

Anesthetic Management for Novel Interventional Oncology Procedures

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1

**Interventional Oncology:
Minimally Invasive Treatments
for Cancer**

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2

**Irreversible
Electroporation**

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3

What is Irreversible Electroporation?

- Uses high voltage **electrical pulses**
 - Delivered through needles
 - Creates **nanopores** in the cell membrane
 - Causes **controlled apoptosis**
- **Preserves the surrounding structures**
 - Vasculature, ducts, bowel
- **Non-thermal = No heat sink**
 - Ablation less effective 2/2 cooling from nearby vasculature
 - Addresses weaknesses of thermal ablation
 - Radiofrequency ablation (RFA)
 - Microwave ablation (MWA)

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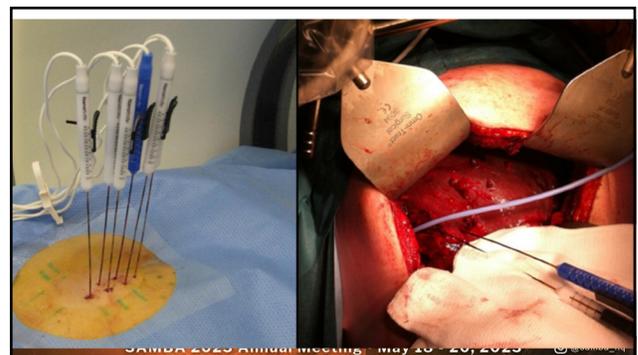
4

What is Irreversible Electroporation?

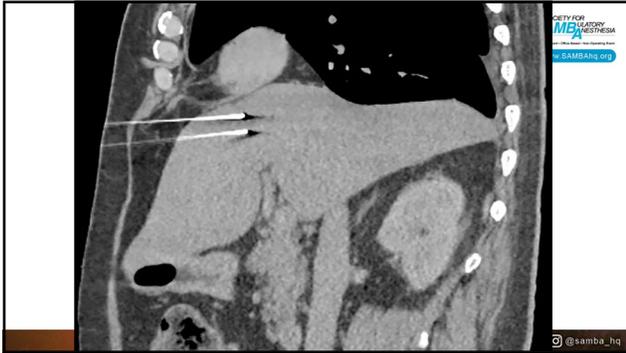
- Used mainly in **pancreatic** and **liver** cancers/metastases
 - Sometimes **lung, kidney, prostate**, and other **unresectable tumors**
- Usually percutaneous under CT-guidance in Interventional Radiology (IR)
 - Can be done open or laparoscopic as well 2/2 tumor location (OR)
- Many unique considerations
 - Major Complication rate: ~2-17%
 - Communication with proceduralist key

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5



6



7

Unique Considerations: Arrhythmias

- Electrical pulses = **R on T phenomenon**
- Before cardiac synchronization: **22% ventricular tachycardia**
 - Pooled analysis
 - **After cardiac synchronization: 1.2%**
 - Location irrelevant
 - Except prostate
- Leads of the EKG connect to the IRE machine
 - Clear QRS
- Defibrillator pads often placed prophylactically
- **Doesn't trigger seizures 2/2 GA**
- Hx: Arrhythmias
 - Pacemaker to asynchronous
 - ICD disabled

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8

Unique Considerations: Muscle Contractions

- Electrical pulses = **severe muscle contractions**
 - May move the IRE needle
 - May affect accuracy
 - Complications: PTX, intraperitoneal hemorrhage, hematomas reported
- Requires **deep neuromuscular blockade**
 - TOF ≤ 0
 - Post-Tetanic Count ≤ 3
 - Mild local contractions still can occur
 - Esp. if needle passes through large musculature

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9

Unique Considerations: Hypertension

- **Severe and rapid hypertension with IRE stimulation**
 - Even with **sevo at 8%**
 - Median systolic: **190** (185-215)
 - Median diastolic: **98** (91-115)
 - 38 patient cohort
 - ~½ the patients received antihypertensives
 - "Poor response"
- **Responds well to opioids**
 - Median dose of fentanyl: 500 mcg
 - Delayed extubation
 - Low postop pain
 - **Remifentanyl is the preferred agent**
 - Sevo 2%, 13% anti-HTN meds
- Hx: Limited cardiopulmonary reserve
 - CAD

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10

Immuno-embolization

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11

What is Immuno-Embolization?

- Similar to chemo-embolization
 - Endovascular
 - Disrupts the tumor blood supply
 - Usually in the liver
- Instead of "chemo"
 - Glycoproteins: GM-CSF
 - Monoclonal Antibodies
 - Oncolytic Viruses
- **Large proteins**
 - **Marked bradycardia**
 - Hypotension
 - Other arrhythmias
 - HTN/tachycardia
- Consider ppx glycopyrrolate

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12



13

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TLDR

- Irreversible Electroporation (IRE)
 - GA 2/2 Deep paralysis
 - Remifentanyl during IRE stimulation 2/2 HTN
 - Risk of arrhythmia high = Consider ppx defib pads
- Immuno-embolization
 - Risk of bradyarrhythmia's 2/2 large molecules
 - Consider ppx glycopyrrolate

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14

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Questions?

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15