Case Series

Parasacral ischial plane block for lower limb wound debridement surgeries – A case series

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ABSTRACT

Parasacral ischial plane block is a novel fascial plane approach to sacral plexus. Parasacral ischial plane block is technically less challenging and obviates the need for direct visualisation of sacral plexus. It can reliably be performed in limb-amputated patients where neuromuscular stimulation is less useful. Ten patients of the American Society of Anesthesiologists physical status II-IV, aged between 18 and 70 years, posted for elective lower limb debridement surgeries were enroled in this prospective case series. The time taken to perform the block was ≤4 minutes in all cases. Time taken for full sensory loss was 9 minutes to 15 minutes. None of the patients developed a complete motor blockade till 30 minutes after our observation. None of the patients required intraoperative supplemental analgesia. This block is technically easy, less time-consuming, and provided adequate sensory analgesia in below-knee surgeries.

Key words: Ischium, nerve blockade, sacral plexus, sacrum, ultrasound guided

INTRODUCTION

Parasacral ischial plane (PIP) block is a new fascial plane approach to the sacral plexus. It is relatively an easy technique and does not require visualisation of the sacral plexus. It can reliably be performed in limb-amputated patients where neuromuscular stimulation is less useful.[1] We present a case series of diabetic wound debridement surgeries done under PIP block.

CASE SERIES

After obtaining approval from the institutional ethics committee (and informed written consent), 10 patients of the American Society of Anesthesiologists physical status II-IV, aged between 18 and 70 years, posted for elective lower limb debridement surgeries were enroled in this prospective case series. Patients refusing nerve block, having an allergy to local anesthetics, or infection at the site of nerve block were excluded. The study was done at a tertiary healthcare hospital and followed the principles of the Declaration of Helsinki. The total duration of the study was 3 months (February to April 2022). In the preoperative holding area, baseline noninvasive blood pressure, oxygen saturation, and electrocardiography were monitored. Five minutes before the procedure, 1 mg of midazolam was given intravenously.

The patient was positioned in Sim's position with the lower limb to be blocked placed in the nondependent position. A curvilinear ultrasound (US) probe of 2-5 megahertz frequency was placed along the line joining the greater trochanter and posterior superior iliac

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spine (PSIS). The medial edge of the probe was placed directly on the PSIS [Figure 1a and b]. Then the probe was moved in the infero-medial direction [Figure 2a], as described by Bendtsen *et al*.[2] (parasacral parallel shift). Posteromedial border of the ischium with the pyriformis muscle overlying it was identified at the level of the greater sciatic foramen [Figure 2b]. A 100 to 150 mm, 22-gauge needle was inserted in an in-plane approach from lateral to medial direction, targeting the posteromedial border of the ischium. Twenty mL of 0.5% ropivacaine was injected after the contact of needle tip with the bone. Local anaesthetic spread under the piriformis toward the sacral plexus was looked for. Patients were assessed every minute for sensory onset, by pinprick method on the dorsal and plantar aspects of the foot and the block was categorised as 0 = sharp pain, 1 = dull pain, and 2 = no pain. Motor power was graded by evaluating the plantar and dorsiflexion of ankle joint as 0 = normal motor power, 1 = reduced motor power, and 2 = complete block. The motor block that was achieved at the end of 30 minutes was considered final. At the end of 30 minutes, if the patient had the pain to pinprick on the dorsal aspect of the foot, then the block was considered as failed.

As some of the procedures were performed in the femoral nerve sensory distribution area, US-guided femoral nerve block was also performed in all patients. Intraoperatively, if the patient experienced mild pain [numerical rating scale (NRS) ≤3], 0.5 mg/kg of ketamine was given intravenously. This was repeated at 10-minute intervals to a maximum of two times, after which the block was considered a failure, and the patient was given general anaesthesia. NRS was used for postoperative pain assessment. At a score of 5 or more, patients were given tramadol 50 mg and the study concluded at this point.

