Compass SHARP

Intraoperative Considerations: Regional and Neuraxial Anesthesia

Presented by: Jennifer Hah MD, MS

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Learning Objectives

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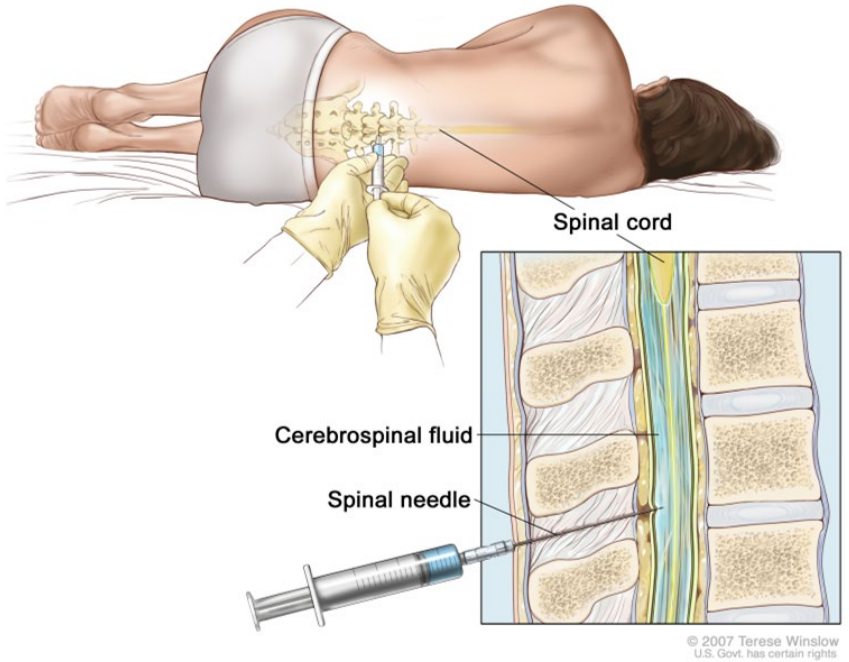
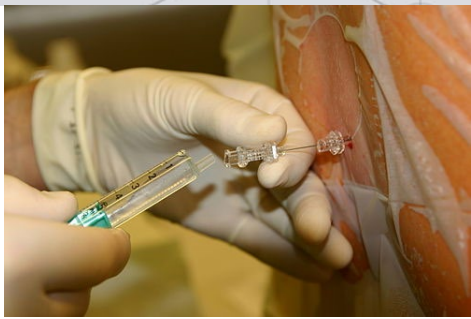
- Describe the various types of regional and neuraxial anesthesia techniques, including spinal, epidural, and peripheral nerve blocks, and their specific applications in different surgical procedures.
- Explain the physiological effects of regional and neuraxial anesthesia on various organ systems, including cardiovascular, respiratory, and neurological, and how these effects influence intraoperative management.
- Identify potential complications associated with regional and neuraxial anesthesia, such as hypotension, bradycardia, and nerve injury, and outline strategies for prevention and management during the intraoperative period.

Neuraxial Anesthesia

- Placement of local anesthetic in or around the CNS
- Spinal anesthesia: LA placed in the lumbar (L3/4, L4/5) intrathecal (subarachnoid space)
- Alone or combined with GA
- For operations in lower abdomen, pelvis, perineal region, lower extremities
- Additives: opioids, clonidine, dexmedetomidine (C-section), epinephrine



Spinal Anesthesia-Contraindications



- **Absolute:**
  - Lack of consent
  - Elevated ICP
  - Infection at site of procedure
  - Septicemia
  - Allergy to LA
  - Uncontrolled coagulopathy or anticoagulation
- **Relative:**
  - Pre-existing neurological diseases
  - Severe hypovolemia due to resulting hypotension (risk factors include emergency operations, obesity, chronic alcohol consumption, chronic HTN)
  - Severe mitral and aortic stenosis, LVOT obstruction
  - Spinal abnormalities

Spinal Anesthesia Intraoperative Monitoring

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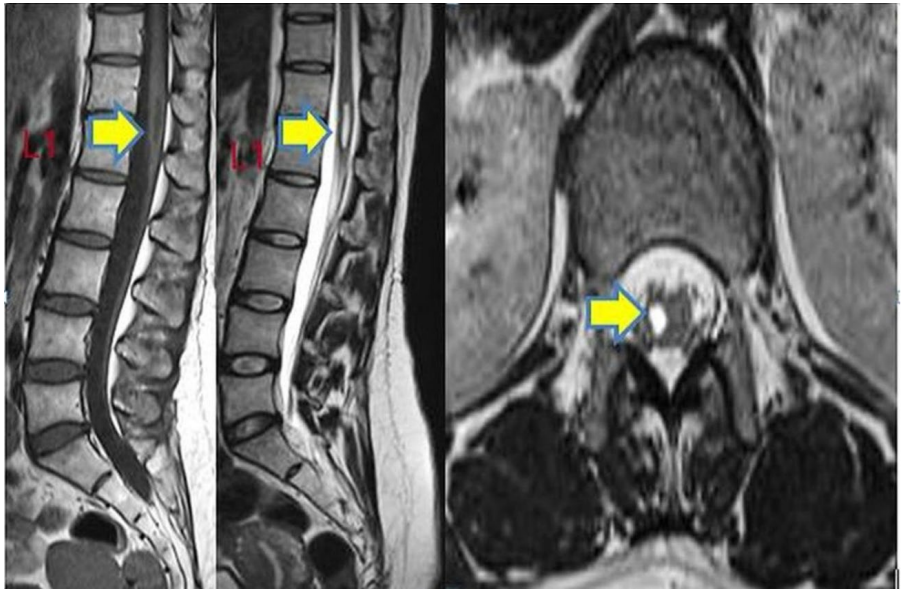
- **Blood pressure:** every 2.5 minutes for the first 20 minutes and then every 2.5 to 5 minutes
- **Hypotension prophylaxis:** IV fluids
- **Hypotension treatment:** IV fluids, vasopressor (ephedrine 5 to 10 mg IV, phenylephrine 50-100 mcg IV, NE for cesarean)
- **Bradycardia:** atropine 0.4-0.6mg IV, glycopyrrolate 0.2-0.4mg IV, ephedrine 5-10mg IV, epinephrine 5 to 10 mcg
- **Assess block level 2 to 3 minutes after injection:** cold, pinprick and light touch
- **Failed block:** Repeat or convert to GA

Physiologic Effects

- **Hypotension**
- Bradycardia
- Hypothermia
- Urinary retention
- **Motor weakness**
- **Respiratory depression (*Neuraxial morphine is associated with delayed respiratory depression 6 to 18 hours after administration)**

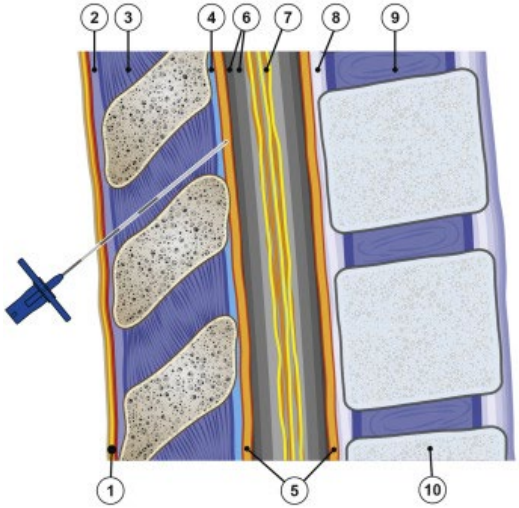


SA and Surgical Outcomes

- 10.8% incidence of intraoperative pain under neuraxial anesthesia for **Cesarean delivery**, with spinal anesthesia having the lowest pooled incidence of pain compared to epidural anesthesia PMID: 40184602
- Faster operation, reduced length of stay, and lower postoperative analgesic use in **percutaneous nephrolithotomy** PMID:38618023
- Shorter operation, hospitalization and reduced postoperative nausea and urinary retention for **awake spine surgery** comparing spinal to general anesthesia PMID: 38110776
- Reduced risk of intraoperative hypotension, lower doses of ephedrine, and reduced risk of acute kidney injury comparing spinal to general anesthesia for **hip fracture surgery** PMID:37753546, 36270701
- Spinal/epidural anesthesia reduced intraoperative hypertension, tachycardia, postoperative PACU analgesic use, PONV, and length of stay for **lumbar spine surgery** PMID: 35943881

