



# MULTIMODAL PAIN MANAGEMENT: ENHANCING PATIENT CARE

## **An Integrated Approach to Pain Relief**

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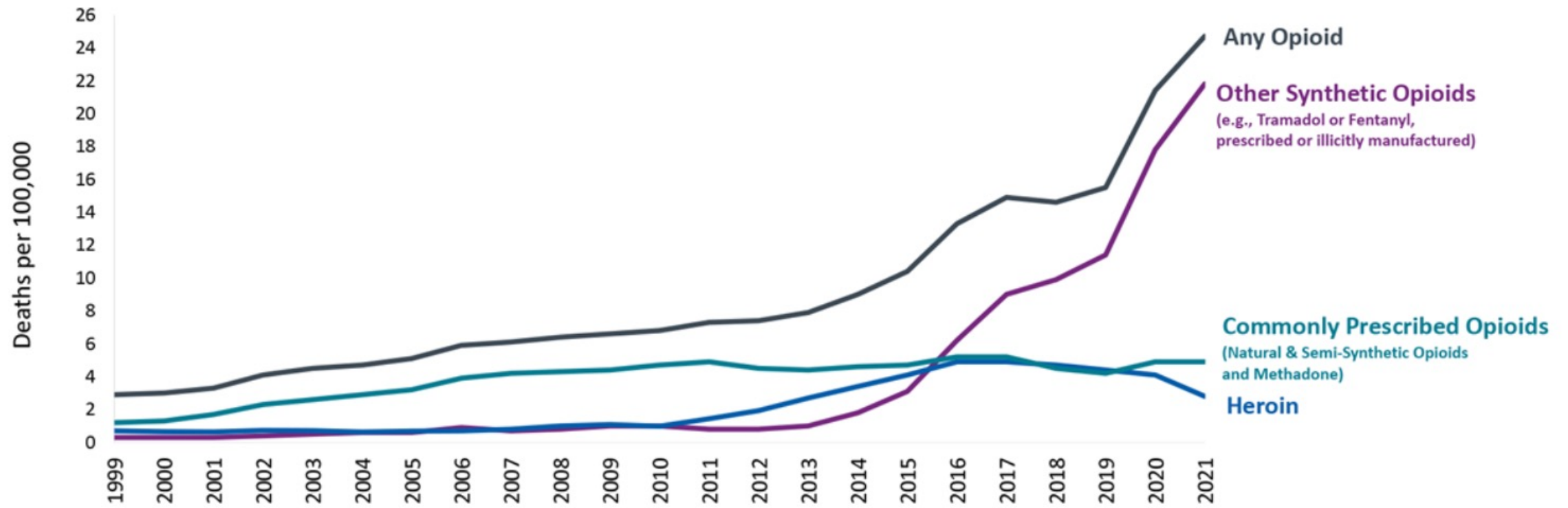
# MULTIMODAL PAIN MANAGEMENT

- Use of different analgesics, blocks, physical modalities, and cognitive strategies to obtain better pain relief with fewer side effects and M&M, utilizing their synergistic effects

# OPIOID CRISIS



# Three Waves of Opioid Overdose Deaths



↑  
Wave 1: Rise in Prescription Opioid Overdose Deaths Started in the 1990s

↑  
Wave 2: Rise in Heroin Overdose Deaths Started in 2010

↑  
Wave 3: Rise in Synthetic Opioid Overdose Deaths Started in 2013

SOURCE: National Vital Statistics System Mortality File.



**220**  
**PEOPLE**

died each day from  
an opioid overdose  
in 2021.

[www.cdc.gov](http://www.cdc.gov)

# MULTIMODAL PAIN MANAGEMENT

- Better pain relief with fewer side effects due to the synergistic effects of different classes of medications
- Earlier discharge from hospital after surgery (ERAS)
- Decreased risk of chronic opioid addiction and overdose
- Opioids were involved in 80,411 overdose deaths in 2021 (75.4% of all drug overdose deaths)
- Overprescribing results in unused opioids dispersed into community

# GOALS OF MPM

- Better pain control
- Decrease side effects: nausea, sedation, resp. depression, constipation
- Decrease in M&M
- Decrease in healthcare costs – ERAS expedites recovery and discharge
- Decreased physician contribution to the opioid epidemic

# TYPES OF PAIN

- Acute vs Chronic
- Nociceptive pain: Somatic, Visceral
- Neuropathic
- Referred
- Breakthrough
- Mild: non-opioids
- Moderate & Severe: Opioids & non-opioids



# NOCICEPTIVE PAIN

- **Somatic:** Postop pain, back pain, exercise injuries  
aching, cramping, gnawing, sharp

Deep: skeletal structure, tendons, and muscles

Superficial: lacerations, abrasions, minor burns.

- **Visceral:** Caused by inflamed, diseased, damaged or injured internal organs

# NEUROPATHIC PAIN

- Pain caused by a lesion or disease of the somatosensory nervous system
- Nerve pain caused by malfunctioning or damaged nervous system
- Abnormal hypersensitivity to stimuli (hyperalgesia) and nociceptive responses to non-noxious stimuli (allodynia)

# COMPONENTS OF MPM

- Medications
- Interventional procedures – Nerve Blocks
- Physical therapy
- Cognitive-behavioral therapy
- Alternative therapies (acupuncture, massage)

# MULTIMODAL PAIN MANAGEMENT

- Opioids
- NSAIDs/COX-2 inhibitor & Acetaminophen
- Gabapentinoids (Gabapentin, Pregabalin)
- Benzodiazepines
- Muscle relaxants
- Topical patches
- Ketamine
- Nerve blocks
- TENS
- Cryotherapy
- Cognitive strategies

# OPIOIDS

- Opioids are  $\mu$  receptor agonists (also  $\kappa$  and  $\delta$  agonists)
- Cause analgesia, euphoria, respiratory depression
- Reversed by Naloxone
- SE: sedation, resp. depr., nausea, hypotension, pupillary constriction, constipation
- Worry about addiction and overdose
- Opioids + NSAIDS  $\rightarrow$   $1+1=3$

# NSAIDS

- NSAIDs inhibit the COX-1 and COX-2 enzymes, therefore decreasing the synthesis prostaglandins (pro-inflammatory mediators), and thromboxanes, (needed for coagulation)
- Most NSAIDs are non-selective, and inhibit both COX-1 & COX-2, reducing inflammation, but also inhibit platelet aggregation and increase the risk of GI ulcers and bleeding
- COX-2 selective inhibitors (Celecoxib) have fewer GI side effects, but promote thrombosis, and some of these agents substantially increase the risk of cardiac events, so some have been discontinued (Rofecoxib)
- Contraindications: Renal dz, asthma, PUD,
- COX-2 inhibitors contraindications: CAD

# ACETAMINOPHEN/PARACETAMOL

- Alternative to NSAIDs
- Analgesic, antipyretic
- MOA: Blocks prostaglandin synthesis from arachidonic acid by inhibiting COX-1 and COX-2
- Contraindications: Liver dz, alcoholics
- Do not exceed 4g in 24h

# GABAPENTINOIDS (GABAPENTIN, PREGABALIN)

- Anticonvulsives
- Inhibit the release of excitatory neurotransmitters
- Useful for analgesia in neuropathic pain such as postherpetic neuralgia
- Decreases total opioid consumption post-operatively significantly when used perioperatively
- SE; Somnolence, confusion, fatigue



