

Epidural Anesthesia For Laparoscopic Cholecystectomy In A Patient With Dilated Cardiomyopathy: Case Report And Review Of Literature

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Citation

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Abstract

Commonly laparoscopic cholecystectomy (LC) is performed under general anesthesia. In this report we describe the anesthetic management of a patient with dilated cardiomyopathy who underwent LC under thoracic epidural anesthesia. To the best of our knowledge this is the first report in the literature which describes epidural anesthesia for LC in a cardiac compromised patient. A 28-year old male patient presented with acute calculous cholecystitis. On examination he looked ill with shortness of breath but lying supine comfortably in bed. Neck veins were engorged with no edema in the lower limbs. On auscultation first and second sounds were audible with murmur and dropped beats. Chest-x-ray showed left atrial enlargement. ECG showed normal sinus rhythm, ventricular premature complexes, left atrial enlargement and possible chronic pulmonary disease pattern. Echocardiography showed severely dilated left ventricle with severe systolic dysfunction and generalized hypokinesia. Ejection fraction was 15%. Upon arrival of the patient to operation room routine monitoring were established. The measured blood pressure was 110/70 mmHg and heart rate 76/min with oxygen saturation on oxygen mask of 99%. A16G i.v and radial arterial cannulation were established under local anesthesia. Right internal jugular vein was cannulated under local anesthesia and bilumenal catheter was inserted for central venous pressure monitoring and for injecting resuscitation drugs when required. Then the patient was placed on right lateral side and thoracic epidural catheter D8-9 was inserted under complete aseptic technique. Bupivacaine 0.25% 7ml injected through the catheter with loss of sensory up to T4 dermatome. Dopamine infusion drip started at dose of 5mcg/kg/min through the central venous line. Foleys catheter was inserted. The mean range of blood pressure intraoperatively was 94-110mmHg and CVP ranged from 26-3 mmHg. Sedation was achieved with 3mg i.v midazolam. Total fluids received 700 ml of crystalloids. Total urine output was 300ml. Surgery took 60min with CO2 insufflation pressure <10mmHg and was uneventful. Through out the procedure the vital signs were stable and the patient was comfortable. At the end of the procedure he was transferred to intensive care unit awake with stable vital signs. Next day he was transferred to the surgical floor.

In conclusion, patients with limited cardiac reserve undergoing LC present challenges to anesthesiologists. Patients with cardiomyopathy should be assessed adequately preoperatively and managed by anesthetists with adequate experience in regional techniques. We are aware that in other hands general anesthesia could be an acceptable option, however, for this particular patient and due to our familiarity with the technique we did feel that TEA can provide adequate block for surgery and excellent postoperative analgesia.

Commonly laparoscopic cholecystectomy (LC) is performed under general anesthesia. In this report we describe the anesthetic management of a patient with dilated cardiomyopathy who underwent LC under thoracic epidural anesthesia. To the best of our knowledge this is the first report in the literature which describes epidural anesthesia for LC in a cardiac compromised patient.

CASE REPORT

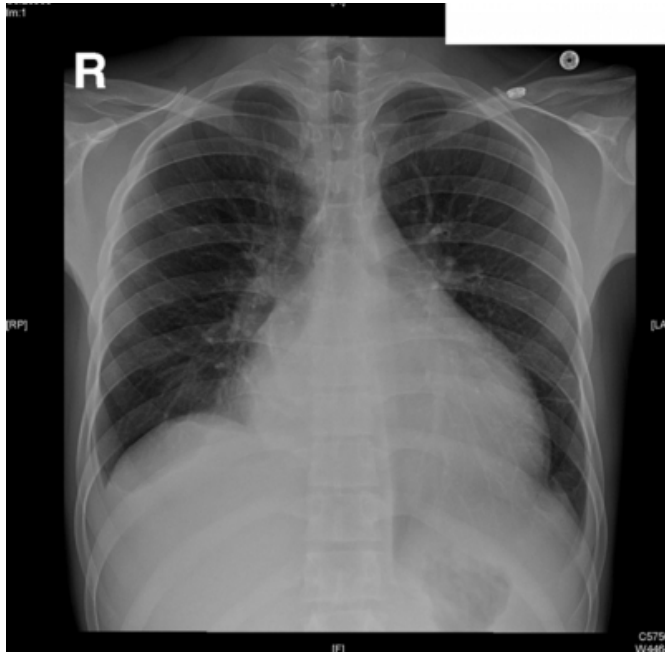
A 28-year old male patient presented with acute cholecystitis which was diagnosed of calculous origin. The patient height and weight were 172 Cm and 62 Kg respectively. Besides he

was complaining of shortness of breath. On examination he looked ill with shortness of breath but lying supine comfortably in bed. Neck veins were engorged with no edema in the lower limbs. On auscultation first and second

sounds were audible with murmur and dropped beats. Blood biochemical analysis showed normal figures except elevated liver enzymes negative for hepatitis. Chest-x-ray showed left atrial enlargement (Figure 1).

Figure 1

Figure 1: Preoperative chest x-ray showing cardiomegaly.



