Ultrasound Guided Ilioinguinal Block

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Abstract

Inguinal herniorraphy is one of the commonest operations in surgical practice performed in patients ranging from paediatrics to elderly age group. It is often performed under spinal anaesthesia which has its limitations due to hemodynamic changes. Hernia block performed using ultrasonography could prove to have technical advantages such as real time imaging of nerve, reduced volume of local anaesthesia and safety in terms of injury to adjacent structures. Our goal is to provide medical education regarding the use of ultrasound-guided ilioinguinal block and to share our experience that how direct visualisation of applied anatomy improves patient care.

INTRODUCTION

Inguinal herniorraphy can be done under general anaesthesia, spinal/epidural and local anaesthesia1. The choice of anaesthesia depends upon many factors: acceptability to the patient, surgeon's wish, safety of the procedure, feasibility and cost incurred. In hernia block ilioinguinal (ILIN) and iliohypogastric (ILHN) nerve blocks are often performed to provide intra and postoperative analgesia for hernia repair. Several techniques have been described in the past. All these techniques have used high amounts of local anaesthetic and are relatively unselective which may lead to blocks of other adjacent structures such as the femoral nerve or injury to major blood vessels and intra-abdominal structures such as bowel2,3,4. Recently an ultrasound guided technique for ILIN and ILHN blocks in children was described for the first time5. In comparison to subarachnoid and general anaesthesia ultrasound guided block technique has proved superior and very effective. A carefully performed blockade may also be helpful in the differential diagnosis of chronic inguinal and lower abdominal pain. Moreover direct sonographic visualization of the ilioinguinal nerve (ILIN) might improve the quality of block and reduce the risk of complications. A bulky subcutaneous fat layer and fully developed muscles overlying tiny nerves may lead to ultimate failure in blind attempts6.

This study was aimed to evaluate the effect of direct visualisation of applied anatomy by ultrasound on the quality of intra operative as well as postoperative analgesia in herniorraphy.

APPLIED ANATOMY

The ILIN (nervus ilioinguinalis) arises from the first lumbar nerve. As it emerges from the lateral border of the psoas major just below the iliohypogastric nerve (ILHN), it passes obliquely across the quadratus lumborum and iliacus finally perforates the transverse muscle above the iliac crest. The ILHN lies medial to the ILIN. The nerve pierces the internal oblique muscle distributing filaments to it and lies between the external and internal oblique muscles descends medially and caudally accompanying the spermatic cord through the subcutaneous inguinal ring.

SUBJECTS AND METHODS

After approval from the Ethical Committee of the institution, 20 male non obese with BMI <25 patients of ASA grade I & II aged 12-25 years with unilateral reducible inguinal hernia were recruited in this study.

The patients with difficult anatomical landmarks such as obese, previous operations in this area obscuring the landmarks or anatomical abnormalities, local or systemic infection and those with huge hernia sac, sensitive to local anaesthetics were excluded from the study. Those with bleeding diathesis or on anticoagulation treatment were considered relative contraindication.

All patients received oral alprazolam 0.5 mg on the morning of operation. An I.V. line was secured in all the patients. All patients received 1.0 mg midazolam. Monitoring included arterial O_2 saturation, non invasive blood pressure and ECG. After obtaining informed written consent the patients were

taken up in operation theatre for ultrasound guided ilioinguinal block

EQUIPMENT/SUPPLIES

Portable ultrasound machine(sonosite micromaxx) with HFL38/13-6MHz broadband linear array(nerve) transducer with a frequency range of 6-13 MHz; 21 gauge 1.5 inch needle attached with syringe; bupivacaine 0.5%; sterile gloves; sterile covering for the probe(cling drape) and sterile ultrasound gel.

PROCEDURE: TWO-PRACTITIONER TECHNIQUE

Patient was placed in a supine position, gel applied to the probe which was held by an assistant. Sterile gloves are donned and the sterile probe cover (cling drape)was applied. Area was sterilized with betadine solution. Anterior superior iliac spine (ASIS), ilioinguinal ligament and line connecting the ASIS with the umbilicus were the anatomical landmark for performing this block. A linear probe of high frequency (6-13 MHz) was oriented perpendicular to the inguinal ligament and was first positioned so the lateral aspect of the probe lied on top of the iliac crest(figure 1). The ASIS is the standard starting position from which the transducer was moved slowly along the ASIS-umbilicus line.

