

**A CASE REPORT ON THORACIC EPIDURAL AS THE SOLE ANAESTHETIC  
TECHNIQUE FOR A PATIENT WITH ISCHEMIC HEART DISEASE AND PECTUS  
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**ABSTRACT**

This case report highlights a 63-year-old male with a complex medical history, including ischemic heart disease and recent Percutaneous Transluminal Coronary Angioplasty. Presenting with umbilical swelling and abdominal pain, the patient underwent successful umbilical hernia repair under high-risk conditions (ASA III) due to cardiac concerns. Employing a graded epidural technique for anesthesia, meticulous monitoring of hemodynamics was crucial, given the patient's cardiac vulnerability. The discussion emphasizes the benefits of epidural anesthesia over general anesthesia in cardiac patients, emphasizing its impact on perioperative outcomes and cardiac stability. Additionally, the report explores the rare association of pectus carinatum with potential thoracolumbar scoliosis which may pose a difficulty with neuraxial anaesthesia techniques.

**INTRODUCTION**

Globally, one of the main causes of illness and death is ischemic heart disease (IHD). It is also one of the main reasons why cardiac patients experience perioperative complications. Because of their low cardiac output status (Ejection Fraction <40%), sustaining hemodynamics is a special difficulty for anesthesiologists treating these patients. Modified neuraxial anaesthetic techniques are reasonable options (low-dose combined spinal epidural or graded epidural anaesthesia) for these kinds of patients. In this case report, anaesthetic implications included assessing the patient's cardiovascular status preoperatively with a selection of epidural anaesthesia (EA) and analgesia techniques.<sup>[1]</sup>

Pectus carinatum involves the aberrant protrusion of the sternum and nearby costal cartilages. It is usually involved with scoliosis of lumbar and thoracic spine. These abnormalities may pose a difficulty to neuraxial anesthetic techniques.<sup>[2]</sup>

**CASE PRESENTATION**

A 63-year-old male presented with complains of swelling over umbilicus. Patient complains of dragging pain abdomen in the past 1 year. Patient is a known case of ischemic heart disease since 1 year. Patient has undergone Percutaneous Transluminal Coronary Angioplasty for Acute Coronary Syndrome 1 year back. Patient has a drug eluting stent insitu. He has been on

dual antiplatelet drugs since then (Tab *ASPIRIN 75mg* + Tab *CLOPIDOGREL 75mg*). After cardiologist consultation, patient was withheld from clopidogrel 75mg for 5 days prior to surgery, and continued with Tab *ASPIRIN 75mg*. On examination, he was moderately built and nourished (body weight = 50 kg, Height = 150 cm). He had no pallor, icterus, cyanosis, clubbing, or lymphadenopathy. His pulse rate was 88/ min, regular rhythm. Blood pressure was 100/60 mm Hg in the left upper limb, sitting posture. All systemic examinations were within normal limits. The patient was noticed to have a pectus carinatum deformity with protrusion of lower 1/3<sup>rd</sup> of ribs. Thoracic and lumbar spine were apparently normal on external palpation. No significant scoliotic changes seen on Chest Xray. All blood investigations were within normal limits. He was posted for umbilical hernia repair. ECH showed prominent q waves in leads V2, V3, V3 with a LBBB pattern. 2D echocardiogram (ECHO) was done and showed: EF 40%, Sclerosed aortic valve, Hypokinetic anterolateral wall, moderate left ventricular systolic dysfunction. The patient was posted for surgery under high risk (ASA III) after stopping antiplatelet drugs for 5 days. Oral premedication with pantoprazole 40mg and alprazolam 0.25mg were given and adequate fasting guidelines were followed. The procedure was explained to the patient in detail, ensuring his full cooperation. IV access was taken with a 18G cannula in the right upper limb. In the operating room, monitors were attached, including pulse

oximetry, Electrocardiogram (ECG), and Non-Invasive Blood Pressure (NIBP). After strict aseptic precautions, an epidural catheter was placed in the T10-T11 space with a catheter length of 9cm in the epidural space. Care was taken in view of pectus carinatum deformity. Correct placement of the epidural catheter was confirmed by a negative test dose of 3ml *Lignocaine 2%* with 15mcg of *epinephrine*. After the test dose and the patient's hemodynamics were stable, the regimen of *Inj ROPIVACAINE 0.75% 5ML* injected into epidural space. Hemodynamics of the patient remained stable. Therefore, we added *lignocaine 2% 4 ml* and waited for another 10 minutes. Supplemental Transverse abdominis plane block with 2% *LIGNOCAINE 5 ml* injected bilaterally. After confirming the block height of T6, surgery was started. The operation lasted for 75 minutes. The fluid replacement was done with IV crystalloids. Epidural top ups given with 2 ml of *Inj ROPIVACAINE 0.75%*. The estimated blood loss was around 60 ml. There were no hemodynamic fluctuations or complications that occurred during and after surgery. After the surgery, epidural top up was given *Inj ROPIVACAINE 0.2%* for postoperative pain management. Patient hemodynamics remained stable throughout the postoperative period and he was discharged after 7 days of treatment in good condition.

