

# Epidural Anesthesia for Abdominal Laparotomy in an Obese Patient with Severe Cardiac Disease and Epilepsy: A Rare Case Report

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## ABSTRACT

**Background:** The current practice of regional anesthesia is soundly established for major surgical procedures associated with increased risk of perioperative morbidity and mortality. Particularly, the introduction of epidural anesthesia and analgesia gain a more pronounced acceptance for major surgical procedures including abdominal procedures. Interestingly, low thoracic epidural anesthesia and analgesia is taken as a golden anesthesia technique in debilitated patients at risk of perioperative cardiopulmonary compromise. Consequently, there exist tremendous advantages of effective epidural anesthesia and analgesia for open abdominal surgery. This facilitates the patient comfort, early ambulation, shorter recovery times, hospital stay, and decreased incidence of cardiopulmonary complications, especially in at risk patient or with underlying cardiopulmonary compromise.

**Case description:** we presented 38 years old, female obese patient with known congestive heart failure secondary to chronic rheumatic heart disease for the past 3 years and known epileptic patient admitted to our hospital with the diagnosis of abdominal wall hematoma collection. She complained left flank pain and abdominal swelling of 10 days, intermittent dry cough, shortness of breath, orthopnea of 3-pillows and dyspnea at rest of 1 month duration. On physical examination she was acutely sick looked, grade-III holosystolic murmur, cardiopulmonary reserve test of 5 and NYHA class-IV. Abdominal and pelvic ultrasound showed large fluid containing abdominal mass of 16 cm × 1.8 cm × 6.3 cm in size. Chest x-ray revealed the enlarged cardiac shadow with elongation left heart border and bulging of the right heart border and Echocardiography showed the presence of chronic rheumatic heart disease. After we obtained written informed consent, we safely performed low thoracic epidural anesthesia supplemented by rectus sheath for emergency laparotomy.

**Conclusion:** Patients with multiple comorbid diseases who had limited cardiorespiratory reserves with reduced tolerance to the adverse effects of general anesthesia were more benefited from epidural anesthesia and analgesia during major abdominal surgery.

## INTRODUCTION

The stress of major surgery greatly affects the cardiovascular systems leading to an increase in cardiac output. Hence, this may result in a substantial morbidity and mortality in patients with underlying cardiac disease during the perioperative period. As a result, certain events may increase the risk of mortality in the postoperative period, including Myocardial Infarction (MI), arrhythmias, and multiple organ failure secondary to low cardiac

output. On top of these events, the provision of anesthesia superimposes the perils of cardiac compromise, especially in already compromised cardiac activity. Major abdominal surgeries such as laparotomy are commonly performed under general anesthesia and endotracheal tube due to the need for artificial ventilation and adequate muscle relaxation. However, general anesthesia is associated with an increased incidence of cardiorespiratory complications especially in high-risk patients. Interestingly, sometimes epidural anesthesia can be used as an

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alternative technique of anesthesia for major abdominal surgery (laparotomy), especially in debilitated patients or poor risk patients. But, in some middle and low-income countries resource constraints limits the use of epidural anesthesia [1-4].

Epidural anesthesia can be used as sole anesthetic technique for procedures involving the lower limbs, pelvis, perineum and lower abdomen. It is possible to perform upper abdominal and thoracic procedures under epidural anesthesia alone, especially in patients with underlying cardiopulmonary compromise, who cannot tolerate general anesthesia. However, the need of increased height of block and subsequent adverse events might make it difficult to avoid significant patient discomfort and risk [5-7]. The advantage of epidural anesthesia is the ability to provide continuous anesthesia by placing an epidural catheter, thus making it suitable for lengthy procedures. A well-managed epidural can provide excellent analgesia in the postoperative period allowing the patient to be pain free at rest and when mobilizing [6,7].

The most common postoperative complications after abdominal surgery in high risk patients were pulmonary or cardiovascular dysfunctions. Hence, certain perioperative factors such as age of patient, severity of comorbid disease, type, emergency nature and duration of the surgery, and type of the anesthesia may affect the incidence of cardiopulmonary complications. The preexisting pulmonary disease may increase the perils of postoperative pulmonary complications, which obliges the concern of essential precautions in such individual patient in the perioperative period [8-10].

Epidural anesthesia and analgesia may reduce the likelihood of postoperative complications such as nausea, vomiting, coagulopathy, thrombo-embolic events, airway and cardiopulmonary adverse events, and thus may improve patient outcome [5]. Besides aforementioned challenges related with general anesthesia, neuraxial anesthesia had been reported to reduce the risk of epilepsy and post-operative complications especially in patients who had pre-existing comorbid conditions [11-14].

