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Bilateral TAP Block (Transversus Abdominus Plane Block) in a Case of Dilated Cardiomyopathy with Left Ventricular Clot for Cystolithotomy: A Case Report

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Abstract: ***Dilated cardiomyopathy a myocardial disease characterised by impairment of ventricular contractility and dilatation of the left or biventricular ventricles. Due to poor left systolic function, ventricular enlargement, the risk of malignant arrhythmias, and sudden cardiac death, anaesthesiologists face a difficulty while managing patients with dilated cardiomyopathy (DCM) during anaesthesia. Case discussion: 50 years male a case of dilated cardiomyopathy, cardiac failure diagnosed a week back, was treated with diuretics and on ventilatory support. He was planned for AICD. During investigation bladder calculi with microscopic hematuria was noted. Patient was posted for cystolithotomy. Investigation showed mild anaemia with leucocytosis. Under all aseptic precautions, USG guided Bilateral transversus abdominus plane (TAP) block given. TAP block was performed with modification where in the probe was placed 2 cm anterior to iliac crest with 15cc of 0.75% ropivacaine and 15cc of 0.5% bupivacaine were diluted with normal saline to deposit 30 ml of volume on either side. Patient was sedated with injection Fentanyl (50mcg) and dexmedetomidine infusion was adjusted to 0.5mcg/kg/minute dose. Conclusion: The management of patients, pre optimization, planning multidisciplinary approach is key to success. Real time use of USG is safe for regional anaesthesia with dexmedetomidine can lead to favourable outcome.***

Keywords: Dilated cardiomyopathy, TAP block, hemodynamic stability, anaesthesia management, multidisciplinary approach

1. Introduction

Dilated cardiomyopathy is a myocardial disease characterize by reduced global myocardial contractility, leading to left ventricular (LV) or biventricular dysfunction[1]. Cardiomyopathy is the third most common cause of heart failure. Its prevalence, in the population with heart failure, is 1:250–400 patients, in the general population it is 1:2500 patients [2]

The poor left systolic function, ventricular enlargement, the risk of malignant arrhythmias, sudden cardiac death, and drugs, all contribute a to the challenges to an anaesthesiologists while conducting a case with dilated cardiomyopathy. Regional anaesthesia and plain blocks have evolved a big way to even in providing surgical anaesthesia without change in the cardio- respiratory physiology. Transversus abdominal plane block (TAP) block is a useful regional technique for anterior abdominal surgeries including cystolithotomy surgery. We managed an ASA III patients with dilated Cardiomyopathy with arrhythmias on anti-failure treatment under Bilateral TAP block posted for Cystolithotomy procedure uneventfully.

The use of real-time ultrasonographic guidance may reduce risks of peritoneal puncture, bleeding and visceral injury, while potentially increasing the rate of success.

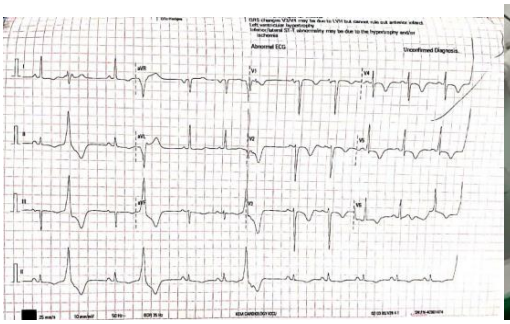
2. Case Report

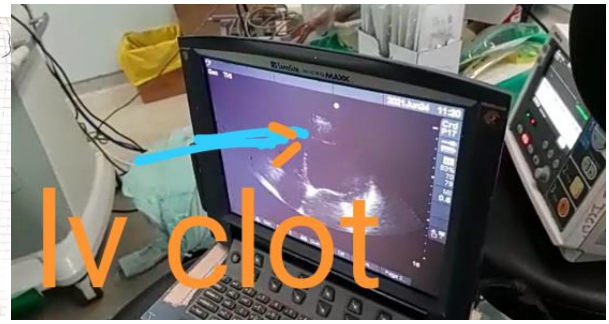
50-year male with BMI 25.71kg/cm^2 diagnosed case of dilated cardiomyopathy, recent onset Diabetes Mellitus posted for open cystolithotomy. 8 day prior he presented with c/o dyspnea on exertion (NYHA grade3) diagnosed with heart failure was treated with non-invasive ventilator for 8 days, anti-failure treatment and planned for AICD. During evaluation he was diagnosed incidentally with bladder stone and was posted for Cystolithotomy. Heart rate was 74/min, blood pressures were 98/ 60 mmHg respiratory rate - 16/min with bilateral pedal oedema. Chest was clear and heart sounds were normal.

