



# COOK COUNTY HEALTH

## LIGATING UNDER LOCAL: EMERGENT NON- CARDIAC SURGERY DURING ACUTE MI

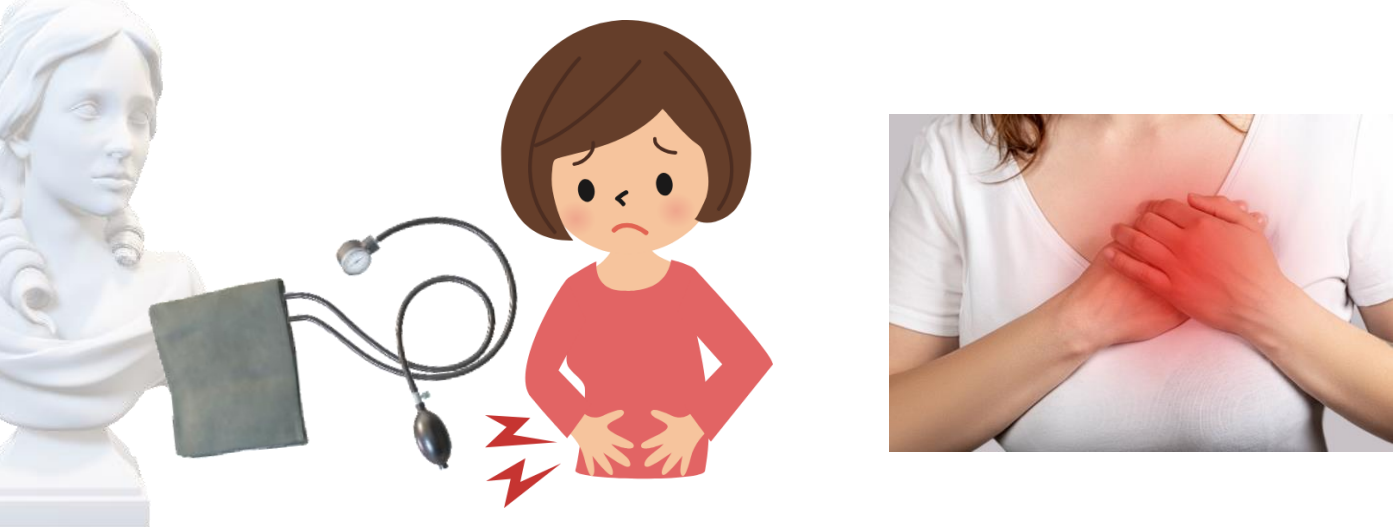
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## Background

Cardioprotective measures in anesthesia aim to minimize myocardial stress, prevent ischemia, and optimize cardiac function perioperatively. We aim to show how regional anesthesia can be a safe and effective option through this case of emergent surgical intervention for a patient who initially presented with life-threatening cardiac pathology.

We exhibit a 61yo female with PMH of hypertension presenting with abdominal pain, progressing to involve chest tightness and difficulty breathing. Physical exam revealed stable vitals, and an abdominal mass diagnosed as an incarcerated hernia. Evaluation confirmed elevated cardiac markers with ST depressions, diagnosed as a NSTEMI. Due to her cardiac status without signs of strangulation, surgical intervention was withheld. However, as troponins began to decrease, her abdominal pain worsened. A multi-disciplinary conversation ensued, and the patient consented to surgery. The anesthetic plan consisted of oxygen via face mask, an infusion of dexmedetomidine (0.5mcg/kg/min), propofol (25mcg/kg/min) and nitroglycerin (10mcg/min). The maximum bupivacaine dosage was administered locally for analgesia, and an incision was made. Intraoperatively, the hernia displayed necrosis, and a small bowel resection was performed. The procedure was completed successfully, and the patient was taken to the CCU for post operative management.



