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Case report

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Iliohypogastric Block in Pediatric Patient with Down Syndrome Undergoing Orchidopexy: a case report

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ABSTRACT

Background: Iliohypogastric/ilioinguinal block is one of the peripheral nerve block techniques used in inguinal and lower abdominal surgery. Orchidopexy is a surgery that is often performed on pediatrics patients.

Aim: This paper aims to present a case study on the utilization of ultrasound-guided iliohypogastric/ilioinguinal blocks in patients with Down syndrome who are undergoing orchidopexy surgery.

Case Presentation: A 4 year old, 11 kg boy, was diagnosed with undescended left testis and retracted right testis. The patient underwent bilateral orchidopexy. The surgery was performed with general anesthesia, using intubation for airway management, sevoflurane for sedation maintenance, and iliohypogastric block using local anesthetic 4ml of 0.2% ropivacaine for right iliohypogastric and 3ml of 0.25% levobupivacaine for left iliohypogastric with ultrasound guidance.

Conclusion: The use of a combination of general anesthesia with iliohypogastric block in orchidopexy surgery can lower the dosage of opioid, postoperative pain and the incidence of postoperative nausea and vomiting. The use of ultrasound on this block can improve the accuracy.

Keywords: Iliohypogastric, Ilioinguinal, Down syndrome, Orchidopexy, Undescended Testis, High Sacral Hiatus

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1. Introduction

Orchidopexy is one of the most common surgical procedures performed on pediatric patients. However, the incidence of postoperative pain in orchidopexy surgery ranges from 30-60% (Wong et al., 2018).

Regional anesthesia in combination with general anesthesia is often used for inguinal and lower abdominal surgeries (Gofeld & Christakis, 2006). Caudal block is the most frequently used technique, but over the years, abdominal wall blocks are starting to be widely used, namely: transversus abdominis plane (TAP) block and iliohypogastric/ilioinguinal block (Song et al., 2000).

The use of peripheral nerve block can lower the dose of opioids used. The use of iliohypogastric/ilioinguinal blocks is becoming more common, but this technique operator-dependent. The use of ultrasound allows for more accurate anatomic placement for local anesthetic injection than the use of landmark technique (Wong et al., 2018).

In this paper, we would like to describe a case of using iliohypogastric/ilioinguinal blocks with ultrasound in patients undergoing orchidopexy surgery with Down syndrome. This case report obtained written informed consent from guardian.

2. Case Report

A 4 year old boy, 11 kg, 89 cm, was diagnosed with undescended left testis and retractile right testis. The parents informed to the doctor that his left testicle was not palpable since birth and the right testicle was sometimes unpalpable either. Since birth, the patient has been diagnosed with Down syndrome. He was also diagnosed with hypothyroidism and was currently taking levothyroxine. History of allergies was denied. On the time of examination, the patient was not having a cough or runny nose. The patient was examined in preparation for orchidopexy surgery. From the physical examination, neither of the patient's testicles were palpable. Examination also revealed a high sacral hiatus. From the results of laboratory tests (Table.1), the levels of thyroid function were within normal limits. Echocardiography examination was found to be normal with an ejection fraction of 70%. Patient was diagnosed with American Society of Anesthesiology (ASA) 3 related to down syndrome, potential difficult to intubate (macroglossia), hypothyroid on medication, and malnutrition.

Table 1. Laboratory examination

Parameters	Results
Hemoglobine	12.6
Hematocrit	38.3
White blood cell	6,460
Platelet	365,000
Blood urea nitrogen (BUN)	15
Creatinine serum	0.49
Random blood glucose	112
Aspartate aminotransferase (AST)	40
Alanine transaminase (ALT)	27
Albumin	3.9
Na	137
K	4.5
Cl	105
HBsAg	Non-reactive
Partial thromboplastin test (PPT)	10.9
Activated partial thromboplastin test (APTT)	23.6

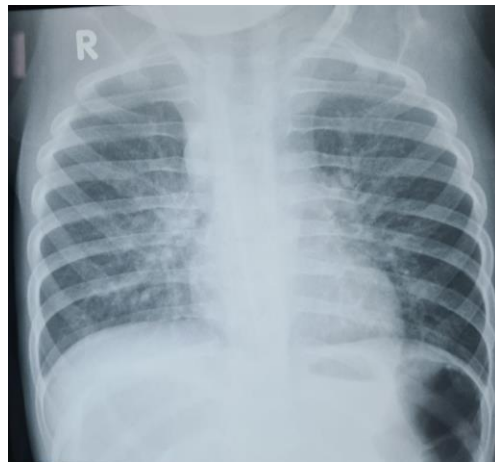


Figure 1. Chest X-ray showed there is no cardiopulmonary abnormality

Patient was given general anesthesia. Patient premedicated in preparation for intubation by administering Atropine sulphate 0.1 mg and midazolam 1 mg. Induction was carried out using 20mcg Fentanyl, 20mg propofol and 5mg atracurium, using ETT no.4. Maintenance during surgery was carried out using sevoflurane. The patient was prepared for iliohypogastric block. The equipment and ultrasound device were prepared. Block was performed with ultrasound guidance using local anesthetic 4ml of 0.2% ropivacaine for right iliohypogastric and 4ml of 0.25% levobupivacaine for left iliohypogastric (Figure 2). During the surgery, the patient did not receive additional intravenous analgesia. Sevoflurane 2.0-2.5% vol was administered.