Epidural Anesthesia

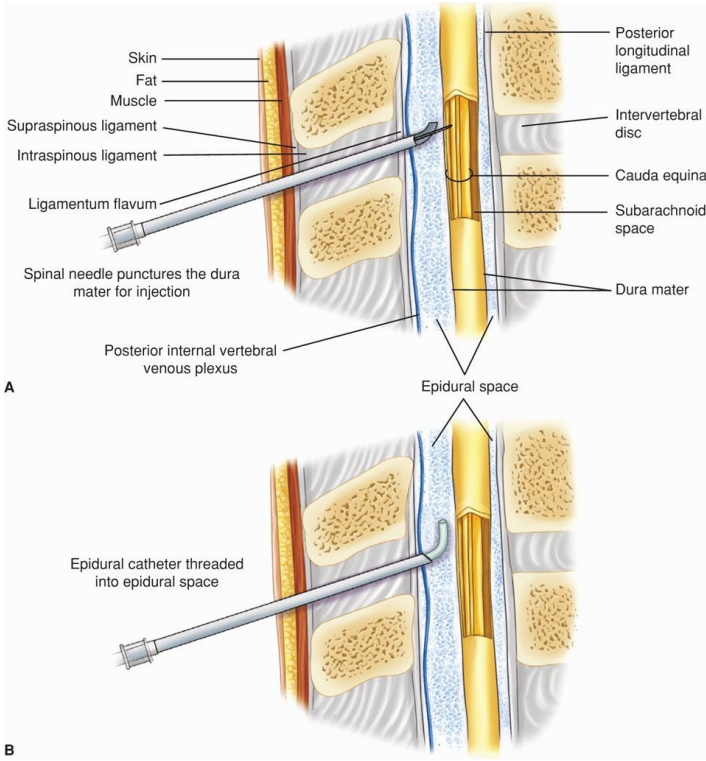
- Injection of anesthetics into the epidural space
- Alone or combined with GA
- For obstetrical anesthesia during labor and surgical anesthesia for thoracic, major intra-abdominal/pelvic, lower extremity, or spine surgeries
- Epidural compared to IV PCA results in better pain relief, reduced opioid consumption, fewer postoperative complications and less cognitive impairment
- Additives: opioids, clonidine, dexmedetomidine (C-section), epi, dexamethasone



1. Skin/fat/subcutaneous tissue
2. Supraspinous ligament
3. Interspinous ligament
4. Ligamentum flavum
5. Epidural space
6. Dura/arachnoid mater
7. Cauda equina (within intrathecal space containing CSF)
8. Posterior longitudinal ligament
9. Intervertebral discs
10. Vertebral body

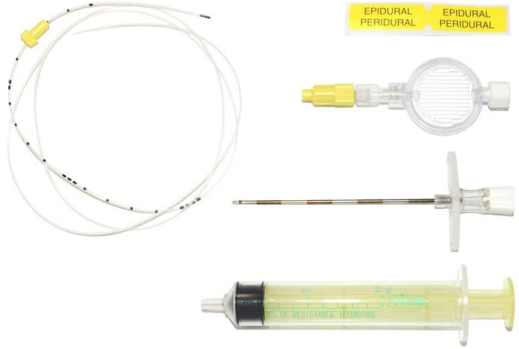
Combined Spinal-Epidural Anesthesia

- Initial IT injection followed by epidural catheter placement
- Rapid onset surgical anesthesia lasting 2-3 hours followed by epidural analgesia
- For general, orthopedic, urological, and gynecological surgery, labor and cesarean delivery
- Less risk of high spinal or prolonged hypotension with CSE due to re-dosing through epidural catheter
- Less unilateral block, motor block, increased sacral coverage PMID:40707286
- Caution: epidural catheter is not initially tested



Epidural Anesthesia-Contraindications

- **Absolute:**
  - Lack of consent
  - Uncontrolled systemic infection
  - Infection at site of procedure
  - Uncontrolled coagulopathy or anticoagulation
  - Severe thrombocytopenia (platelet count <70,000/µL)
  - Allergy to LA
- **Relative:**
  - Pre-existing neurological diseases
  - Vertebral abnormalities
  - Spinal cord injury
  - Mild to moderate thrombocytopenia (platelet 70,000-100,000/µL)
  - Hypovolemia
  - Increased ICP
  - Patient inability to cooperate or remain still



Epidural Anesthesia Intraoperative Monitoring

COMPASS HEALTHCARE COLLABORATIVE

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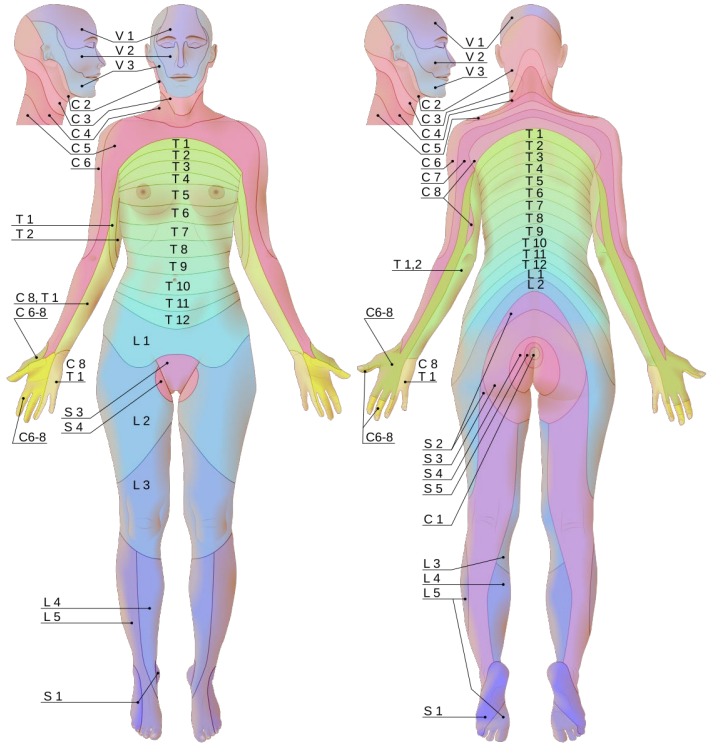
- **Hypotension prophylaxis:** IV fluids
- **Hypotension treatment:** IV fluids, vasopressor (ephedrine 5 to 10 mg IV, phenylephrine 50-100 mcg IV)
- **Bradycardia:** atropine 0.4-0.6mg IV, glycopyrrolate 0.2-0.4mg IV, ephedrine 5-10mg IV
- **Assess block level and for inadequate anesthesia:** LA in 3 to 5 ml increments OR 20-25% of initial dose 20 to 25 minutes after first dose
- **Unilateral block:** Add 5-10ml of additional LA in increments or withdraw catheter 1cm

Neuraxial Technique	Pros	Cons
Spinal	• Rapid onset of block • Symmetric block • Low doses of LA and opioids	• Limited duration • Single shot • Dural puncture
Epidural	• Re-dosing allows for prolonged duration of block • Less hemodynamic instability • Postoperative analgesia	• Slower onset • Higher doses of LA and opioids • Higher risk of PDPH • Greater risk of patchy block • Less sacral block
CSE	• Rapid onset of block • Symmetric block • Re-dosing allows for prolonged duration of block • Postoperative analgesia	• Longer procedure time • Possible delayed testing of epidural catheter

