Anesthesia for MMC repair

A tightrope walk

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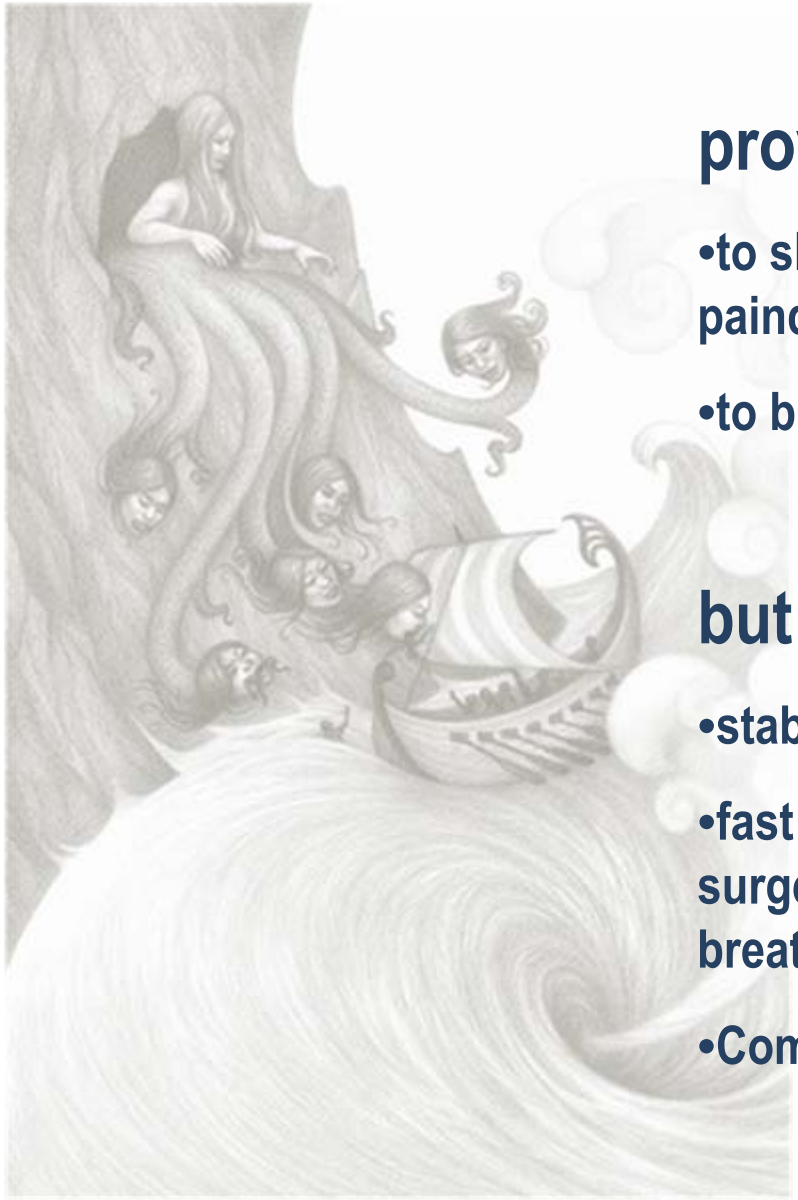
The need to



provide a very deep anesthesia

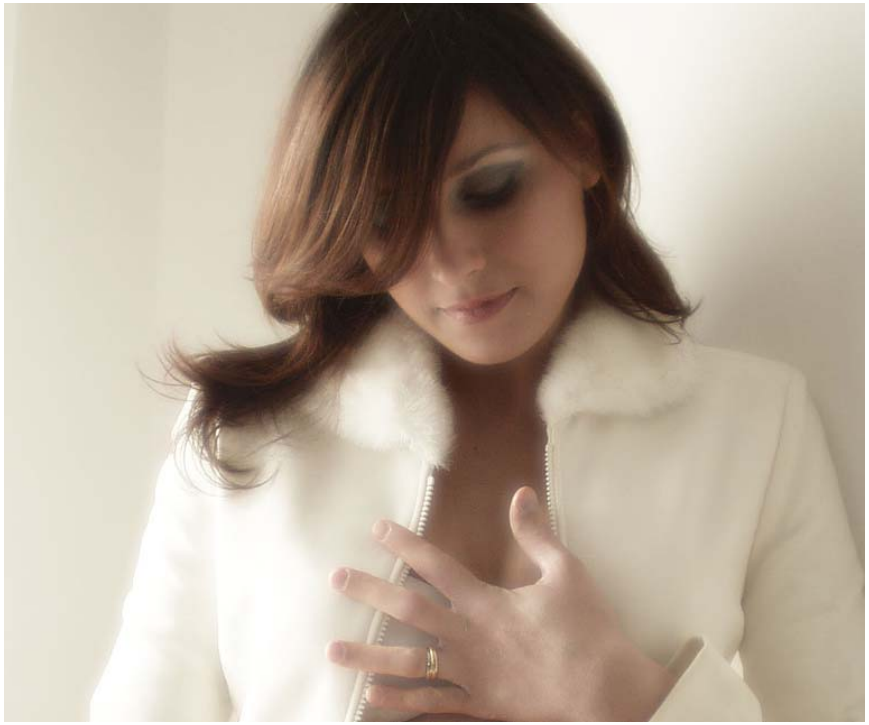
- to shield mother & fetus from surgical stimuli and paind
- to blunt uterine contractions

