

CASE REPORT**Report of an effective awake thoracic epidural anaesthetic for major abdominal surgery in two high risk patients with severe pulmonary disease**

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INTRODUCTION

We report two cases of awake major abdominal surgery in two high risk surgical patients with severe pulmonary disease, performed under thoracic epidural anaesthesia as a sole technique. The first case was an elective open sigmoid colectomy in a 61-year-old patient with chronic obstructive pulmonary disease (COPD) and recent thoracotomy for a wedge resection of a bronchial adenocarcinoma. The second case was an emergency open cholecystectomy in a 66-year-old patient with end-stage COPD. Reviewing the literature, no similar cases were reported recently.

CASE ONE

A 61-year-old male patient known to have end-stage COPD was diagnosed with a sigmoid adenocarcinoma in January 2008. Preoperative staging identified a spiculated mass lesion in his right lung. A PET scan suggested that these were two independent primaries. In March 2008 he underwent a right thoracotomy under a combined anaesthetic technique of general anaesthesia in conjunction with a thoracic epidural. During surgery, it was difficult to ventilate him due to secretions in his dependent lung and a decision was taken to limit the operative procedure to a wedge resection rather than a lobectomy. The first 10 postoperative days were complicated by atelectasis, reduced oxygen saturation and rapid atrial fibrillation, which converted to sinus rhythm with amiodarone.

At anaesthetic assessment prior to colonic resection, the patient was noted to have a BMI of 32 and he was still smoking 4-5 cigarettes per day (previous history of 50 pack years). He had chronic productive cough and was on four regular inhalers; terbutaline (Bricanyl), tiotropium bromide (Spiriva) and budesonide/formoterol (Symbicort) with salbutamol (Ventolin) as required. On examination he sounded generally wheezy, with reduced air entry bilaterally. His preoperative chest Xray showed generalised emphysematous changes with hyperinflation, but was clear of focal disease.

The patient's peak expiratory flow rate (PEFR) was 250L.min⁻¹. Pulmonary function tests showed that his FEV₁ was 1.5L (54% of predicted) with an FEV₁/FVC ratio of 45%, and not improved after a bronchodilator. The six-minute walk test (6MWT) detected an overall low level at 223 meters (predicted distance in healthy elderly = 631 ± 93 meters),¹ and he was diagnosed to have moderately severe irreversible COPD.

Surgical and anaesthetic options were discussed and we decided to proceed to open surgery using awake thoracic epidural anaesthesia to minimise potential chest complications.

The patient received an awake thoracic epidural anaesthetic (T7-8). The technique was performed in a lateral position under complete asepsis and continuous monitoring of heart rate (HR), non-invasive blood pressure (NIBP) and pulse oximetry (SpO₂). Light sedation using 4mg midazolam was given and lignocaine 1% (5ml) was used to infiltrate the skin. The block was induced with lignocaine 2% with adrenaline 1:200 000 (total 20ml), clonidine 150mcg and diamorphine 3mg. Loss of sensation up to T4 was obtained bilaterally five minutes after injection of the local anaesthetic bolus. This was confirmed testing cold sensation with ice. A bolus of 10ml levo-bupivacaine 0.5% was given followed by an infusion of 0.1% levo-bupivacaine with fentanyl 2mcg.ml⁻¹ (10–15ml.h⁻¹) to maintain the block throughout the operation. Analgesia and abdominal muscle relaxation were optimum and excellent operating conditions were obtained.

The patient was conversing with the operative team during surgery, while remaining very comfortable, breathing 4-6L.min⁻¹ oxygen via Hudson facemask. No further sedation was required. The patient was stable from a haemodynamic and respiratory standpoint throughout the operation. The operation time was two hours and invasive monitoring was not used.

Summary

Awake thoracic epidural anaesthesia as the sole anaesthetic technique was successfully employed for two high-risk surgical patients with chronic obstructive pulmonary disease, undergoing abdominal surgery. The procedure was tolerated well and the anaesthetic technique, which has been shown to reduce intraoperative and postoperative cardiac, respiratory and gastrointestinal complications, may have significantly contributed to the prompt, complication free recovery experienced by both patients.

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The patient was transferred to the recovery room postoperatively, and then to the high dependency unit (HDU) for postoperative observation and monitoring. Continuous epidural analgesia was very effective and no further analgesia was required. The upper level of the epidural block was consistent with the epidural scoring scale for arm movements (ESSAM) of zero (able to perform a hand grip),² the patient was breathing comfortably and no respiratory support was needed. The patient made a remarkable recovery and was discharged home 6 days post-operatively in good general condition. On review at 4 and 8 weeks after discharge, the patient was well and had returned to preoperative activity levels.

CASE TWO

A 66-year-old male ex-smoker was admitted to the emergency department of Wishaw General Hospital suffering from sudden onset epigastric and right upper quadrant pain. He had tenderness and guarding in the right upper quadrant with an obviously palpable gall bladder consistent with acute cholecystitis. He had progressive shortness of breath, generalized expiratory wheeze with bilateral basal crepitations consistent with COPD, for which he used three different inhalers regularly; salbutamol (Ventolin), fluticasone/salmeterol (Seretide), and tiotropium bromide (Spiriva). He could manage only 50 meters on the flat and one flight of stairs, with a PEF_R of 250L.min⁻¹. His most recent pulmonary function tests showed that he had FEV₁ of 1.14L (45% of predicted value) and FEV₁/FVC ratio of 41%. His chest Xray showed COPD with bilateral basal consolidation. He was also taking amlodipine for a history of hypertension and co-dydramol for osteoarthritis.

