Paralytics and Train-of-Four Monitoring

When ICU patients are paralyzed, sedation first, the three infusions, how to do a train-of-four, bedside care and stopping

WHAT YOU WILL DO

- Confirm deep sedation and analgesia before the first dose, and keep both running the whole time.
- Do a train-of-four (TOF) with a peripheral nerve stimulator and read it together with the clinical goal.
- Give scheduled eye care, turn and protect skin, keep VTE prophylaxis and glucose control going.
- Guard the airway: a paralyzed patient cannot breathe if the ventilator or tube fails.
- Ask on rounds every day whether paralysis is still needed.

WHEN CONTINUOUS PARALYSIS IS USED

SITUATION	CURRENT GUIDANCE
Early ARDS, P/F under 150	Conditional for (SCCM 2026, ATS 2024: early, up to 48 h); ESICM 2023 against routine infusion. See ARDS page
Dyssynchrony with life-threatening hypoxemia, acidosis or shock	A trial when deep sedation fails (SCCM 2016); not routine in status asthmaticus
Raised ICP	No SCCM recommendation; a later-tier step in some ICP protocols
Shivering during targeted temperature management	May be used for overt shivering (SCCM 2016), per protocol

THE AGENTS

Label infusion rates come mostly from operating room studies. Your protocol and pharmacist set the ICU dose.

DRUG	CLEARED BY	WATCH FOR
Cisatracurium	Hofmann elimination in blood (pH and temperature), organ independent	Laudanosine metabolite builds up in kidney or liver failure; the drug used in the ARDS trials
Rocuronium	Liver and bile	About 1.5 times longer in liver disease; tolerance with long ICU use
Vecuronium	Liver and bile, some kidney	Active metabolite; prolonged paralysis after days of use, mainly with kidney failure
Succinylcholine	Plasma cholinesterase	Intubation (RSI) only, never an ICU infusion. See RSI page

SAFETY Paralytics have no sedative or pain-relieving effect. The patient may be awake and in pain and cannot show it. Sedation and analgesia go in first and are never stopped while the blocker runs.

HOW TO DO A TRAIN-OF-FOUR

1. Use the ulnar nerve and watch the thumb (adductor pollicis). Get a baseline before the first dose if you can.
2. Clean, dry skin. Black (negative) electrode on the little-finger side of the inner wrist near the crease; red (positive) 3–6 cm above it along the nerve.
3. Palm up, fingers steady, thumb free. Rest a finger against the thumb to feel each twitch.
4. Deliver the train and count thumb twitches, 0 to 4. Ignore wrist or finger flicks from direct muscle stimulation.
5. Check the clinical goal: ventilator synchrony, no shivering, no breathing over the set rate.
6. Document count, current, site and clinical findings; adjust the infusion per protocol.

TWITCHES	WHAT IT SUGGESTS
4 of 4	Little or no block; four twitches do not mean full strength
1–2 of 4	A common protocol target, read with the clinical goal
0 of 4	Deep block; check the setup, then report per protocol

EXAM TIP Avoid the face. Eye muscles resist blockers and the current can twitch the muscle directly, so the face can show twitches while the thumb shows none, and you may give more drug than needed. Edema, sweating and hypothermia also distort the count.

BEDSIDE CARE WHILE PARALYZED

- Eyes: scheduled lubricant and lid closure (the one strong SCCM 2016 recommendation).
- Skin and positioning: turn, pad heels and pressure points, range of motion and physiotherapy.
- VTE prophylaxis as ordered; glucose under 180 mg/dL (10 mmol/L).
- Secure the tube; two people for every turn; alarms on and audible.
- Talk to the patient and explain care: some remember the paralysis.

CALL FOR HELP WHEN

- Possible awareness or pain: rising heart rate or blood pressure, tearing, sweating.
- Dyssynchrony or breathing effort despite the target count, or 0 of 4 that will not lift.
- Disconnection, tube displacement, falling SpO_2 or a high-pressure alarm.
- Hypotension, rash or wheeze after a dose; any movement that could be a seizure.
- Weakness that does not recover after the infusion stops.

CHECK YOUR UNIT POLICY

Check your unit's policy for the TOF target and how often to check it, who may titrate, the stimulator current, eye-care products, whether BIS is used, daily holds of the infusion and reversal in the ICU.

Sources (12) are listed with links at icubasics.com/sheets/paralytics-tof.html. For education and exam preparation only. Not medical advice; follow current guidelines and your institution's protocols. ICU Basics is an independent study aid not affiliated with any certifying body.