Sensory Level for Operations Performed with Neuraxial Anesthesia

Cesarean delivery	T4
Postpartum tubal ligation	T4
THA	T10
ORIF Femur or Hip Fractures	T10
Cervical cerclage	T10
Urologic procedures	T10
Peri-anal procedures	S1
TKA	L1
Knee arthroscopy	L1
Foot Surgery	L2 to L3

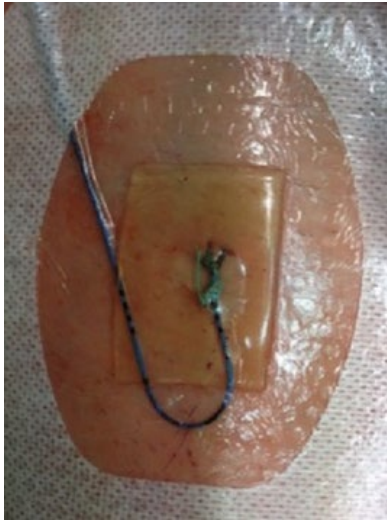


Continuous Epidural Analgesia 1

Operations	Epidural Catheter Placement
Upper lobectomy/Mediastinal incision	T4/5
Pneumonectomy/Mid-lower lobectomy	T5/6
Esophagectomy	T6/7
Esophagectomy and abdominal incision	T7/8
Rib fractures	T2-T12
Supra- or Infra- umbilical Incision	T7/8
Pfannenstiel (Gynecologic)	L1/2
TKA THA	L2-4

Continuous Epidural Analgesia 2

- **Preoperative**
- **Intraoperative: initiate several hours before end of operation or administer bolus 30 minutes before emergence from GA**
- **Postoperative: patient-controlled epidural analgesia vs. programmed intermittent epidural bolus vs. continuous infusion**
  - 0.0625 to 0.1% bupivacaine, 0.1% ropivacaine
  - 2 to 5 mcg/ml fentanyl OR 5-20 mcg/ml hydromorphone
- **Duration: 1 week**



PMID: 25879016

Continuous Epidural Analgesia 3

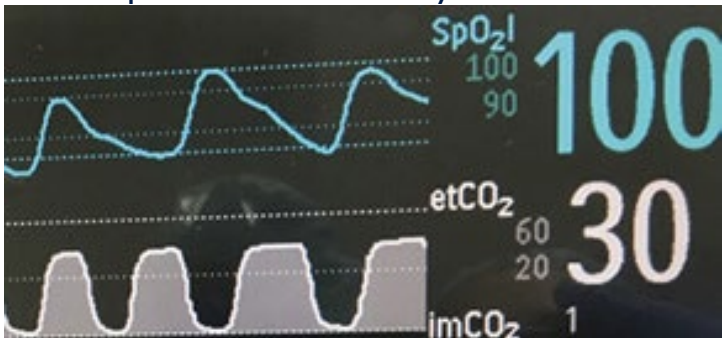
- **PCEA Example: 0.0625% bupivacaine with 2 to 5 mcg/ml fentanyl or 5 to 20 mcg/ml hydromorphone**
  - Basal infusion: 6 to 12 ml/hr
  - Bolus volume: 3 to 4 ml
  - Lockout: 15 to 20 min
  - Hourly maximum 18-22 ml
- **Continuous infusion**
  - 8-14 ml/hour
- **PIEB (lumbar)**
  - Bolus: 6 to 10 ml
  - Bolus interval: 30 to 75 minutes

- **Benefits**
  - Improved pain control
  - Reduced postoperative opioid consumption
  - Decreased pulmonary complications (pneumonia, respiratory distress)
  - Decreased cardiac morbidity (atrial fibrillation, MI)
  - Reduced DVT and PE risk
  - Accelerated return of GI function, reduced incidence and duration of postoperative ileus
  - Earlier mobilization

CEA Monitoring

- **VS**
- **Level of sedation**
- **Motor function**
- **Pain**
- **Activity level**
- **Sensory/Motor blockade**
- **Nausea**
- **Pruritus (increased with hydromorphone PMID:39442405**
- **Signs of infection at catheter site**
- **Neurologic changes**

- **Respiratory Depression (neuraxial opioids)**
  - Monitor q1hr for the first 12 hours, q2hrs from 12 to 24 hours, q4hrs thereafter during course of infusion
  - RR, pulse oximetry, level of sedation
  - Consider continuous capnography and pulse oximetry



CEA Outcomes

- Meta-analysis of 636 patients from 7 studies comparing dexmedetomidine and opioids as PCEA adjuvants showed **reduced pruritus, N/V, and improved postoperative analgesia with dexmedetomidine** PMID 37127531
- Although intercostal nerve block is noninferior to TEA or paravertebral block after thoracic surgery, **TEA and PVB are associated with larger decreases in postoperative MMEs** PMID: 34779845
- **Epidural analgesia** is superior to continuous regional anesthesia (rectus sheath, TAP, wound infiltration) for the first 24 hours, and had comparable effect on pain 48 hours after **midline laparotomy** PMID 34739706
- Meta-analysis of 16 trials of 1,000 patients demonstrated comparable postoperative pain in the first 48 hours after thoracotomy with PVB or TEA, but **TEA resulted in less rescue analgesia but greater incidence of hypotension, urinary retention, and vomiting after thoracotomy** PMID:33477177

Complications-Neuraxial Anesthesia

- Backache-9%
- PDPH (25%)
- Nausea, vomiting-increased with opioids
- Pruritis- from opioids, may be prevented with ondansetron PMID:37167702
- Urinary retention- due to opioids
- Hypotension, Bradycardia
- Arachnoiditis
- Transient Neurological Syndrome
- Total spinal anesthesia- respiratory depression from paralysis of intercostals and diaphragm, loss of consciousness, cardiac arrest
- Spinal/Epidural Hematoma (0.03-0.02%) or Abscess
- Meningitis
- Spinal Cord Injury
- Neurological injury (0.08%)
- Motor weakness

Spinal Cord Injury

Risk Factors

- Extremes of age
- Obesity
- Diabetes
- Neurological disorder
- Immunocompromised Status
- Anticoagulation
- Coagulopathy
- Spine pathology

Consequences

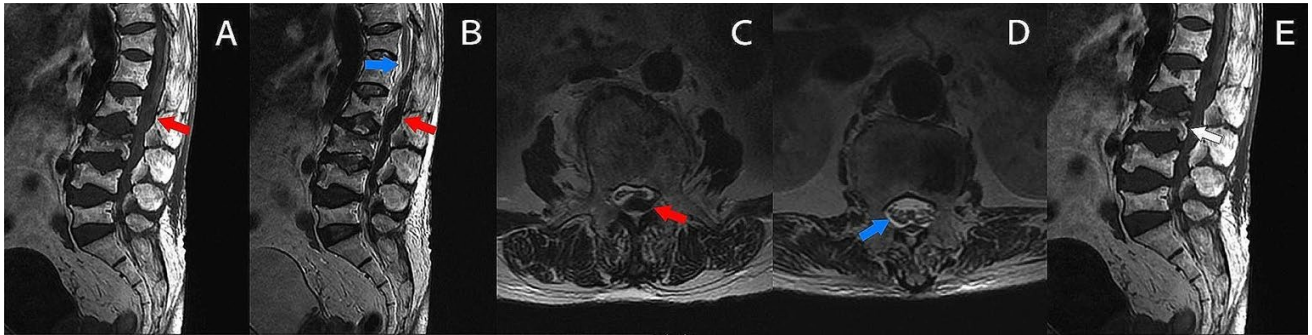
- Motor deficit
- Paraplegia
- Dyskinesia
- Sensory loss
- Pain
- Absent Urethral Sphincter Tone /Urinary incontinence
- Death

PMID: 36902095

Spinal Cord Injury Continued

- **Hematoma**
- **Catheter/needle trauma**
- **Abscess**
- **Ischemia**
- **Infarction**
- **Adhesive arachnoiditis**
- **Hematomyelia**

- **Monitoring**
  - Pain/Paresthesia during procedure
  - Sensory/Motor loss-hold infusion while monitoring for recovery
  - Emergent MRI
  - Decompression within 8 hrs.