# BENZODIAZEPINES

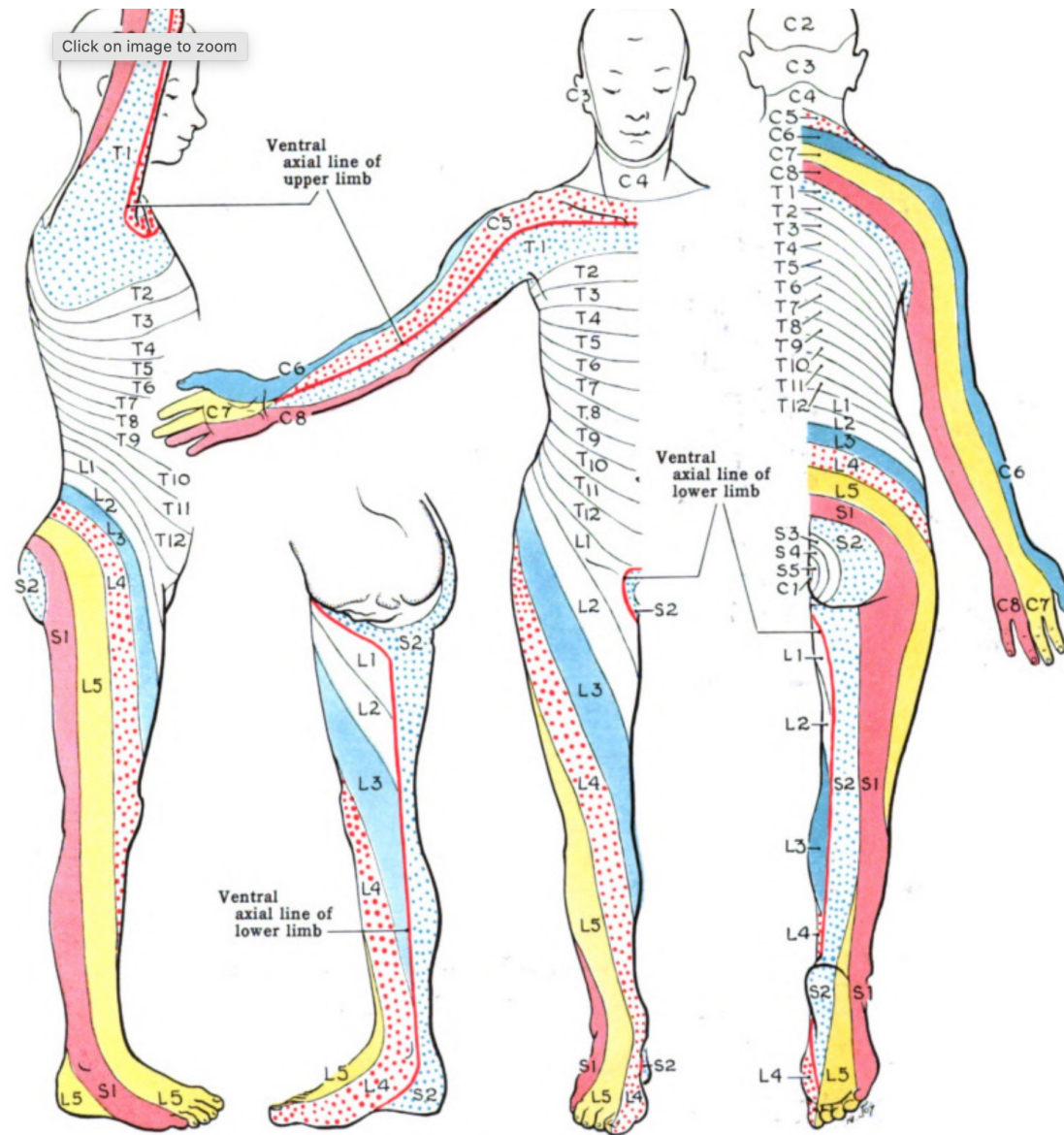
- GABA-A receptor agonists
- Versed causes anxiolysis and anterograde amnesia
- Reversed by Flumazenil
- DOA : 2-3 hrs
- SE: Sedation
- Valium, Xanax, Ativan, Klonopin

# KETAMINE

- NMDA antagonist
- Analgesic and anesthetic effects
- Causes dissociative anesthesia by dissociating sensory impulses from the sensory cortex
- Activates the SNS
- SE; Hallucinations, emergence delirium, minimal resp.depr.

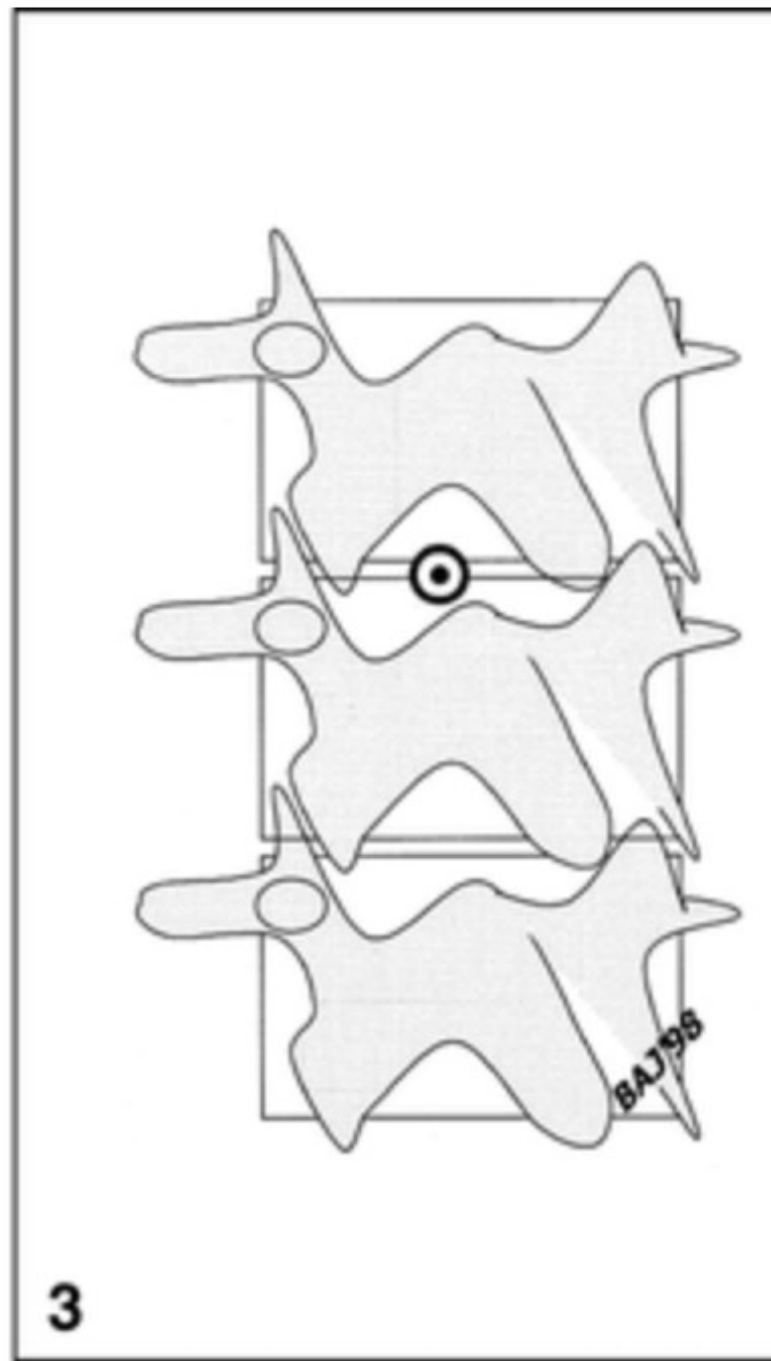
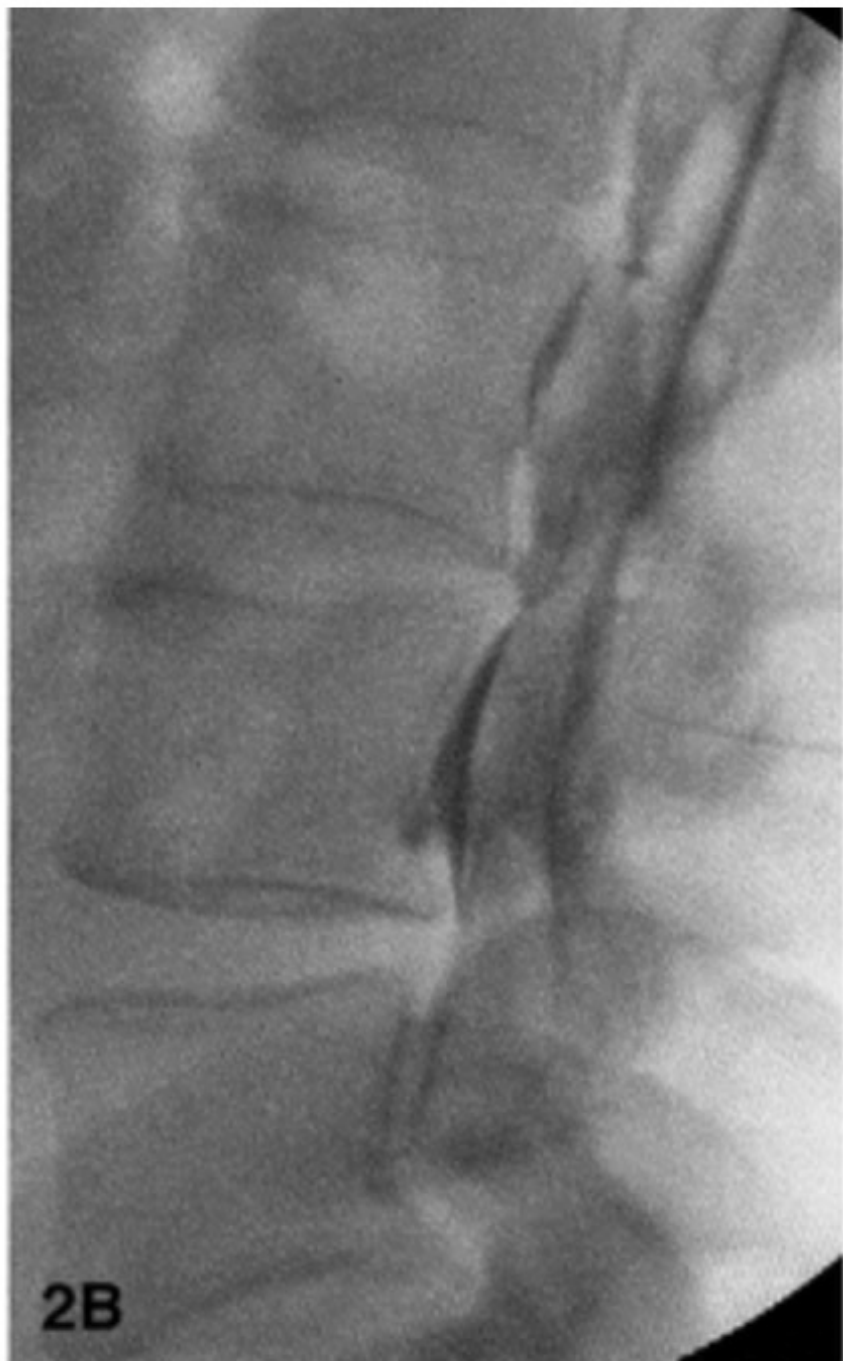
# INTERVENTIONAL PROCEDURES

