

# Avoiding Nerve Injury: Anatomy Review and How I Do It

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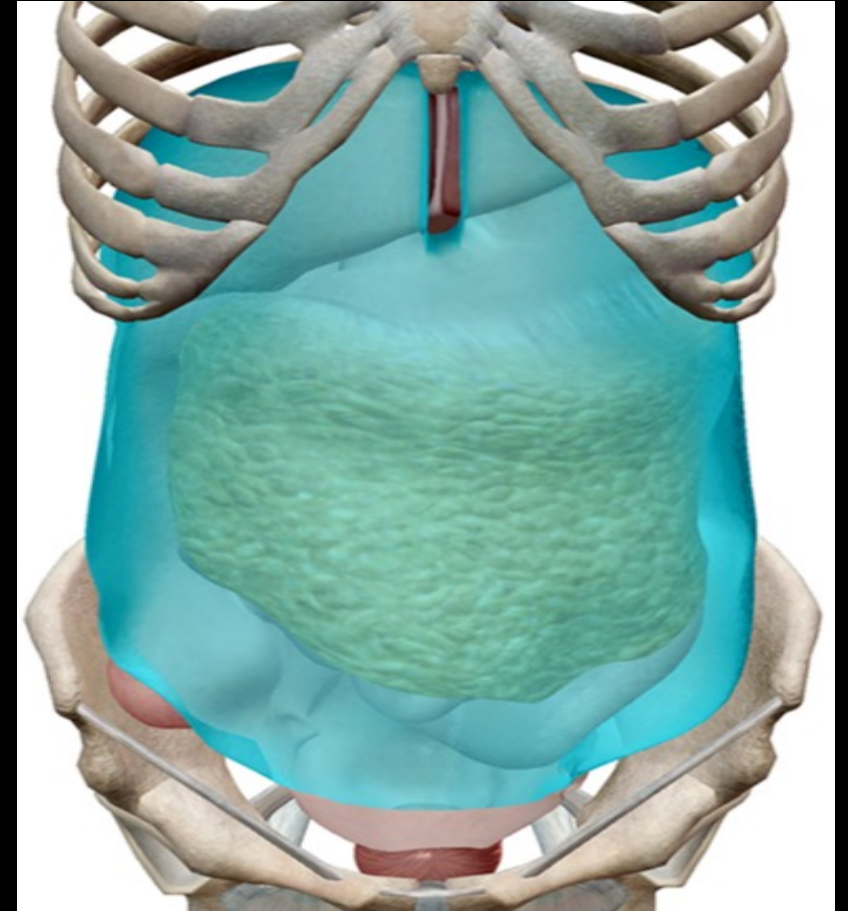
# Disclosures