## DISCUSSION

Factors influencing the anaesthetic management in this patient are the history of IHD and his dual antiplatelet therapy. Additionally the incidental finding of pectus carinatum can also pose a difficulty in establishing regional anaesthesia using neuraxial blockade.

Perioperative cardiovascular events are more likely in patients with IHD undergoing noncardiac surgery. One of the key factors influencing the success of surgical procedures performed under general or regional anaesthesia in older patients is the maintenance of the cardiovascular, renal, pulmonary, and central nervous system functions.<sup>[3]</sup>

The avoidance of cardiac depression, maintenance of normovolemia, prevention of a rise in afterload, and avoidance of abrupt hypotension are the anaesthetic goals for this patient. A subarachnoid block's inability to regulate the block's level might lead to significant hemodynamic instability. Due to sympathetic stimulation from direct laryngoscopy and endotracheal intubation, general anaesthesia has been linked to tachycardia, hypotension from intravenous induction drugs, and hypertension from endotracheal intubation. These outcomes can cause myocardial ischemia and subsequent cardiac morbidity.

*Jehosua BT, Sucandra et al.* outlines a case report detailing the anaesthetic management of a patient with cardiac comorbidities undergoing non-cardiac surgery. The authors emphasize the challenges associated with managing such patients and highlight the importance of

maintaining myocardial oxygen supply greater than demand to prevent ischemia. In this particular case, a 52-year-old female with nephrolithiasis and severe hydronephrosis, among other conditions including chronic kidney disease stage V, underwent percutaneous nephrolithotomy and retrograde pyelogram. The patient presented with significant cardiac comorbidities, including congestive heart failure (CHF) functional class II, low ejection fraction (22%), regional wall motion abnormality, and inferior ischemia, categorizing her as ASA III according to the American Society of Anesthesiologists Physical Status Classification System.

The authors opted for epidural anaesthesia (EA) and analgesia techniques, presumably due to the potential benefits of regional anaesthesia in patients with significant cardiac compromise. They administered incremental doses of local anaesthetic to manage myocardial oxygen demand effectively throughout the procedure.<sup>[1]</sup>

*Hedge J, Balajibabu PR, Sivaraman T. et al.* have proved that as the prevalence of ischemic heart disease (IHD) rises within the population, there is a corresponding increase in the number of patients undergoing non-cardiac surgeries. Given the heightened susceptibility of these patients to myocardial ischemia, infarction, and arrhythmias during the perioperative period, a comprehensive assessment is imperative, encompassing detailed history-taking and diagnostic tests. It is essential to address any modifiable risk factors and order further investigations as necessary. Collaboration among cardiologists, surgeons, primary care physicians, and patients is essential, as perioperative care is a collaborative effort. Continuation of heart failure medications, beta-blockers, and statins throughout the perioperative period is crucial. When employing regional anaesthesia, adherence to guidelines regarding anticoagulant medications is essential. Factors influencing the myocardial oxygen supply-demand balance must be carefully managed. Vigilant monitoring is necessary to promptly identify signs of ischemia and rhythm abnormalities. Effective postoperative pain management is also integral to comprehensive care. Thus, thorough perioperative evaluation and management are pivotal for ensuring successful outcomes.<sup>[5]</sup>

Graded Epidural method was selected in light of these factors. The graded epidural anaesthetic technique produces very slow changes in the preload and afterload. In addition, it lessens the negative effects of general anaesthesia and the stress, coagulation, coronary vasospasm, and perioperative myocardial events. It also preserves the oxygen supply and decreases the demand for oxygen in the heart. Patients with cardiac illness undergoing noncardiac surgeries have better perioperative outcomes with graded epidural blockade than with general anaesthesia.<sup>[4]</sup> In this instance, a local anaesthetic was gradually administered in increments

while hemodynamic parameters were being watched. Additional advantages of epidural anaesthesia include superior pulmonary healing in the postoperative phase, reduced risk of deep vein thrombosis, and outstanding pain management.