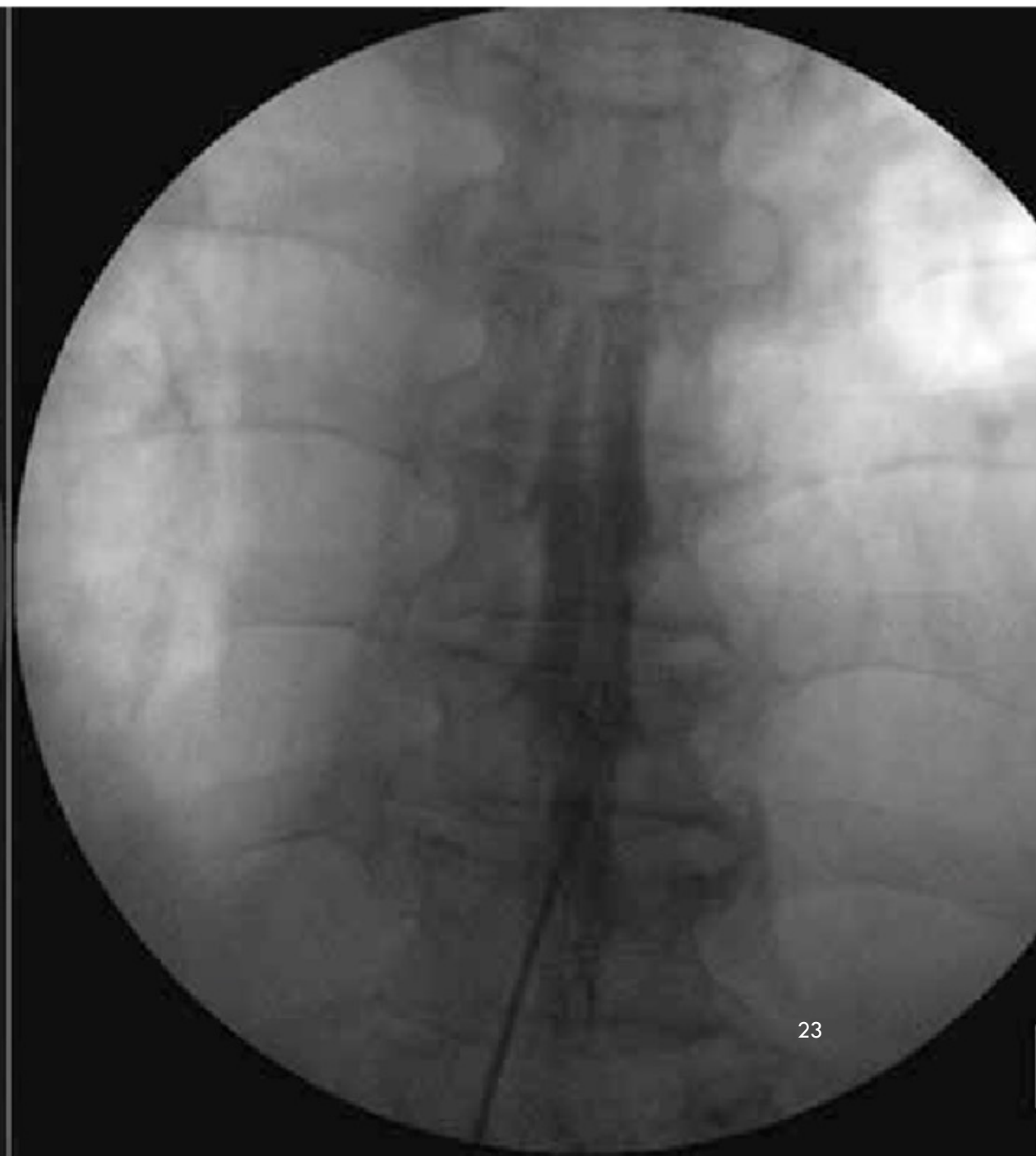
- Injections/blocks for chronic pain conditions such as back pain, CRPS, headaches, pancreatic cancer
- Perioperative pain blocks before, during, and after surgery