# Anatomy Review

- Peritoneum
- Phrenic Nerve
- Iliolumbar Nerves

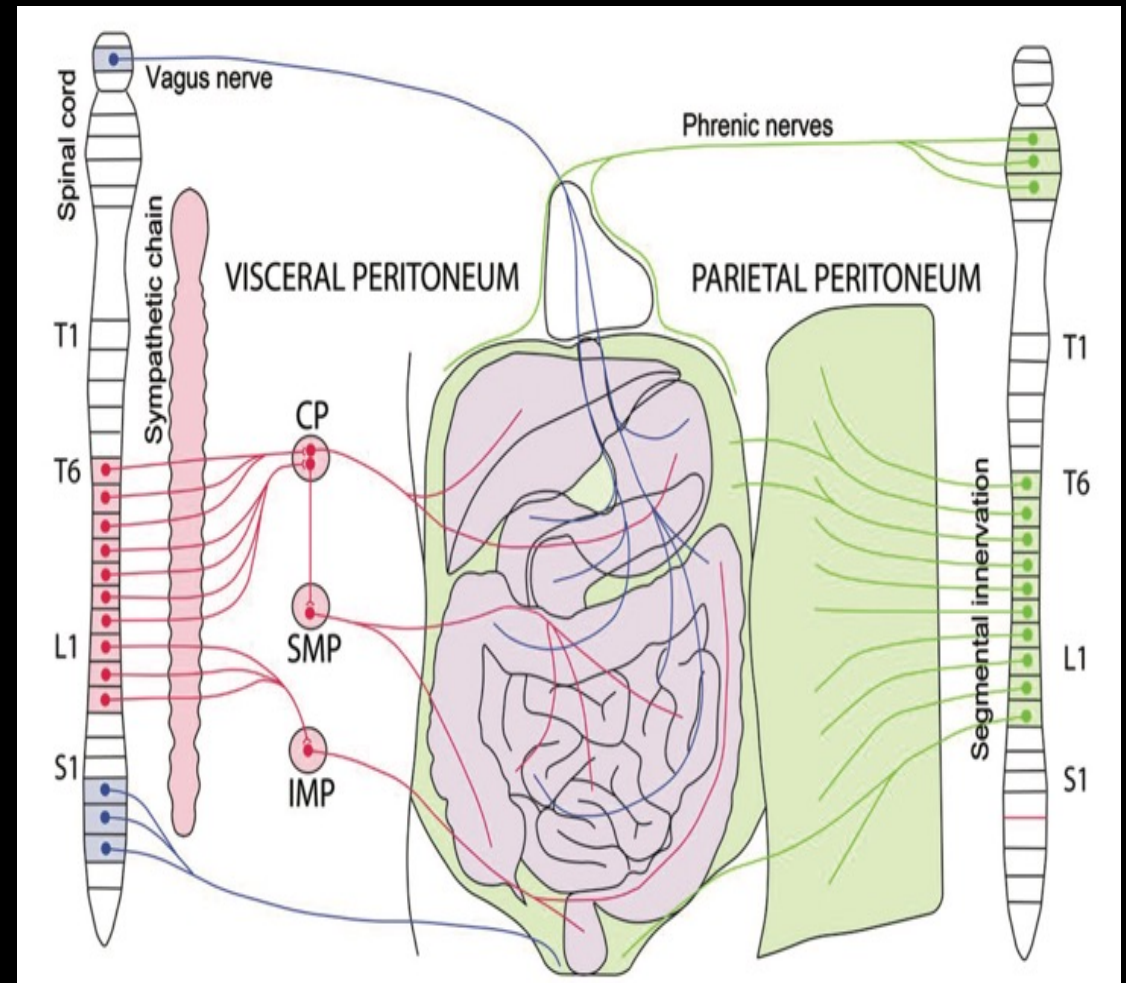
# Parietal Nerves

- Sensitive to pressure, pain, touch, friction, cutting, and **temperature**.
- Somatic, chemical, or nociceptive stimuli can induce reflex reactions of abdominal/pelvic muscles
  - “**abdominal guarding**”

