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Ultrasound Guided Bilateral Infraorbital and Mental Nerve Blocks for Mandibulo- Maxillary Fixation Screws Removal in a Patient with Limited Mouth Opening

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Abstract

Mandibulo-facial injuries present special concerns to the anaesthesiologist in terms of difficult airway access. If possible to use regional anaesthesia in such cases the major concern of difficult airway access is out of the way. We present a case of removal of mandibulo-maxillary fixation (MMF) screws post bilateral mandibular condylar fracture dislocation repair under ultrasound-guided bilateral infraorbital and mental nerve blocks. Through this case report we recommend the use of these simple ultrasound-guided infraorbital and mental nerve blocks for the removal of MMF screws or any similar surgery on the upper and lower alveolus. Ultrasound guidance made it possible for us to give the minimum drug at target-specific foramen. This block can be especially useful in such cases as access to difficult airway due to limited mouth opening for general anaesthesia could be completely avoided.

Keywords: Infraorbital nerve , Mandibular nerve, Mental nerve, Nerve Block, Ultrasound.

Introduction

The infraorbital nerve is a branch of the maxillary nerve (V2) ,the second division of the trigeminal nerve. It provides sensory innervation to the lower eyelid, lateral aspect of the nose, upper incisor, upper lip, canine, premolars, and mesiobuccal root of the first molar on the ipsilateral side of the face [1]. The mental nerve is a branch of the mandibular nerve (V3) third division of the trigeminal nerve [2, 3]. The mental nerve supplies sensation to the lower lip, buccal mucosa, and skin of the chin ventral to the mental foramen. Mandibulofacial fractures usually present to anaesthesiologists with difficult airways. Airway aids like video laryngoscopes, fiberscopes are used for anaesthetizing such patients [4]. Post mandibular maxillary fixation; mouth opening is often very limited and this makes the patient's airway access difficult. With sedation or total intravenous anaesthesia there is a risk of losing patency of airway which in a patient with limited mouth opening can be risky. Regional anaesthesia alone is rarely used for such cases. We present one such case of implant removal in a patient of post-condylar fracture dislocation repair under bilateral mental and infraorbital nerve blocks.

Case history

A 56-year-old 60 kg male with a height of 167 cm, known hypertensive since twenty years had a fall and sustained a bicondylar fracture of the mandible. There was no evidence suggestive of head, chest, and abdominal injuries. He underwent bilateral reduction and internal fixation with mandibulo-maxillary fixation (MMF) screws under general anaesthesia and three months later was posted for the MMF screws removal (Fig. 1). He had good effort tolerance with metabolic equivalent of task (MET)> 4. On clinical examination, he was conscious, and afebrile with stable vitals. The patient was asthmatic with occasional wheezing. He had restricted mouth opening; less than one finger breadth. Routine laboratory evaluation showed hemoglobin of 13.2 g%, random plasma glucose of 103 mg%, and serum creatinine of 0.9 mg%. Preoperative electrocardiograph (ECG), X-ray chest and echo-cardiogram were normal. The patient was anxious about the procedure and was worried about pain during surgery. As the surgery was of short duration but involved MMF screws and implant removal of both sides of the mandible with limited mouth opening, a plan of ultrasound-guided bilateral infra orbital and mental nerve block was made. A local anaesthetic solution mix of 2 ml of 0.5% bupivacaine with 2 ml of 2% lignocaine was used. The procedure was explained to the patient ,and the patient was placed in a supine position. Minimal monitoring standards as per American Society of anaesthesiologists (ASA) were applied which included pulse oximetry, noninvasive blood pressure, and ECG. An intravenous line was secured and intravenous fluids started. The skin was aseptically prepped with betadine. The ultrasound (Sonosite®) with linear transducer (10-12 HZ) probe was prepared with sterile sheath and aseptic ultrasound gel. First the left infraorbital nerve was blocked under ultrasound guidance using the liner transducer. The transducer was applied longitudinally to the lateral side of the nose and then rotated slightly clockwise to obtain a longitudinal (long-axis) view of the infraorbital canal to find the left infraorbital foramen (Fig. 2). We identified the infraorbital foramen with a hyperechoic protuberance (Fig. 3). After negative aspiration 1 ml of prepared solution was injected through a 25 g needle. The same steps were repeated for the

