

Q3 September 2009

Describe the factors that influence the speed of onset of neuromuscular blockade.

Onset is time from injection to onset of maximal single twitch depression. Speed of onset is related to:

- How quickly the dose reaches the neuromuscular junction
- Type of interaction with the receptor
- Margin of safety of the receptors (i.e. percentage of receptors that need to be occupied by drug for blockade to occur - approximately 80-90%)

The factors that influence speed of onset can be drug or patient factors.

Drug factors

1. Rate of injection → faster injection causes faster onset
2. Higher dose causes faster onset
3. Use of priming dose → a small priming dose can partially block NMJ, followed by an intubating dose. This decreases time from intubating dose to intubating conditions.
4. Drug potency → lower potency causes faster onset. Lower potency means larger dose needed, which causes a higher concentration gradient between the plasma and the NMJ; this leads to faster onset.
5. Lower protein binding means more free drug available, leading to faster onset
6. Depolarising block has faster onset than non-depolarising block

Patient factors

1. High cardiac output and muscle blood flow → faster drug delivery to NMJ, therefore faster onset
2. Site of injection - administration into a central vein has faster distribution and therefore speed of onset, than peripheral veins
3. Neuromuscular disorders
4. Muscle group affected → small, rapidly moving muscle groups (e.g. fingers) affected first; trunk/abdominal muscles affected last
5. Burns/Spinal cord injury → increased extra junctional receptors means drug dose binds to these, therefore less drug is available to bind to NMJ receptors