Time taken to perform the PIP block was defined as the time from placement of US probe till the end of local anaesthetic injection and needle withdrawal. The onset of sensory block was calculated from the time of completion of injection of local anaesthetic till the patient felt no pain from a pin prick. The onset of motor block was calculated from the time of completion of local anaesthetic injection to complete loss of motor power. The duration of the block was calculated from the onset of the sensory block to the first rescue analgesia. Surgeon satisfaction was assessed: Complete satisfaction–needs the same anaesthesia for future; partial satisfaction–needs some improvement in anaesthesia; not satisfied–needs different anaesthesia.

All patients underwent debridement procedures for the diabetic foot [Table 1]. Six patients were operated in the foot and four patients in the foot and leg. The time taken to perform the block was ≤4 minutes in all cases. Time taken for full sensory loss was 9 minutes to 15 minutes. None of the patients developed a complete motor blockade till 30 minutes after our observation. Four patients had normal motor power (score of 0) and six patients had reduced power (score of 1). First rescue analgesia was needed at 10 to 24 hours. The surgeon satisfaction score was graded as complete satisfaction in seven patients and partial satisfaction in three patients.

DISCUSSION

The sacral plexus is located in a fascial plane which is formed by various structures. It is surrounded

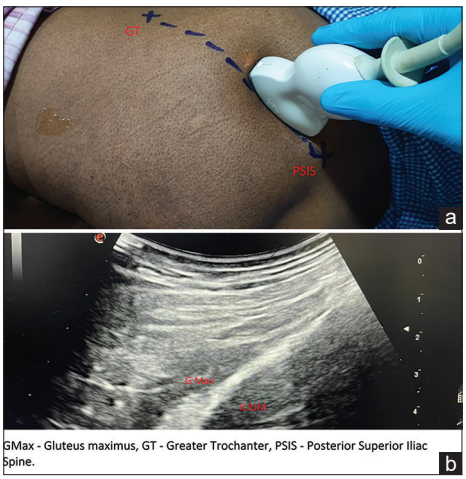

Figure 1: (a) Curvilinear probe placed on the medial edge of the line connecting PSIS and GT. (b) Corresponding ultrasound picture showing iliac bone

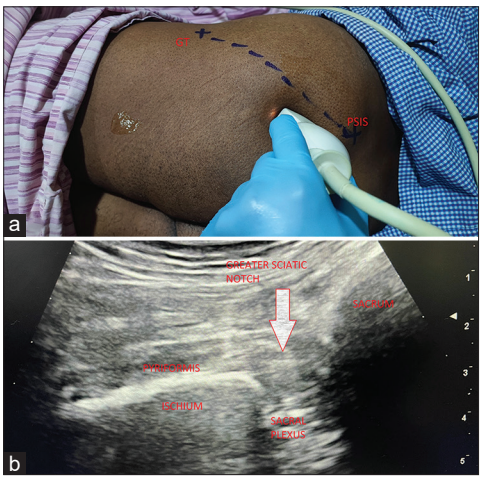

Figure 2: (a) Curvilinear probe is moved inferomedially (parasacral parallel shift). (b) Corresponding ultrasound picture showing greater sciatic notch, ischium, and sacral plexus

Table 1: Patient demographics and procedural parameters

Case No.	Age (years)/ gender	ASA grade	BMI kg/m²	Surgery site	Block duration (min)	Sensory onset (min)	Motor block at 30 min	Time to rescue analgesia (hours)	Surgeon satisfaction score
1.	90/M	III	36.8	Leg	5	12	1	24	1
2.	62/M	II	25.5	Leg	3	10	0	9	2
3.	73/M	III	25.7	Leg	3	9	1	16	1
4.	60/M	II	23.4	Foot	4	14	0	8	2
5.	62/M	II	24	Foot	4	11	0	8	1
6.	64/M	III	25.9	Foot	3	6	1	11	1
7.	35/M	II	25.5	Foot	3	12	1	24	1
8.	40/M	II	25.6	Foot	3	11	1	24	1
9.	72/M	II	22.3	Foot	3	15	1	24	1
10.	48/F	III	22.4	Leg	4	12	0	12	2