ECG showed normal sinus rhythm, ventricular premature complexes, left atrial enlargement and possible chronic pulmonary disease pattern. Echocardiography showed severely dilated left ventricle with severe systolic dysfunction and generalized hypokinesia. Ejection fraction was 15%. Left atrium, right atrium and right ventricle were also dilated. Moderate regurgitation of mitral and tricuspid valves. Patent foramen ovale or small atrial septal defect was diagnosed. Pulmonary artery pressure was 40mmHg. The diagnosis made was compatible with myocarditis with cardiomyopathy. He was on the following medications, lisinopril, digoxin and lasix in oral tablet forms. Ultrasound guided drainage of the gall bladder was performed. However, cholecystectomy was indicated for complete cure. Due to his cardiac compromised condition the plan was laparoscopic partial (deroofing) cholecystectomy. After obtaining high risk consent the plan was to insufflate the peritoneum with CO₂ pressure <10mmHg and performing partial cholecystectomy under thoracic epidural anesthesia (TEA). Premedication consisted of oral lorazepam 2mg 2 hours preoperatively. Upon arrival of the patient to operation room routine monitoring were established. The measured blood pressure was 110/70 mmHg and heart rate 76/min

with oxygen saturation on oxygen mask of 99%. A16G i.v and radial arterial cannulation were established under local anesthesia. Right internal jugular vein was cannulated under local anesthesia and biluminal catheter was inserted for central venous pressure monitoring and for injecting resuscitation drugs when required. Then the patient was placed on right lateral side and thoracic epidural catheter D8-9 was inserted under complete aseptic technique. Bupivacaine 0.25% 7ml injected through the catheter with loss of sensory up to T4 dermatome. Dopamine infusion drip started at dose of 5mic/kg/min through the central venous line. Foleys catheter was inserted. The mean range of blood pressure intraoperatively was 94-110mmHg and CVP ranged from 26-3 mmHg. Sedation was achieved with 3mg i.v midazolam. Total fluids received 700 ml of crystalloids. Total urine output was 300ml. Surgery took 60min with CO₂ insufflation pressure <10mmHg and was uneventful. Through out the procedure the vital signs were stable and the patient was comfortable. At the end of the procedure he was transferred to intensive care unit awake with stable vital signs. Next day he was transferred to the surgical floor.

DISCUSSION

In recent years advanced laparoscopic surgery has targeted older and sicker patients and subsequently anesthesia challenges has increased. It is well known that laparoscopy can compromise the cardiovascular and respiratory function of the patients; however, in the mean time it was introduced as a safe and simple procedure and could be performed in ambulatory settings. LC is the most widely performed laparoscopic procedure in the surgical arena which requires gas insufflation. Carbon dioxide approaches the ideal insufflating gas in laparoscopy. Major hemodynamic changes in the form of alteration of blood pressure, arrhythmia and cardiac arrest have been reported with gas insufflation. The extent of these changes depends on intra-abdominal pressure (IAP) and patient position. At IAP <15 mmHg, venous return is augmented as blood is squeezed out of splanchnic venous bed with increased cardiac output which also increased secondary to peripheral vasoconstriction due to hypercapnia (1). At IAP >15mmHg venous return decreases due to compressed inferior vena cava which leads to decreased cardiac output and hypotension (2). In the case presented the IAP was <10 mmHg and subsequently as explained above, venous return was adequate and blood pressure remained on the higher side stable throughout the procedure and tolerated very well. The small dose of dopamine used in our case was to support

the circulation if hypotension occurs in light of the cardiac compromised status of the patient. In one report the hemodynamic changes associated with laparoscopic gas insufflation was described as short lived and lose significance at 10min from the time a patient undergoes pneumoperitoneum (3). Elliott et al, in a study using transesophageal echocardiography (TEE) during LC in health patients found that considerable cardiovascular changes occur during insufflation of CO₂ and they recommended the use of TEE in patients with limited cardiac function (4). Gasless laparoscopic technique with use of abdominal wall lift could provide better cardiovascular condition, however in patients with limited cardiac, pulmonary or renal function, the technique has no clinically relevant advantages compared with low-pressure (5-7 mmHg) pneumoperitoneum, and furthermore, gasless technique combined with low-pressure pneumoperitoneum might be a good alternative (5). Stress response to pneumoperitoneum during LC is of paramount importance particularly in a patient with limited cardiac function as in our case. In a study compared three anesthetic techniques general, general supplemented by fentanyl and general combined with TEA it was found that, general anesthesia with sevoflurane/N₂O could not suppress stress response of both hypothalamus-pituitary-adrenocortical axis and sympathoadrenal system while TEA suppressed only the sympathoadrenal responses (6). In light of this TEA might be of advantage in patients with limited cardiac function undergoing LC. In a case report, combined spinal/epidural technique was used for a patient with significant chronic obstructive lung disease (COPD) underwent LC with encouraging results (7). In another series epidural anesthesia was used as sole technique for LC and the authors recommended it for patients who are not good candidates for general anesthesia due to cardio respiratory problems (8). In another study performed on 20 patients, van Zundert et al, have shown that segmental spinal anesthesia can be used successfully and effectively for laparoscopic surgery in healthy patients with caution during inserting the needle above the level of termination of the spinal cord (9). In another series on 6 patients with COPD a thoracic epidural anesthesia (T10-T11) was used for LC safely and intraoperative shoulder-pain was not a major event and was controlled effectively with small doses of opioid analgesia (10). Our patient did not complain of any intraoperative shoulder pain and this might be due to instillation of bupivacaine in the intraperitoneal cavity. In a previous case report we have used TEA for LC in a patient with myotonia dystrophy safely, however, even with

intraperitoneal bupivacaine instillation the patient intraoperatively complained of severe shoulder pain which was effectively treated using systemic opioids (11).

In conclusion, patient with limited cardiac reserve undergoing LC present challenges to anesthesiologists. Patients with cardiomyopathy should be assessed adequately preoperatively and managed by anesthetists with adequate experience in regional techniques. We are aware that in other hands general anesthesia could be an acceptable option, however, for this particular patient and due to our familiarity with the technique we did feel that TEA can provide adequate block for surgery and excellent postoperative analgesia. To the best of our knowledge this is the first case reported on the use of TEA in patient with cardiomyopathy undergoing LC.

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