Landmark-guided pericapsular nerve group (PENG) block for reduction of dislocated prosthetic hip: A case report

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Abstract

Dislocated hip joint is a painful condition, which requires urgent reduction. Previously, ultrasound (US)-guided pericapsular nerve group (PENG) block has been used for reduction of dislocated prosthetic hip. We have used landmark-guided PENG block in two patients of dislocation of prosthetic hip. We suggest that the landmark-guided technique of PENG block can be used safely and successfully as an alternative technique, where US facility is not available.

Keywords: Femoral nerve, joint dislocations, nerve block, pericapsular nerve group block (PENG), reconstructive surgical procedures

Introduction

Dislocated hip joint is a painful condition, which requires urgent reduction. Pain and associated muscle spasm often result in failure to achieve the reduction if the reduction is tried without anesthesia.[1] Previously, ultrasound (US)-guided pericapsular nerve group (PENG) block has been used successfully to do the reduction after dislocation of prosthetic

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hip.[2] However, availability of ultrasound is a limiting factor particularly in developing world.[3] We report two cases of dislocated hip prosthesis who were managed with PENG block given using landmark-guided technique.

Case Reports

Case-1

A 82-year-old female patient was admitted with severe pain and abnormal posturing of right hip. Attendants of the patient informed that, after finishing her lunch, the patient squatted on the ground and was unable to stand up again. Diagnosis of dislocation was confirmed by x-ray and reduction was scheduled. After written informed consent, patient was taken to procedure room, noninvasive blood pressure monitor, electrocardiography, and oximeter were attached. An intravenous line was secured, 10 ml blood was drawn. Urgent random blood sugar was done and remaining blood was sent for other baseline investigations. The patient was very anxious and continuously complaining pain; therefore, 1 mg injection midazolam and 25 μg injection of fentanyl were given intravenously. Then, with due aseptic precaution, right sided landmark-guided PENG block was given with 20 ml local anesthetic (mixture of 10 ml 2% lidocaine and 10 ml 0.75% ropivacaine). To give block, the patient was in supine position, a line was drawn between anterior superior iliac spine (ASIS) and pubic tubercle. Femoral artery was palpated and marked. Needle insertion point was selected 5 cm medial to ASIS on that line. After infiltration of skin and subcutaneous tissues with 2 ml 1% lidocaine at the needle entry point, 100 mm long 21G block needle (Contiplex® B. Braun Medical, India) was inserted perpendicularly (till it contacted the bone) avoiding medial inclination (fingers of the other hand were on femoral artery to avoid accidental vascular injury) [Figure 1a-c]. While inserting the needle, a nerve stimulator was attached (Stimuplex® HNS12, B. Braun Inc.) with the set current at 1mA. This was a precautionary measure to avoid direct contact with femoral nerve (in case of quadriceps contraction occurred, indicating femoral nerve contact the needle can be re-directed laterally to avoid femoral nerve). After 15 min, the effect of block was tested by raising the affected limb by 15°, the patient reported no pain. After 30 min, the patient was shifted for reduction under fluoroscopy. Reduction was done without any supplemental anesthesia as there was no pain or discomfort during reduction. The patient was discharged after 1 hour of observation from operation room and next day from hospital after check x-ray. Patient had dislocation again after 7 days and then after 1 month [Figure 2a-f]. The landmark-guided PENG block was used again for both the reductions successfully. The volume was subsequently reduced to 10–15 ml instead of 20 ml given during the first reduction as patient was not muscular and we anticipated that lower volume may be effective. After the third event the patient was referred to the specialized center for surgical management for recurrent dislocation.

