

S44: Muscle Relaxants

Components of Balanced Anesthesia

- Antiemetics: prevent post-op N/V
- Anticholinergics: prevent secretion of fluids
- Short-acting barbiturates: rapidly induce anesthesia
- BZDs: relieve anxiety
- Opioids: relieve pain
- Inhalants, barbiturates, BZDs, etc: maintain anesthesia
- Muscle relaxants: relax muscles

Types of Muscle Relaxants

Neuromuscular blockers	Spasmolytics
<i>Depolarizing</i>	<i>Antispastic</i>
<i>Nondepolarizing</i>	<i>drugs</i>
	<i>Motor nerve</i>
Neuromuscular blockers	<i>blockers</i>
produce muscle paralysis	
required for surgery.	Spasmolytics
	treat muscle
	hyperactivity.

Neuromuscular Junction

1. Arrival of the action potential to the synapse causes an influx of Ca^{2+} and the release of ACh.
2. ACh binds to the nicotinic receptors located on the motor end plate.
3. Binding of ACh to the nicotinic receptors causes the channel to open. Subsequent movement of Na^+ and K^+ is associated with depolarization at the end plate membrane.
4. Next, the adjacent muscle membrane is depolarized and action potential is propagated along the muscle fiber.
5. Muscle contraction is initiated by excitation-contraction coupling.

S44: Muscle Relaxants (cont)

Neuromuscular Blockers

Mechanism of

action:

Depolarizing agents: occupy and activate the nicotinic receptor for a prolonged time, leading to blockade (receptor desensitization)

Nondepolarizing agents: competitive antagonism of ACh at nicotinic receptors; action can be reversed by inhibiting AChE and increasing [ACh]

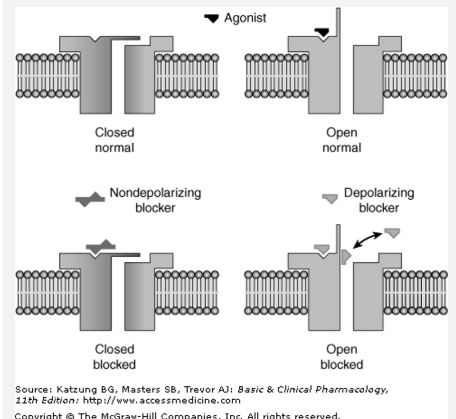
Clinical uses:

- Surgical relaxation
- Tracheal intubation
- Ventilation control
- Treatment of convulsions

Drugs:

- Suxamethonium chloride (succinylcholine)
- Tubocurarine
- Steroid-type
 - Rocuronium (20-60 min)
 - Vecuronium
 - Pipecuronium
 - Pancuronium (120-180 min)
- Tubocurarine-type
 - Atracurium (30-60 min duration)

Neuromuscular Blocking Drugs



Nondepolarizing blockers bind at an allosteric site on the closed receptor. Depolarizing blockers bind to the open receptor and block the channel.