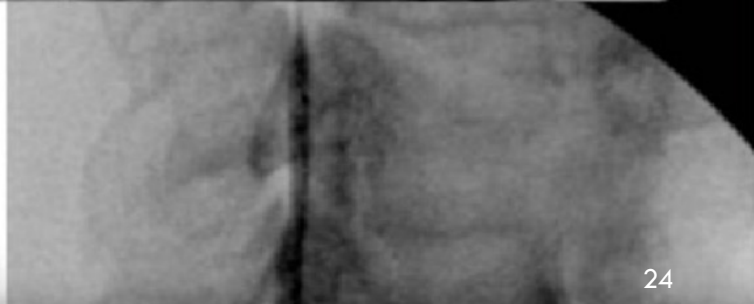
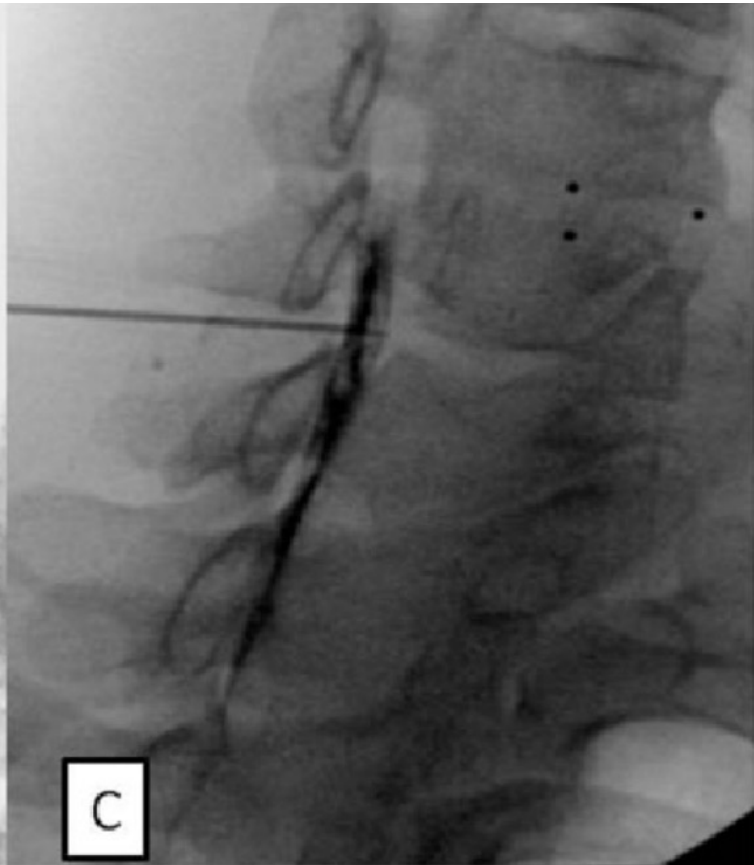
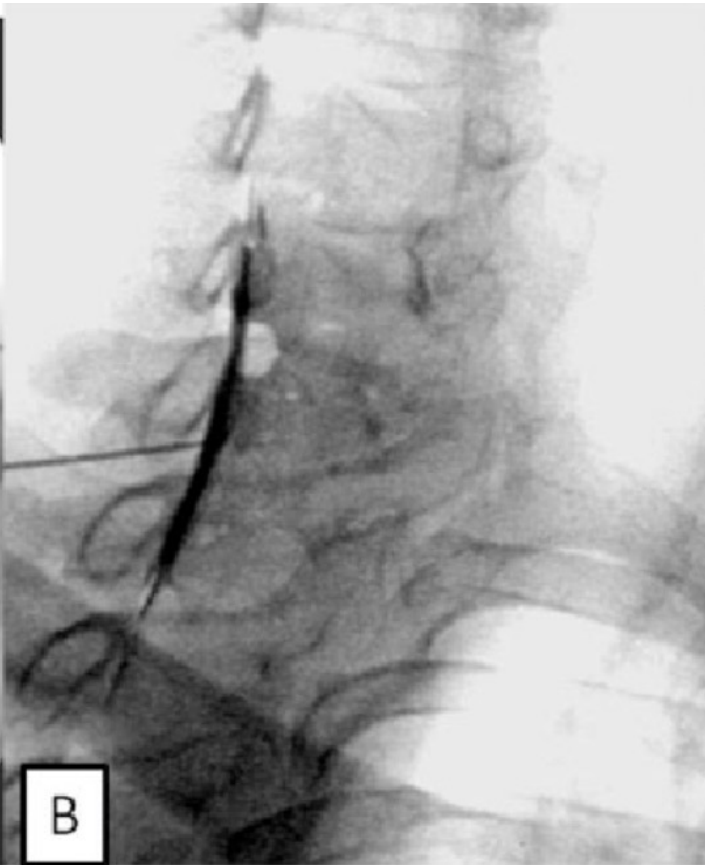
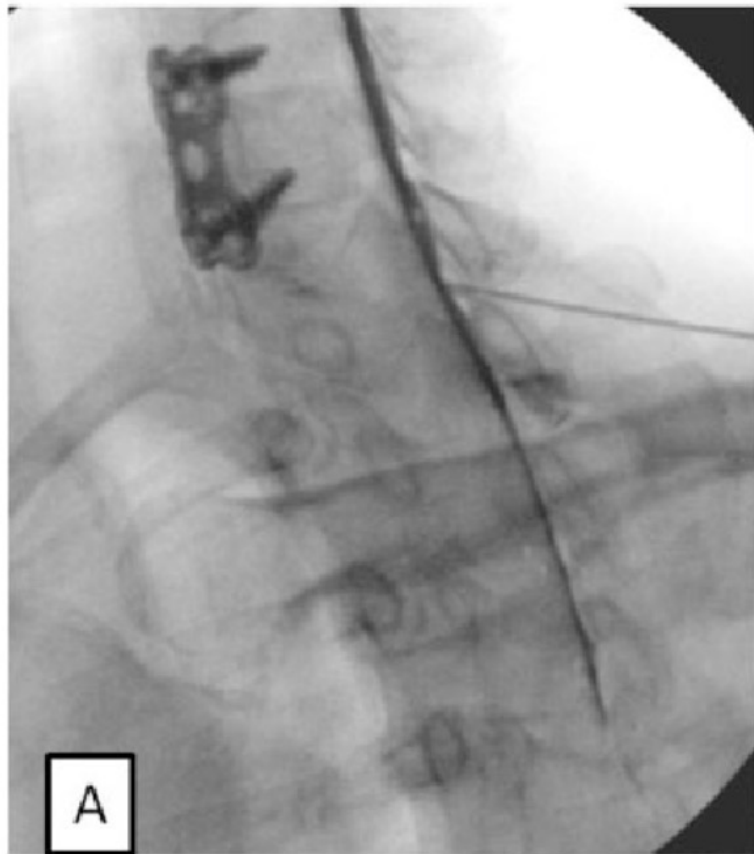