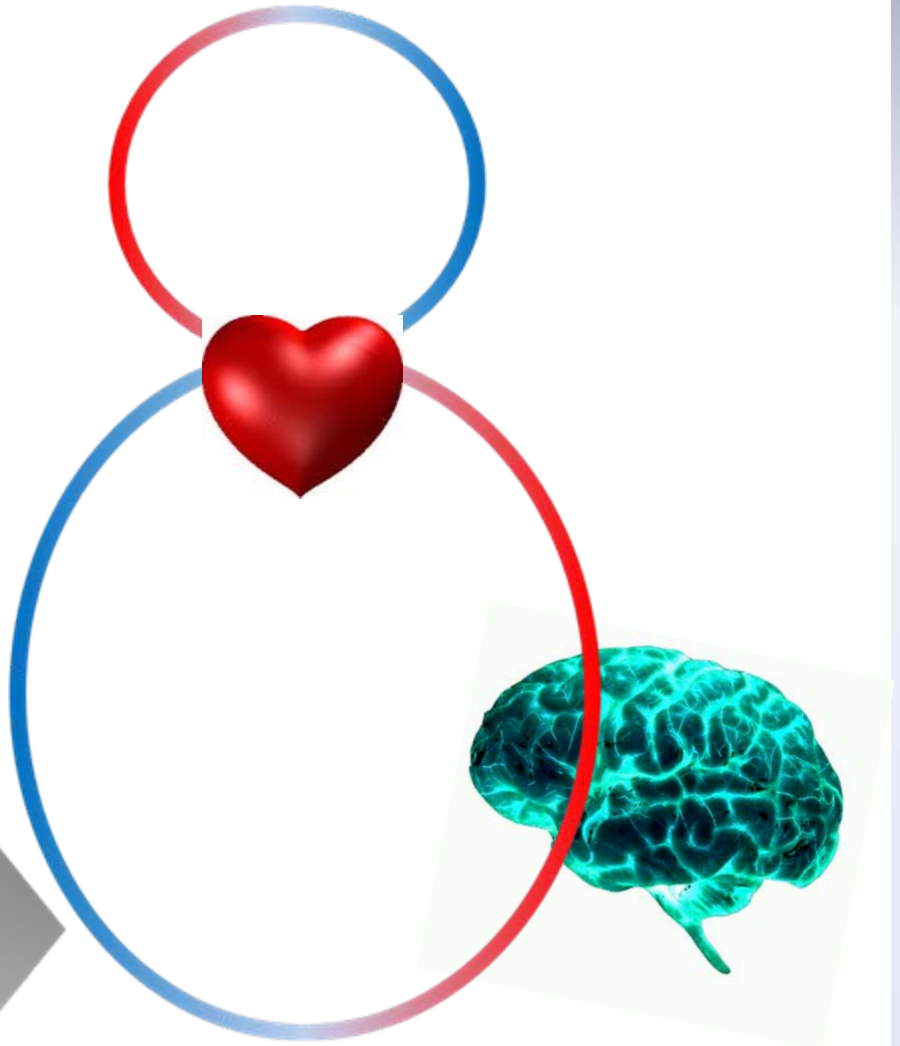
but still enable

- stable maternal, uterine and fetal hemodynamics
- fast emergence from anesthesia after the end of surgery with immediately sufficient spontaneous breathing
- Comfortable, pain free recovery

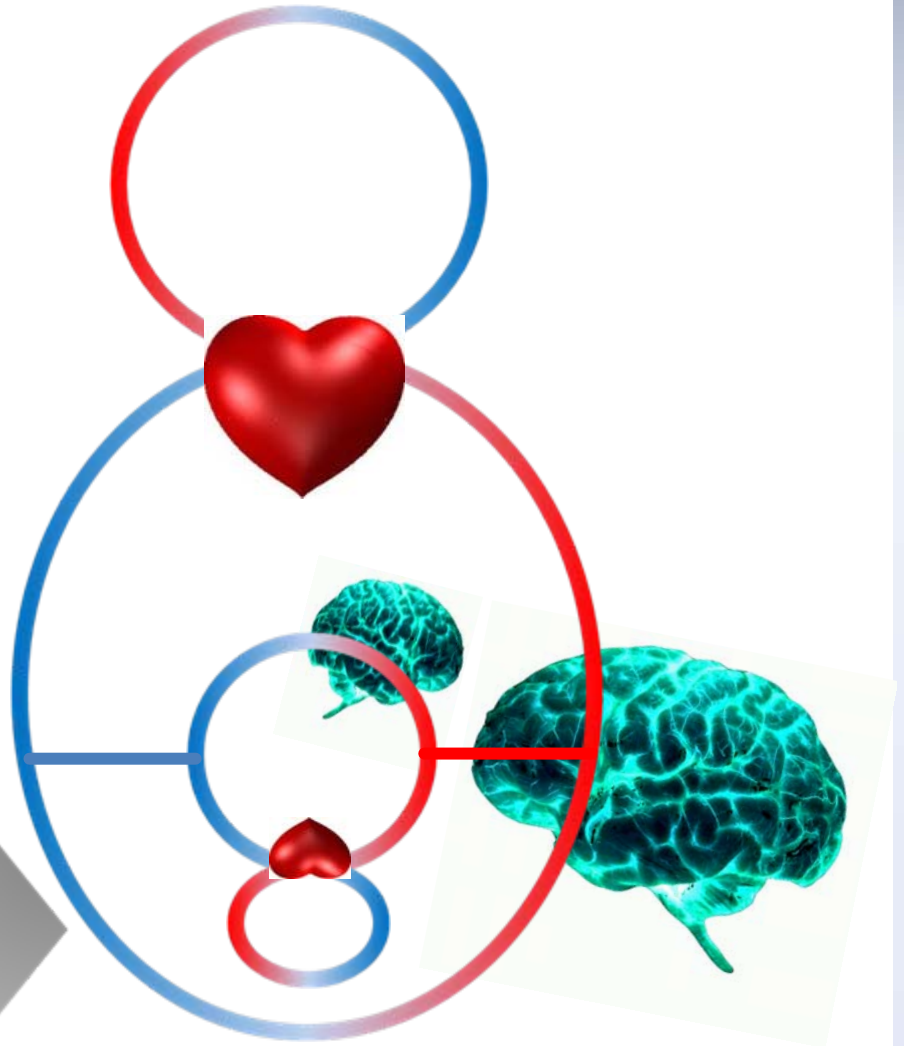
Two in one?

