THE UNIVERSITY OF ARIZONA
COLLEGE OF MEDICINE PHOENIX
Anesthesiology

Total Intravenous Anesthesia (TIVA) Regimen for Spine Surgery

Applies to: Cervical, thoracic, lumbar, and deformity spine procedures

GOALS

- Preserve MEPs/SSEPs
- Maintain spinal cord perfusion (MAP ≥ 75–85 mmHg)
- Enable rapid, controlled emergence
- Minimize coughing/bucking

STANDARD SPINE TIVA

Induction:
Propofol 1.5–2.5 mg/kg
Remifentanil 0.5–1 mcg/kg
Lidocaine 1–1.5 mg/kg (optional)
Rocuronium - intubation dose only

Maintenance:
Propofol 75–150 mcg/kg/min (MEP ceiling ~120–130)
Remifentanil 0.05–0.2 mcg/kg/min
BIS target 40–60

NEUROMONITORING-OPTIMIZED TIVA

Propofol 60–100 mcg/kg/min
Remifentanil 0.05–0.15 mcg/kg/min
Adjuncts:
Ketamine 0.2–0.5 mg/kg/hr
Lidocaine 1–2 mg/kg/hr
Dexmedetomidine 0.2–0.5 mcg/kg/hr (use caution with higher doses w/ MEPS)

EMERGENCE

Stop remifentanil 10–15 min before closure
Hydromorphone 0.5–1 mg IV or Methadone 0.1–0.2 mg/kg (not yet available at BUMCP at the time of this writing)
Propofol tail 30–50 mcg/kg/min

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ALTERNATIVE REGIMENS/SPECIAL SITUATIONS

NEUROMONITORING-OPTIMIZED TIVA (Fragile MEPs)

Use if poor baseline signals, scoliosis, revision surgery, or hypotension risk:

- Propofol **60–100 mcg/kg/min**
- Remifentanil **0.05–0.15 mcg/kg/min**
- Add ONE or more adjuncts:
  - **Ketamine: 0.2–0.5 mg/kg/hr**
  - **Lidocaine: 1–2 mg/kg/hr**
  - **Dexmedetomidine: 0.2–0.5 mcg/kg/hr** (monitor for bradycardia)

KETAMINE-FORWARD TIVA (Salvage / High-Risk Spine)

Indications: Marginal cord perfusion, anemia, hypotension, poor MEPs

- Propofol **50–80 mcg/kg/min**
- Ketamine **0.3–0.7 mg/kg/hr**
- Remifentanil **0.05–0.1 mcg/kg/min**

TIVA WITHOUT REMIFENTANIL (If Required)

- Propofol **75–125 mcg/kg/min**
- **Fentanyl:** 25–50 mcg boluses *or* **1–2 mcg/kg/hr infusion**
  - *Alternative:* Sufentanil **0.1–0.3 mcg/kg/hr**
- Expect **less titratability** and **longer emergence**

ADJUNCTS

Adjunct	Dose	Notes
Ketamine	0.2–0.7 mg/kg/hr	Often improves MEP amplitude
Lidocaine	1–2 mg/kg/hr	↓ propofol & opioid needs
Dexmedetomidine	0.2–0.5 mcg/kg/hr	Smooth emergence
Magnesium	30–50 mg/kg load → 10–15 mg/kg/hr	Use selectively