# EPIDURAL STEROID INJECTIONS

- Lumbar
- Thoracic
- Cervical



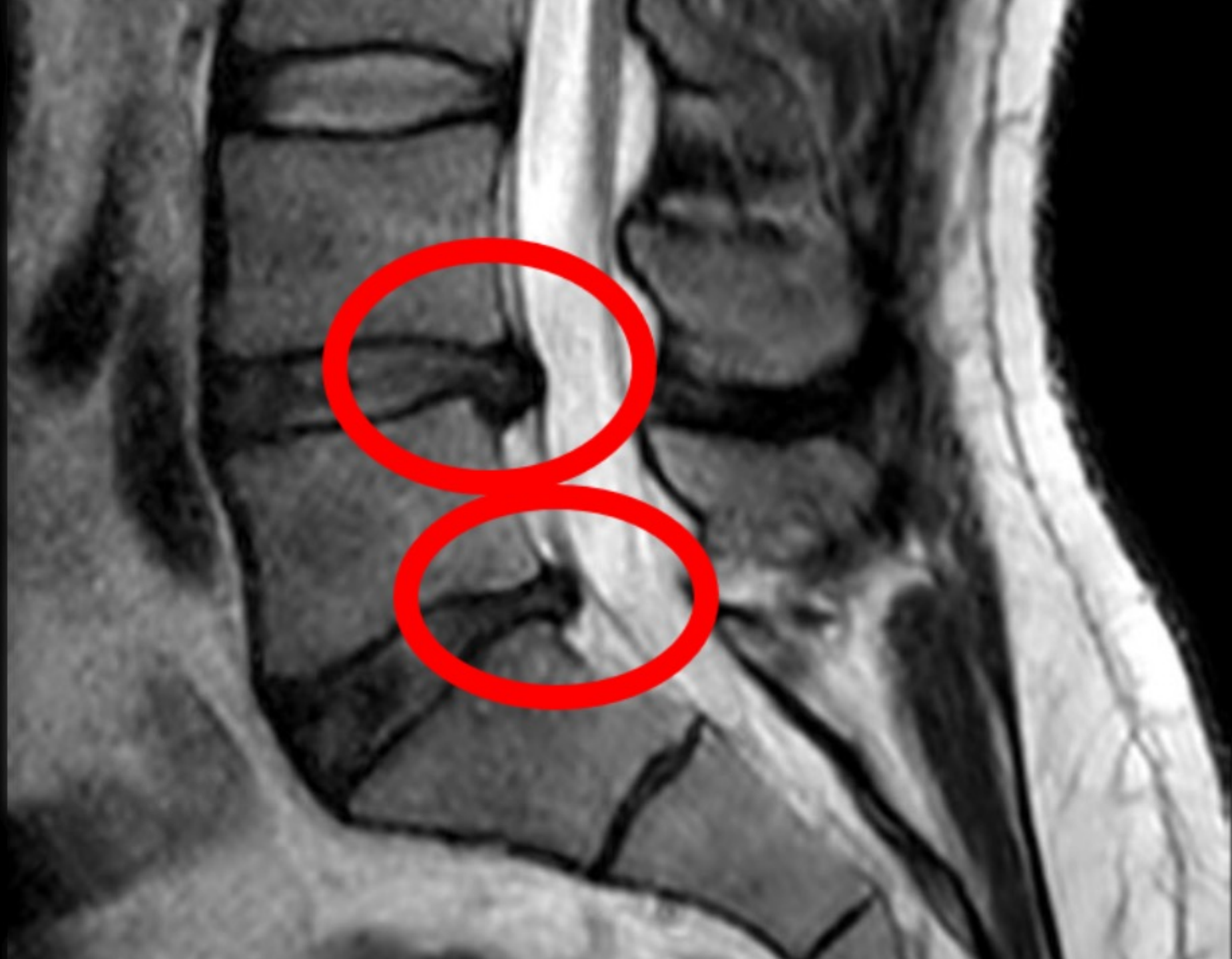


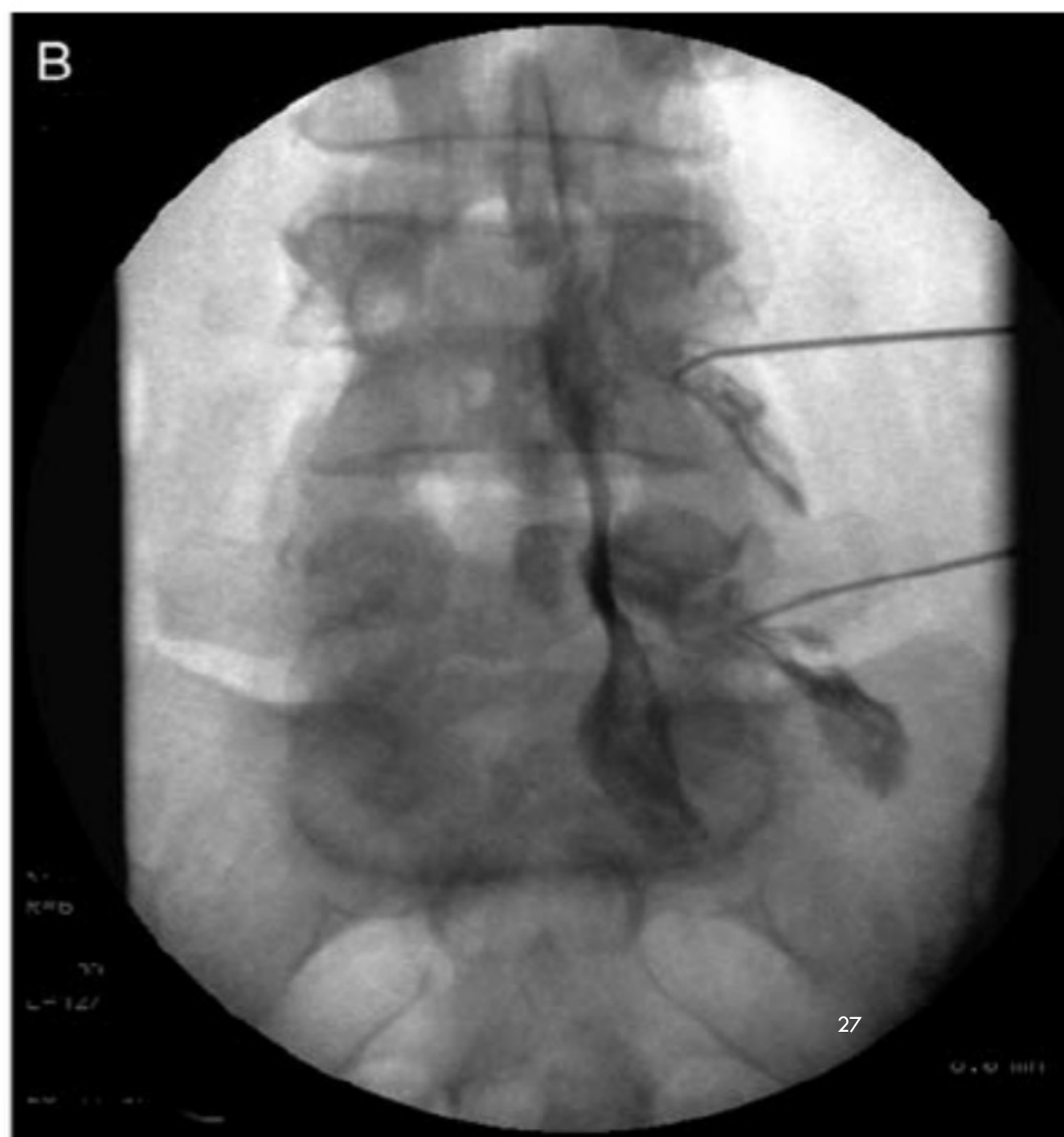
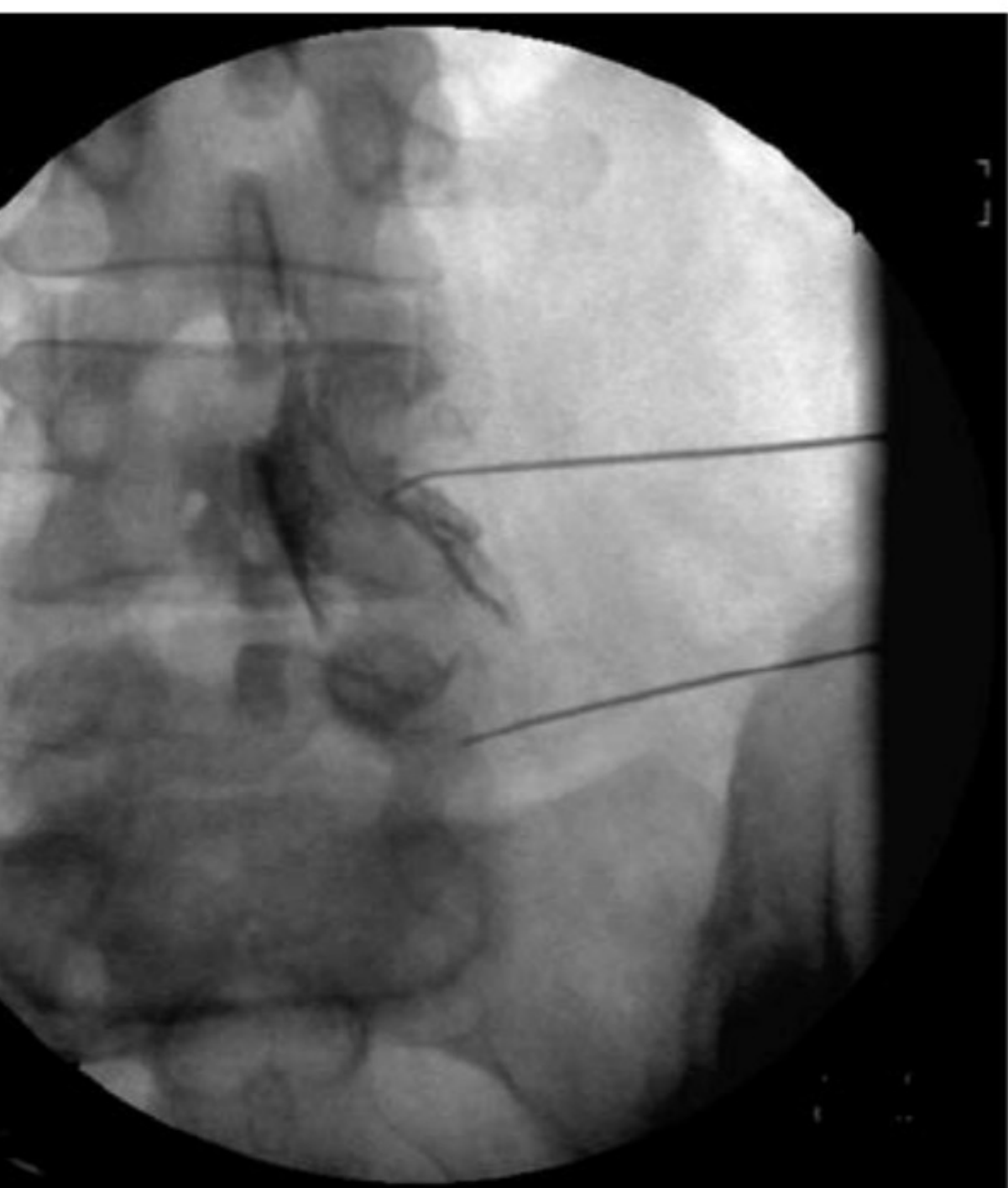


