

Ultrasound Guided Femoro-popliteal Block for Below Knee Amputation in a Patient with Gas Gangrene with Coagulopathy

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Abstract

Introduction: Gas gangrene is a necrotic infection of soft tissue associated with high mortality, often necessitating amputation in order to control the infection.

Case Presentation: We present a case of emergency below knee amputation in a patient with lower limb gas gangrene. He was a known diabetic, hypertensive, alcoholic and on warfarin for central venous thrombosis and presented in septic shock. Crepitus and gram staining of the wound confirmed the diagnosis of gas gangrene. Immediate warfarin reversal was facilitated with Fresh frozen plasma and Vitamin K prior surgery. Ultrasound was used for Central Venous Catheter placement and administering femoro-popliteal nerve block.

Results: Below knee amputation was successfully performed uneventfully and patient was later discharged home.

Conclusion: Timely intervention and combined efforts of surgical, microbiology and anaesthesia team resulted in lifesaving procedure for the patient.

Ultrasonography guidance was of immense help in performing regional procedures especially during coagulopathy where risk of bleeding due to blind procedures would have been high.

Keywords: Gas gangrene, Femoro-popliteal nerve block, Ultrasonography

Introduction

Regional anaesthesia like Femoropopliteal block administered under ultrasound guidance provides an excellent anaesthesia and analgesia of lower limb. It enables difficult debridement especially in diabetic foot and multiorgan failure patients with compromised haemodynamics. Here we present a case of an elderly patient with multiple comorbid conditions and on anticoagulant who was diagnosed with gas gangrene which needed emergency amputation.

Case Presentation

67-year-old male, known case of hypertension and diabetes mellitus on treatment presented in emergency department with altered sensorium for the past two days. He had history of fall at home followed by blunt trauma to left foot four days back. He was a chronic alcoholic and also had a history of cerebral venous sinus thrombosis with subarachnoid haemorrhage and generalized tonic clonic convulsion two years back for which he was now taking tab warfarin 5 mg twice daily.

On examination, there was blackening and swelling of left foot involving lateral 4 toes extending up-to ankle. Local crepitations were present. Central nervous system examination showed Glasgow Coma Scale 10/15 with no neurological deficit. He was febrile with a heart rate was 100/min and blood pressure was 70/50 mm of Hg (MAP-56 mm of Hg), serum creatinine was 4.5 mg/dL with oliguria, blood urea nitrogen 53 mg/dL, haemoglobin 13.6 gm/dL, Total leucocyte count

23,300/cmm (Neutrophil 95%), haematocrit 40. S. total bilirubin 1.4 mg/dL and mild elevated liver enzymes. Internal jugular vein was cannulated under ultrasound guidance and intravenous crystalloid infusion was started with inj Noradrenaline. Patient's INR was 6.0. Based on vital parameters and clinical presentation, a diagnosis was made of gas gangrene with septic shock. Foul smelling tissue from affected area was sent for Gram stain. It showed few pus cells, plenty of stout gram-positive bacilli with sub-terminal spores which confirmed the diagnosis of gas gangrene. Emergency below knee (BK) amputation of left lower limb was planned. Immediate reversal of warfarin was warranted hence patient was transfused six units of fresh frozen plasma (FFP) and intravenous 10 mg vitamin K [1]. Arterial blood gases showed mild acidosis and correction with intravenous sodium-bi-carbonate was given. A broad spectrum antibiotic inj. Piperacillin-Tazobactam 2.25 gm was started and patient was taken up for surgery as his general condition was worsening.

A written informed high risk consent from patient's son was obtained and patient was shifted to operation theatre. Monitoring started with 5 lead ECG, pulse oximetry, non invasive blood pressure, and central venous pressure monitor. Patient was asked to lie in supine position and left lower limb flexed at knee joint. Under asepsis, local anaesthetic mixture (35 ml) was prepared using 20 ml of 2% Lignocaine with adrenaline and 15 ml 0.5% Bupivacaine and 0.5 ml 7.5% Sodium bicarbonate. With ultrasound guidance popliteal nerve (just before its division into tibial and common peroneal nerve) was

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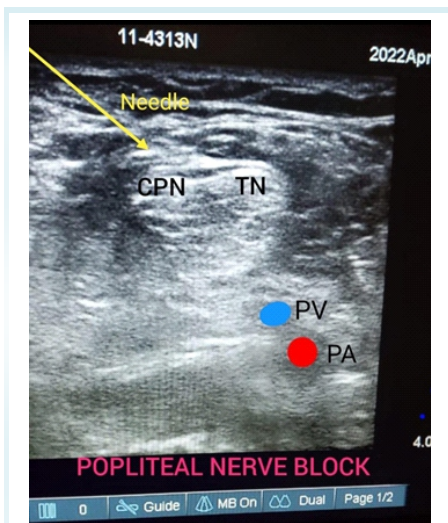