Pectus carinatum makes up around 5% of all abnormalities of the anterior chest wall. Two to four times as many men as women are impacted. The enlargement of the costal cartilages, along with a subsequent forward displacement of the sternum, is considered to be the mechanism. The most prevalent type of pectus carinatum, known as keel chest or chondrosternal prominence, is characterized by the lower third of the sternum moving forward, with the sternoxiphoidal junction being the site of maximal prominence. The finding of concomitant thoracolumbar scoliosis in 12–34% of patients suggests that pectus carinatum may actually be the result of a ubiquitous connective tissue disorder.<sup>[5]</sup>

A substantial component of the pain experienced by patients after abdominal surgery is derived from the abdominal wall. Transversus abdominis plane (TAP) block is a novel approach of injecting local anaesthesia into the plane between the internal oblique and transversus abdominis muscle. It provides analgesia to the parietal peritoneum, skin and muscles of the anterior abdominal wall.<sup>[6]</sup> TAP block reduces post-operative pain, post-op opioid requirement, respiratory complications. All these factors help reduce myocardial oxygen demand.<sup>[7]</sup>

The American College of Cardiologists guidelines on the management of patients with ICS recommend dual antiplatelet therapy (DAT) for minimal 14 days after balloon angioplasty, 30 days for bare metal stents, and 365 days for drug-eluting stents. The risk of stent thrombosis (STH) and surgical bleeding needs to be assessed carefully and many factors which are implicated in STH, apart from the type of stent and the duration of DAT, need to be considered when decision to discontinue DAT is made. DAT management should be a multidisciplinary exercise and bridging therapy with shorter acting intravenous antiplatelet drugs should be contemplated whenever possible.

*H. Freise, H. K. Van Aken et al.* have done a detailed study on the risk and benefits associated with thoracic epidural anaesthesia. Thoracic epidural anaesthesia (TEA) exerts a dampening effect on cardiac and splanchnic sympathetic activity, impacting the perioperative function of vital organs. Recent meta-analytical findings suggest that TEA correlates with a reduction in postoperative cardiac complications and mortality rates. Moreover, TEA seems to mitigate gut injury during major surgeries, provided that its systemic hemodynamic effects are appropriately managed. While TEA offers enhanced pain control across various surgical interventions, its specific functional advantages in fast-

track and laparoscopic procedures warrant further clarification. Despite its efficacy, the utility of TEA in advanced surgical settings with fast-track protocols and minimal event rates suggests a relatively high number needed to treat to prevent mortality. Nevertheless, the associated risk of harm from TEA remains low, especially when compared to alternative pain management strategies, each carrying its own inherent risks. To optimize the risk-benefit ratio of TEA, careful attention to safe intervals for concomitant anticoagulant use and considerations regarding impaired renal function influencing drug elimination are paramount. Although infection is a rare occurrence, its detection and management through vigilant monitoring and predefined treatment protocols are essential to ensure patient safety. Overall, the favorable risk-benefit profile of TEA for analgesia supports its continued clinical utilization.<sup>[8]</sup>

## CONCLUSION

Finally to conclude on the new learnings from this case report, when patients with low EF IHD present for noncardiac surgery, the anaesthesiologist faces significant challenges. Patients with IHD and a low EF may benefit solely from graded epidural anaesthesia combined with slow dermatome blockade for non-cardiac surgery. The added feature of pectus carinatum increased the difficulty in the technique of Thoracic epidural catheter placement.

## REFERENCES

1. Jehosua BT, Sucandra IMAK. Epidural anesthesia in patients with ischemic heart disease and low ejection fraction who underwent non-cardiac operation: A case report. *Int J Med Rev Case Rep.*, 2021. [cited December 05, 2023]; 5(13): 51-54.
2. Desmarais TJ, Keller MS. Pectus carinatum. Current opinion in paediatrics, Jun. 1, 2013; 25(3): 375-81.
3. Dr Anu Ambooken et al *JMSCR*, October 2023; 11(10).
4. Jain M, Yadav N, Singh A K (May 03, 2022) Graded Epidural Anesthesia for Non-cardiac Surgery in the Prone Position in a Patient With Low Ejection Fraction. *Cureus*, 14(5).
5. The patient with ischaemic heart disease undergoing non cardiac surgery. Hedge J, Balajibabu PR, Sivaraman T. *Indian J Anaesth*, 2017; 61: 705–711.
6. A Paladini G Varrassi YV Waisundara I Banjari J Balkić Multimodal Pharmacological Analgesia in Pain Management Pain Management - Practices, Novel Therapies and Bioactives [Internet]202110.5772/intechopen.87267
7. G Niraj A Searle M Mathews V Misra M Baban S Kiani Analgesic efficacy of ultrasound-guided transversus abdominis plane block in patients undergoing open appendectomy *Br J Anaesth*200910346015
8. Gurajala I, Gopinath R. Perioperative management of patient with intracoronary stent presenting for noncardiac surgery. *Ann Card Anaesth*, Jan-Mar., 2016; 19(1): 122-31. doi: 10.4103/0971-

9784.173028. PMID: 26750683; PMCID:  
PMC4900389.

9. H. Freise, H. K. Van Aken, Risks and benefits of thoracic epidural anaesthesia, *BJA: British Journal of Anaesthesia*, December, 2011; 107(6): 859–868.