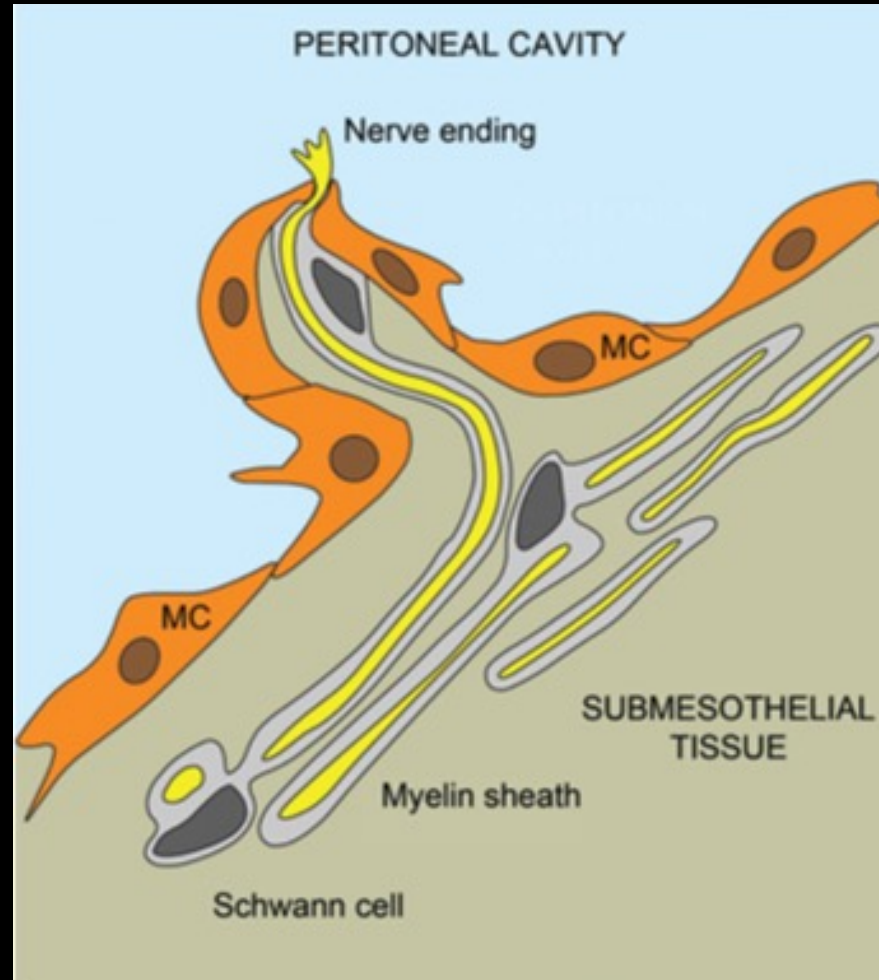


# Parietal Nerves

- Parietal peritoneum is innervated by somatic and visceral afferent nerves
- Receives sensitive branches from lower intercostal nerves and from upper lumbar nerves



# Parietal Nerves

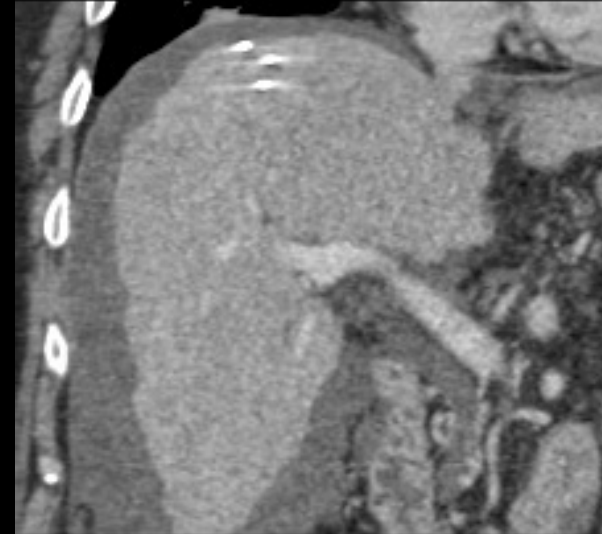


# Parietal Nerves

- **Implications for thermal ablation**
  - Thermal injury can result in abdominal guarding, pain associated with movement, and breathing
  - Symptoms can last up to 2-3 weeks post-ablation
  - Difficult to manage
    - Often required narcotic analgesia