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Figure 1: MMF screws

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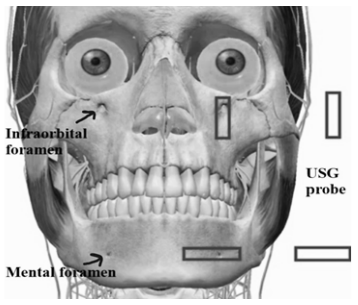

Figure 2: USG Probe placement for nerve block

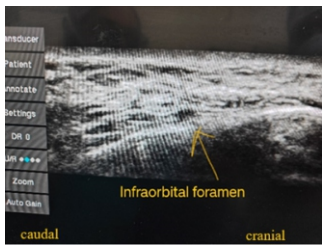

Figure 3: Ultrasound image of infraorbital foramen

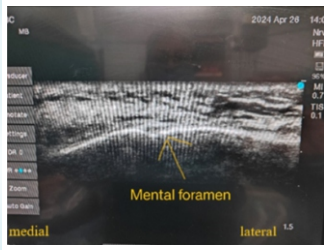

Figure 4: Ultrasound image of Mental foramen

ght infraorbital nerve.

For ultrasound-guided bilateral mental nerve block the transducer was first placed transversely at the level of the left second premolar, midway between the upper and lower borders of the mandible (Fig. 2). We scanned his mandible in the cephalad direction from the inferior border of the mandible and easily identified the mental foramen with a hypoechoic cleft and the pulsatile mental artery in the groove (Fig. 4). After negative aspiration 1 ml of prepared solution was injected through a 25 G needle. The Same steps were performed for the right mental nerve.

In total, we injected about 4 ml of the total anaesthetic solution. The patient was monitored for any changes in the vitals, dysrhythmias, or any other complications during the procedure. There was numbness within 5-7 minutes of the block. The surgeon could manipulate the lower jaw to open the mouth well and the MMF screws were removed without any supplemental need of analgesics or sedation. The procedure lasted about 20-25 minutes. The patient was comfortable, pain-free, and stable and was observed in the recovery area for half an hour before being shifted back to the wards. The block weaned off in about 4 hrs without any side effects.

Discussion

Infraorbital nerve block and mental nerve are branches of the maxillary and mandibular division of the trigeminal nerve respectively. Many healthcare clinicians widely use the mental nerve block, especially dentists, dermatologists, plastic surgeons, and emergency room providers. Mandibular nerve blocks are usually employed for mandibular surgery either alone or in combination with general anaesthesia. Mandibulo -facial fracture usually presents with a challenging airway to anaesthesiologist. Our patient had screws in both upper and lower teeth with limitations in mouth opening. Hence, bilateral infraorbital and mental nerve block was planned. S. Parthasarathy et al [4] reported a case of bilateral mandibular and maxillary nerve block near the tragus using Braun's technique and around 15 ml of the local anaesthetic drug for bilateral condylar fracture surgery. Our case was different as we performed the nerve block for screw removals by blocking the individual nerves i.e. infraorbital nerve and the mental nerve as they emerge from their respective foramina under ultrasound guidance using only 4ml of local anaesthetic drug.

Our patient presented for screw removal 3 months after surgery with restricted mouth opening. Lim SM et al [5] performed ultrasound-guided infraorbital nerve pulsed radiofrequency treatment for intractable postherpetic neuralgia. After thorough research of literature, we could not find any reference to our mode of management for the proposed surgery. Elective fiberoptic intubation with general anaesthesia is the proposed method for such cases if the airway has to be secured. Often total intravenous anaesthesia may be used without securing the airway. Hence we state this could be the first case report of ultrasound-guided bilateral infra orbital and mental nerve block for MMF screw removal following mandibular fracture surgery in a patient with limited mouth opening with complete analgesia and no sedation or supplemental intravenous opioids.

Conclusion

In patients with limited mouth opening, often giving sedation can be difficult as not only is the airway access difficult in emergency scenarios also in case of vomiting the suction of the oral cavity becomes difficult too. These simple nerve blocks under ultrasound guidance make the patient and surgeon completely comfortable while the patient is still wide awake. Also, the amount of drug needed is very limited as nerves are small peripheral type c nerves and with ultrasound guidance, it is specifically targeted.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his/her consent for his/her images and other clinical information to be reported in the Journal. The patient understands that his/her name and initials will not be published, and due efforts will be made to conceal his/her identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

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