



A combination of Interscalene Brachial Plexus Block and Superficial Cervical Plexus Block for Fracture Clavicle Surgery in a patient with Dilated Cardiomyopathy

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Abstract: We report a case of interscalene brachial plexus block supplemented with superficial cervical plexus block in a patient with dilated cardiomyopathy with ejection fraction of 24% and prone to heart failure, scheduled for surgery of fracture mid-shaft of clavicle in non union. We are unaware of any case report of similar anaesthetic management before, where administration of general anaesthesia and its possible side effects were totally avoided.

Keywords: Interscalene brachial plexus block, Superficial cervical plexus block, Dilated cardiomyopathy, Heart failure

Introduction: Dilated cardiomyopathy (DCM) is a primary myocardial disease characterized by ventricular dilatation and impaired myocardial contractility.¹ Our patient was a diagnosed case of DCM prone to heart failure (HF) and the anaesthetic management was very challenging. We planned a combination of interscalene brachial plexus block (ISBPB) and superficial cervical plexus block (SCPB) for fracture clavicle surgery as we felt it will be a better alternative to general anaesthesia (GA).

Case Report: A 50 years old male, weighing 60 kg, height of 156 cm and a diagnosed case of DCM for last five years was scheduled for open reduction and internal fixation of fracture left mid-shaft clavicle, in non union, after a road traffic accident six months ago.

On pre operative evaluation the patient had history of occasional breathlessness and was able to carry out his daily activities but his exercise tolerance was poor (NYHA grade III). There was history of hospitalization for HF twice in last one year. His medications included carvedilol, ACE



inhibitor, diuretic, atorvastatin, digitalis and warfarin. He was advised to stop warfarin five days before surgery and subcutaneous low molecular weight heparin (LMWH) was started. On the day of operation his scheduled dose of LMWH, ACE inhibitor and diuretic were omitted. On auscultation there was a systolic murmur over the mitral region. His vitals were within normal range. The airway examination showed an adequate mouth opening with Mallampati grade II and without restriction in neck mobility. His pre operative investigations were normal. His chest skiagram showed cardiomegaly and 12 lead ECG revealed non-specific ST-T changes with atrial fibrillation (AF) and occasional ventricular ectopics (VE). His echocardiogram featured left ventricular (LV) dilatation, mitral regurgitation (MR) and tricuspid regurgitation (TR), global hypokinesia of myocardium and LV ejection fraction (EF) of 24%. Our plan of anaesthesia was a combination of ISBPB and SCPB.

On the day of surgery, after taking informed high risk consent and explaining the procedure to the patient, an intravenous line was established in dorsum of right hand with 18 Gauge cannula, and routine monitors of pulse, oxygen saturation, NIBP, ECG, temperature were attached. His vitals were normal. Oxygen was administered through face mask at 5L/ min. Central venous catheterization was done in right internal jugular vein to monitor the central venous pressure (CVP). Foleys catheter was inserted to note hourly urine output. Pulmonary artery pressure monitoring and trans-oesophageal echocardiography were not available. Pre-medication with midazolam 0.02mg/kg intravenous was given. Intra operative fluid therapy was judged based on CVP and urine output. Equipments for administering GA were kept ready in case of failure of regional technique. Inotropic infusion drip and anti-arrhythmic drugs were also kept ready.

The nerve blocks were carried out with the help of a peripheral nerve stimulator. ISBPB was given at the level of the cricoid cartilage, in the interscalene groove, lateral to the lateral border of the sternocleidomastoid muscle.² Contraction of fingers at less than 0.5 amp was judged as an adequate response and 15 ml injection ropivacaine 0.75% made up to 25 ml with normal saline (NS) was injected. For SCPB a line drawn from mastoid process to the clavicular insertion point along the lateral border of sternocleidomastoid and 5 ml of 0.75% ropivacaine made up to 10 ml with NS was injected at the midpoint in both cephalic and caudal direction.² We did not add epinephrine to the local anaesthetic in order to prevent any epinephrine induced arrhythmias.

After checking adequacy of sensory block in the operative region the surgical procedure was started. The patient had adequate surgical anaesthesia. His vital signs remain stable. There were no intraoperative problems and the surgery was completed within two hours. Total 1000 ml crystalloids was administered. CVP was maintained between 2-7 cm of H₂O both during intra-operative and post-operative period. Total urine output was 400ml. The post operative period was uneventful and the patient did not require monitoring in intensive care unit.

Discussion: DCM features LV or bi-ventricular dilation, systolic dysfunction, and normal LV wall thickness. The most common initial manifestation of DCM is HF.³ Ventricular dilation may lead to functional MR and TR. Supra-ventricular and ventricular dysrhythmias, conduction system abnormalities, systemic embolization in patients with AF and sudden death are common complications. Symptomatic patients have a 5 year mortality rate of 50%.¹



The goals of anaesthetic management include prevention of drug induced myocardial depression, maintenance of normovolemia and prevention of increased ventricular afterload. Usually, general anaesthesia is the technique of choice in fracture clavicle surgery but we planned ISBPB with SCPB this case to prevent the side effects of GA on haemodynamics. GA increases the risk of HF, myocardial ischemia and arrhythmias.⁴ With the combination of nerve blocks, the generalized peripheral vasodilatation and cardiac depressant effects of GA were avoided with the added advantage of immediate postoperative analgesia. Our patient was prone to HF and the predictors of poor prognosis in this patient were an EF of 0.24, global hypokinesia of heart, MR and TR, and presence of arrhythmias like AF and VE.

Gong T K et al reported a case where lumbar epidural anaesthesia, ilioinguinal and iliohypogastric nerve blocks were used for a wound revision in a woman with cardiomyopathy.⁴ Aono et al compared three anaesthetic techniques: GA, epidural analgesia and GA combined with epidural analgesia for laparoscopic cholecystectomy and concluded that thoracic epidural anaesthesia may be of advantage in patients with limited cardiac function.⁵ Amarnath et al reported a case of 69 year old male with DCM who underwent hip replacement under epidural analgesia.⁶ Curtis M J et al reported 22 cases of fracture clavicle done under ISBPB supplemented with propofol.⁷ As ISBPB alone would not have been sufficient, we planned to supplement it with SCPB and avoid the use of any intravenous anaesthetic agent. Peripheral nerve blocks have made achievement of anaesthetic goals easier. ISBPB and SCPB may be associated with complications but they occur rarely.² This case demonstrates that a combination of ISBPB and SCPB is effective to provide surgical anaesthesia in operation of fracture clavicle and is an attractive alternative to GA in a cardiac compromised patient.

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