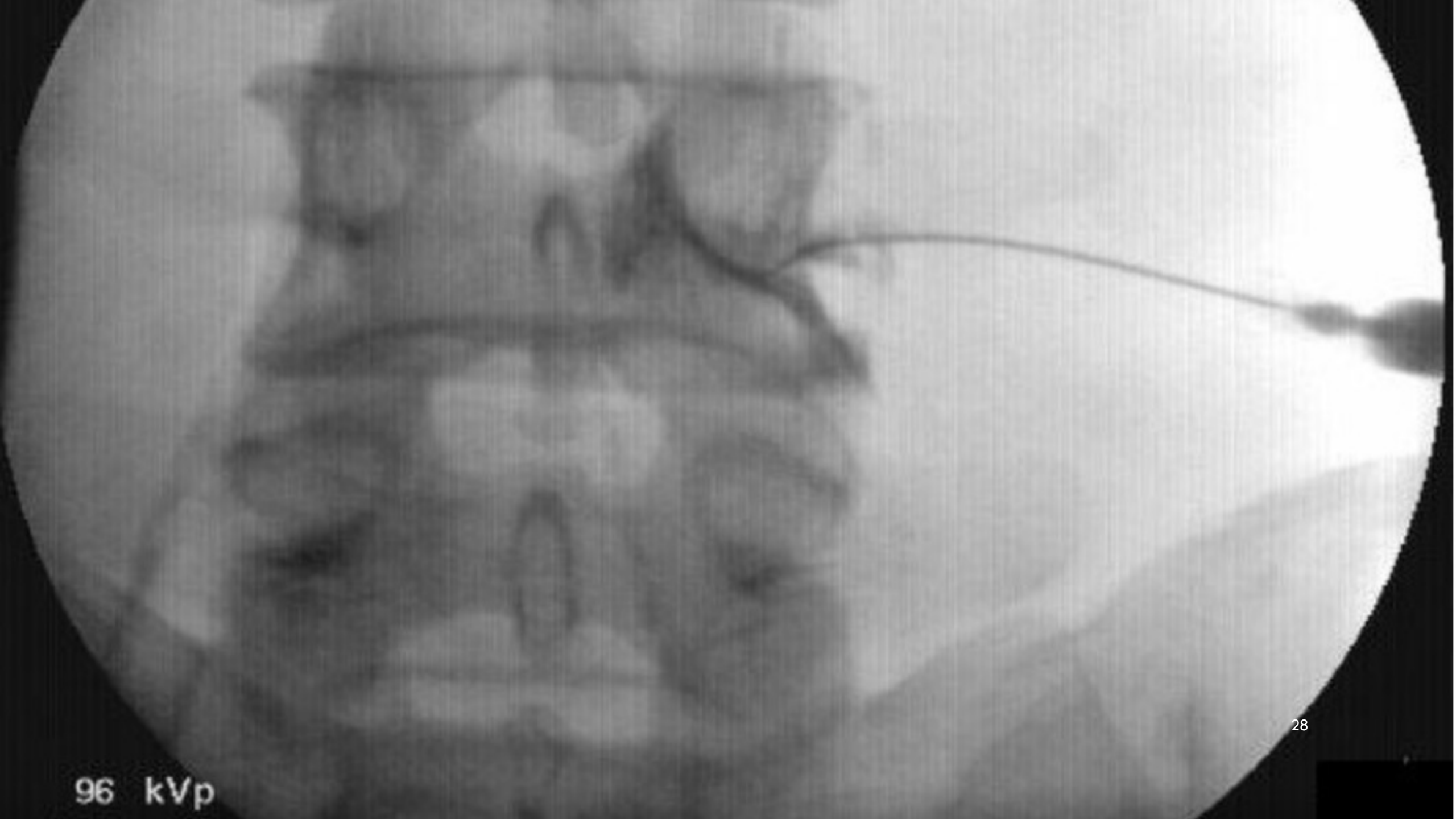


# TRANSFORAMINAL STEROID INJECTIONS

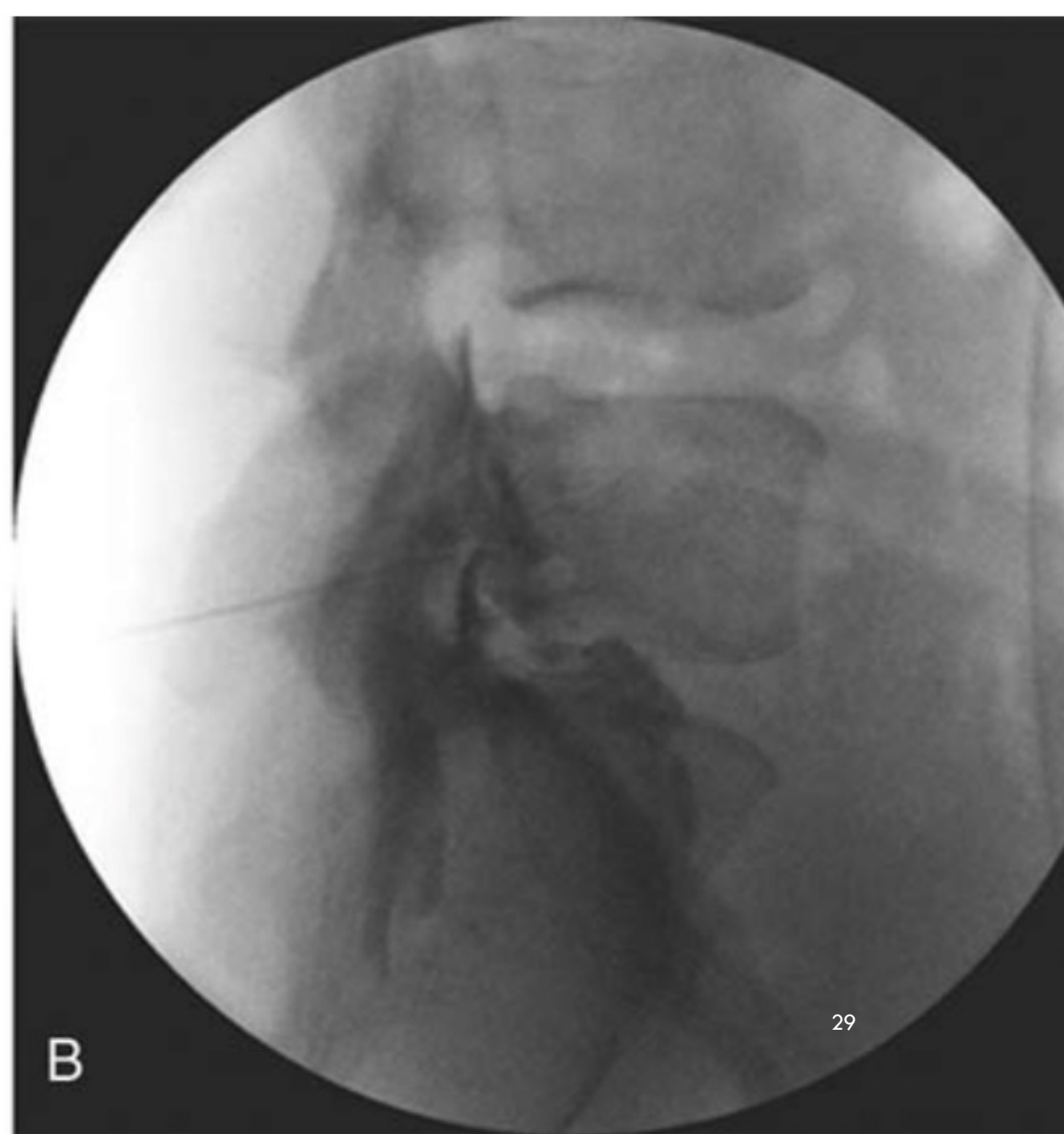
- Most common disc herniations are L4-L5 and L5-S1
- Common TFSl levels that give good pain relief are the L3-L4, L4-L5, and L5-S1 levels. Gravity pushes the steroids to the lower levels







96 kVp



B

# FACET INJECTIONS

- Medial branch nerve blocks
- Facet joint intraarticular injections
- Radiofrequency

# SACROILIAC JOINT INJECTION

- SI joint injection can be used for both the diagnosis and treatment of SI joint pain