We presented a case of known cardiac and epileptic patient on medication and follow up who underwent laparotomy for abdominal wall hematoma collection under low thoracic epidural anesthesia in a resource constraints area.

## CASE DESCRIPTION

A 38 years old, female patient (146 cm, 86 kg), known Congestive Heart Failure (CHF) secondary to chronic rheumatic heart disease for the past 3 years on follow up and medication (metoprolol 50 mg po per day, spironolactone 25 mg po per day, frusemide 4 mg po per day) and also known epilepsy on valproic acid 500 mg po per day for the past 10 years. She was referred from other primary hospital to our hospital emergency surgery outpatient department with the diagnosis of abdominal wall hematoma collection. On admission, she complained left flank pain and abdominal swelling of 10 days, for which she was investigated at the referred hospital. In addition to this, she had complaint of intermittent dry cough, shortness of breath, orthopnea of 3-pillows and dyspnea at rest of 1 month duration.

She was taking warfarin 5 mg po per day for three weeks and ordered to discontinue warfarin and prescribed vitamin-k by a physician caring for her. On physical examination she was acutely sick looked, clear and resonant chest, grade-III holosystolic murmur best heard at the apex on cardiovascular evaluation. No raise in jugular venous pressure and no central and peripheral cyanosis detected. Cardiopulmonary reserve test of 5 and NYHA class-IV. Peripheral oxygen saturation of 94% on room air at sitting position or (compromised with position change, particularly to supine). Baseline vital signs were blood pressure and pulse rate 130/84 mmHg and 115/minutes respectively. Laboratory test results depicted that White blood cell  $12.5 \times 10^3/L$  ( $4.0-10.0$ )  $\times 10^3/L$ , Red blood cells;  $2.89 \times 10^3/L$  ( $3.55-5$ )  $\times 10^3/L$ , Hemoglobin-7.7 g/dl, Hematocrit-24.3%, Platelet count of  $229 \times 10^3/L$ . Normal liver function test, and the creatinine levels was 1.75 mg/dl (0.5-0.9) and blood urea nitrogen was 58.9 mg/dl (16.6-48.5) on renal evaluation. Within normal range electrolyte profiles. Blood group and Rh-O positive.

## Imaging findings

Abdominal and pelvic ultrasound showed that, there exist large heterogeneous intramuscular abdominal mass at the left side of abdomen measuring 16 cm  $\times$  1.8 cm  $\times$  6.3 cm in size. The mass is largely fluid containing with no evidence of color flow on Doppler, which was concluded as left side abdominal heterogeneous mass likely hematoma. Chest x-ray (postero anterior) revealed the enlarged cardiac shadow with elongation left heart border and bulging of the right heart border. There is diffuse veiling opacity on both lung pronounced at the central zones, concluding cardiomegaly secondary to unknown cause and or bilateral pulmonary edema or pneumonia. Echocardiography was done and concluded the presence of chronic rheumatic heart disease; markedly dilated left atrium with moderate mitral regurgitation (precipitated by atrial fibrillation). After all possible workup and investigation, in addition to aforementioned diagnosis we conclude that she had moderate mitral regurgitation precipitated by atrial fibrillation +morbid obesity+mild renal dysfunction.

At arrival to the operation room waiting area, written informed consent was obtained after discussing the techniques, procedure and risks of anesthesia clearly for the patient. Accordingly, we decided low thoracic epidural anesthesia supplemented with rectus sheath block for emergency laparotomy and post-operative pain management. In the operation room she positioned on the operating table in modified ramped position (with under shoulder pillow and back up operation table) to reduce aforementioned risk of dyspnea and maximize patient comfort.

Standard monitors (non-invasive blood pressure, pulsi-oxymetry, electrocardiography and temperature) monitors were placed. An 18G cannula placed on both hand and intravenous fluid initiated with 0.9% normal saline. Then, the patient was placed in sitting position comfortably. All necessary equipment's (Epidural kit, medications for epidural injection, and skin numbness) were prepared and checked, medication drawn and titrated as desired on the sterile field Epidural Anesthesia of 38 years old female patient shown in Figure 1.



**Figure 1:** Aseptic preparation of necessary equipment's for Epidural Anesthesia of 38 years old female patient with abdominal wall hematoma.