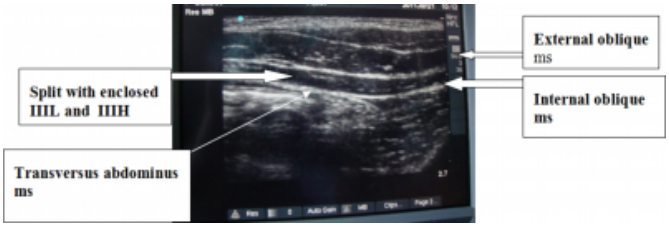
Figure 1

Figure 1. Direction of the ultrasound transducer along the line connecting ASIS and umbilicus

Ilioinguinal and iliohypogastric nerves are sought in the fascial plane between the external oblique and internal oblique and between internal oblique and transverse abdominus muscle. The ilioinguinal nerve is usually found close to the iliac crest and the iliohypogastric nerve lies medial to it. The peritoneal fascia and peritoneal cavity lie deep to the transverse abdominus muscle and peristaltic movements of the bowel could be detected. The needle was advanced to the fascial plane between the internal oblique and transversus abdominal muscles and placed adjacent to the ilioinguinal and iliohypogastric nerves which is enclosed in the fascial split(figure2).

Figure 2

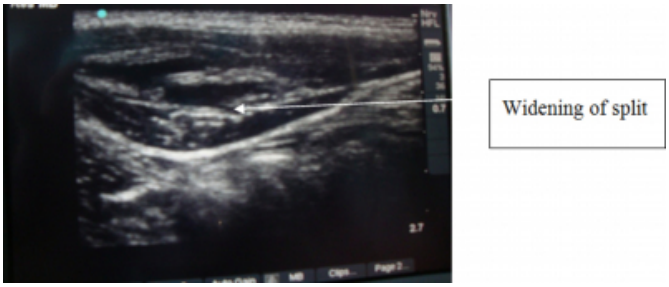
Figure 2. Ultrasonograph depicting split containing the ilioinguinal and iliohypogastric nerves



Bupivacaine (0.5%) at dose 0.3 ml/kg was infiltrated into the split fascial plane. Injected local anaesthetic encircles the nerve which appears as a distinct hypo echoic structure highlighted by the hyperechoic surrounding fat (Figure 3).

Figure 3

Figure 3. Marker indicating widening the split due to spread of local anaesthetic.



Frequently in few patients nerves could not be visualized as a distinct structure. A branch of the deep circumflex iliac artery lies in the same anatomic plane between the internal oblique and transverse muscles and nearly parallel to the ILIN. This artery can readily be identified by sonography with color doppler imaging. In such situation, we injected local anaesthetic drug adjacent to the artery to get desire effect.

In rare occasion, when neither the nerve nor adjacent artery can be identified we injected 10 ml of local anaesthetic into the interspaces between the internal and external oblique

muscles and between the transverse and internal oblique muscles.

Surgery started after 15 min of procedure. Induction of anaesthesia was achieved with propofol 2.0 mg/kg and maintained on inhalational O_2,N_2O and isoflurane through appropriate size laryngeal mask airway. Mean duration of surgery was 50 min. Postoperatively patients were shifted to recovery room. For rescue analgesia inj. diclofenac 1mg/kg on VAS >5 was administered.

RESULTS

We studied ultrasound guided inguinal block in 20 patients(table 1). One patient started pushing intra abdominal contents towards incision site and had to be converted to full general anaesthesia. The mean duration of analgesia in hours(from end of surgery to first request for analgesic) was 8.4±0.9 hrs. The majority of the patients was ambulatory, took oral fluids and passed urine by 6 hours after the operation (Table 2). Time spent in recovery room was 0.6±1.1 hr with no post-operative complication such as nausea/vomiting/urinary retention/femoral palsy noted except for one patient who developed local hematoma around 2cm noted which resolved spontaneously without any consequences.

Figure 4

Table 1. Patient demographic profile.