On admission, his white cell count was raised with the C-reactive protein over 300, which fell after administration of intravenous antibiotics. An ultrasound confirmed gallstones with acute inflammatory changes in the gallbladder. Imaging and clinical impression suggested he was developing a gallbladder empyema and concerns were raised about the viability of the gallbladder, suggesting open cholecystectomy was necessary.

The anaesthetic technique was very similar to the first case. After patient consent, the patient was placed in the lateral position and a thoracic epidural was inserted into space T6-7. Light sedation was used, and the same combination of anaesthetic and analgesic medication was used. The surgery was completed in one hour and there were no complications. The patient was stable and was able to converse with the operating team throughout.

The patient was again managed in the HDU postoperatively and did not require any analgesia in addition to the continuous epidural infusion, nor respiratory support. The ESSAM score was again zero. The patient stayed in hospital for 12 days post-operatively to optimise his chest condition with nebulisers, antibiotics and physiotherapy. The postoperative histopathologic examination confirmed the diagnosis of acute diffuse suppurative cholecystitis with numerous suppurative foci within the necrotic gallbladder wall.

DISCUSSION

General anaesthesia in high risk surgical patients with significant pulmonary disease can trigger adverse effects such as pneumonia,

impaired cardiac performance, neuromuscular problems, biotrauma and barotrauma and intra- and postoperative hypoxemia. Avoiding tracheal intubation decreases the risk of postoperative laryngospasm and bronchospasm, especially in elderly COPD patients who have irritable upper and lower airway tracts. Awake thoracic epidural anaesthesia has been reported to be a safe technique in patients with end-stage COPD.³ Our two patients had end-stage COPD as a significant co-morbidity and we feel that the use of epidural anaesthesia may have made a vital contribution to their recovery.

The pathophysiological response to surgical trauma includes pain, nausea, vomiting and ileus, stress-induced catabolism, impaired pulmonary function, increased cardiac demands, and risk of thromboembolism. Surgical and medical complications, delayed recovery and discharge from hospital may result. The development of safe anaesthetic and analgesic techniques including regional anaesthesia, provide excellent operative conditions and enhanced recovery. The anaesthetist has a pivotal role in facilitating early postoperative recovery by providing minimally invasive anaesthesia and analgesia and tailoring the anaesthetic strategy to suit the patient's general condition and the surgical demands.⁴

Thoracic epidural anaesthesia improves tissue oxygenation by reducing the fall in subcutaneous tissue oxygen tension caused by surgical stress and adrenergic vasoconstriction during major abdominal surgery, improves cardiac, respiratory and gastrointestinal function and may decrease the incidence of surgical wound infection.⁵ Splanchnic sympathetic nervous blockade induced by epidural anaesthesia results in reduced inhibitory gastrointestinal tone and increased intestinal blood flow, positive factors where a colonic anastomosis is to be performed.⁶

Postoperative myocardial infarction is reported to be significantly lower in patients receiving continuous thoracic epidural analgesia. Two systemic reviews have found that epidural anaesthesia with or without postoperative epidural analgesia reduces postoperative pulmonary infections compared with general anaesthesia with or without postoperative systemic analgesia.^{7,8} Ballantyne et al confirmed that postoperative epidural pain control can significantly decrease the incidence of pulmonary morbidity.⁹ Furthermore, a comparative study of major abdominal surgery in the elderly reported that postoperative epidural analgesia provides better pain relief, improved mental status and faster return of bowel activity.¹⁰

Awake epidural anaesthesia was reported to be an effective and safe technique in the high-risk colectomy patient in 1994.¹¹ Since then, there has been a paucity of data in the literature to describe the procedure performed under regional, especially awake, epidural anaesthesia in patients with co-existing pulmonary diseases. Awake laparoscopic cholecystectomy has been reported under thoracic epidural anaesthesia in COPD patients.¹² However, this anaesthetic technique is still unrecorded for open cholecystectomy, despite the fact that open surgery is known to adversely affect postoperative pulmonary function more than the laparoscopic procedure.¹³

In this article, the two reported patients had significant respiratory co-morbidity and prompted the team to consider all surgical and

anaesthetic options. Thoracic epidural was preferred to combined spinal epidural (CSE) anaesthesia because it is simple, less invasive and more reliable. In a CSE technique, the clinician has no chance to test the effectiveness of his epidural until the effect of the spinal wears off and it would be too late if it is found to be ineffective or not working at all and the only available option in this scenario would be to induce general anaesthesia. In our technique, epidural anaesthesia was induced with lignocaine to speed up the onset of the block, but later the longer acting levo-bupivacaine was used. Diamorphine and clonidine were added to improve the quality of the analgesic effect of the epidural. The risk of inadvertent high blockade postoperatively was reduced by monitoring the patient's arm movements using the epidural scoring scale for arm movements (ESSAM), which has been found to be very simple and reliable method for the early detection of the cephalad spread of thoracic epidural analgesia.²

We believe that thoracic epidural anaesthesia and analgesia is very useful technique for selected high-risk patients, and avoids the risks associated with general anaesthesia. Development of this technique may help extend the range of surgery offered to the high-risk surgical patient with significant co-morbidity, especially those with severe pulmonary disease. The technique avoids the dangers associated with positive pressure ventilation in high-risk patients, enhances postoperative recovery and avoids the need for postoperative ICU care. Needless to say, the technique requires anaesthetic and surgical experience as well as co-operation, and we recommend that these high-risk patients are observed closely in a high dependency area whilst they are receiving the epidural infusion.

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