What actually happens





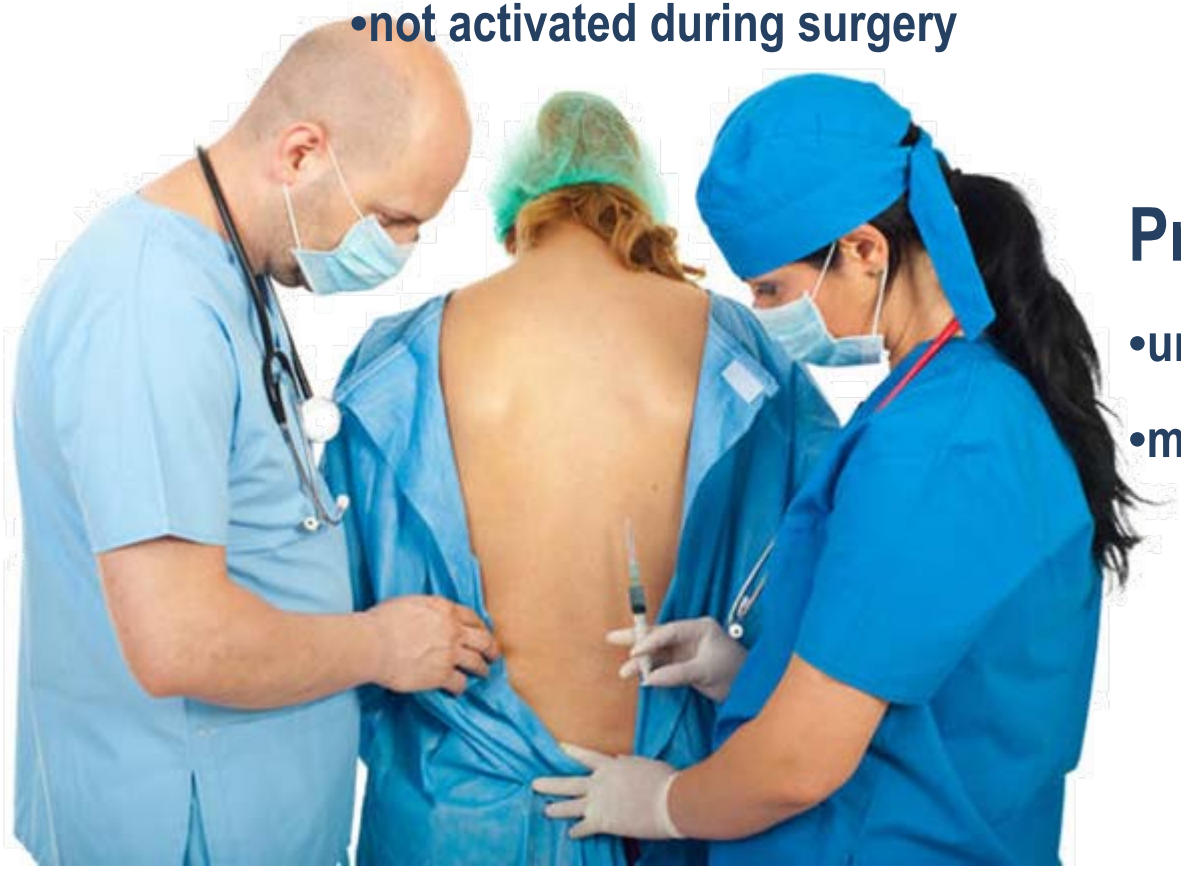
What actually happens



First: an epidural

Awake placement of a thoracic epidural katheter

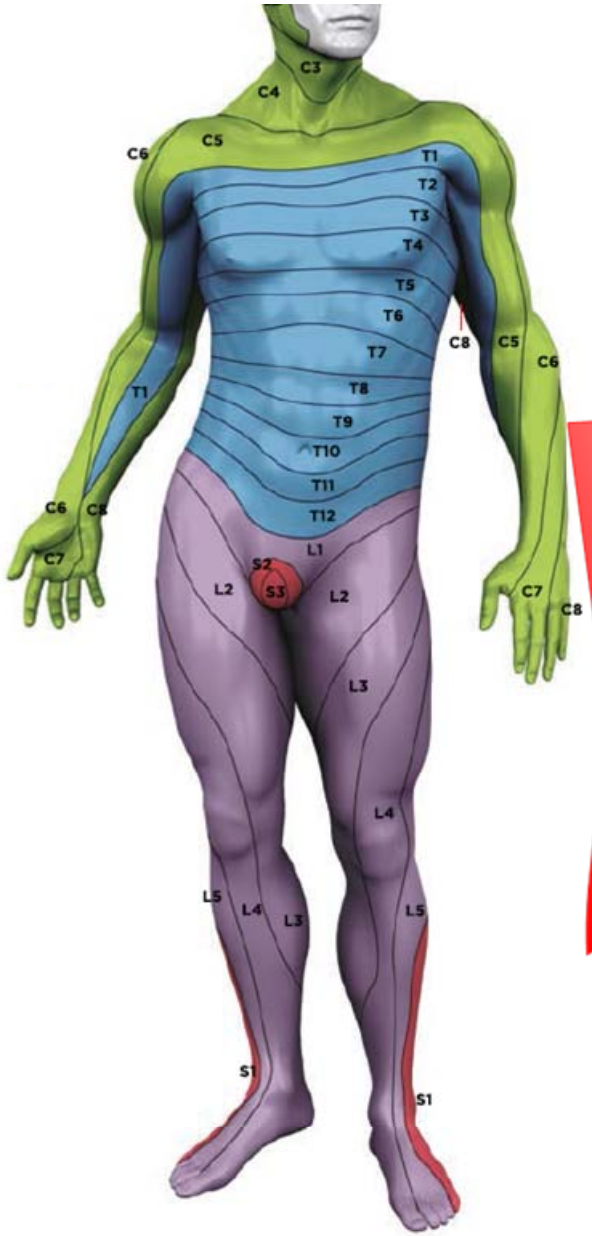
- for postoperative pain control
- Th10-12
- not activated during surgery