Figures 1-4: Medical history and exam

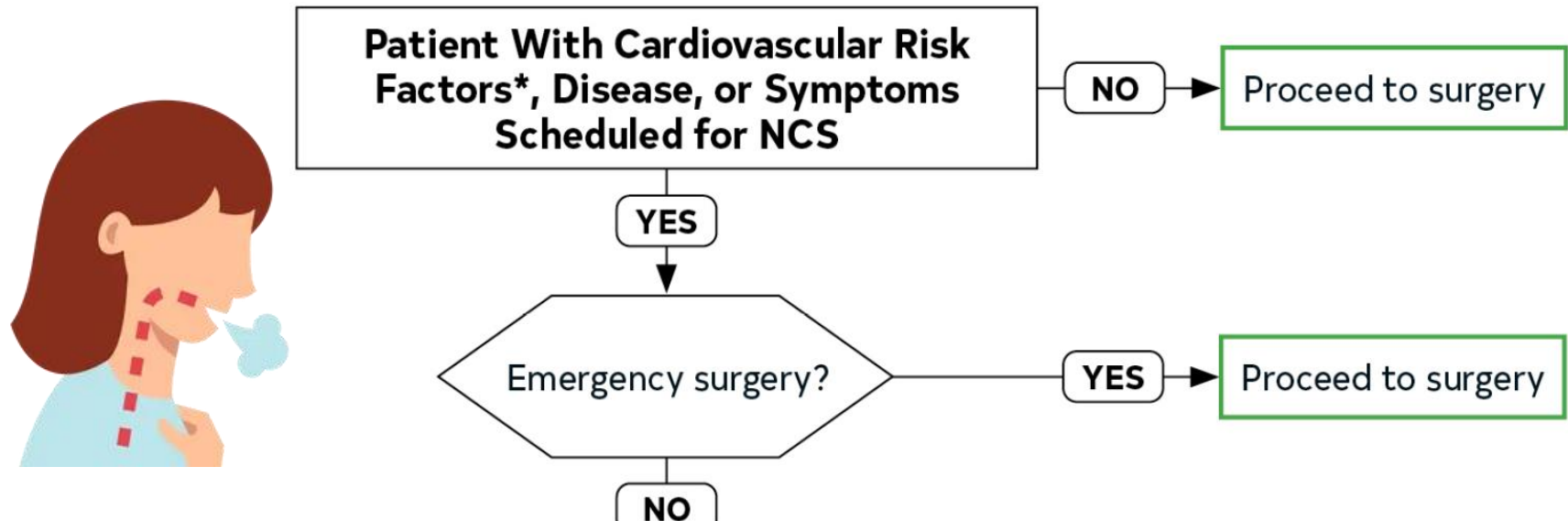


Figure 5: Portion of "Stepwise Approach to Perioperative Cardiac Assessment"<sup>14</sup>