References for Anticoagulation

- **ASRA Guidelines**
- Kopp SL, Vandermeulen E, McBane RD, Perlas A, Leffert L, Horlocker T. Regional anesthesia in the patient receiving antithrombotic or thrombolytic therapy: American Society of Regional Anesthesia and Pain Medicine Evidence-Based Guidelines (fifth edition). Reg Anesth Pain Med. 2025 Jan 29:rapm-2024-105766. doi: 10.1136/rapm-2024-105766. Epub ahead of print. PMID: 39880411.
- **Considerations**
  - Time interval for discontinuation of anticoagulation before neuraxial or deep plexus/peripheral block
  - Time interval between needle placement/catheter removal and first postoperative dose of anticoagulation
  - Accidental dosing of anticoagulation with neuraxial catheter in situ
  - HIT with platement count assessment after >4 days of IV or SC unfractionated heparin

Regional Anesthesia and Analgesia

- **Indications:**
  - Reduce respiratory complications of GA and systemic opioids for patients with OSA, obesity, pulmonary disease, and the elderly
  - Difficult airway
  - History of PONV
  - Preference to be conscious
  - Coagulopathy or anti-coagulated
  - Reduce CV complications of GA (e.g. aortic stenosis)
  - Reduce urinary retention (elderly, male, BPH, DM, HTN, bladder or prostate surgery)

Source: Admir Hadzic: Hadzic's Textbook of Regional Anesthesia and Acute Pain Management, Second Edition
www.AccessAnesthesiology.com

Regional Anesthesia-Contraindications

- **Absolute:**
  - Lack of consent
  - Inability to cooperate
  - Allergy to LA
- **Relative:**
  - Infection at injection site
  - Coagulopathy or anticoagulation (for noncompressible locations such as lumbar plexus, paravertebral, infraclavicular, quadratus lumborum)
  - Pre-existing neurologic deficits in the distribution of the

Regional Anesthesia and Analgesia Continued

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Reduces postoperative pain and opioid requirements, may reduce the risk of CPSP

- Continuous (percutaneous catheter) vs. Single Shot peripheral nerve blocks
- Instillation of local anesthetic prior to incision and/or at closure
- Rectus sheath, erector spinae, quadratus lumborum, TAP etc. plane blocks

PMID:35351743

Regional Anesthesia/Surgical Field Blocks 1

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2024 Systematic Review and Meta-Analysis of perioperative regional anesthesia on persistent opioid use and chronic pain after noncardiac surgery

- **37 studies analyzed**
- Results showed that regional anesthesia had a **significant effect** on **reducing prolonged opioid use** *(relative risk [RR] 0.48, 95% CI, 0.24-0.96, P = .04, I 2 0%, 5 trials, n = 348 patients, GRADE low quality)*.
- Pooled estimates for **chronic pain** also indicated a **significant effect favoring regional anesthesia** at 3 (RR 0.74) and 6 (RR0.72) months after surgery.
- Demonstrated no effect at 12 months after surgery

PMID: 39231035

Regional Anesthesia Medications

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Local anesthetics commonly used for peripheral nerve block

Anesthetic	Onset (minutes)	Duration of anesthesia* (hours)	Duration of analgesia* (hours)	Maximum dose*¶ (mg/kg) without/with epi
2% lidocaine	10 to 20	2 to 5	3 to 8	4.5/7
1.5% mepivacaine	10 to 20	2 to 5	3 to 10	5/7
0.2% ropivacaine	15 to 30	n/a	5 to 16	3/3.5
0.5% ropivacaine	15 to 30	4 to 12	5 to 24	3/3.5
0.25% bupivacaine	15 to 30	n/a	5 to 26	2.5/3
0.5% bupivacaine (+epi)	15 to 30	5 to 15	6 to 30	2.5/3

Adapted from: Gadsen J. Local Anesthetics: Clinical Pharmacology and Rational Selection. The New York School of Regional Anesthesia website, October 2013.

UpToDate®

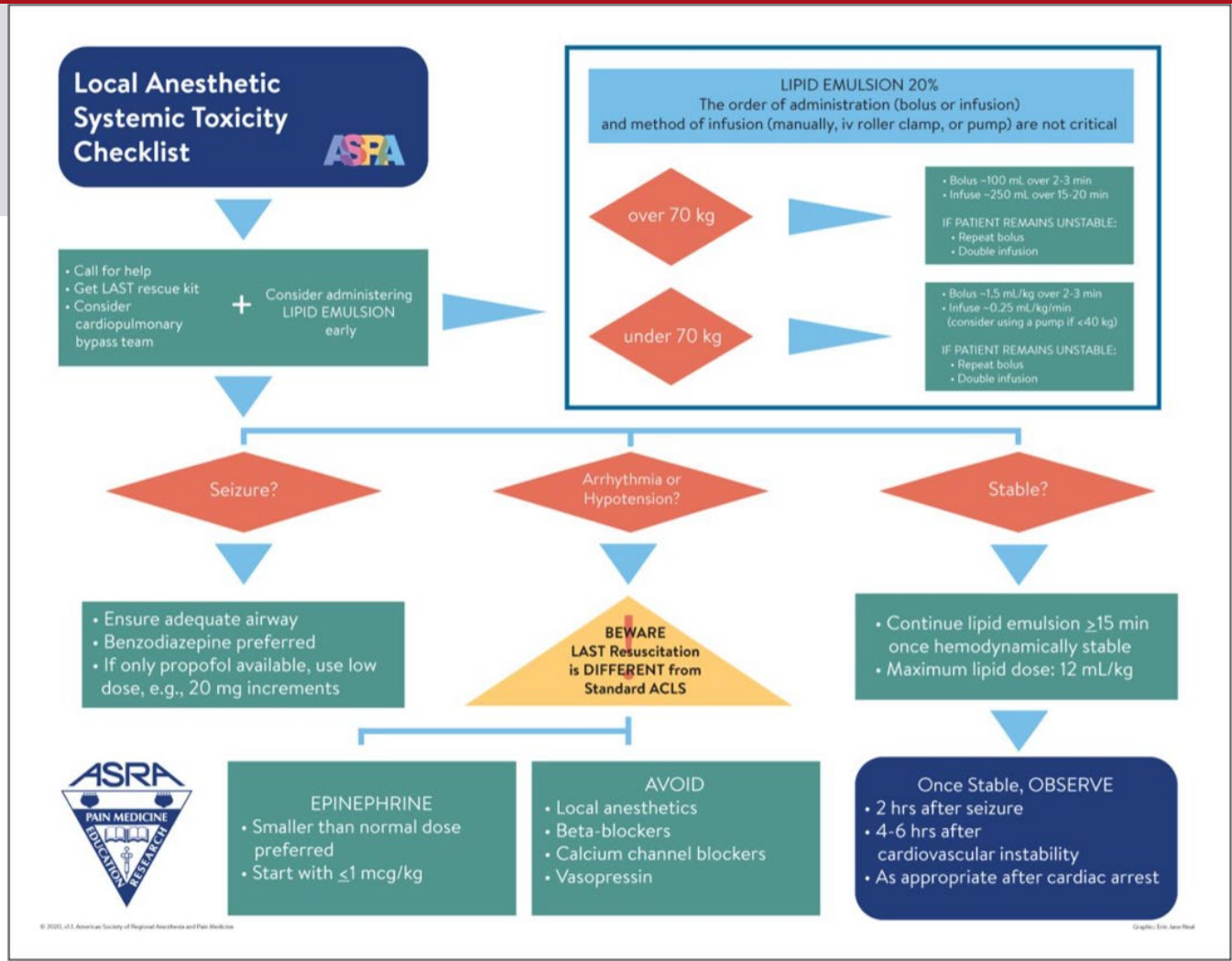
Regional Anesthesia Complications

- **Vasovagal**
- **Inadvertent IV injection**
- **Local Anesthetic Systemic Toxicity (LAST)**
- **Rebound pain**
- **Permanent nerve damage (0.015-0.09%, 0.21% with catheters)**
  - Pre-existing nerve damage
  - Longer beveled needles
  - LA neurotoxicity
- **Hematoma**
- **Allergic reaction**
- **Infection**
- **Myotoxicity**
- **Secondary Injury**