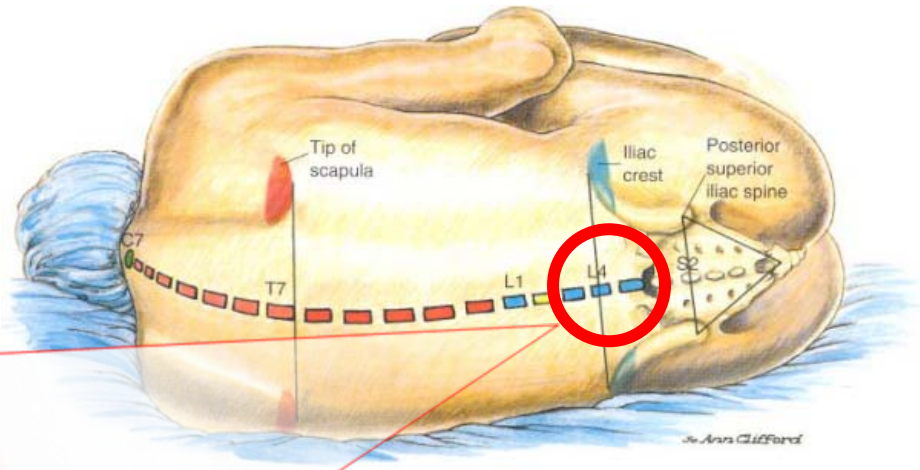


Problems

- unwanted motor blockade
- maternal hemodynamics

Epidural

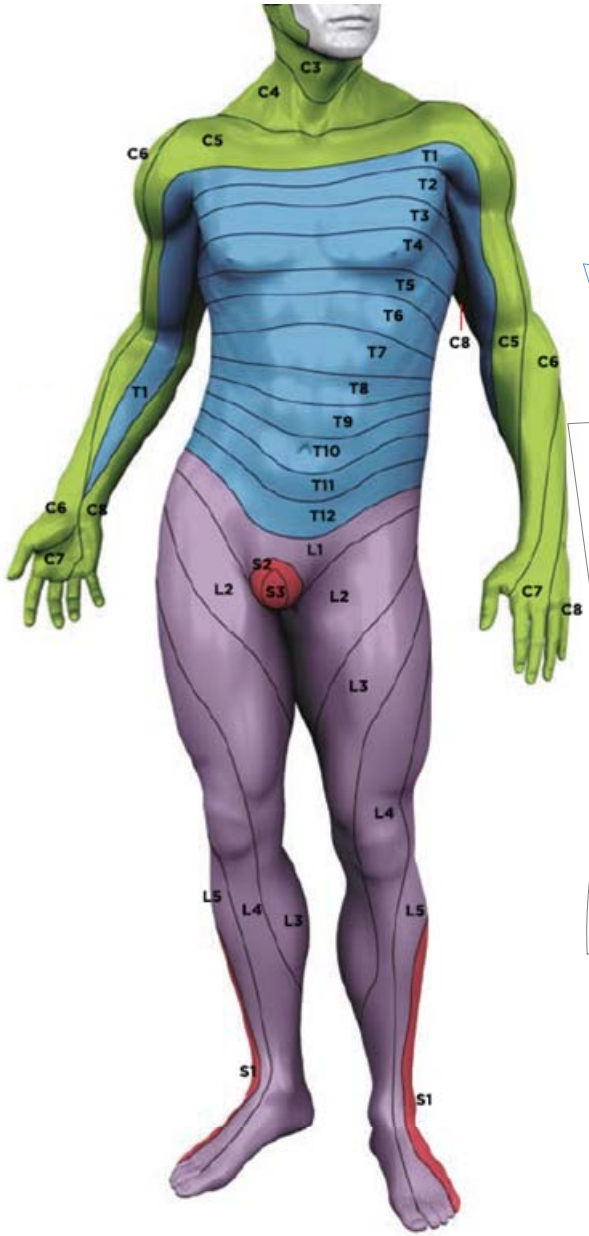


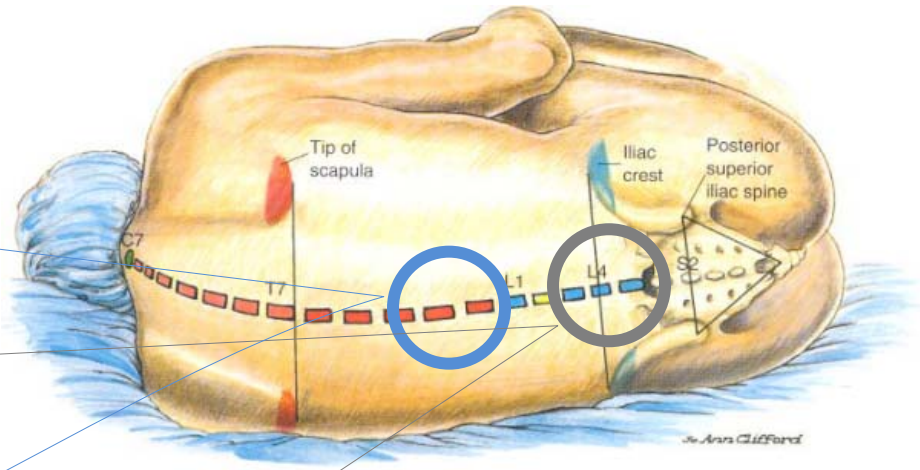


The goal is to provide…

- a profound **postoperative** analgesia in the lower abdominal region

Epidural



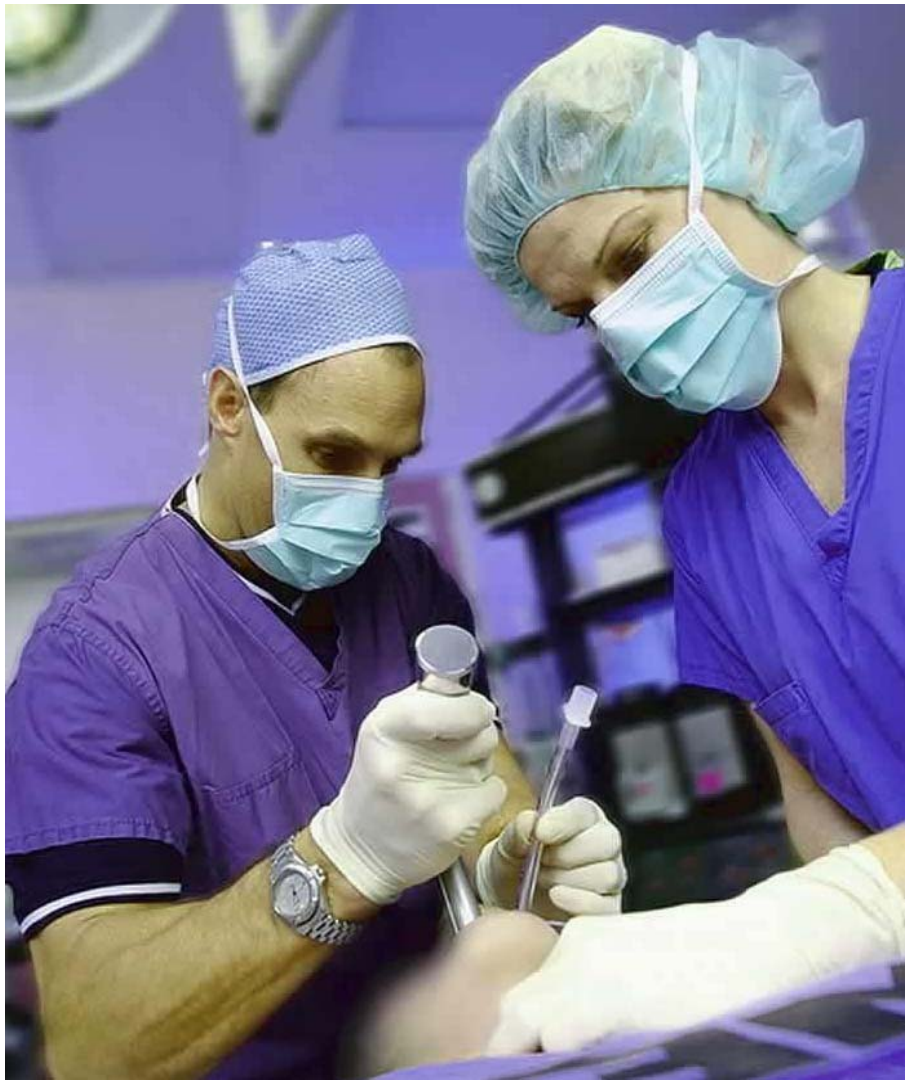


The goal is to provide…

- **a profound postoperative analgesia in the lower abdominal region**

- **to avoid (or to reduce) motor blockade of the legs.**

Tracheal intubation



- Rapid sequence induction (late pregnancy style)
- Aspiration prophylaxis
- Blunting hemodynamic response
- Complete neuromuscular blockade (fast onset)

Problems

- Sometimes difficult (1 : 300)

Maintenance of anesthesia

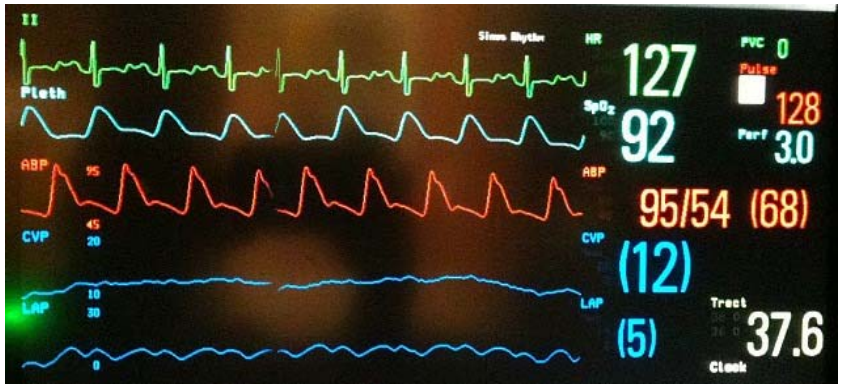
Must

- be steerable (continuous application of short acting agents)
- be profound (high dose)
- contain a permanent neuromuscular blockade

Problems

- Uterine activity
- Hemodynamics
- Prolonged muscular paralysis

Maintenance of anesthesia



Hypnosis

- Propofol (induction only)
- Desflurane

Analgesia

- Fentanyl
- Remifentanil TCI

NM relaxation

- Rocuronium → **relaxometry**

Intraoperative requirements

Antibiotics

Uterine relaxation

- Deep anesthesia
- Magnesium (or alternative?)
- Nitroglycerine

Hemodynamic stability

- Fluids
- Norepinephrine (noradrenaline)