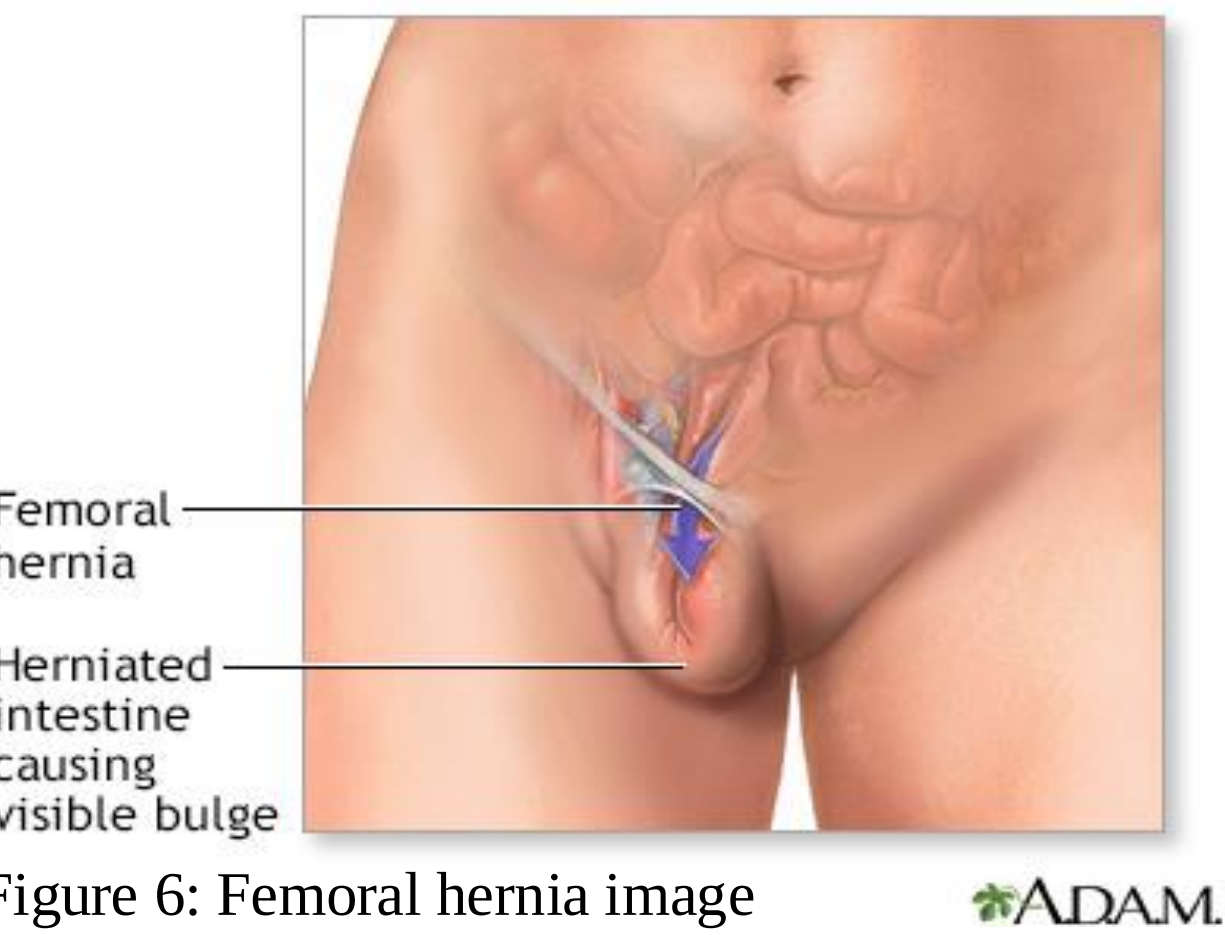


Figure 6: Femoral hernia image

Preoperative Diagnosis: Left incarcerated Strangulated femoral hernia

Surgery performed: Right inguinal hernia repair with small bowel resection

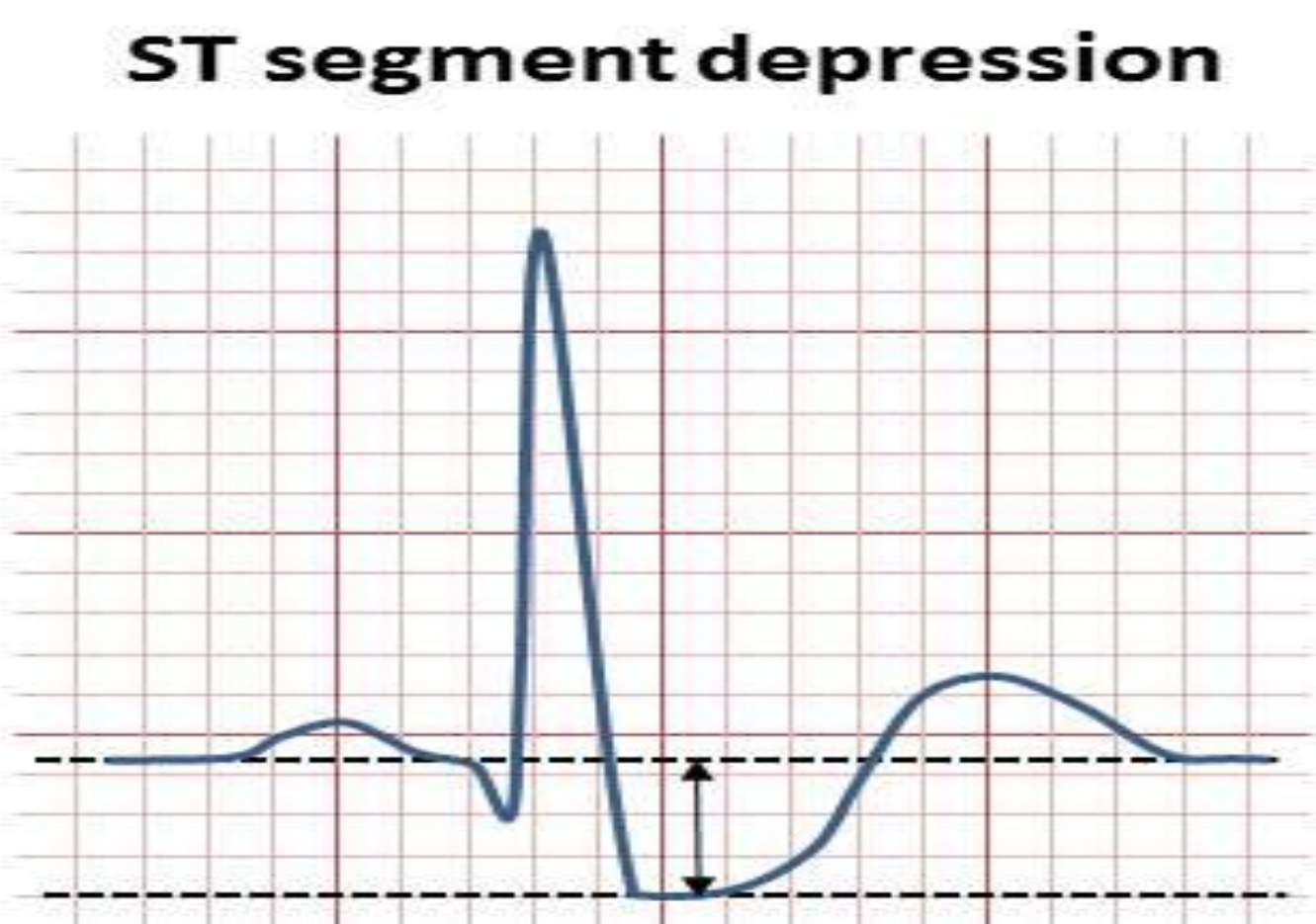


Figure 7: ST segment depression

Patient exhibited ST depressions in inferior and lateral leads (II-III; V4-V6)

Troponin Trend: 0.43>0.53>0.379

- TIMI score: 3 = 13% risk of all cause mortality at 14 days vs mortality rate of 20-40% in strangulated hernia to >50% in patients requiring resections.<sup>9</sup>

## Methods/Results

| Technique: Monitored Anesthesia Care (MAC) + Local Anesthesia Infiltration |          |      |      |      |      |      |      |  |  |
|----------------------------------------------------------------------------|----------|------|------|------|------|------|------|--|--|
| Name                                                                       | Total    | 3:30 | 3:45 | 4:00 | 4:15 | 4:30 | 4:45 |  |  |
| Medications                                                                |          |      |      |      |      |      |      |  |  |
