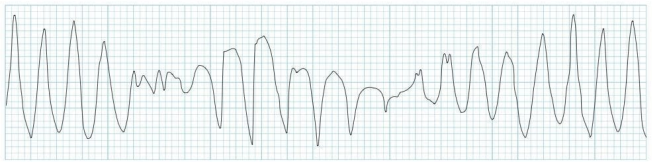
QT interval and Torsades des Pointes (TdP)

Drug-induced TdP is more commonly observed in conjunction with bradycardia. Intravenous magnesium is first line treatment of TdP.

Definitions:

- **QT interval** = start of the QRS complex to end of T wave
- **TdP** = form of polymorphic ventricular tachycardia with a characteristic twisting appearance of QRS complexes



Risk Assessment

Common drugs causing TdP following overdose include:

- Antipsychotics: amisulpride, ziprasidone, haloperidol chlorpromazine
- Sotalol
- Antidepressants: citalopram, escitalopram
- Opioids: methadone, oxycodone, loperamide
- Others: antihistamines, chloroquine, arsenic, quinine, hydroxychloroquine, macrolides, antifungals, quinolones

Risk of TdP is further increased by:

- Bradycardia, ↓[K^+], ↓[Ca^{2+}], ↓[Mg^{2+}]

Measurement of the QT interval

- Do not rely on ECG generated QT/QTc measurement
- QT correction formulae including Bazett's formula can under/over-estimate risk
- QT nomogram where a manually measured QT is plotted against HR should be used.
  - Plot the median QT of 3 limb leads and 3 chest leads against HR on nomogram.
  - QT:HR above nomogram identifies patients at risk of developing TdP

Management of patients at risk of TdP

- Patients should have cardiac monitoring until the QT:HR pair is below the nomogram line
- Correct electrolytes: Ensure [K^+] >4.0mmol/L, [Ca^{2+}] > 2.0mmol/L, [Mg^{2+}] >1.0mmol/L
- There is no evidence that a magnesium infusion prevents TdP in patients with a normal serum magnesium concentration

Administration of sodium bicarbonate is **NOT part of the management of prolonged QT / TdP*

Management of TdP

- All patients should receive 10 mmol of $MgSO_4$ as a slow IV bolus (Paediatric dose: 0.2 mmol/kg)
- If deteriorates to pulseless TdP/VT/VF (cardiac arrest): commence CPR, DC shock as per ACLS guidelines
- Once stable, overdrive pace using an adrenaline/isoprenaline infusion or electrical pacing to achieve heart rate 80 - 100 bpm
- Maintain [K^+], [Ca^{2+}] and [Mg^{2+}] at the upper limit of normal range

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