→ invasive arterial BP monitoring

Intraoperative requirements

Fetal medication

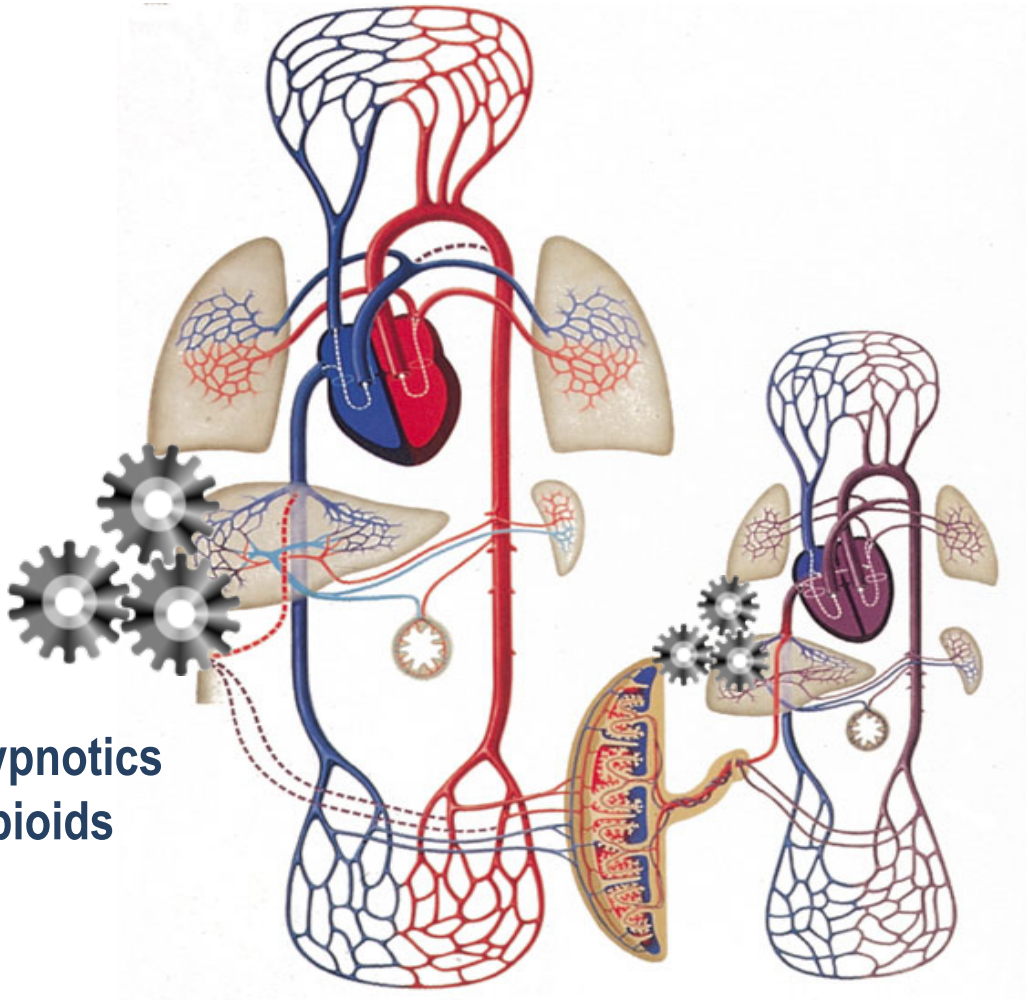
mandatory

- Transplancentar anesthetics (via mother)
- Intramuscular fentanyl and atracurium mixture (directly)

