

Ultrasound Guided Nerve Blocks in Multiple Limb Pediatric Orthopedic Surgery the Changing Times!!

Abstract

Pediatric patients with complex multitudinous orthopedic problems undergoing complex, long duration, multiple limb procedures pose a unique challenge to the paediatric anaesthesiologist. The advances in pediatric regional anaesthesia, an ever evolving branch, have led to successful management of such patients throughout the perioperative period. The advent of ultrasound guidance for paediatric regional blocks has led to a smooth and harmonious conduct of anaesthesia with decreased requirement of the drugs used, avoidance of airway manipulation, decreased blood loss, a better relaxed operative field for the surgeon, decreased chances of delayed recovery and a superior and effective post-operative analgesia. Dosages of local anaesthetics, in terms of volume per kg and milligram per kg have remained a precarious issue in small kids. Since the available safe amount of local anaesthetic is fixed and specific, multiple blocks at the same time is a concern. Advances in paediatric regional anaesthesia such as application of ultrasound gives us a chance of blocking a nerve with smaller dosage of local anaesthetic as compared to traditional modalities [1]. We present a case of an infant posted for multiple limb orthopaedic surgery successfully managed with ultrasound guided multiple nerve blocks.

Keywords: Multiple limb abnormalities; Ultrasound guidance; Regional anaesthesia

Case Report

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Abbreviations: Kg: Kilogram; LA: Local Anaesthetic; ASAPS: American Society of Anaesthesiologist Physical Status

Introduction

Pediatric regional anaesthesia is an ever evolving field. There is a changing trend towards greater use of regional anaesthesia in paediatric population as compared to general anaesthesia alone. The advent of ultrasound guided technique for regional anaesthesia has led to an overall decrease in the risks associated with regional anaesthesia, which was once considered similar to that of opiate anaesthesia (1 in 1000) [2,3].

Regional anaesthesia is being performed frequently in paediatric patients. It is now a well-known fact that the regional blocks can be performed safely and efficiently without risks of neurological damage. The amalgamation of ultrasound into the practice of regional anaesthesia has perilously improved routine paediatric Perioperative care [4,5]. Ultrasound has the advantage of delivering the right amount of drug at the right place.

Here, we are presenting a case of a 1year 6 months female child with multiple anomalies of hand and feet for correction surgery, successfully managed with ultrasound guided caudal and left axillary block (multiple regional anaesthesia techniques) which shed light on the efficacy of ultrasound guided axillary block with minimal volume of local anaesthetics used enabling us to use an appropriate caudal block dose. Also it has the advantage of avoiding polypharmacy and airway instrumentation being surface surgeries.

Case Presentation

A one year six months, female child weighing 12 kg, a known case of syndactyly of bilateral hand and feet with left hallux varus, right metatarsus adduction was posted for left upper limb syndactyly release and right foot osteotomy.

A thorough preoperative evaluation was done, informed consent was obtained from the parents of the child and the case was accepted under ASA PS I. patient was pre medicated with intranasal midazolam 0.3 mg/kg, half an hour before the procedure.

Once in the OR, baseline vitals were noted and anaesthesia was induced using sevoflurane 2-8 vol% in air and oxygen mixture. Intravenous access was secured ringer lactate was started. Inj. Glycopyrrolate 4mcg/ kg was given IV, anaesthesia was deepened with Inj. Propofol 1 mg/ kg. Patient was maintained with sevoflurane 2 vol% in air and oxygen mixture on spontaneous ventilation via surgical mask as a harness and JR circuit [6].

Patient was positioned left lateral. Under all aseptic precautions, ultrasound guided caudal epidural block was given using a 22 gauge 1 inch needle with 0.5 ml / kg 0.25 % bupivacaine and 2% lignocaine with 1:2,00,000 adrenaline mixture. Clonidine 1 mcg/ kg were added as an adjuvant to the mixture. After caudal block was performed, patient was positioned supine and under all aseptic precautions, ultrasound guided left axillary block was given using 0.25 ml/ kg diluted mixture of 2 ml 0.25% bupivacaine and 1 ml 2% lignocaine with 1: 2,00,000 adrenaline. A high frequency probe (Micromax® Sonosite Inc., Bothell, WA) was used.

The real time visualization of the needle in the caudal space and the sagging of the dura mater during injection of the drug (during caudal block) and the peri arterial hydro dissection of the tissues at 6 and 10 o clock positions (during an axillary block) confirms the correct drug deposition, diminishes the chances of unsuccessful block and prevents inadvertent complications related to the procedure.



Figure 1: Bilateral upper limb defects of the patient described.



Figure 2: Patient in standing position.

Discussion

Complex orthopedic procedures, especially on multiple extremities pose a unique challenge for dose distribution of LA.

The fact that LA dosage is fixed, the real test is to work with minimum volumes and milligrams per kilogram dosages, yet get successful blocks. The impact of the advances in pediatric regional anaesthesia is affirmative on the outcome of paediatric patients undergoing painful multiple limb procedures. These procedures, when done under general anaesthesia alone increases the requirement of drugs used (especially opiates), use of polypharmacy, associated with airway manipulation which have their own complications. The use of regional anaesthesia (multiple ultrasound guided blocks in this case), decreases the need of perioperative polypharmacy, avoids the need for airway manipulation and circumvents the complications associated with general anaesthesia and most importantly renders the use of minimum effective dosages of LA for a successful block. Regional anaesthesia also provides a far more superior postoperative analgesia, the duration of which can be increased with the use of adjuvants (clonidine in this case). Ultrasound guidance relinquishes a superior accuracy of the block (ultrasound guidance in this case) and hence a smooth and hassle free conduct of anaesthesia and surgery. Regional anaesthesia also provides a relaxed field for the surgeon to operate on and is associated with lesser blood loss and stable hemodynamics all which have a commendatory effect on successful perioperative management.



Figure 3: Bilateral foot deformities in the patient described.

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