

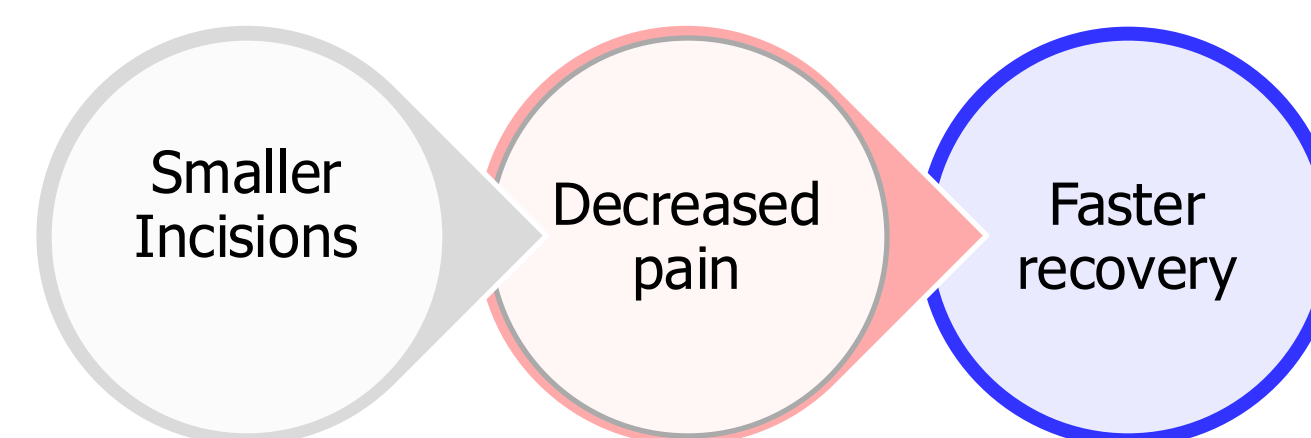
CO₂ Embolism and Iatrogenic Aortic Injury During Elective Hernia Repair

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Introduction

- Minimally invasive surgical techniques have become routine in the diagnostic and therapeutic management of gynecological and intra-abdominal pathologies.

- Advantages:



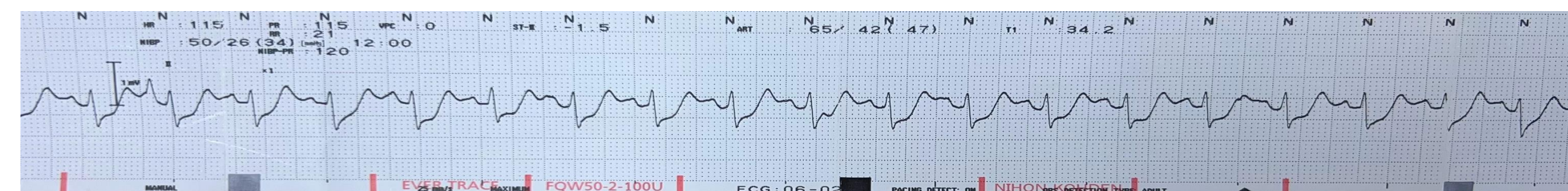
- A rare but potentially fatal complication is carbon dioxide (CO₂) embolism, which carries a reported mortality rate of approximately 28%.^[3]
- CO₂ embolism occurs when insufflated gas enters an injured vein, artery, or solid organ, leading to serious sequelae such as cardiac arrest, pulmonary edema, or neurological impairment.

References

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- Kalenda Z. (1975). Capnography: a sensitive method of early detection of air embolism. *Acta anaesthesiologica Belgica*, 23 Suppl, 78–85.
- Park EY, Kwon JY, Kim KJ. Carbon dioxide embolism during laparoscopic surgery. *Yonsei Med J*. 2012 May;53(3):459-66. doi: 10.3349

Case Description

- A 77-year-old male with a history of COPD (active smoker), idiopathic pulmonary fibrosis, coronary artery disease, asthma, heavy alcohol use, multiple prior CVAs, and recurrent vertebral fractures presented for elective robotic inguinal hernia repair.
 - ✓ ASA PS III with plan for General IV induction with endotracheal intubation
- Upon insufflation: sudden ↓ Et CO₂, hypotension, hypoxia and ST segment changes on telemetry
 - ✓ POC ultrasound revealed multiple air bubbles in cardiac chambers, raising concern for venous air embolism
- Upon emergent surgical exploration 1L intraabdominal blood was found and the abdomen was packed
- Patient underwent 2 rounds of CPR, volume resuscitation with pRBC and FFP, and epinephrine for hemodynamic support With resuscitation and vasopressor support, ST changes improved, and the patient was stabilized for transfer to a higher level of care where an aortic injury was diagnosed and repaired



Discussion

- Gas embolization after insufflation
 - Rapid gas entrainment → large emboli → right cardiac chamber and pulmonary artery obstruction → ↓ Venous return, ↑ pulmonary hypertension, ↓ cardiac output, ↑ V/Q mismatch
- Early detection of gas embolism is paramount, and capnography serves as a sensitive indicator, with a drop in ETCO₂ correlating to the volume of gas entrained.^[2]
- This emphasizes the critical role of continuous ETCO₂ monitoring, particularly in at-risk patients or during procedures with potential for vascular injury.
- Prompt recognition and collaborative management between surgical and anesthesia teams to improve outcomes in such critical situations.