in case of emergency

- Atropine
- Adrenaline

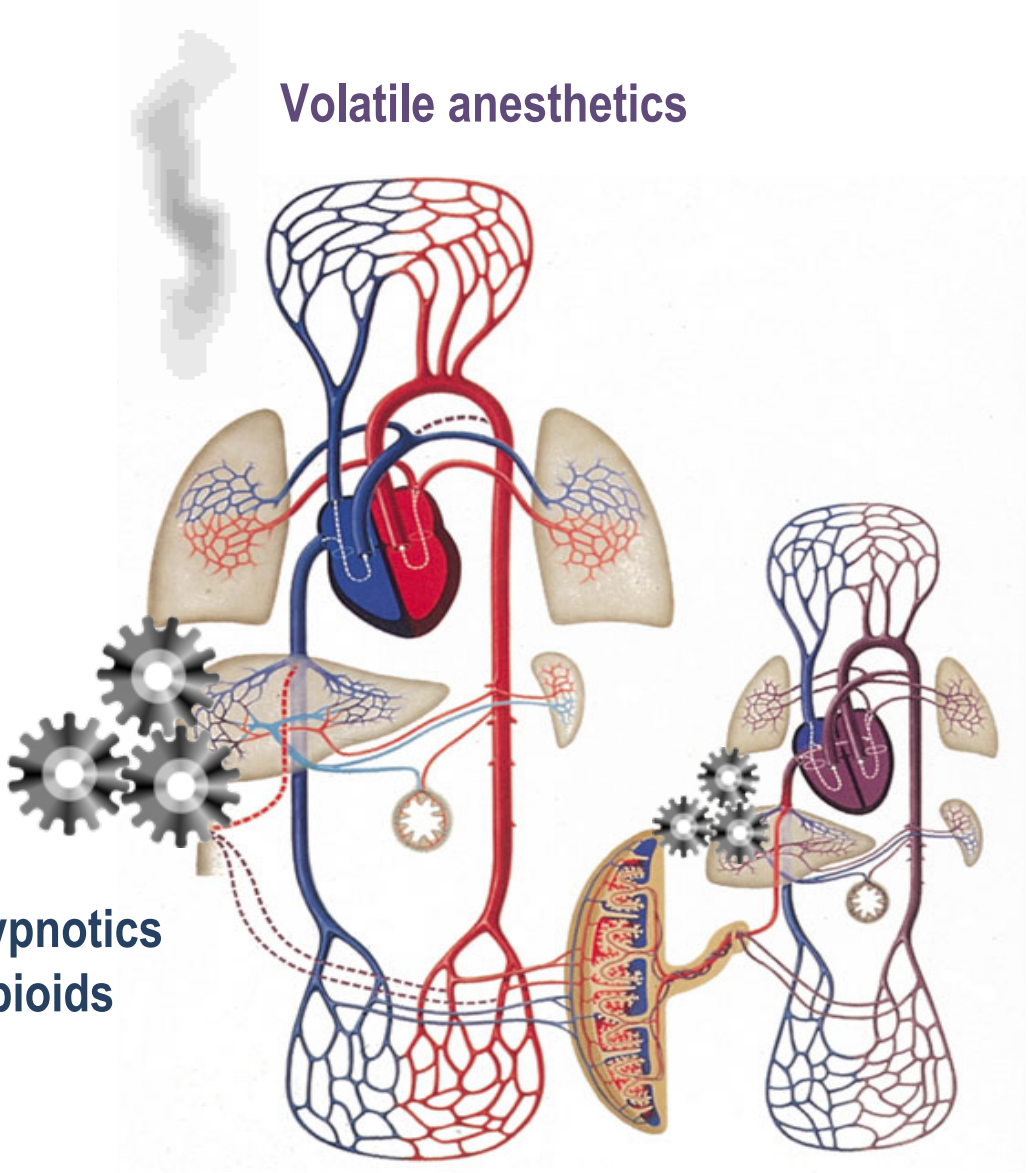
Emergence from anesthesia



Hypnotics
Opioids

Emergence from anesthesia

Volatile anesthetics

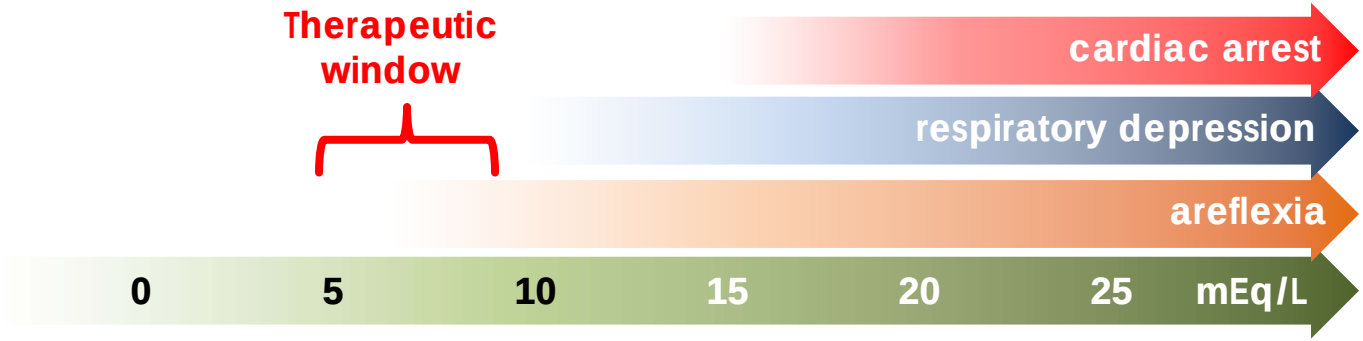


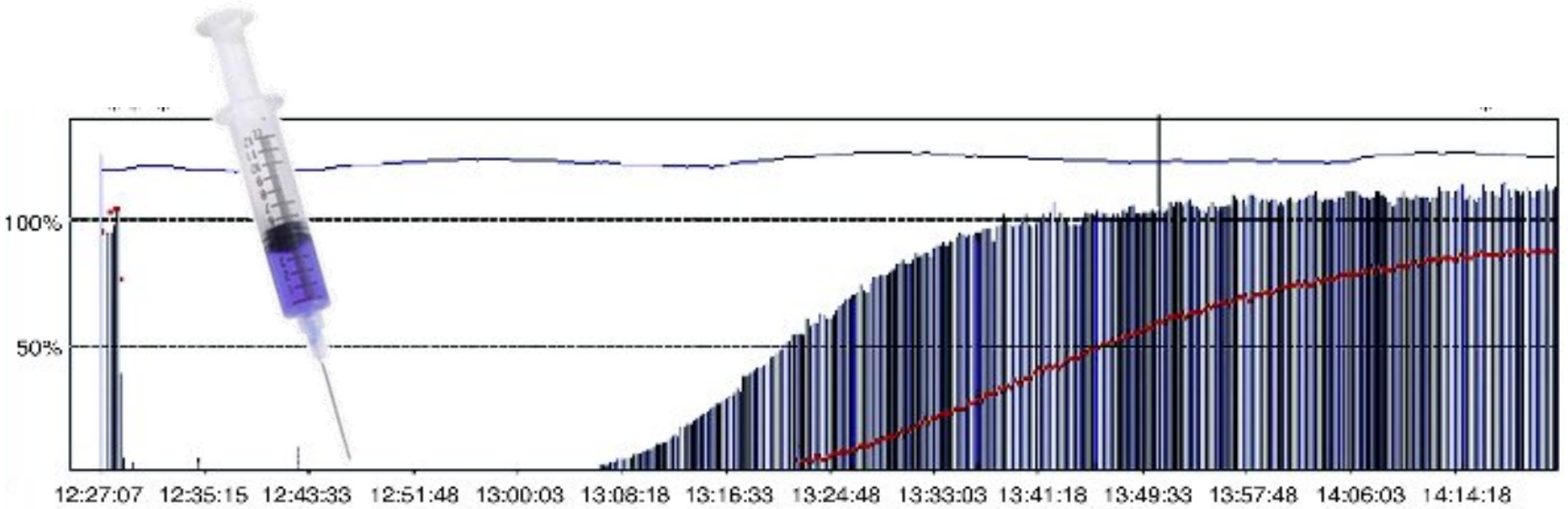
Hypnotics
Opioids

Residual neuromuscular relaxation

Residual neuromuscular relaxation