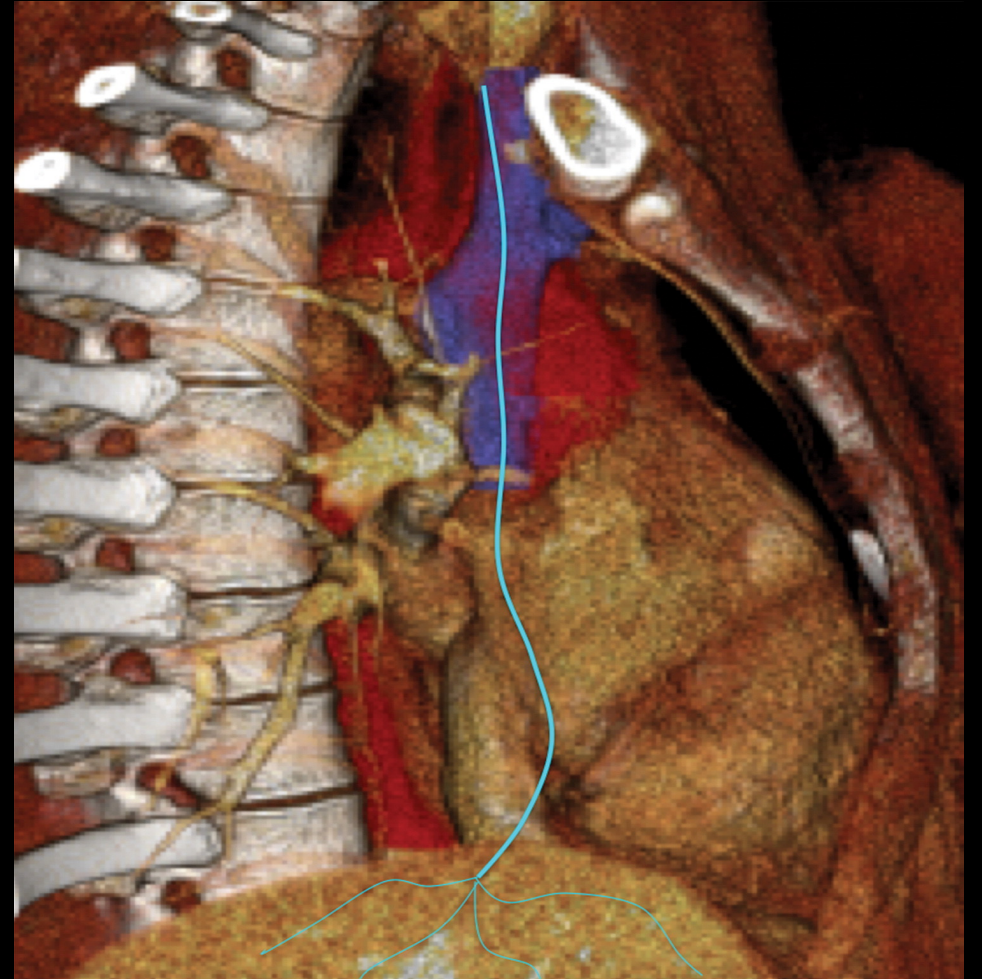
# Parietal Nerves

- **How I do it: techniques to mitigate parietal pain a/w thermal ablation**
  - **Hydrodissection:** creates separation from liver dome lesions or subcapsular lesions adjacent to parietal peritoneum
    - Allows aggressive treatment of tumors with little risk of peritoneal burn
    - Post-ablation discomfort is temporary and primarily related to puncture site
  - **Pneumdissection:** separates anterior surface of left hepatic lobe from peritoneum



# Phrenic Nerve

- Derived from C3-C5
- Supplies central portion of diaphragm
  - Sensory pain involving C3-C5 dermatomes
    - Neck and shoulder
  - Hiccups
  - Diaphragmatic dysfunction



# Phrenic Nerve

- Clinical Signs and Symptoms
  - Sensory pain involving C3-C5 dermatomes
  - Hiccups
  - Diaphragmatic dysfunction



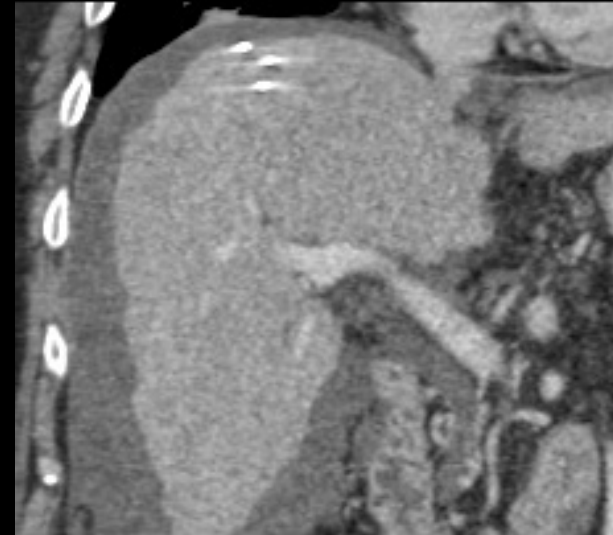
# Phrenic Nerve

- **Implications for thermal ablation**
  - Thermal injury can result in right shoulder pain, hiccups, diaphragmatic dysfunction
  - Symptoms can last up to 1-2 weeks post-ablation
  - Difficult to manage
    - Often required narcotic analgesia