# STELLATE GANGLION BLOCK

- Complex regional pain syndrome of the head and upper limbs
- Peripheral vascular disease
- Postherpetic neuralgia
- Raynaud's disease



# CELIAC PLEXUS BLOCK

- A celiac plexus block relieves severe abdominal pain caused by pancreatic cancer
- Local anesthetic
- Neurolytic

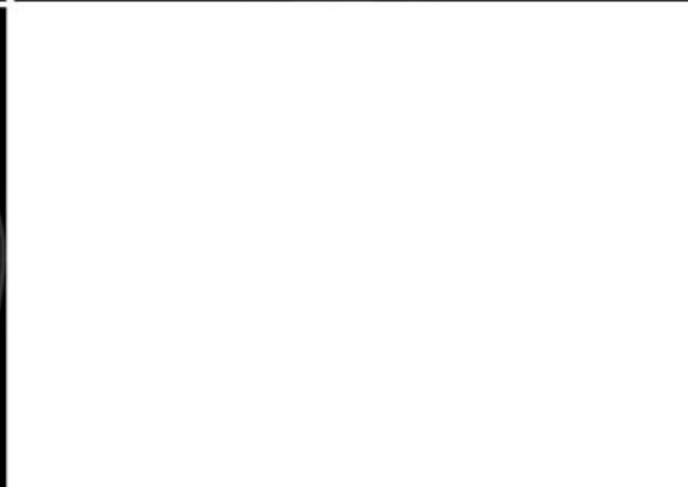
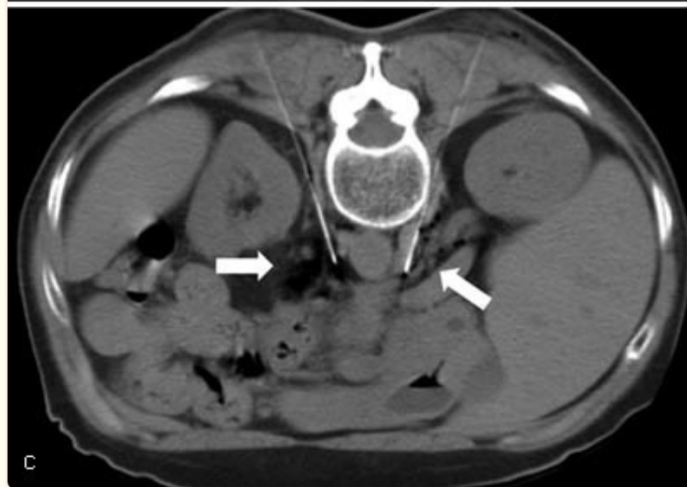
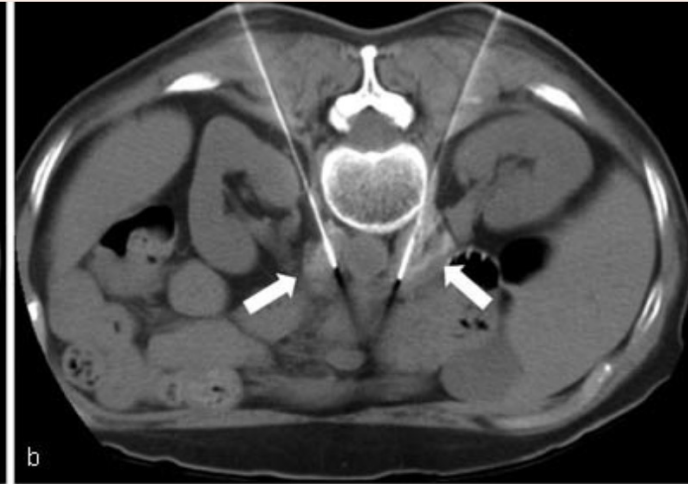
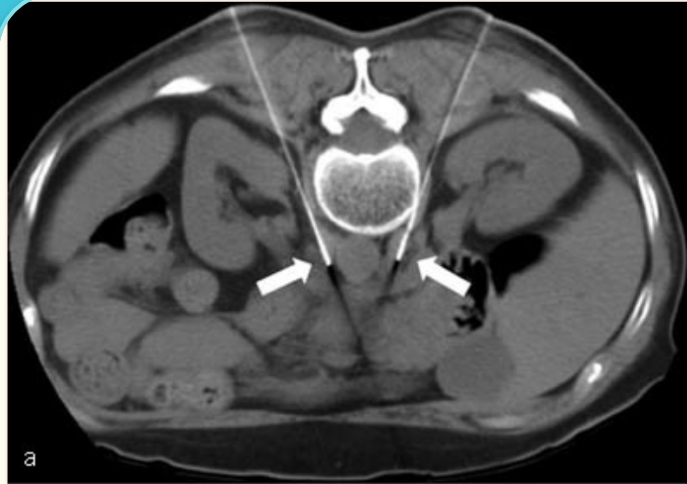