M, Male; F, Female; BMI, Body Mass Index; ASA, American Society of Anesthesiologists. Motor block 0=Normal Power, 1=Reduced Power, 2=Complete Motor Block, Surgeon Satisfaction Score 1=Completely satisfied, 2=Partially satisfied, 3=Not satisfied

anteriorly by the pelvic fascia, medially by the sacral bone, laterally by the ischium, and posteriorly by the piriformis muscle. Lateral to the sacral plexus, a fascial plane exists between the ischial bone and the piriformis muscle. This plane is in direct connection with the sacral plexus. Thus, the injection of any drug into the plane between the ischium and piriformis will result in the drug reaching the sacral plexus.

The PIP block offers various benefits. As PIP is a fascial plane block, it does not require accurate needle tip placement. The needle tip is distant to the neural structures, thereby averting neurovascular damage. Unlike neural elements, bony structures are easily evident on US even in patients with tissue oedema or obesity. Hence, it is an easy procedure with a high success rate. In patients with above-knee or below-knee amputation where neuromuscular stimulation is less useful, PIP block can be done consistently.[1] This concept of PIP block has been validated by Narayan *et al*.[3] in their cadaveric study.

We were successful in performing the PIP block in all the patients. In our study, the time taken for performing the block was less than 4 minutes in all patients. As claimed by Venkataraju *et al*.,[1] we also found the block to be easy and less time-consuming. Hussien *et al*.[4] in their study comparing the US-guided sciatic nerve block through popliteal and subgluteal approach found that the time taken to perform the block was 11 ± 4 minutes in the popliteal approach and 18.15 ± 4.7 minutes in the subgluteal approach.

The time to full sensory block was 9 minutes to 15 minutes. This was similar to the results of the study by Bansal *et al*.[5] (13.58 ± 2.604 minutes). In our study, we wanted to assess the motor block of the sciatic component alone. It was assessed by asking the patient to push the foot against resistance.[6] Four patients had normal ankle motor power and six patients had reduced power at the end of 30 minutes of the block. Since the sensory block was adequate and the procedure was only wound debridement, we proceeded with the surgery. In three patients, the surgeon had a partial satisfaction score. This was due to the absent motor blockade causing foot movement during surgery. Venkataraju *et al*. in their trial performed a PIP block with 20 mL 0.375% bupivacaine for postoperative analgesia along with general or spinal anaesthesia. Although the analgesia was good, the author has not mentioned the motor power. None of the patients required intraoperative supplemental analgesia. Three patients had toe amputation along with curettage and cleaning of the metatarsal bone. There was no pain during the bone cutting.

Subgluteal[7] and popliteal sciatic nerve[8] block is being used as a sole anesthetic technique for below-knee surgeries. As the PIP block covers the posterior cutaneous nerve of the thigh, it has the advantage of covering tourniquet pain as compared to the gluteal or popliteal sciatic nerve block. Both foot and leg wound debridement surgeries were included in our study. However, tourniquet was not demanded by the surgeons. We used only 0.5% ropivacaine, 20 mL for PIP and 15 mL for the femoral block. More patients need to be studied and drugs like bupivacaine need to be used to know more about the PIP block characteristics. The operated leg was dressed with a cotton bandage postoperatively in the patients in our case series. Thus, we could not properly assess the postoperative sensation and motor power. Hence, we used the time to first rescue analgesia as the duration of the block. We studied PIP block for leg and foot surgeries only. Nevertheless, the block also needs to be studied in surgery involving the thigh.

CONCLUSION

PIP block can be successfully used for lower limb wound debridement surgeries. It is technically easy, less time-consuming, and provides adequate sensory analgesia in below-knee surgeries.

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Conflicts of interest
There are no conflicts of interest.

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