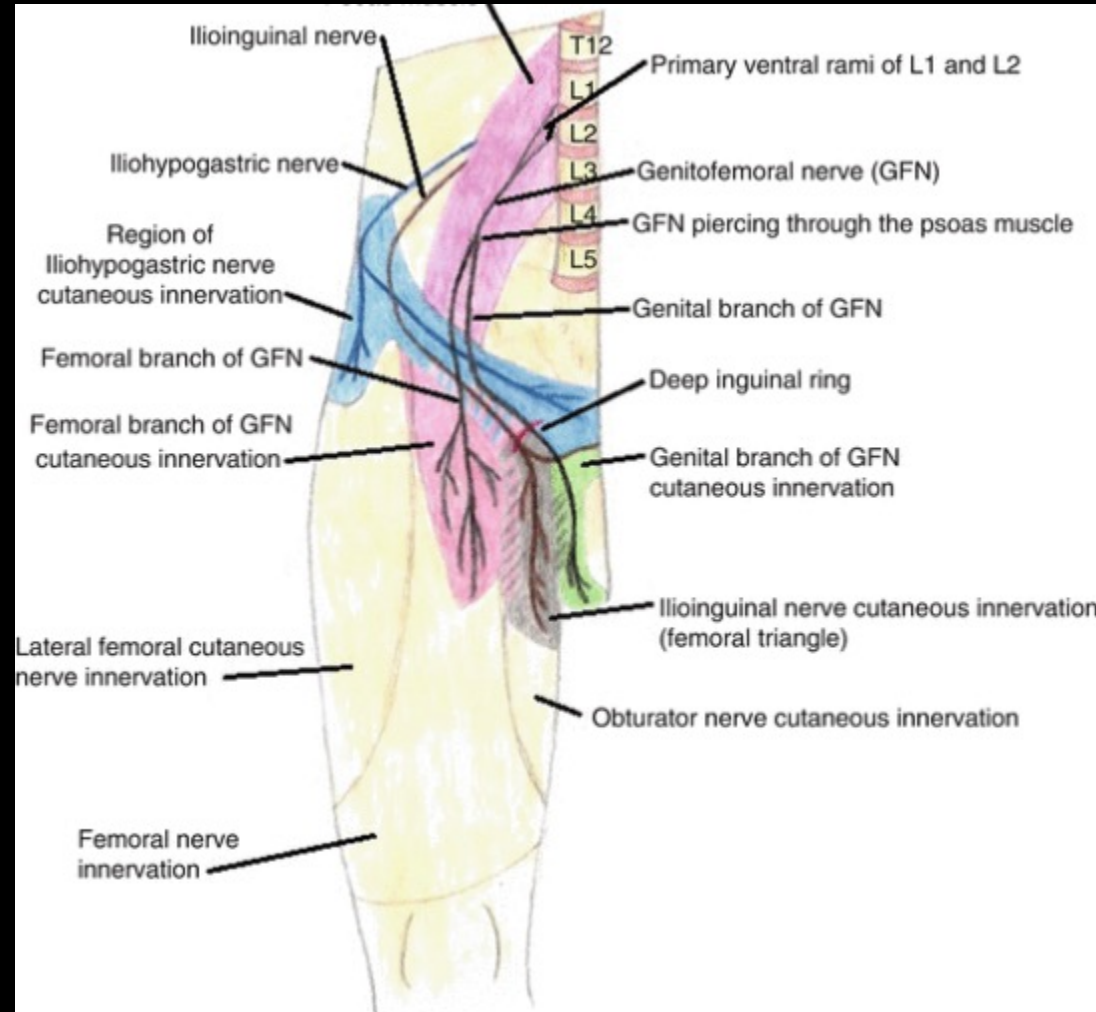
# Phrenic Nerve

- **How I do it: techniques to mitigate phrenic nerve pain a/w thermal ablation**

- **Hydrodissection:** creates separation from liver dome lesions or subcapsular lesions adjacent to parietal peritoneum
  - Allows aggressive treatment of tumors with little risk of peritoneal burn
  - Post-ablation discomfort is temporary and primarily related to puncture site
- **Pneumdissection:** usually do not work because air localizes anteriorly in abdomen and does not flow to subphrenic space when patients are in supine position



# Iliolumbar Nerves



# Iliolumbar Nerves

- **Implications for thermal ablation**
  - May be “irritated’ during thermal ablation of RCC
  - Symptoms
    - Burning sensation in the ipsilateral groin (genitofemoral)
    - Paresthesia involving ipsilateral lateral thigh (Lateral femoral cutaneous nerve, iliohypogastric nerves, cutaneous brach of genitofemoral nerve)
  - Difficult to manage
    - Often required narcotic analgesia