Magnesium infusion: 6 g in 30 min followed by 4 g/h





Residual neuromuscular relaxation

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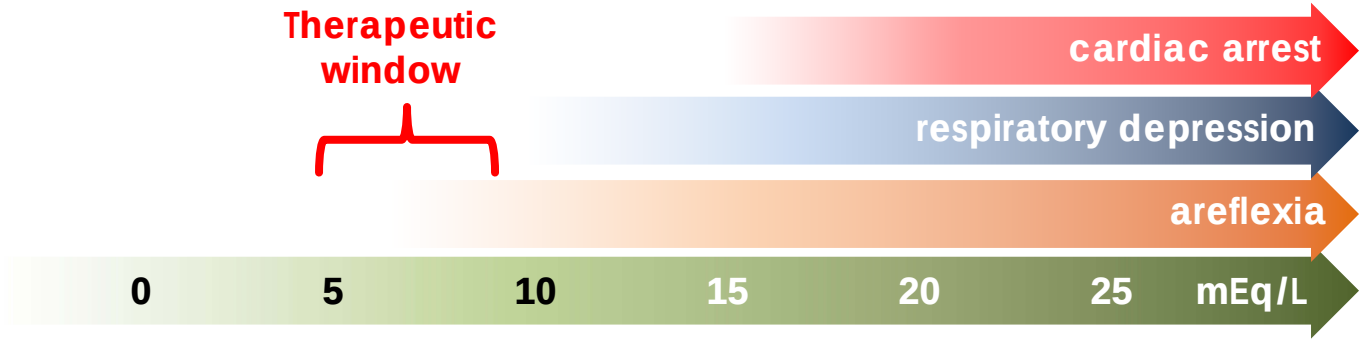
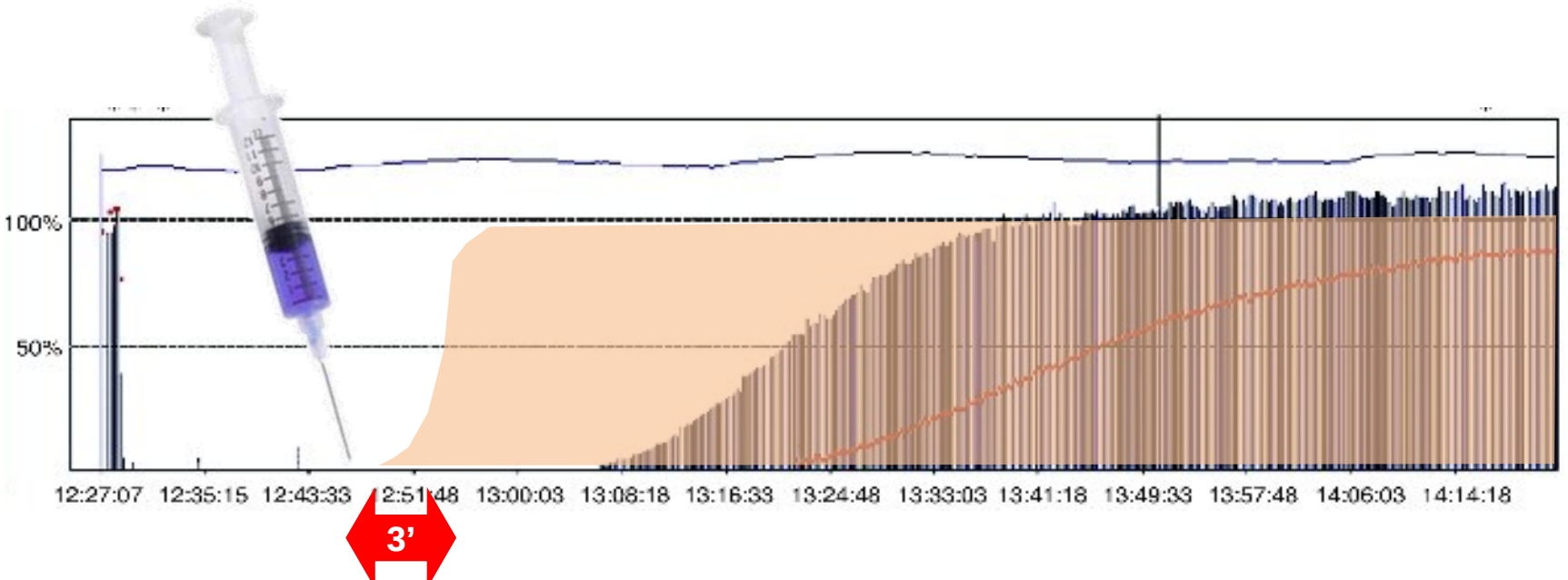
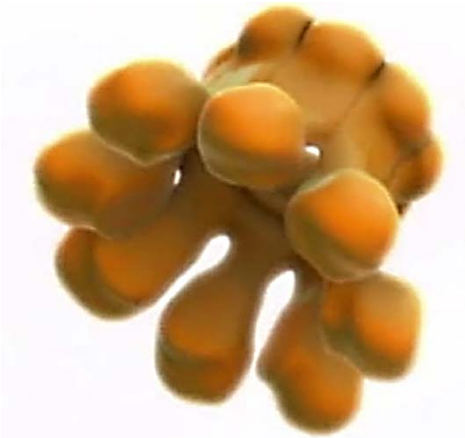




Fast and complete reversal

Rocuronium

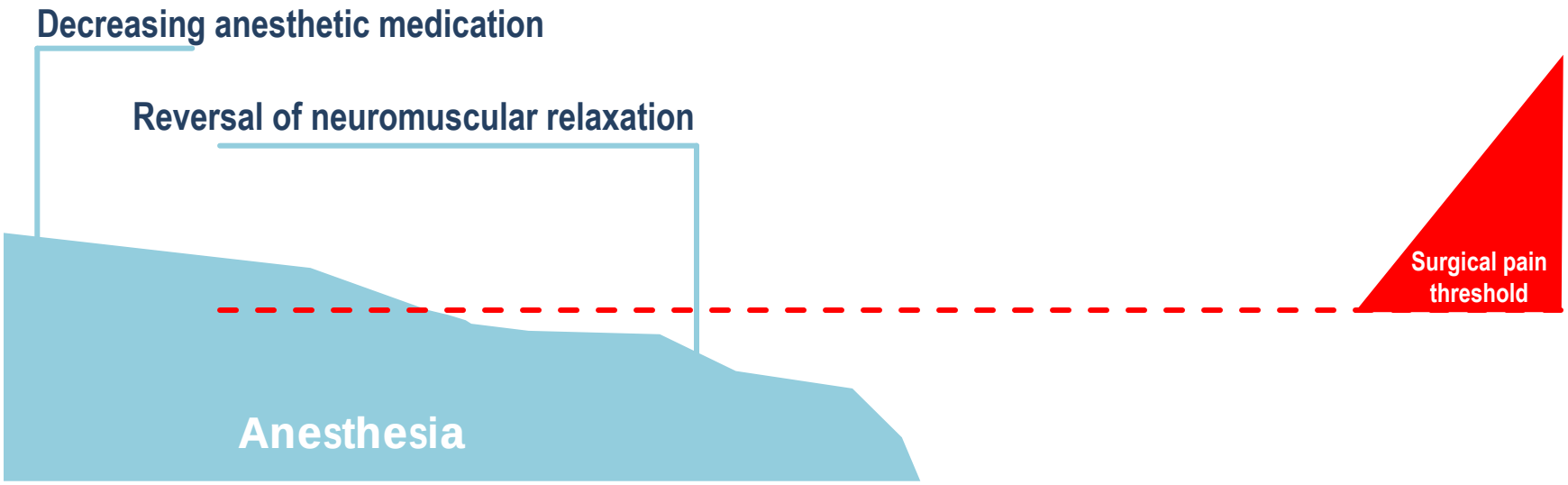


Sugammadex (Bridion®)

