Ultrasound guided lateral sagital infraclavicular block for pectoral flap release

Pektoral flep ayrılmasında ultrason rehberliğinde lateral sagital infraklavikular blok uygulaması

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Summary

Ultrasound may provide effective guidance during nerve blocks in cases where nerve stimulation is not feasible for various reasons. We describe a 28-year-old, ASA physical status I, male patient who was operated for pectoral flap release under lateral sagittal infraclavicular block. Using ultrasound guidance alone, total volume of 30 ml of local anesthetic mixture (15 ml of levobupivacaine 5 mg/ml and 15 ml of lidocaine 20 mg/ml with 5 µg/ml epinephrine) was injected dorsal to the axillary artery. There was no vascular puncture or any other complication. The block was successful and the patient was ready for surgery 20 minutes after block performance. This case report is one of the examples that ultrasound guidance may be the only way to perform safe regional anesthesia; ultrasound guidance alone is an effective way of performing infraclavicular block.

Key words: Infraclavicular block; levobupivacaine; ultrasound.

Özet

Ultrason farklı nedenlerle sinir stimülasyonunun uygun olmadığı durumlarda sinir bloklarında etkili bir rehber olabilir. Bu yazıda lateral sajital infraklaviküler blokla pektoral flep ayrılması ameliyatı geçiren 28 yaşında, ASA I, erkek hasta sunuldu. Ultrason rehberliğinde toplam 30 ml lokal anestezik karışımı (15 ml levobupivacaine 5 mg/ml ile 5 µg/ml adrenalin içeren 15 ml lidokain 20 mg/ml) aksiller arterin dorsal bölgesine uygulandı. Vasküler ponksiyon ya da farklı bir komplikasyon gelişmedi. Blok başarılı oldu ve hasta uygulamadan 20 dakika sonra cerrahiye hazır oldu. Bu olgu, emniyetli bir şekilde rejyonal anestezi uygulamasında tek yolun ultrason rehberliği olduğu ve infraklaviküler blok uygulamasında sadece ultrason rehberliğinin etkinliğini gösteren bir örnektir.

Anahtar sözcükler: İnfraklaviküler blok; levobupivakain; ultrason.

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Introduction

Lateral approaches to infraclavicular block of the brachial plexus have gained wide acceptance and popularity due to the high success rate even with the single injection technique. Following an MRI study in volunteers Klaastad et al.[1] suggested that infraclavicular block could be accomplished by "*lateral sagittal route*" with ease and low risk of complications like pneumothorax. It was shown that using lateral sagittal infraclavicular block (LSIB), single injection technique is well accepted by patients and has fewer adverse effects than an axillary block by multiple injection technique.[2] Following a single injection almost complete anesthesia for arm and hand below the shoulder can be provided. Clinical studies reported that the block success rate ranges between 85-91% and a block onset time was 20 minutes.[3-5]

Ultrasound technology is advancing rapidly and portable ultrasound devices provide acceptable image quality during regional anesthesia.[6] During infraclavicular block performance ultrasound provides the clinician the ability to see vascular and neural structures, and also the pleura. It is suggested that the use of ultrasound guidance would improve the block success rate and also decrease the incidence of complications.[7]

Case Report

In this case report we describe 28-year-old, ASA physical status I, male patient who was operated earlier for hand surgery due to a crash injury of distal phalanxes of second and third fingers and pectoral flap was performed under general anesthesia. Next time patient was evaluated for pectoral flap release (Figure 1) the orthopedic surgeon stated that he would prefer brachial plexus block if applicable instead of pure local anesthetic infiltration by the surgeon.

On arrival to the preanesthesia holding area where blocks were performed standard monitoring was applied (electrocardiogram, pulse oximetry, and noninvasive blood pressure) and an intravenous catheter was placed in the opposite forearm of the patient. He had an infusion of lactated Ringer's started IV before block performance. Sedation was provided with intravenous midazolam 2 mg and 100 µg of fentanyl. The puncture site was immediately adjacent to the most medial point of the coracoid process and the anterior surface of the clavicula. After antiseptic preparation of the area with povidone-iodine, the ultrasound probe was placed just below the clavicle about 1 cm inferior to the site of needle entry. General Electrics Logic E ultrasound machine (Jiangsu, P.R. China) with a 12L-RS: Large bandwidth, multifrequency linear probe (8-13 MHz)

Figure 1. The patient being prepared for the ultrasound guided lateral sagittal infraclavicular block of left arm.

was used during block performance. The needle was inserted using in-plane technique. Following identification of the axillary artery and the cords, the stimulating needle was positioned posterior to the axillary artery. We injected the local anesthetic dorsal to axillary artery. Local anesthetic distribution around the cords and axillary artery was observed with ultrasound imaging following local anesthetic administration. Eighty mm insulated needle (22 G Pajunk Needle Germany) was used during block performance.

Local anesthetic mixture of 15 ml of levobupivacaine 5 mg/ml and 15 ml of lidocaine 20 mg/ml with 5 µg/ml epinephrine (total volume 30 ml) were used. We have administered first two ml of local anesthetic mixture and looked at the heart rate to see if there was any increase indicating inadvertent intravascular injection of LA. Then the rest of 30 millilitres of the above local anesthetic mixture was slowly injected in fractioned doses with frequent aspiration. Throughout needle insertion and redirections continuous aspiration of the syringe was performed by an assistant to detect any possible intravascular puncture. There was no vascular puncture or any other complication. The block was successful and the patient was ready for surgery 20 minutes after block performance.

Discussion

Earlier studies comparing nerve stimulation and ultrasound guidance have already shown that the use of ultrasound could improve block success rate during infraclavicular block. Dingemans et al.[8] reported that at 30 minutes block supplementation rates were 8% in ultrasound group and 26% in nerve stimulation group. Block success rate at 30 minutes was 95% in our study during infraclavicular block.[7] Tran et al.[9] suggested that a "*double bubble sign*" produced by directly posterior injection of local anesthetic would be a predictor of an almost 100% success rate. Bloc et al.[10] showed that local anesthetic spread demonstrated by the ultrasound posterior or deeper to the axillary artery was associated with complete sensory block of the 3 cords at 30 minutes. That is why the site posterior to axillary artery was chosen for local anesthetic administration during our clinical performance.

Despite the availability of ultrasound guidance and the opportunity to see vascular and neural structures in real time, many clinicians still prefer to verify the position of the needle and proximity to nerves by nerve stimulation also (dual control). Contrary to dual control Sandhu et al.[11] recommend that ultrasound guidance alone would be sufficient to provide almost 100% block success rate following triple injections at the level of each cord. Avoiding neurostimulation and thus more expensive insulated nerve block needles could also decrease the cost of plexus block.[12] This could be possible in the case of infraclavicular block where axillary artery and brachial plexus cords could be identified and verification of neural structures by electrical stimulation could be avoided.

Ultrasound provides an advantage to the clinician when neurostimulation should be best avoided due to extreme pain due to trauma of the involved extremity and also in cases where motor nerve response is difficult or even impossible to evaluate in cases like arthordesis of a joint or total absence of a joint where motor response can not be evaluated at all. Our case is one of such examples that motor response is best avoided in order to prevent pain during neurostimulation. In our case axillary block was not accessible and either supraclavicular or infraclavicular blocks were the possible regional anesthesia techniques. We chose infraclavicular block due to our extensive experience with LSIB technique.

We conclude that our case report is one of the examples that ultrasound guidance could be the only way to perform safe regional anesthesia and ultrasound guidance alone without nerve stimulation is an effective means of performing infraclavicular block.

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