# Iliolumbar Nerves

- **How I Do It**

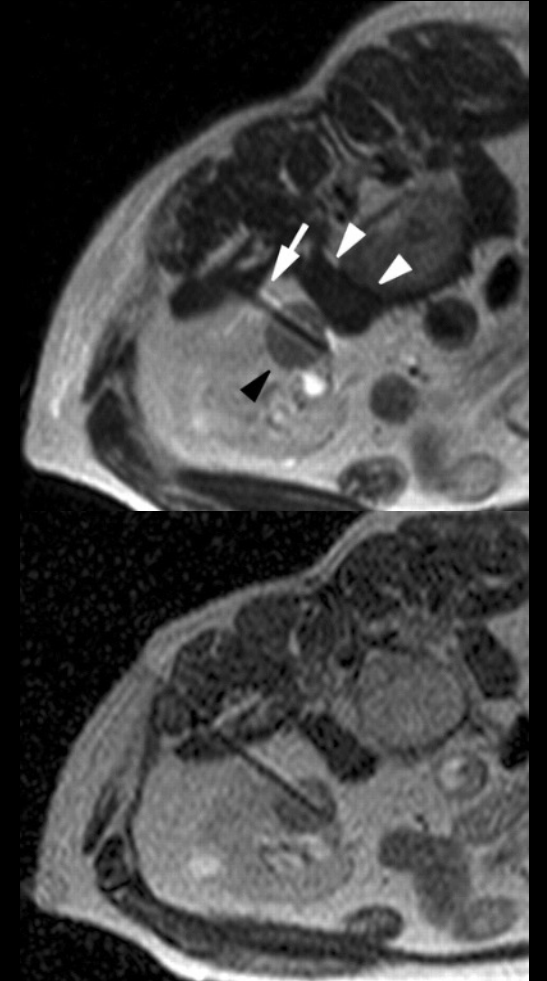
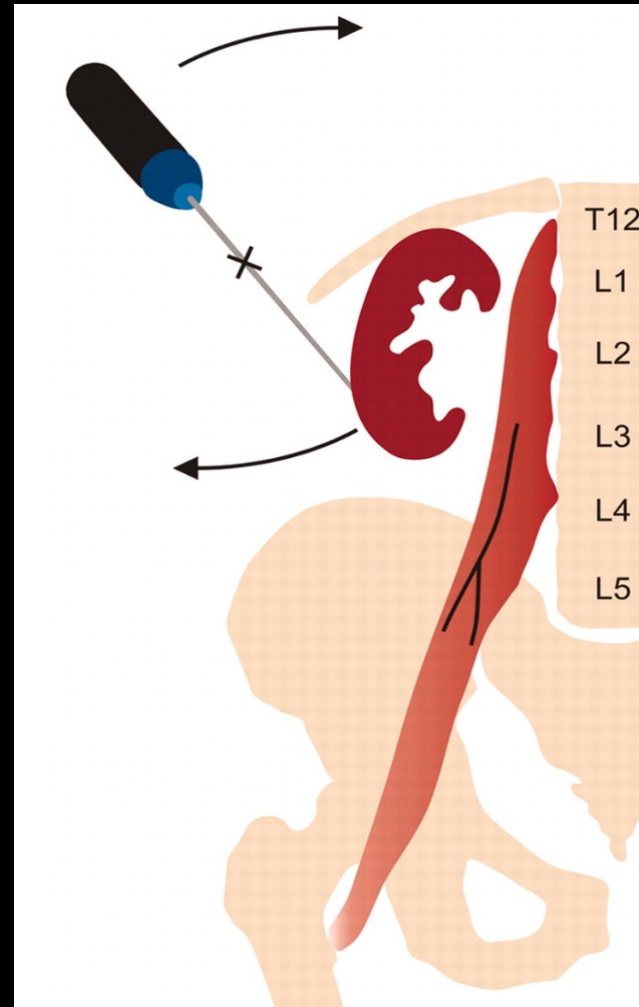
- Hydrodissection/pneumodissection for renal tumors adjacent to the psoas muscle



# Iliolumbar Nerves

- **How I do it**

- Use of applicator as a lever for moving the kidney away from psoas muscle



# Thank You



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