Airway examination was normal no sign suggestive of difficult airway.

Routine investigations showed mild anaemia with leucocytosis normal platelet count, mild raised bilirubin with normal hepatic enzymes and normal PT/INR. Urine- pus cell and RBCs. HBA1C- 6.5%. ECG-ST-T wave changes with LBBB and multifocal VPCs 5-7/minute. 2Decho- 25%global

hypokinesia(anterior>inferior), moderate PH, layered clot in the LV. CAG – insignificant. USG Abdomen- two urinary bladder calculi of 2 cm ,2.5 cm with no bladder hematoma or bladder clot.





Medication aspirin, atorvastatin. Lasilactone and cardivas was continued till day of surgery. However OHA were withheld on morning of surgery, T warfarin 20 HS was converted to Inj. Heparin 5000units 6hourly and the morning dose of heparin on day of procedure was with-held.

Anaesthetic management

Patient ASA III NBM status was confirmed, High risk consent was taken with cardiology and ICU standby. Patient was kept NBM for 6hrs for solid food.

We planned with surgeons for open cystolithotomy anaesthesia plan was to give bilateral TAP block with conscious sedation.

As per standard operating practice airway equipments, machine check, emergency cardiac drugs and defibrillator, all were kept ready. Standard ASA monitors like pulse oximetry, ECG, NIBP, Temperature and capnograph were attached. A focused trans thoracic ECHO was done by cardiologist to know the functioning of heart and preload by giving 200-300 ml of fluid. Arterial cannulation done and transduced for invasive BP monitoring. Oxygen was started at 4lites/min by Hudson mask and convection warmer was started. As a part of pre-emptive analgesia protocol, injection Paracetamol (1000 mg), injection Dexamethasone (8mg) were given. Inj. fentanyl 1mcg/kg and Inj. midazolam 1 mg titrated as given. Infusion of inj. Dexmedetomidine with loading dose 0.5mcg/kg and gradually up titrated over 10minutes to achieve optimum depth of sedation on Ramsay score, monitoring vitals. Dexmedetomidine maintenance infusion at dose 0.5mcg/kg/min was continued and titrated as per sedation score to maintain Ramsay score of 3. Under all aseptic precautions, USG guided Bilateral lateral TAP block was performed with modification where in the probe was placed 2 cm anterior to iliac crest. A real time USG guided block performed with Sonosite machine curvilinear probe with 2- 5 Hz frequency, in plain technique 15 cc of 0.75% ropivacaine and 15 cc of 0.5% bupivacaine were diluted with normal saline to deposit 30 ml of volume in either side. 5 cc of 2% lignocaine was given for local infiltration at the surgical site prior incision. The procedure commenced 20 minutes after the block. A small 3-4 cm long incision was taken 2cm above the pubic symphysis and the bladder. The 2 stones were delivered out easily and closure done in layers without any discomfort to the patient. surgery was uneventful with no hemodynamic stability. His postoperative course was uneventful and was posted for AICD after 3weeks.

3. Discussion

Dilated Cardiomyopathy (DCM) is a disease of the heart muscle characterized by enlargement and dilation of one or both of the ventricles along with impaired contractility defined as left ventricular ejection fraction (LVEF) less than 40%[3]. Patient commonest clinical presentation is with cardiac failure and or arrythmias with or without thromboembolic events. The clinical significance of LV thrombi lies on their potential risk of systemic embolization particular, protrusion of thrombus in LV, mobility, and pedunculated appearance are associated with an increased risk of embolization during any stage of procedure. Goals of anaesthesia are to maintenance of sinus rhythm, left ventricular filling and systemic vascular resistance. Reducing sympathetic stimulation reducing chronotropy and inotropy is important.