| ANES - dexmedetomidine 200 MCG Inj 50 ML <i>IV</i>                         | 50.4 MCG |      |      |      |      |      |      |  |  |
| ANES - nitroglycerin 100 mg/250 ML D5W Inj <i>IV</i>                       | 1285 MCG |      |      |      |      |      |      |  |  |
| fentanyl 50 mcg/ml inj 5 ml <i>IV</i>                                      | 150 MCG  |      |      |      |      |      |      |  |  |
| ANES - midazolam 1 mg/mL PF Inj 2 ML <i>IV</i>                             | 2 MG     |      |      |      |      |      |      |  |  |
| ANES - phenylephrine 40mcg/mL Inj 10mL <i>IV</i>                           | 4660 MCG |      |      |      |      |      |      |  |  |
| ANES - propofol 10 mg/ml Inj 20 ML <i>IV</i>                               | 299.7 MG |      |      |      |      |      |      |  |  |
| ANES - dexAMETHasone 4 mg/mL Inj 5 ML <i>IV</i>                            | 4 MG     |      |      |      |      |      |      |  |  |
| ANES - ceFAZolin 2 g/50 mL D5W IVPB <i>IV</i>                              | 2 GM     |      |      |      |      |      |      |  |  |
| ANES - ondansetron 2 mg/mL Inj 2 mL <i>IV</i>                              | 4 MG     |      |      |      |      |      |      |  |  |