Fig. 2



# PERIPHERAL NERVE BLOCKS

- Ilioinguinal
- Genitofemoral
- Greater Occipital
- Auriculotemporal
- Supraorbital

# CHRONIC PAIN PTS CONSIDERATIONS

- Injections should be only part of the equation (not more than 3 TFSIs per 6 months and less than 6 per year)
- A bigger part of the equation is mitigating the causes of the pain
- For back pain patients they need to:
  - Lose weight
  - Exercise, low impact, fast walking and swimming better than running
  - Sleep in a firm bed
  - Do things the ergonomically correct way
  - PT

# PERIOPERATIVE PAIN BLOCKS

- ITC
- Epidural infusion
- TAP block
- Interscalene, Supraclavicular
- Femoral

# INTRATHECAL MORPHINE

- OOA: 5 to 10 minutes
- DOA: 20-24 hours
- Delivery into the subarachnoid space with direct access to opiate receptors
- Perioperative analgesia for intra-abdominal, intra-thoracic, and orthopedic surgery of the lower extremities
- Perioperative analgesia for Cesarean Delivery
- 200mcg

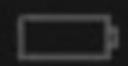
# EPIDURAL INFUSION

- For labor analgesia infusion of 0.0625% Bupivacaine and 2mcg/ml Fentanyl run at 12ml/hr
- For abdominal, thoracic or pelvic surgeries 6ml/hr
- For Cesarean Deliveries 20ml 2% Lidocaine



# TRANSVERSUS ABDOMINIS PLANE (TAP) BLOCK

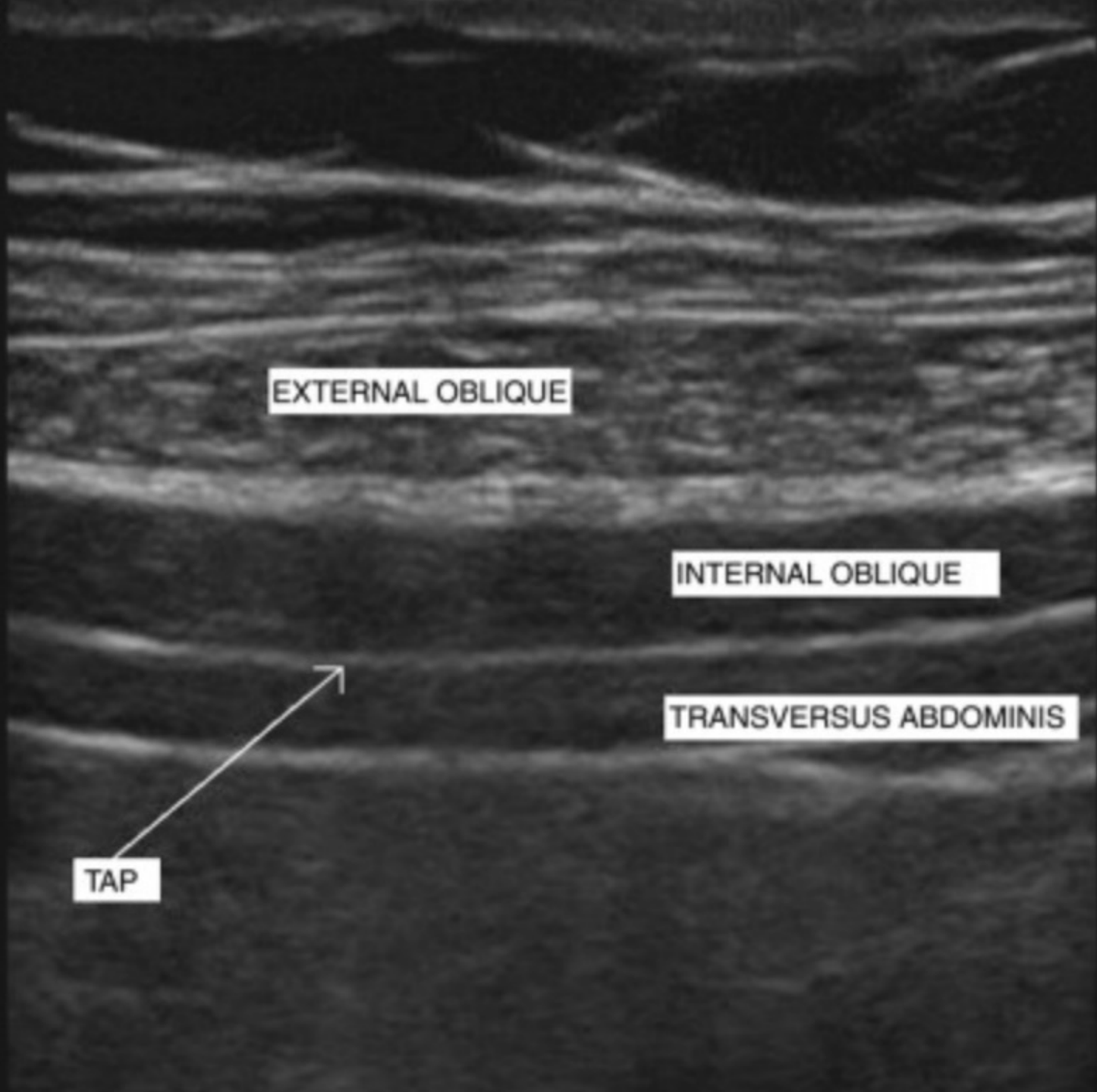
- For postoperative pain management in abdominal wall procedures
- Provides somatic analgesia to the anterior and lateral abdominal walls
- The anterolateral abdominal wall has 4 muscles: the rectus abdominis, external oblique, internal oblique, and transversus abdominis muscles.
- The TAP anatomical compartment is a plane that is located between the internal oblique and transversus abdominis muscles and contains the T6 to L1 thoracolumbar nerves



82%

MI  
0.7

129



Zoom

Calipers



# BRACHIAL PLEXUS BLOCK

- Interscalene and Suprascapular nerve blocks: provide anesthesia and analgesia for the shoulder

# FEMORAL NERVE BLOCK

- The femoral nerve block (FNB) is indicated for surgery on the anterior aspect of the thigh. It may also be combined with a sciatic nerve block to provide complete lower extremity coverage below the knee

# TENS

- Transcutaneous electrical nerve stimulation (TENS) uses low-voltage electrical currents to relieve pain

# MISCELLANEOUS

- PT low back strengthening and stretching exercises
- Tailor PT programs to individual needs
- Heat and ice packs
- Massage therapy
- Acupuncture
- Cognitive-Behavioral Therapy

# CONCLUSION

- Please use of different classes analgesics, utilizing their synergistic effects along with blocks, PT, TENS, and other modalities to obtain better pain relief with fewer side effects and decrease M&M from opioid overdose
- Encourage weight loss, low impact exercises, and other beneficial lifestyle changes





QUESTIONS?