TAP block is an important component of multimodal analgesia. Its utility for anaesthesia in high-risk patients is also seen in practice. TAP can provide midline abdominal analgesia anywhere from the symphysis pubis to the xiphoid process for several dermatomes around the injection point[4]

Anatomically intercostal, subcostal, and L1 segmental nerves communicate to form the upper and lower TAP plexuses, which innervate the anterolateral abdominal wall, including the parietal peritoneum, However the L1 segmental nerves in the TAP are not covered by the lateral TAP nerve block and require an anterior TAP nerve block medial to the anterior superior iliac spine. Nerve supply of bladder is by sympathetic spinal segment-T11 to L1 pain, touch, and temperature sensations are carried by sympathetic nerves.[2] Parasympathetic-S2 to S4 [3] spinal levels for pain conduction-T11 to L2(dome) and S2 to S4(neck). The subcostal(T12), ilioinguinal(L1) and iliohypogastric(L1) are the nerve suppling bladder.

A real time USG guided block have improved the accuracy as well as the safety in plain blocks. In addition, a growing number of reports suggest that TAP blocks may also be a safe alternative to neuraxial blockade in patients who are anti-coagulated, coagulopathic, or in patients who would not tolerate the hemodynamic sequelae often associated with profound neuraxial sympathectomy [4]

Lipi Mishra et al successfully conducted emergency perforative peritonitis surgery in ASA gr 4 patient, an uncontrolled COPD with type 1 respiratory failure po2 - 58mmhg [5].

Quek et al conducted infraumbilical surgery under Rectus sheath block and propofol infusion at 50mg/Hr, diagnosed cardiomyopathy with EF of 20 % [6]. Kim et al administered bilateral TAP block for lower rectus abdominis muscle hematoma sized 16 × 7.7 × 9.2cm in a breastfeeding primipara woman who rejected other anaesthetic methods underwent the successful evacuation of an abdominal wall hematoma under a US-guided bilateral TAP block [7].

Regional anaesthesia used alone or in combination with general anaesthesia has the advantage of reducing after load which can improve cardiac output. Central neuraxial blockade sympathectomy can be detrimental which is an advantage with TAP block. The over administration of pre spinal or intraoperative fluid can cause severe postoperative symptoms. Hypotension can be treated with phenyl epinephrine, while administrating B agonist can causes LVOT obstruction[8].Additionally, unlike central neuraxial blockade, rectus sheath block is a viable option in the presence of relative coagulopathy, and recent use of antiplatelets or anticoagulants.

We had decided to do this case under bilateral rectus sheath block and sedation with dexmedetomidine infusion. Dilated cardiomyopathy and severe left ventricular dysfunction placed our patient at high risk for adverse effects during procedural sedation as there were both decreased myocardial function and limited cardiac reserve.

Dexmedetomidine infusion provides effective sedation in diverse procedural scenarios. Reduces sympathetic and stress response to surgery and also reduce post operative pain. Its is used safely in cardiac disease patients. The effect of DEX on MAP over the composite time period was not found to be significantly different in the Heart failure with low EF(HFrEF) group compared to the non-HFrEF group[9]. Wang G etal in metanalysis conclude dexmedetomidine in cardiac surgery patients can reduce risks of abnormal hemodynamics with good safety[10].

TAP block technique had advantage over general anaesthesia as it avoids airway manipulation so reducing intubation and extubation response and need of inhalational anaesthetic agents leading to haemodynamic instability after general anaesthesia. TAP block is associated with risk of intraperitoneal injection, bowel hematoma, visceral organ injury and local anaesthetics systemic toxicity as well, incidence can be reduced by real time ultrasound guided block.

4. Conclusion

The management of patients, pre optimization, planning multidisciplinary approach is key to success. Real time use of USG is safe for regional anaesthesia with dexmedetomidine can lead to favourable outcome.

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