Table 1: Intraoperative medications

Intraoperative local injected: 0.25% bupivacaine injected for local pain management – 138 mg (2.5 mg/kg)

At end of surgery, 0.25% bupivacaine in preperitoneal space injected for post-operative pain management.

### Regional Block (e.g. TAP block) + MAC would potentially reduce anesthetic requirements

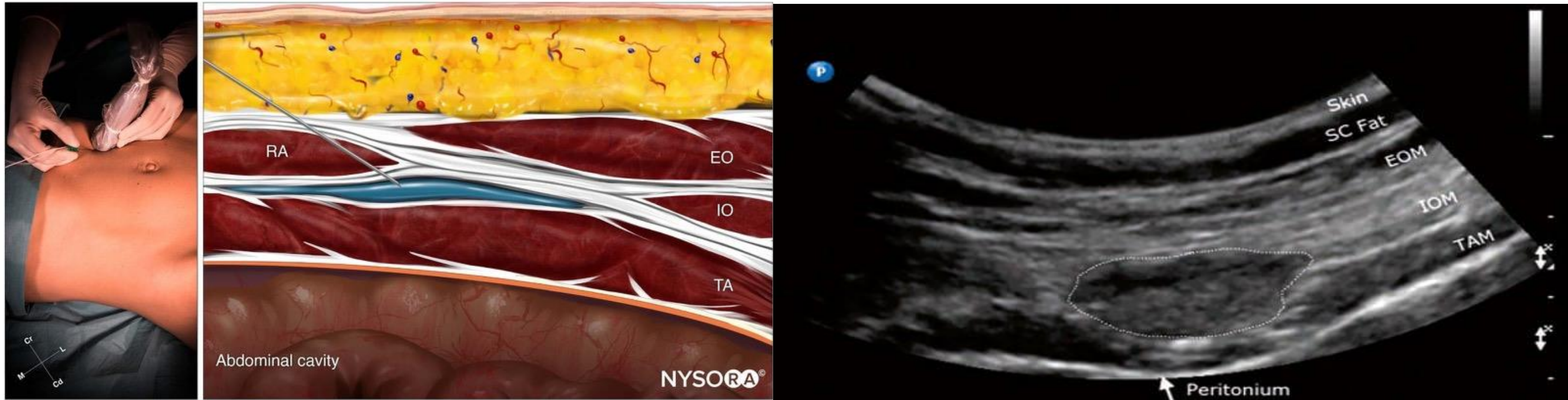


Figure 8: Subcostal TAP block reverse ultrasound anatomy (NYSORA Image)

Figure 9: Injectate spread between internal oblique muscle and transversus abdominis muscle (NYSORA Image)