The puncture site located at L2-3, back of the patient was cleaned adequately with antiseptic solutions. Then after skin infiltration and full aseptic precautions lumbar puncture was made by using 16G Touhy needle at L2-3 interspinous space to identify the epidural space by using loss of resistance technique. Epidural space obtained, and the epidural catheter inserted through the needle to the epidural space for continuous epidural anesthesia and analgesia. Test dose initiated to check correct placement of the catheter. Three minutes after catheter position deemed correct and 10 ml of 0.5% plain bupivacaine was administered as illustrated.

During intraoperative period had given supplemental oxygen *via* nasal cannula at 4 L/min and no episodes of hypotension observed.

The operation takes 90 minutes and the estimated blood loss was approximated to 750 ml. A total volume of 800 ml of isotonic crystalloid was given and two units of O-positive blood were transfused. Intraoperative urine output was 200 ml/hr. No intraoperative and postoperative complications occurred.

The patient was transferred to the post-anesthesia care unit and continuously monitored at post anesthesia care unit for 6 hours. Routine monitoring, including pulse-oximetry, non-invasive blood pressure, body temperature, and urine output were monitored thoroughly at post-anesthesia care unit. Post-operative pain was addressed with continuous epidural 0.125% bupivacaine supplemented by rectus sheath block.

## RESULTS AND DISCUSSION

To date, Epidural anesthesia and analgesia was introduced as the standard of care in the perioperative clinical care combined with the early administration of opioid sparing analgesics [13].

The provision of save anesthetic techniques is very crucial in the pace of maintaining stable hemodynamic status of the patient, as anesthesia for patient with underlying cardiac causes were associated with adverse anesthetic outcome. Therefore, vigilant selection of anesthetic technique with less hemodynamic

manipulation, careful monitoring and early intervention is crucial to prevent perioperative complications [15,16]. Epidural anesthesia created good operating conditions for major abdominal surgeries, especially in fragile patients for better post-operative ventilation, intra-operative and postoperative pain management. A patient with cardiovascular comorbidity are more benefited from epidural anesthesia since it causes less cardiac manipulation and provide good quality of analgesia which assist them in early mobilization and nutrition [4,5].

It has been reported that, the successful use of sole epidural anesthesia for awake laparotomy had been exceedingly accepted as it avoids the risk of airway manipulation during general anesthesia. On top of this, epidural anesthesia and analgesia address the issue of effective pain control and abolish the surgical stress response facilitating enhanced recovery after major surgery. Laparotomy increases a substantial surgical injury heightening the risk of postoperative cardiopulmonary complications. Hence, epidural anesthesia has a proven to be protective against cardiopulmonary complications after major abdominal surgery [4,11,13].

Laparotomy for major abdominal procedures with extensive bowel manipulations predisposes the patients to develop undesirable and potentially life threatening events such as paralytic ileus. The use of certain perioperative medications like systemic opioids and increased sympathetic response may increase the risk of reduced bowel motility and might leads to ileus. However, the use of thoracic epidural anesthesia has been proven to be effective in accentuating the occurrence of ileus following open abdominal procedures, as a result of local anesthetic induced sympathetic block and avoidance of opioids [5,11].

Patients who have an effective epidural can experience excellent and often complete pain relief after operation while the epidural is running. Patients report reduced visual analogue pain scores at rest and on movement, this latter being beneficial for early mobilization of patients. The few studies seeking the patient's perspective on postoperative epidural analgesia revealed a high level of satisfaction and quality of recovery [5].

For the present case, low thoracic epidural anesthesia and analgesia was performed with 10 ml of 0.5% bupivacaine at L2-3 successfully and the vital sign was stable throughout the procedure. We addressed the issue of post-operative pain by epidural analgesia with 0.125% bupivacaine supplemented with rectus sheath block.

## CONCLUSION

Epidural anesthesia and analgesia has a great role in both intraoperative and postoperative pain management. Therefore, patients with multiple comorbid diseases who had limited cardiorespiratory reserves with reduced tolerance to the adverse effects of general anesthesia were more benefited from epidural anesthesia and analgesia during major abdominal surgical procedure.

## ETHICS APPROVAL AND CONSENT TO PARTICIPATE

We received proper patient consents to participate in this study. The patient was given her consent for her clinical data to be incorporated in the paper. Confidentiality was maintained throughout, with a due concerns will be made to protect her privacy.

## CONSENT FOR PUBLICATION

We described the technique to the patient in her native language and obtained her approval to submit the article and accompanying photographs for publication.

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