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Review Article

ANAESTHETIC MANAGEMENT OF A CASE OF BELOW KNEE AMPUTATION IN A PATIENT WITH PERI-OPERATIVE MYOCARDIAL INFARCTION

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ABSTRACT

Patients with perioperative myocardial infarction are prone to undergo myocardial infarction. Hence, general anesthesia is not preferred due to profound hypotension and myocardial depression. Alternatively, the use of peripheral nerve blocks for below knee amputation (BKA) have the advantage of cardiovascular stability, especially in a case of peri-operative myocardial infarction. Here, we report a 61 year old male patient, ASA Grade IV with a history of recent myocardial infarction, diabetes mellitus for 15 years. The patient developed right diabetic foot with septicemia, requiring right BKA. The surgery were successfully carried out under ultrasound-guided combined popliteal, fascia illiaca and adductor canal blocks.

INTRODUCTION

Cardiac complications make up the most common cause of post-operative morbidity and mortality having considerable impact on the length and cost of hospitalisation.[1] In patients requiring emergency below knee amputation with peri-operative myocardial infarction, peripheral nerve blocks are preferred because they can maintain hemodynamic stability[2].There is an increased risk of peri-operative complications such as myocardial infarction, myocardial ischemia, cardiac failure, arrhythmias, cardiac arrest, increased morbidity and mortality in patients with ischemic heart disease.[1, 3]In our case, the patient had stable hemodynamics irrespective of being in sepsis. The general conditions were life threatening and coagulation profiles were abnormal. Therefore, we chose PNBs for anaesthesia instead of general anaesthesia or a central neuraxial block. PNBs provide more stable intraoperative hemodynamics than general anesthesia or a central neuraxial block[4, 5, 6]

CASE REPORT

This study was done after approval of the institutional ethics committee and obtaining written informed consent from the patient. Here we report a 61 year old male patient, ASA grade IV with a history of recent myocardial infarction and diabetic mellitus for 15 years not under regular medication. He was posted for below knee amputation. During preoperative assessment detailed history, physical examination was carried out. He gave a history of trauma to right third toe following which ray amputation was done. The patient developed right diabetic foot with septicaemia requiring below knee amputation. On physical examination, patient was well nourished. BP of 125/80 mm of Hg and a pulse rate of 86 bpm, other vitals were stable. The cardiovascular system on examination was normal. Respiratory system examination revealed crepitations in the right infra-axillary region. Breath holding was 18 seconds and METS not assessed as patient was bedridden. His airway examination was normal. Investigations showed haemoglobin of 8.1 gm%, elevated total counts 26850 per ml, Coagulation profile with PT-16.6, INR-1.6, aPTT- 28.0 sec. Sodium levels were low, normal potassium levels with normal renal and liver function test. Chest radiograph was normal. His ECG showed ST segment elevation in V3-V4 and T wave inversion in all chest leads. The Troponin I was significantly positive. A diagnosis of STEMI was made. The Echocardiogram revealed Ejection Fraction of 45%, hypo-kinetic anterior wall with grade II LVDD. Physician, cardiologist and pulmonologist opinion was sought and obtained. She was started on loading dose of blood thinners followed by daily OD dose, and Inj. Heparin 5000 IU IV Qid. She was put on anti-angina drugs, anti diuretics, beta blockers and statins. The cardiologist gave high risk for surgery. The correction of coagulation parameters and electrolyte imbalance was done. The blood thinners Asprin and Clopidrogel were stopped five days before surgery. The preoperatrive blood sugar was within naormal range. The Anaesthetist, reviewed the patient, gave fitness for surgery under ASA IV for below knee amputation and asked for high risk written informed consent, continue cardiac drugs, preoperative Troponin I. He was advised to stop heparin 4 hours before surgery and repeat

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FBS, urine ketones, serum electrolytes, coagulation profile and 12 lead ECG on day of surgery. Two units of PRBCs and ICU bed with ventilator were reserved.

Anaesthetic management

After confirming adequate starvation and compliance with preoperative orders, patient shifted to the OT. IV line secured. Immediately after putting the patient on operation table, non-invasive blood pressure monitoring, temperature probe, continuous ECG, and pulseoximeter were attached. Patient in the supine position, the skin was disinfected, and transducer (linear transducer with frequency of 8-12 MHz) placed in the transverse position at the popliteal crease. Popliteal artery was identified, and then common peroneal and tibial nerves were identified. Probe was then advanced proximally till sciatic nerve was seen at separation of Tibial (TN) and Common Peroneal Nerves (CPN). Once sciatic nerve was seen, lidocaine 1% was infiltrated subcutaneously; the needle (blunt spinal needle G22) was inserted in plane 2 to 3 cm lateral to the transducer and advanced toward the sciatic nerve. Once the needle tip was adjacent to the sciatic nerve in the epi-neural sheath of the sciatic nerve between the TN and the CPN, the syringe was gently aspirated and 20 ml of bupivacaine 0.25% and 1% Lignocaine with 4 mg of dexamethasone was injected circumferentially around the sciatic nerve, causing separation of the TN and the CPN.