| Anesthesia Technique              | Pros                                                                                                                                                           | Cons                                                                                                                                                                                             | Information                                                                                                                                                                                                            |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Local infiltration                | <ul style="list-style-type: none"><li>- Expeditious</li><li>- Low risk</li><li>- Minimal hemodynamic impact</li><li>- Beneficial for somatic pain</li></ul>    | <ul style="list-style-type: none"><li>- Large dose requirement</li></ul>                                                                                                                         | <ul style="list-style-type: none"><li>- Nerves: ilioinguinal, iliohypogastric, genitofemoral</li></ul>                                                                                                                 |
| Epidural                          | <ul style="list-style-type: none"><li>- Beneficial for somatic and visceral pain</li><li>- Post-operative pain control</li></ul>                               | <ul style="list-style-type: none"><li>- Technically challenging in emergency</li><li>- Risk of hypotension</li></ul>                                                                             | <ul style="list-style-type: none"><li>- Nerves affected would depend on level of insertion. Possible beneficial injection level would be T10-L1.</li></ul>                                                             |
| Spinal                            | <ul style="list-style-type: none"><li>- Potentially quick procedure</li><li>- Somatic and visceral pain</li></ul>                                              | <ul style="list-style-type: none"><li>- Major risk of hypotension</li><li>- May lack post operative pain control depending on duration</li><li>- Postdural puncture headache potential</li></ul> | <ul style="list-style-type: none"><li>- Nerves effected dependent on level of insertion</li><li>- Motor block may delay ambulation</li></ul>                                                                           |
| Transversus Abdominis Plane block | <ul style="list-style-type: none"><li>- Effective for somatic pain at incision site</li><li>- Reduced systemic absorption<sup>4</sup></li></ul>                | <ul style="list-style-type: none"><li>- Nonreliable visceral analgesia<sup>5</sup></li></ul>                                                                                                     | <ul style="list-style-type: none"><li>- Nerves: T6-12, L1</li><li>- Location: between internal oblique and transversus abdominis muscles; other variations exist<sup>5</sup></li></ul>                                 |
| Celiac Plexus block               | <ul style="list-style-type: none"><li>- Visceral pain</li></ul>                                                                                                | <ul style="list-style-type: none"><li>- Technically challenging in emergency</li><li>- Risk of hypotension</li></ul>                                                                             | <ul style="list-style-type: none"><li>- Nerves: T5-12</li><li>- Location: retroperitoneal space at T12-L1 (commonly)</li><li>- Standard indication: refractory/intractable abdominovisceral pain<sup>6</sup></li></ul> |
| Paravertebral block               | <ul style="list-style-type: none"><li>- Provides somatic and visceral pain relief<sup>7</sup></li><li>- Postoperative analgesia coverage<sup>8</sup></li></ul> | <ul style="list-style-type: none"><li>- Technically challenging</li></ul>                                                                                                                        | <ul style="list-style-type: none"><li>- Nerves: T7-12, L1-L2</li><li>- Location: paravertebral space</li></ul>                                                                                                         |

Table 2: Anesthetic Techniques

## Discussion/Conclusion

We present this case to demonstrate the potential benefits of utilizing regional anesthesia in medically challenging patients with cardiac comorbidities. The use of general, versus TIVA and regional anesthesia was under strong examination for this case. Our goal was to take particular care to preserve the myocardial oxygen supply. Previous experimental trials contained evidence supporting volatile anesthetic use for myocardial protection. More recently, the MYRIAD Study Group determined no significance in mortality at both 1 month and 1 year when comparing patients who underwent elective CABG utilizing volatile anesthetics versus TIVA.<sup>1</sup> One consideration, demonstrated by Klein<sup>2</sup>, has shown regional anesthesia has a propensity to reduce the sympathetic stress response to a larger degree than general anesthesia. Patients with ischemic heart disease are at an increased risk of mortality from this stress response. Thus, regional anesthesia can be proposed as a legitimate approach for patients with a history of MI. Although our case implements local anesthesia injected diffusely at the surgical site, without precise regional techniques, it demonstrates how targeted nerve blocks may optimize patient care in situations where the use of general anesthesia poses more risk. Regional techniques, such as the TAP and ilioinguinal block, have been reported to decrease postoperative pain and opioid requirements in patients undergoing laparoscopic surgery when used on their own.<sup>3</sup> Although, limitations on adopting this practice may depend on individual skill, patient specifics, or surgeon comfort. The patient’s poor oropharyngeal anatomy, NPO status, and critical condition led to a collective decision to utilize local anesthesia. However, the successful outcome of this case illustrates a reasonable path for continued research into the practice of regional anesthesia for those patients who are critically ill, particularly with ischemic heart disease.

## References

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6. <https://www.nysora.com/pain-management/ultrasound-guided-transversus-abdominis-plane-tap-block/>

*This presentation has no identifiable patient information; therefore, the case report is IRB exempt.*