Shiraishi T. Large Hematoma Following Ultrasound-Guided Rectus Sheath Block. Local Reg Anesth. 2025 Jun 9;18:39-44. doi: 10.2147/LRA.S511201. PMID: 40519556; PMCID: PMC12164880.

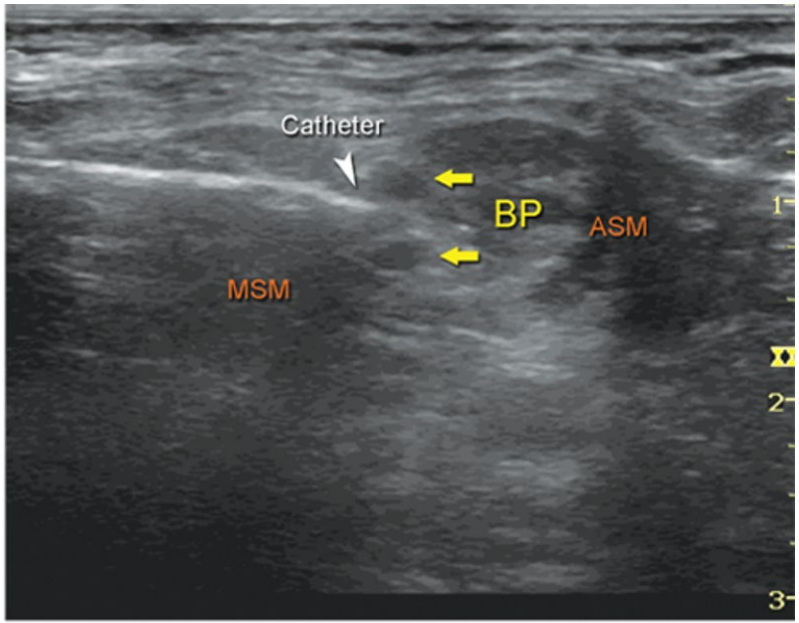
LAST

- **CNS:** tinnitus, circumoral numbness, metallic taste, agitation, dysarthria, seizures, loss of consciousness
- **CV:** hypotension, bradycardia, arrhythmias, **CV collapse**
- **Respiratory arrest**



Joseph M Neal et al. Reg Anesth Pain Med 2021;46:81-82

Regional Anesthesia Upper Extremity 1



Interscalene block, catheter placement

Source: Admir Hadzic: Hadzic's Textbook of Regional Anesthesia and Acute Pain Management, Second Edition
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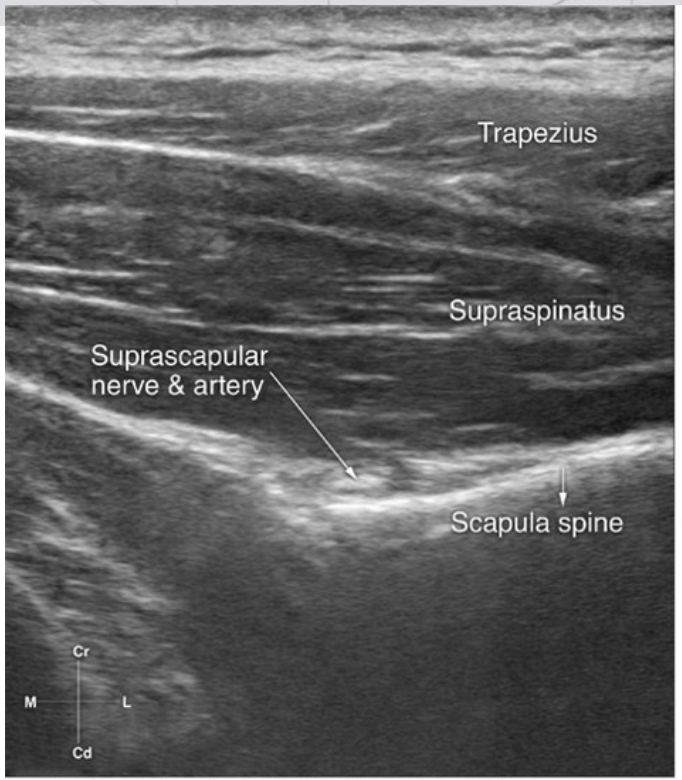

Admir Hadzic: *Hadzic's Peripheral Nerve Blocks and Anatomy for Ultrasound-Guided Regional Anesthesia, 3ed.*

Regional Anesthesia Upper Extremity 2

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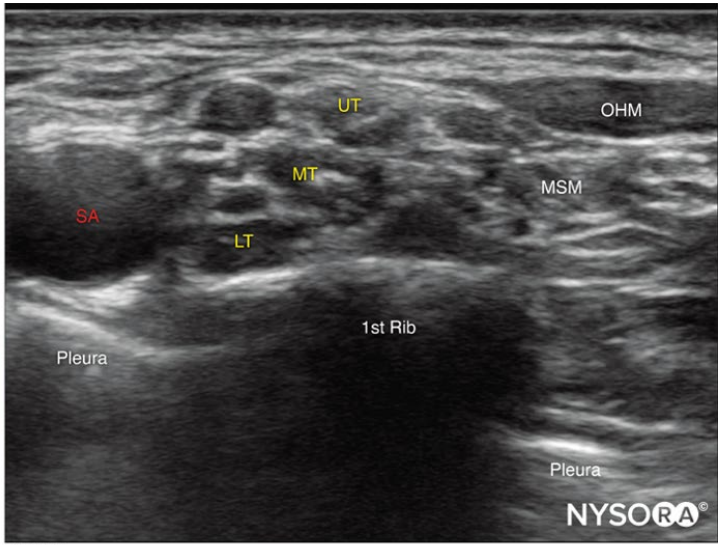

