tone.
- δ waves are not generally seen.
- AVRT is always antidromic and usually has LBBB morphology.

Management of AVRT

- ABCs, O_2
- Narrow complex tachycardia (Orthodromic AVRT)
    - As for AVNRT
- Wide complex or irregular tachycardia (Antidromic AVRT, WPW+AF, WPW+flutter)
    - DC cardioversion, starting @ 100J if unstable
    - If stable, still consider DC cardioversion as may be safest option OR
    - Pharmacological options:
        - **Procainamide** 50mg/min IV until reversion or ↓BP, ↑QRS>50%, or 17mg/kg max reached. Would be first line but not available in Australia
        - **Flecainide** 2mg/kg IV over 30min. But **CI** if heart not structurally OK.
        - **Amiodarone** 150mg IV over 5-10mins (can rpt over 20min) then 900mg/24h – **some concern that amiodarone could also accelerate HR or →VF**
        - **Ibutilide** 1mg (0.01mg/kg if <60kg) IV, may rpt.
        - **Avoid adenosine/CCB/BB/digoxin as may → VT or VF**
- Prophylaxis: **sotalol**, **flecainide, amiodarone**
- Electrophysiological studies and radiofrequency ablation