Figure 1: Popliteal nerve block

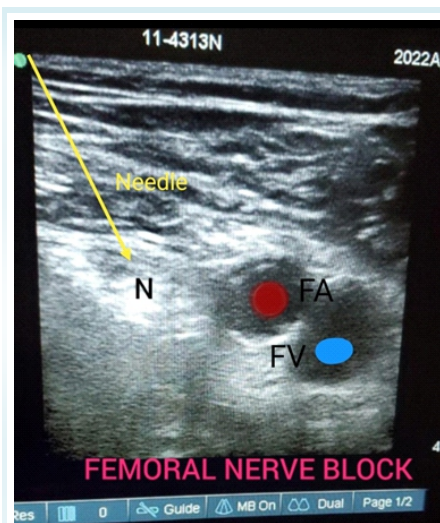


Figure 2: Femoral nerve block



Figure 3: Amputation Stump

identified with a linear transducer array 6-14 MHz (Sonosite- Edge) placed just above the popliteal fossa. The transducer was covered with sterile polythene camera cover. Under aseptic precautions, popliteal block was performed with 10 cm sterile nerve stimulating needle and 20 cc local anaesthetic mixture after confirming motor response in the foot either plantar flexion for tibial nerve and dorsiflexion for common peroneal nerve at 0.4mA current (Fig. 1).

Similarly, ultrasound guided femoral nerve block was also performed with 15 ml of similar local anaesthetic mixture in the inguinal canal after confirming quadriceps contractions (Fig. 2).

While injecting the local anaesthetic negative aspiration of blood was ensured after every 5 ml injection. The block action was confirmed by hypoaesthesia in lower limb. To give immediate access for surgical scrubbing, supplementation with inj Pentazocine 30 mg and ketamine 30 mg. was given. Complete block action with loss of pin prick sensation took around 15 minutes. Below knee amputation was completed with blood loss about 200ml which was replaced with intravenous gelatin (Fig. 3). Patient was shifted to surgical intensive care unit with noradrenaline infusion and oxygen via nasal prongs 2-4 lit/min. Over next two days, correction of metabolic acidosis was continued, his vitals stabilized, noradrenaline was tapered and stopped. Once the INR and renal function normalized in the surgical ICU, patient was started on low molecular weight heparin inj. Enoxaparin 4000 IU subcutaneously which could be stopped temporarily before subsequent surgeries. Seven days after amputation, patient's wound was resutured under central neuraxial block and patient was discharged on the 15th day.

Discussion

Clostridial gas gangrene is a severe necrotising and rapidly progressive soft-tissue infection. It consists of Gram-positive, anaerobic, spore-forming bacilli. The high mortality (upto 30% which reaches 100% in untreated cases) in clostridial gas gangrene is due to potent bacterial exotoxins [2]. In our case, septic shock with multiorgan involvement and gram stain evidence suggestive of gas gangrene, required immediate surgery to control infection and warfarin reversal to prevent life threatening bleeding during surgery. Prothrombin

concentrate complex also known as factor IX complex containing factors II, IX and X is recommended for urgent reversal. However, the exact dosage for reversal of INR values are not clear [3]. Also it could not be made available in the emergency set up. Fresh frozen plasma, 6 units, were administered along with vitamin K 10 mg intravenously expecting to reduce surgical haemorrhage. Precise local anaesthetic delivery under ultrasound guidance and addition of sodabicarb to the femoropopliteal block ensured early and predictable block action even in the metabolic acidosis state of the patient [4]. Supplementation of inj ketamine and pentazocine ensured adequate analgesia during the procedure without any haemodynamic compromise.

'Ultrasound guided central venous cannulation' has been a norm to reduce postprocedure vascular/haemorrhagic complications in a patient with deranged coagulation [5]. Since it was a life-saving procedure to facilitate inotropes and rapid administration of blood products, same was followed in our case. Ultrasound guidance while inserting CVC helps reduce complication rate and increases success rate of the procedure. Ultrasound helped in the administration of the block and overall success of the procedure without causing haemodynamic derangement. Mortality was thus avoided with the help of timely intervention and multispeciality approach.

Conclusion

Thus, ultrasonography helps in regional anaesthesia and invasive procedures especially in coagulopathy when blind procedures carry a huge risk.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his/her consent for his/her images and other clinical information to be reported in the Journal. The patient understands that his/her name and initials will not be published, and due efforts will be made to conceal his/her identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

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