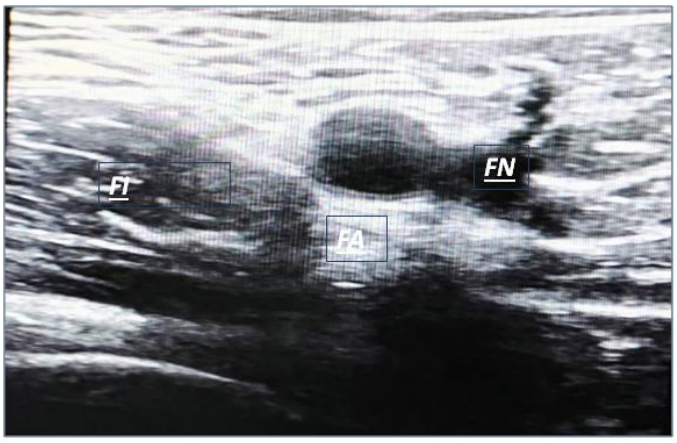

Figure 1 Fascia Iliaca Block under USG

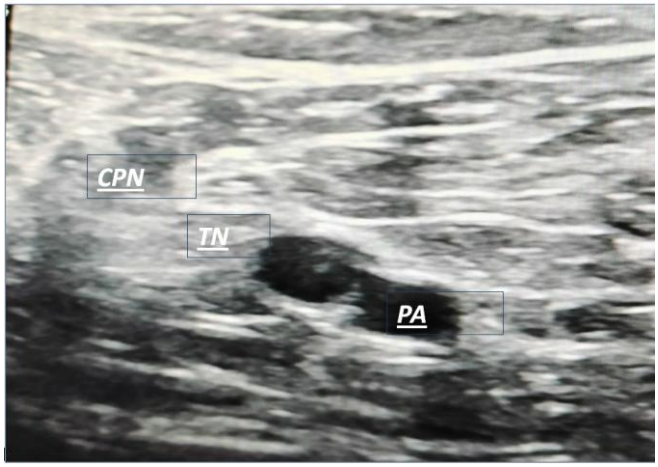

Figure 2 Popliteal block under US

Subsequently, the skin over the right femoral crease was disinfected and the transducer (linear transducer with frequency of 8-12 MHz) was positioned to identify the femoral artery, femoral nerve is lateral to the artery in the femoral sheath. Once visualized, lidocaine 1% was infiltrated subcutaneously 1 cm away from the lateral edge of the transducer. The needle (blunt spinal needle G22) was inserted in-plane in a lateral-to-medial orientation and advanced through the fascia iliaca towards the femoral nerve, after negative aspiration, 20 ml of bupivacaine 0.25% and 1% lignocaine with 4 mg of dexamethasonewas injected around the femoral nerve. Sensation was examined by pin pricking on the distribution of sciatic nerve and femoral nerve. The surgery was allowed after confirming a complete sensory and motor block, Intraoperative period was uneventful. Postoperatively patient was shifted to SICU with monitor and O2 mask. In ICU, 12 lead ECG and post-operative troponin I done postoperatively was still mildly positive. With the cardiologist review, Unfractionated Heparin was started 4 hours after surgery and antiplatelets were restarted 24 hours after surgery. The break through pain was managed with IV Paracetemol 1 gm. The vitals were stable throughout ICU stay. After 24 hours of ICU care he was transferred to ward. During postoperative period daily 12 lead ECG was done and at the time of discharge on 4th postoperative day the troponin I was slightly positive. At the time of discharge, advice for follow up at cardiology OP was given.

DISCUSSION

Patients with acute myocardial infarction are extremely susceptible to the cardiodepressive effect of anesthetics under general anesthesia.[7] In our case, the patient revealed unstable hemodynamics due to myocardial infarction and septic shock. Patients', general conditions were life threatening and coagulation profiles were abnormal. The type of anaesthesia is chosen on the basis of preoperative assessment, the patient's condition, and the surgical site. An important factor is whether haemodynamics can be maintained[4]. Even modest sedation can cause haemodynamic and respiratory compromise in a patient with MI and sepsis. Therefore, careful dosing of sedatives or local anaesthetics is required during induction of general anaesthesia or neuraxial block. A neuraxial block in patients treated with anticoagulants also poses a risk of additional complications, such as haematomas.

Patients who undergo below-knee amputation usually presents with multiple comorbidities such as diabetes, hypertension and ischemia which makes General Anaesthesia (GA) a risky option, moreover, postoperative pain control may need large doses of analgesics as opioids and this makes these patients liable to analgesics side effects[8].Therefore, we chose PNBs for anesthesia instead of general anesthesia or a central neuraxial block.

PNBs provide more stable intraoperative hemodynamics than general anesthesia or a central neuraxial block[4, 5, 6] Ultrasound-guided combined femoral and sciatic nerve blocks are mainly chosen for lower limb surgery. USG guided regional nerve blocks became popular and frequently used for anaesthesia and postoperative pain control of such cases, having the advantages of providing a good intraoperative anaesthesia as well as a prolonged postoperative analgesia that may last for up to 20 hours with addition of dexamethasone' [8, 9]. PNB has the strong advantage of hemodynamic stability, which has been reported to be related to increased survival. Reported death rates after lower limb amputation range from 8 to 30%,

but reports indicate PNB has a lower mortality rate in patients with high risk cardiac diseases than neuraxial block[7, 10, 11] in our case, sciatic nerve at popliteal and saphenous nerve a branch of femoral at adductor canal level was performed. Popliteal approach of the sciatic nerve has the advantage of being easy to perform and the feasibility of using linear probe. Saphenous nerve should also be blocked, either directly or through a femoral nerve block, to assure complete anaesthesia of the leg below the knee.[8, 12]Ttroponin elevation also occur in the setting of septic shock, renal failure, or pulmonary embolism.46 These causes, however, are less frequent and need to be kept in mind as differential diagnosis of the clinical situation.

CONCLUSION

Ultrasound guided (USG) peripheral nerve block (PNB) can be safely performed for lower limb surgeries, providing haemodynamic stability and reducing complications.[8, 12]

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