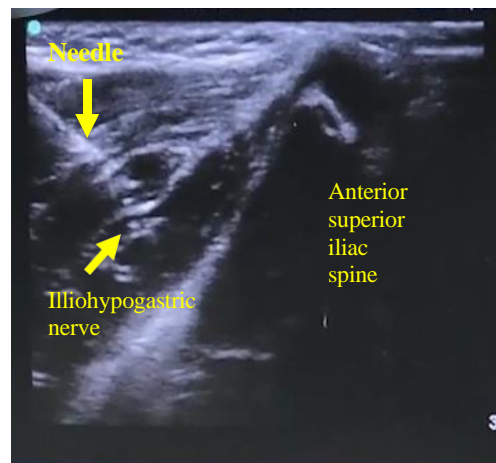


Figure 2. Ultrasound guiding of iliohypogastric block

Urologist performed bilateral orchidopexy and circumcision. The patient was stable throughout the surgery without a period of shock. The patient was extubated and transferred to the Recovery Room and was given paracetamol 150 mg IV every 6 hours. After 2 hours of observation, the patient was transferred to the ward. Postoperatively, the patient were followed up for pain observation at 1, 2, 4, 8, 12, 20, and 24 hours postoperative, each with FLACC scores of 1, 2, 2, 2, 2, 2 and 3. Complaints of nausea and vomiting was not found. The next day, the patient was discharged and scheduled for follow up examination at outpatient clinic.

3. Discussion

Ilioinguinal/Iliohypogastric block is a simple and convenient regional anesthetic for inguinal surgery. This technique proved to be superior and cost effective compared to subarachnoid and general anesthesia (Gofeld & Christakis, 2006)(Song et al., 2000). Ilioinguinal and iliohypogastric blocks are often used for intraoperative or postoperative analgesia in inguinal surgery in children. Blocks can also prevent postoperative chronic pain

(Eichenberger et al., 2006).

The anatomy of the ilioinguinal / iliohypogastric innervation originates from the T12 to L2 branches. The nerve arises laterally from the psoas major muscle, under the peritoneum and passes around the abdominal wall between the transversus abdominis and internal oblique muscles, emerging superficially at a point 2–3 cm medial to the anterior superior iliac spine (ASIS). This nerve supplies the most inferior part of the transversus abdominis and internal oblique muscles and fascia, then runs parallel to the inguinal ligament. At the inguinal ligament, the nerve runs between the internal and external oblique muscles. In some people, the ilioinguinal / iliohypogastric may be joined, and either of those may also be absent (Trescot, 2016).

The ilioinguinal / iliohypogastric blocks can be done using several techniques, including using landmarks and ultrasonography (Trescot, 2016). Landmark technique can be done by palpating the anterior superior iliac spines, then drawing a line 2 cm medially and 2 cm superiorly. Local anesthetic infiltration is administered, then inserting the needle until resistance is felt in the external oblique muscles. When the needle enters the internal oblique muscle, a "pop" and loss of resistance would be felt. Deeper insertion would give another "pop", which means the needle has entered between the internal oblique and transversus abdominis muscle (Trescot, 2016). The use of ultrasound on peripheral nerve blocks lowers the complication rate and improves the quality of the block (Willschke et al., 2005). Ultrasound is used by placing the probe on the anterior superior iliac spine and umbilicus.

The volume of local anesthetic needed to perform this block is 0.3ml/kgBW (Willschke et al., 2005), but several other studies used a dose of 0.4ml/kgBW, both of which have shown to be effective for postoperative analgesia. Local anesthetic concentrations vary, levobupivacaine 0.25-0.5% and ropivacaine 0.2-0.75% can be used [6,7,8,9,10].

Comparison of ilioinguinal / iliohypogastric blocks with caudal blocks, TAP blocks, perifocal infiltration and without regional anesthesia, are giving varies results. Ilioinguinal / iliohypogastric block compared to perifocal infiltration were reported to be more effective for analgesia in inguinal surgery. The incidence of PONV did not show a significant difference (Grosse et al., 2020). In another study, comparison of ilioinguinal / iliohypogastric with TAP and Caudal block have shown that Caudal and TAP blocks were more effective than ilioinguinal / iliohypogastric in the early postoperative phase. However, for orchidopexy or herniorrhaphy surgery, there was no significant difference in the results of these two blocks (Sahin et al., 2017). Changes in hemodynamic response were not significantly different when using all of these blocks (Yimer et al., 2020).

In a review that compared caudal, TAP and iliohypogastric and ilioinguinal blocks, there were varies results. Some of the reasons for the variation in results are: practitioner's experience, type of surgery, differences in local anesthetics used, differences in doses and volumes, use of different pain scores, and intraoperative type of opioid and dosage (Sahin et al., 2017).

4. Conclusion

The use of a combination of general anesthesia with iliohypogastric block in orchidopexy surgery can lower the dosage of opioid, postoperative pain and the incidence of postoperative nausea and vomiting. The use of ultrasound on this block can improve the accuracy.

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