Age(years)	Body weights(kg)	Operative times(min)
19±4.4	45±8.6	50±5.8

Figure 5

Table 2. Postoperative analgesia and activity , satisfaction with anaesthetic technique and recovery time

Satisfaction of anaesthesia (satisfied) Surgeon Patients	 18 16
Duration of postoperative analgesia(in hrs)	8.4±0.9
Time spent in recovery room(hrs)	0.6±1.1
Activity 6 hrs after operations Ambulation Oral intake Passing urine	 19(95%) 19(95%) 18(90%)

DISCUSSION

The subjective feeling of fascial click in conventional ILIN block based on anatomical surface landmarks guides needle which pierces the deep fascia of the external oblique muscle. The definitive site of needle placement has remained a subject of debate in the past. Some authors suggest 2 cm medial and cephalad to the ASIS7 others recommends that the needle be inserted 2 inches medial and inferior to the ASIS8. This has been attributed to anatomic variability in the inguinal region9. However the path of the nerve above the ASIS remains consistent between the internal oblique and transverses abdominus muscle. Absence of one of these nerves is also not uncommon. Another variation being the presence of an accessory ILIN or ILHN nerve10. Inserting needle to such depth can potentially damage vital structure like vessels and bowel. Although injecting large-volume local anaesthetic injection distributed in fan shape manner could address to these technical difficulties encountered during inguinal block, other newer more sophisticated and safe means need to be investigated.

In this study we preferred to block ILIN and ILHN nerves with ultrasound guided visualization with high frequency and resolution transducer. The nerves lie in the fascial split between the two muscles layer and appear as hypo echoic centre surrounded by hyperechoic periphery The needle could be seen approaching the fascial split in out of plane approach. After local anaesthetic injection, the split widened due to spread of the drug.

Direct visualization of the nerve in between the fascial split allowed us to administer low volume of the local anaesthetic to obtain the desired effect. Precision with the technique, less chances of potential injury to adjacent vital structures in the region, a long comfortable painfree postoperative period and early ambulation expediated the overall recovery of the patient. Employing low volumes of the drug prevented from toxic levels to be reached.

The ultrasound guided block technique gave us an opportunity to readily identify the anatomical variation in the region which improvised the conventional blind technique

Transient femoral nerve palsy is a coincidental complication described by some authors in children11 but we did not encounter any such occurrence with ultrasound guided block. This could be due low volume of the drug in the study.

From this, we draw this conclusion that inguinal block should preferably be performed with ultrasound guided advancement of needle. It has not only given encouraging

results in the present study and can play an effective role in the refinement of inguinal block.

References

1. Kehlet H and White PF. Optimizing anaesthesia for inguinal herniorrhaphy: General, Regional or local anaesthesia? Anesth Analg 2001; 93:1367 –9.
2. Johr M, Sossai R. Colonic puncture during ilioinguinal nerve block in a child. Anesth Analg 1999; 88:1051–1052.
3. Amory C, Mariscal A, Guyot E, Chauvet P, Leon A, Poli-Merol ML. Is ilioinguinal/iliohypogastric nerve block always
totally safe in children? Paediatr Anaesth 2003; 13:164–166.
4. Vaisman J. Pelvic hematoma after an ilioinguinal nerve block for orchialgia. Anesth Analg 2001; 92:1048–1049.
Shandling B, Steward DJ. Regional analgesia for postoperative
pain in pediatric outpatient surgery. J Pediatr Surg1980;15:477–
480.
5. Willschke H, Marhofer P, Bosenberg A, et al. Ultrasonography
for ilioinguinal/iliohypogastric nerve blocks in children. Br J Anaesth 2005; 95:226–230.
6. Gofeld M, Christakis M. Sonographically Guided Illioinguinal
Nerve Block. J Ultrasound Med 2006;25:1571-1575.
7. Reynolds L, Kedlaya D. Ilioinguinal-iliohypogastric and genitofemoral nerve blocks. In: Waldman SD (ed). Interventional Pain Management. 2nd ed. Philadelphia, PA: WB Saunders Co; 2001:508–511.
8. Waldman SD. Atlas of Pain Management Injection Techniques.
Philadelphia, PA: WB Saunders Co; 2000.
9. Jamieson RW, Swigart LL, Anson BJ. Points of parietal perforation
of the ilioinguinal and iliohypogastric nerves in relation to optimal sites for local anaesthesia. Q Bull Northwest Univ Med
Sch 1952;26:22–26.
10. al-Dabbagh AK. Anatomical variations of the inguinal nerves and risks of injury in 110 hernia repairs. Surg Radiol Anat 2002; 24:102–107.
11. Lipp AK, Woodcock J, Hensman B, et al. Leg weakness is a
complication of ilio-inguinal nerve block in children. Br J Anaesth 2004; 92:273–274.

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