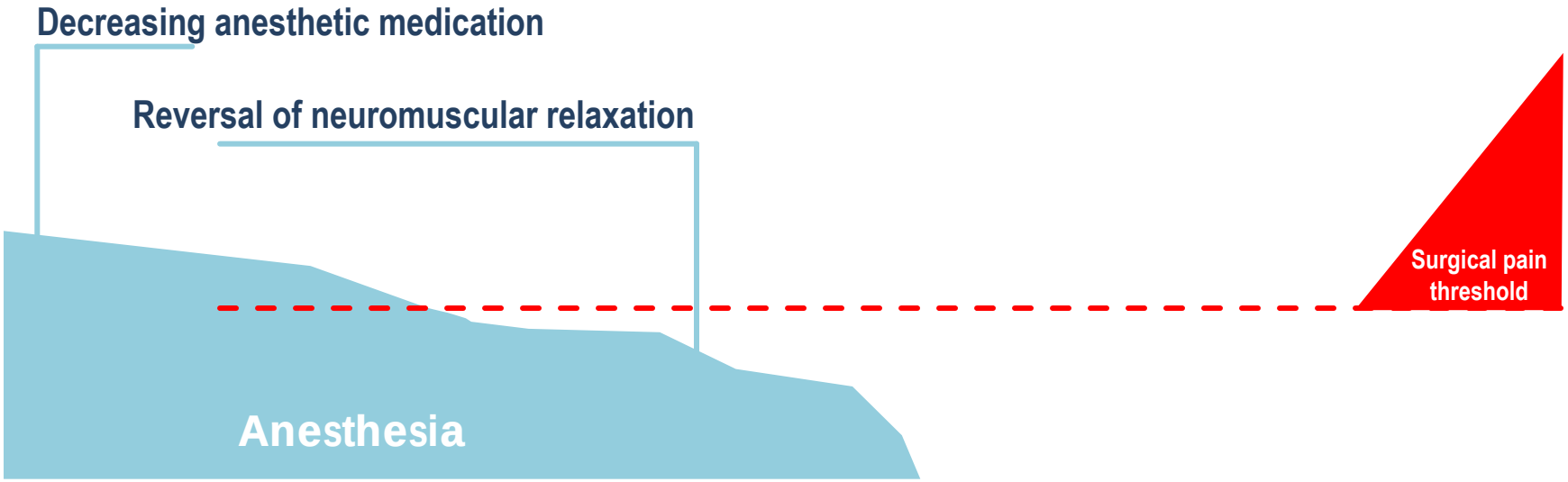
Encapsulated (inactive) drug

Reversal of neuromuscular relaxation

Transition to epidural analgesia



Transition to epidural analgesia



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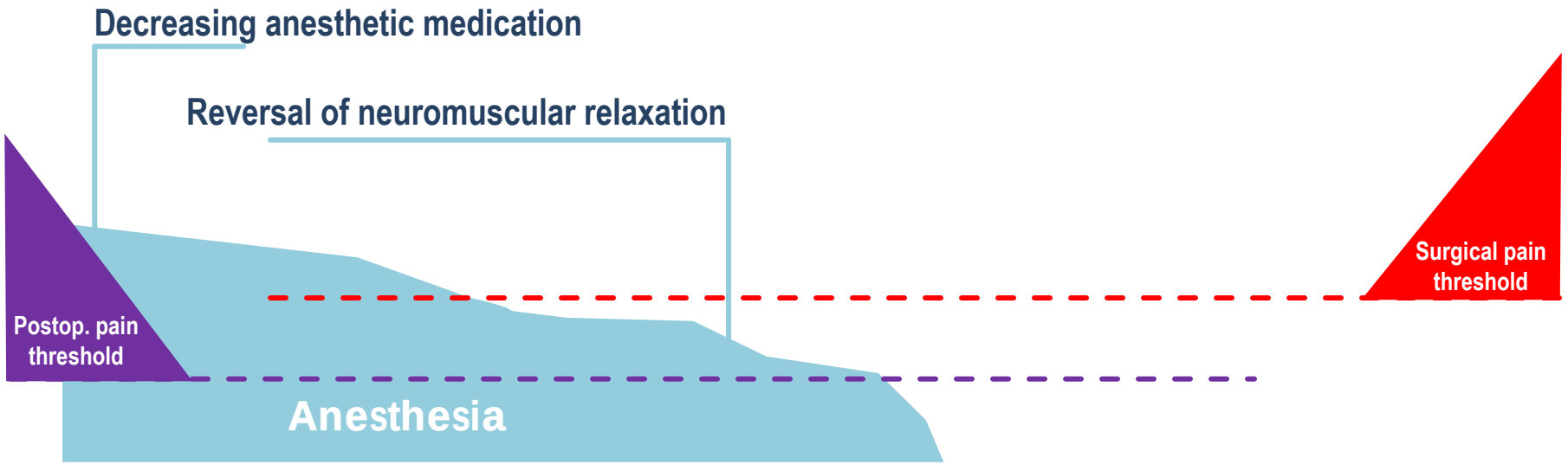
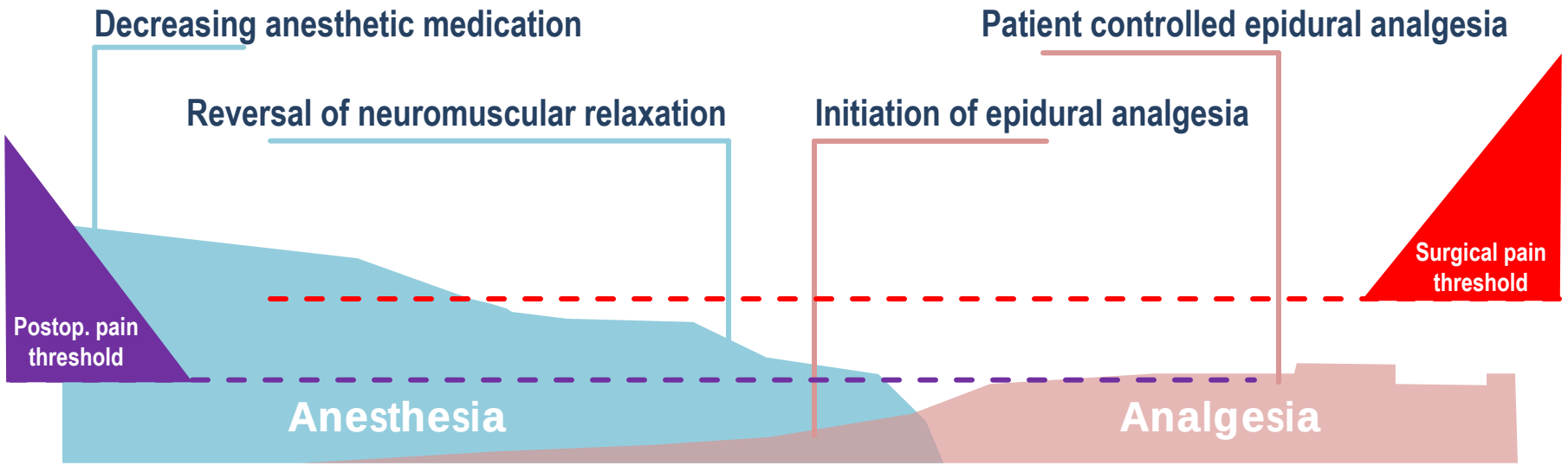
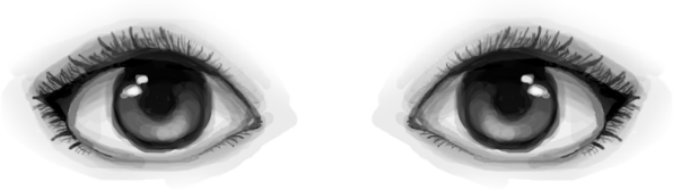


Transition to epidural analgesia



Now she can wake up…



A brief summary of the problems

Uterus relaxation → hemodynamic instability, residual paralysis(m)	Deep anesthesia, tocolytic medication (m)
Anesthesia to the fetus → hemo-dynamic instability (m), bradycardia (m, f)	Deep anesthesia (m), intra-muscular injection (f)
Mg therapy → Fatigue, hypo-ventilation (m), arrhythmias (m), prolonged recovery time (m)	Short acting anesthetic drugs, Mg plasma level measueremts
Postoperative stress & pain → Uterine contractions, miscarriage	Patient controled epidural analgesia (multimodal pain therapy)

Thank you