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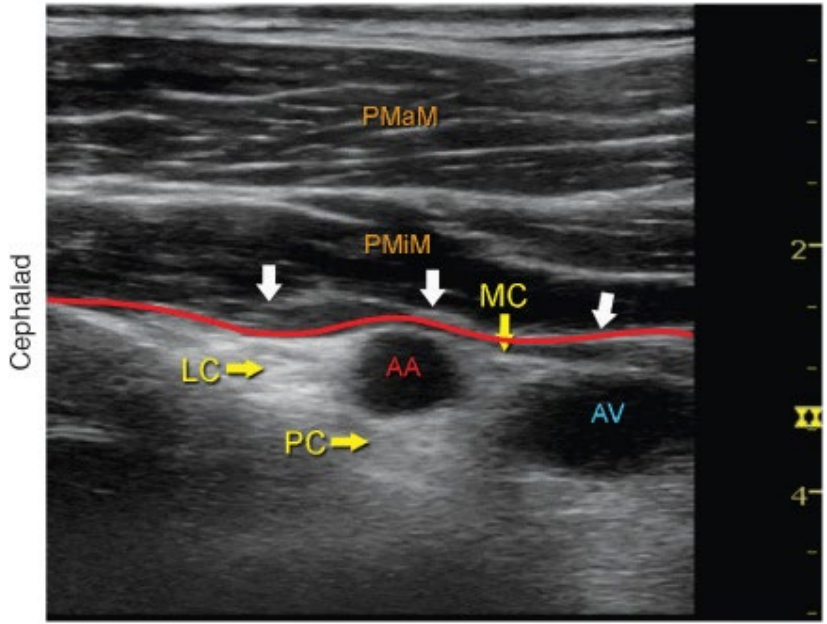
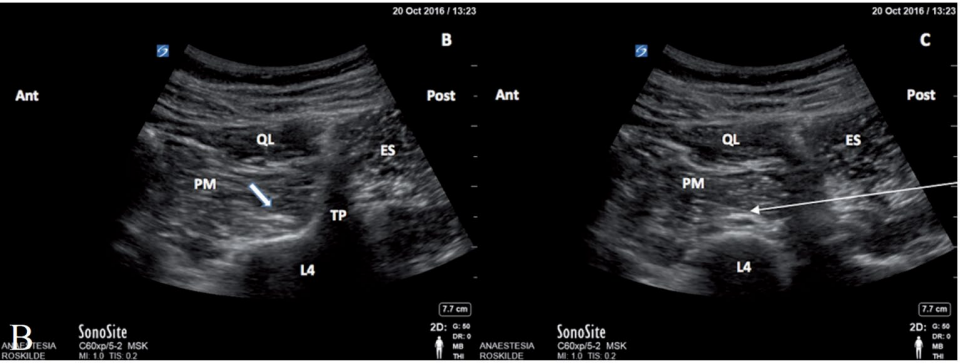
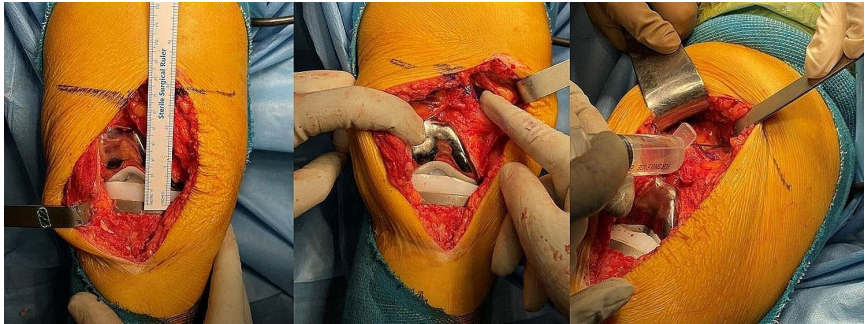


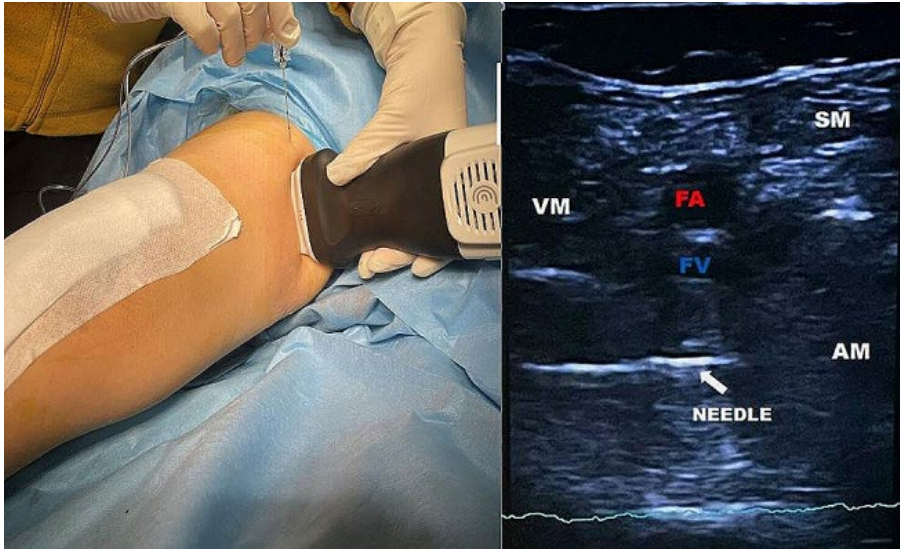
Infraclavicular block

Regional Anesthesia Lower Extremity 1



From: Nielsen MV, Bendtsen TF, Børglum J. Superiority of ultrasound-guided Shamrock lumbar plexus block. Minerva Anestesiol. 2018 Jan;84(1):115-121.





Cakmak MF, Horoz L, Arslan FN, Demir OU, Basarir K. Comparison ultrasound-guided adductor canal block and surgeon-performed block for pain management after total knee arthroplasty: a prospective randomized controlled study. BMC Musculoskelet Disord. 2024 Aug 10;25(1):637.