Case-2

A 67-year-old male patient presented in hospital emergency with severe pain in right hip after fall in bathroom. He was operated 6 months back for right hip fracture and cemented THR (Total Hip Replacement) was done. The clinical diagnosis of hip dislocation was later confirmed by X-ray [Figure 3a]. Considering his severity of pain and no other comorbidity except controlled hypertension, he was taken to fluoroscopy unit. Surgeon attempted reduction without anesthesia, however, due to severe muscle spasm and pain the procedure was abandoned. The anesthesia team was informed. During pre-anesthetic assessment, it was found that the patient had a full meal just prior to injury. There was no other significant history. After

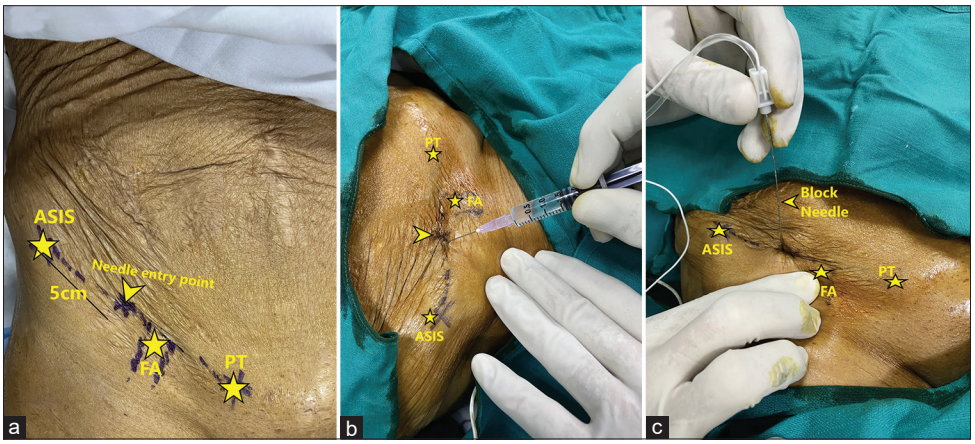

Figure 1: (a)-A line joining ASIS and PT was drawn, (b)- local infiltration at needle entry point (5 cm medial to ASIS), (c)- needle entering perpendicularly till bony contact (superior pubic ramus), whereas fingers of other hand on FA. ASIS-anterior superior iliac spine, FA-femoral artery, PT-pubic tubercle

informed consent and securing an intravenous line 10 mg slow intravenous injection of metoclopramide and injection of Ranitidine 50 mg were given. Standard monitors for pulse, blood pressure, and oximetry were attached. Landmark-guided PENG block was given on the right side [Figure 3b]. A total of 50% reduction in pain on Numeric pain rating score (NPRS) on the scale of 10 where (0 = no pain, 10 = severe pain) was noticed after 15 min and pain became negligible (score 0-1/10) by 25 min. Closed reduction was done successfully without any analgesic or sedative supplements [Figure 3c].