Regional Anesthesia Lower Extremity 2

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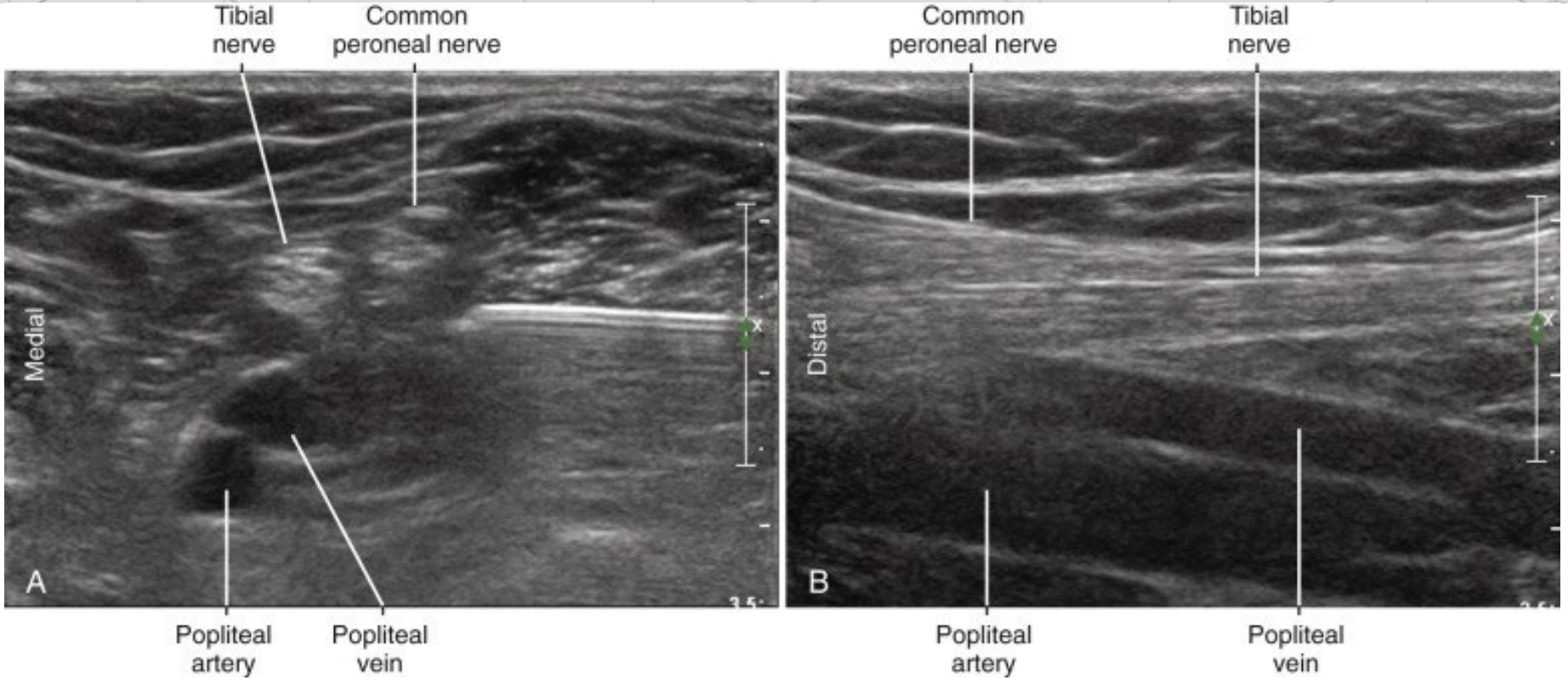
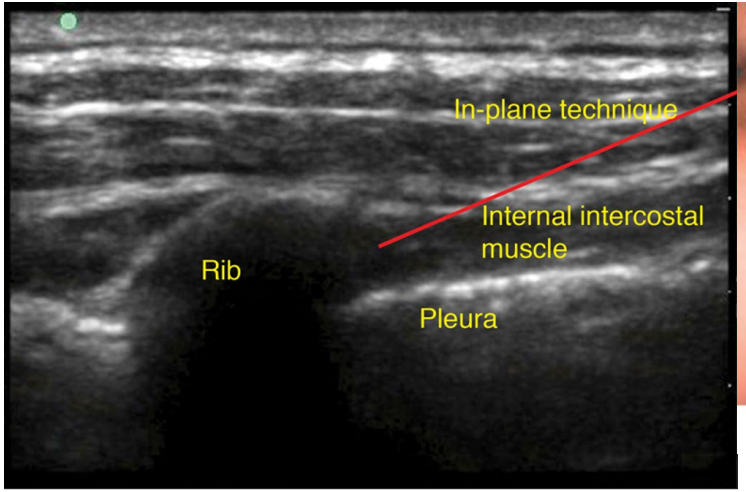
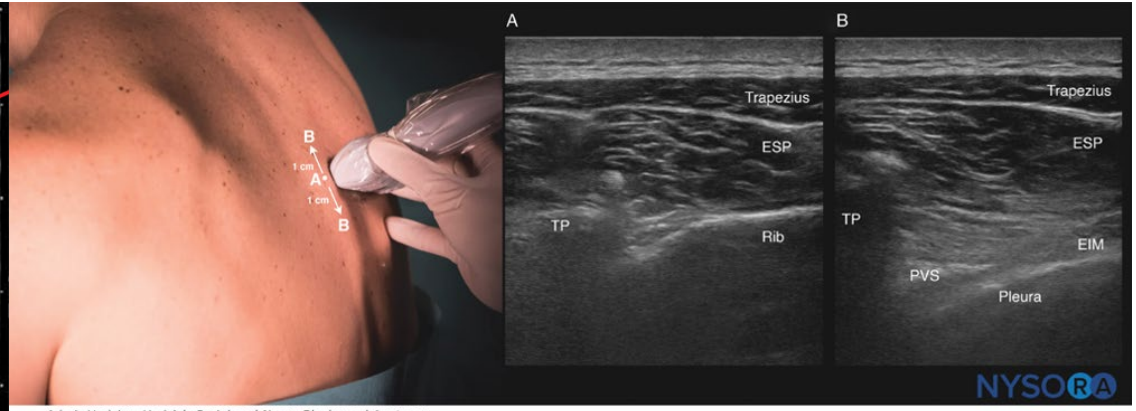


Regional Anesthesia-Trunk and Abdomen

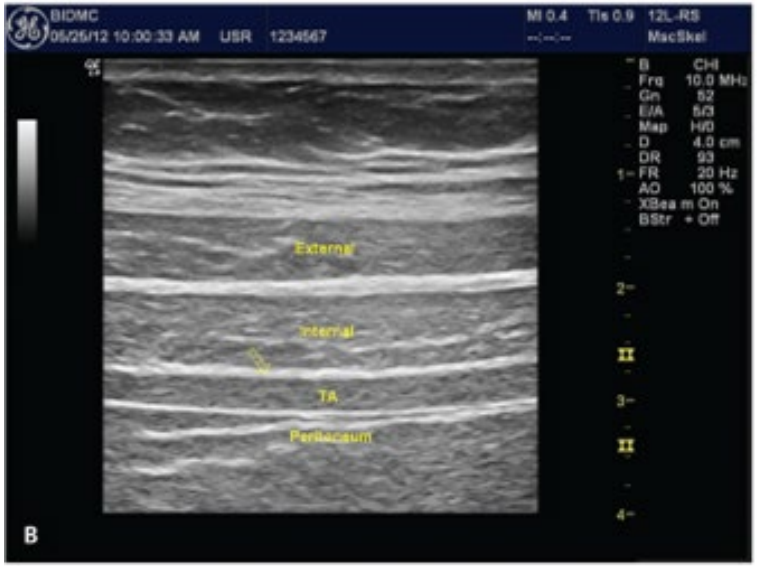


Source: Atchabahian A, Gupta R: *The Anesthesia Guide*
www.accessanesthesiology.com

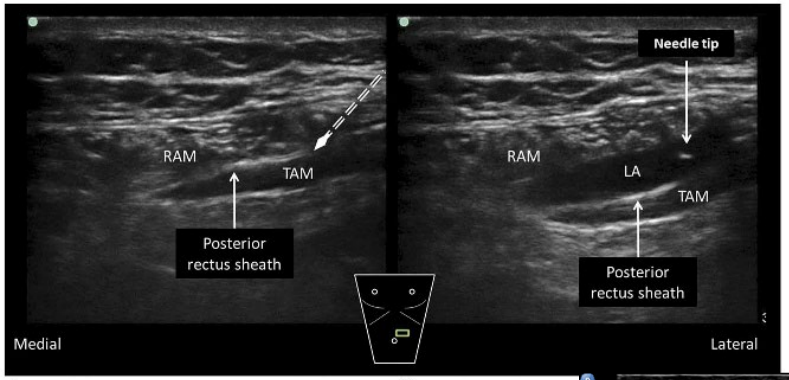


Admir Hadzic: *Hadzic's Peripheral Nerve Blocks and Anatomy for Ultrasound-Guided Regional Anesthesia, 3ed.*

Regional Anesthesia-Trunk and Abdomen Continued



Source: Zahid H. Bajwa, R. Joshua Wootton, Carol A. Warfield: *Principles and Practice of Pain Medicine*, 3rd Edition
www.accessanesthesiology.com



Chin KJ, McDonnell JG, Carvalho B, Sharkey A, Pawa A, Gadsden J. Essentials of Our Current Understanding: Abdominal Wall Blocks. Reg Anesth Pain Med. 2017 Mar/Apr;42(2):133-183.

Regional Anesthesia/Surgical Field Blocks 2

2024 Systematic Review and Meta-Analysis of role of supplemental regional analgesia blocks after major non-cardiac surgeries on postoperative neurocognitive dysfunction

- **26 Randomized clinicals analyzed**, consisting of **4414 patient**s
- The **regional analgesia** group had a **significant reduction** in the incidence of **postoperative neurocognitive dysfunction**
- OR 0.46 (95% CI 0.35 to 0.59; p<0.00001; I2=28%)
- Studied surgeries included: Hepatectomy, Spine Surgery, Hip Fracture Surgery, Pulmonary Resection, Esophagectomy, Abdominal Surgery, Colorectal resection, VATS, gastrectomy

PMID: 36535728

Regional Anesthesia/Surgical Field Blocks 3

- **TAP blocks:**
  - decreased length of stay following **laparoscopic colorectal surgery** compared to systemic opioids
  - superior to rectus sheath blocks or subcutaneous infiltration for patients undergoing **abdominoplasty** with reduced opioid use, decreased pain
- **S-PECS block (serratus anterior and PECS-2 blocks):**
  - demonstrated reduced pain following **breast augmentation** with reduced need for additional pain medications
- **Quadratus lumborum block:**
  - demonstrated reduced pain and opioid consumption for **abdominoplasty**
- **Wound catheter infusion with local anesthetic in pediatric surgery:**
  - reduced pain and opioid requirements after abdominal and extremity operations

Regional Anesthesia/Surgical Field Blocks 4

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+ **Total knee arthroplasty and total hip arthroplasty:**
  - Obturator
  - Sciatic
  - Lumbar plexus-psoas
  - Adductor canal
  - Pericapsular nerve group
+ **International Consensus on Anesthesia-Related Outcomes after Surgery recommends peripheral nerve blocks for total joint arthroplasty**
  - Reduced risk seen for serious postoperative complications
  - **16.2% and 12.7% reduction in postoperative opioid consumption** for THA and TKA respectively

PMID 39597962

CMS CENTERS FOR MEDICARE & MEDICAID SERVICES | SAS6052 SECTION 6052 OF THE SUPPORT ACT | COMPASS OPIOID STEWARDSHIP PROGRAM

Regional Anesthesia/Surgical Field Blocks 5

Motor sparing: Local infiltration analgesia, Adductor canal blocks, iPACK (infiltration between popliteal artery and capsule of knee), genicular nerve blocks for TKA

- **Single-shot adductor canal block vs. LIA provide similar postoperative analgesia**
- Modest analgesic benefit of adding adductor block canal catheter to LIA
- Genicular nerve blocks improve analgesic outcomes compared to placebo
- **Genicular blocks with 20-40 ml of LA produce equivalent analgesia to high volume (150ml) LIA**
- **iPACK produces similar or better analgesia compared to LIA while using half the LA**
- No additional benefit of iPACK combined with LIA
- LIA- can include LA, epinephrine, NSAIDS, opioids, steroids, reduces short-term postoperative pain, length of hospital stay, and opioid consumption after TJA, reduced nausea, and improved ROM 24 and 48 hrs after surgery compared to epidural

PMID: 39753403

Table 1 Comparative Overview of Ultrasound-Guided Nerve Blocks Across Various Fracture Types

Fracture Type	Anesthesia Technique	Advantages	Disadvantages
Clavicle and Upper Limb	Ultrasound-Guided Continuous Interscalene Block	Profound analgesia for shoulder surgeries	Risk of diaphragmatic paralysis
	Supraclavicular and Costoclavicular Blocks	Costoclavicular approach preserves diaphragmatic function	Supraclavicular may impair pulmonary function
	Continuous Infraclavicular and Axillary Blocks	Stable analgesia, minimized risk of catheter displacement	Requires precise anatomical knowledge
Thoracic and Lumbar	Medial Branch Block	Directly targets pain centers for spine surgeries	High anatomical knowledge required
	Thoracolumbar Interfascial Plane Block	Extensive coverage for severe pain management	Risk of incomplete blockade
	Erector Spinae Plane Block	Simpler to perform, effective for thoracic surgeries	Limited data on efficacy in lumbar surgery
Hip Fracture	Lumbar Plexus Block	Prolonged pain control for extensive surgeries	Risk of kidney and intestinal injury
	Femoral Nerve Block	Reduces opioid requirement, effective pain control	May cause muscle weakness, increasing fall risk
	Fascia Iliaca Compartment Block	Long duration of analgesia, eases positioning pain	May cause hypotension before lumbar anesthesia
	Quadratus Lumborum Block	Extends analgesia, reduces opioid consumption	Variable effectiveness in different studies
	Fascia Obturator Nerve Block	Targets pain from hip to medial thigh effectively	Requires high precision and anatomical knowledge
	PENG Block	Targets pericapsular nerves effectively	Risk of inadvertent motor blockade

Yi R, Li Z, Yang X, Huang T, Liu H, Zhang J. The Utilization of Ultrasound-Guided Regional Nerve Blocks in Anesthetic Management for Fracture Surgery. J Pain Res. 2025 Jan 20;18:353-366. doi: 10.2147/JPR.S492151. PMID: 39867533; PMCID: PMC11761137.

Regional Anesthesia/Surgical Field Blocks 6

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+ **Liposomal bupivacaine**
  - **extended duration of action** reducing need for repeated injections
  - **inconsistent outcomes** compared to conventional local anesthesia
  - **possible reductions in opioid medication use and improved QOL**
  - high cost is a concern and prohibitive for use
+ **Dosing: up to 266mg (20ml), 25g or larger needle to maintain structural integrity of liposomes**
+ **Contraindications: obstetrical paracervical block (fetal bradycardia and death)**
+ **AE: LAST, lipid emulsion 20%**
+ **Management of rebound pain after discontinuation of RA**

Regional Anesthesia/Surgical Field Blocks 7

Weinstein EJ, Levene JL, Cohen MS, Andreae DA, Chao JY, Johnson M, Hall CB, Andreae MH. **Local anesthetics and regional anesthesia versus conventional analgesia for preventing persistent postoperative pain in adults and children.**

- **Epidural analgesia reduces PPSP** at 3-18 months (OR 0.52, NNT 7) among patients undergoing **thoracotomy**
- **Paravertebral block reduces PPSP** at 3-12 months (OR 0.43, NNT 7) amongst patients undergoing **breast cancer surgery**
- Perioperative administration 48-72 hours

Cochrane Database Syst Rev. 2018;6:CD007105

Cardiac Surgery

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- Routine use of TEA for managing sternotomy pain is not recommended due to neurologic sequelae in patients receiving full anticoagulation
- Recommend continuous bilateral paravertebral block for sternotomy pain
- Recommend continuous bilateral ESPB or single shot parasternal intercostal plane blocks as an adjunct to multimodal analgesia for sternotomy pain
- A single shot or continuous serratus anterior plane block may be an adjunct to multimodal analgesia for acute pain after minimally invasive cardiac surgery
- PMID: 39855959

Thoracic Surgery

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- **Epidural- gold standard**
- **Paravertebral block-** no significant difference in pain scores compared with TEA after thoracotomy, reduced rate of hypotension, ileus, sedation, PONV, pruritus, urinary retention
- **Erector Spinae Plane Block-**non-inferior to epidural, comparable to PVB
- **Intercostal block-** lower pain during the first 24 hours after surgery compared to systemic analgesia, non-inferior to epidural and PVB, helpful in event of contraindication to epidural or PVB
- **Serratus anterior block-**No difference in pain scores during 1st 24 hours compared to epidural
- PMID: 39797121

Conclusions

- Regional and neuraxial anesthesia represent an integral component of multimodal analgesia with effects spanning from the intraoperative to post-discharge phases of surgery.
- Both immediate alleviation of acute pain and opioid-sparing effects and the decreased incidence of persistent post-surgical pain and long-term opioid use after surgery are important advantages to incorporating these techniques into a patient's perioperative pain management plan.
- Despite the safety of these techniques, continued monitoring for adverse effects and timely management of complications is critical.
- Patient education should include the advantages of these techniques as well as potential adverse effects including the development of breakthrough pain upon discontinuation of continuous regional or neuraxial analgesia after surgery.

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Compass SHARP

Jillian Schneider, MHA, CPPS
Program Director
Compass Healthcare Collaborative
schneiderj@compasshcc.org

Sharmie Russell, ACEA
Project Support Specialist
Compass Healthcare Collaborative
russells@compasshcc.org

Melissa Perry, MSW, LCSW
Project Coordinator
Compass Healthcare Collaborative
perrym@compasshcc.org

Amanda Dolon, BSN, RN, CDCES, CPHQ, CPPS
Clinical Improvement Consultant
Compass Healthcare Collaborative
dolona@compasshcc.org

Thank you

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