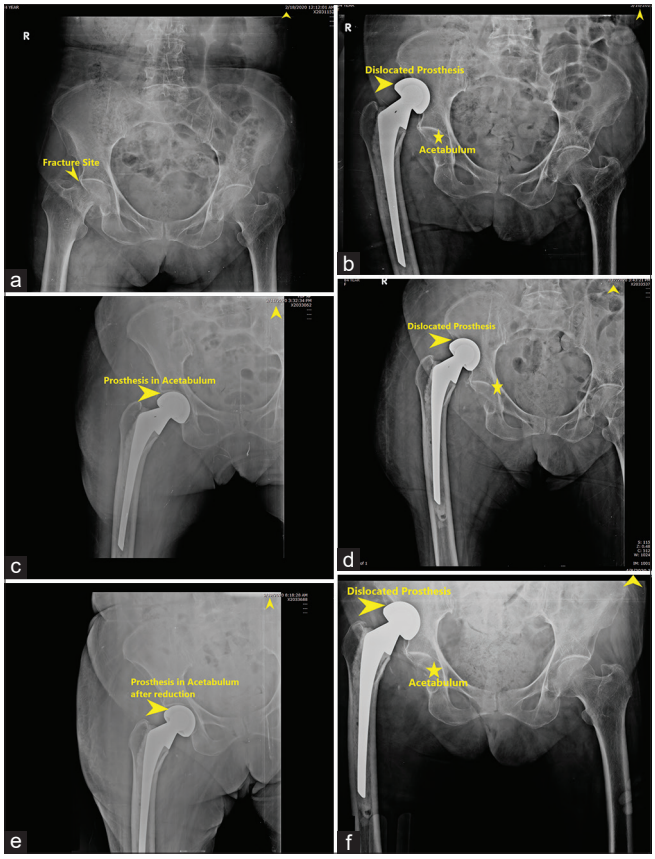

Figure 2: (a)-X-ray showing right side hip fracture before surgery, (b)-x-ray after 1 month of surgery showing dislocation of prosthesis on right side, (c)- check x-ray after reduction, (d)-dislocation after 1 week of reduction, (e)-check x-ray after reduction, (f)-re-dislocation after 1 month. Arrow head at right corner of each x-ray showing date of investigation

Discussion

Dislocation following hip arthroplasty (HA) is a potentially devastating complication with a reported incidence up to 15%.[4] General anesthesia is commonly used for hip reduction; however, time taken for preanesthetic check-up and other arrangements is considered as a limitation.[1] Reduction of dislocated hip with prosthesis can be done under conscious sedation; however, failure in reduction and complications related to over sedation are serious concerns.[1] A technique of hip reduction without anesthesia has been suggested by Zhou *et al.*,[5] but prone position of a patient with painful hip is difficult to obtain. Both of our patients were full stomach and were unable to sit due to severe pain therefore, general anesthesia, deep intravenous sedation, and neuraxial block were not tried. Instead, we used landmark-guided PENG block in our cases. PENG block is a novel US-guided block, which provides effective hip analgesia; however, the block profile is dose dependent.[6,7] Previously, US-guided in-plane technique has been used in two patients with successful reduction of dislocated prosthetic hip.[2] However, out-of-plane (OOP) approach also has been suggested as an alternative technique. The claimed advantage of OOP technique is the, ease of procedure, and additional safety as there are no vital structure in the trajectory of block needle.[8] We used landmark-guided technique where insertion of needle is similar to OOP approach.[9] We used similar technique in subsequent dislocations in the first patient [Figure 2a-f] and every time successful analgesia was achieved even with reduced volume of local anesthetic.[2] In the second case, also, effective analgesia was achieved and reduction was possible without any difficulty. One recent cadaveric study

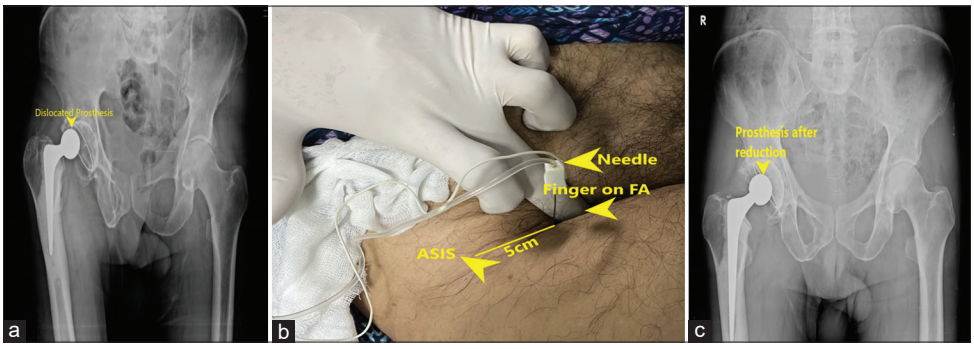

Figure 3: (a)- X-ray showing right side dislocated hip prosthesis, (b)- 100 mm blunt tip needle entering perpendicularly 5 cm medial to ASIS till bony contact (superior pubic ramus) while fingers of other hand on FA. ASIS-anterior superior iliac spine, FA-femoral artery, (c)- check x-ray after reduction

further supports the advantage of PENG block exclusively for reduction of dislocated prosthetic hip.[10] Reduction of dislocated hip is an emergency and where the facility of US is not available, landmark guided the technique can be used safely to circumvent the delay in reduction procedure and provide the pain relief.

To conclude, PENG block is an effective regional anesthesia technique in providing pain relief during reduction of dislocated hip. It is primarily an US-guided block; however, landmark-based approach can be used safely and effectively where, the facility of US is not available.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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