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Local Anesthesia Failure Cases with Scorpion Bite History in Third Molar Surgery- A Challenge

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Abstract: *Patients planned for third molar surgery who were administered conventional intraoral mandibular nerve block were considered. Local anesthesia failure in third molar surgery can be attributed to many causes but, failure due to history of scorpion bite was not reported in the literature in oral and maxillofacial surgeries. On the operative day after obtaining informed consent, local infiltration of the skin on the ventral aspect of the forearm, using, 6 ml, 2% lignocaine with adrenaline, was carried out. Confirming the suspicion, there was no sensory block after the injection, confirmed by pin prick method. Cases reported in the literature were due to failure of spinal anesthesia but not in third molar surgery the female patients also gave a history of spinal anesthesia failure during their deliveries and were operated under general anesthesia.*

Keywords: *scorpion bite, local anesthesia résistance, minor oral surgery.*

1. INTRODUCTION

Management of pain is an ever challenging task; overcoming the failures of local Anesthesia is one of the concerns in oral and maxillofacial third molar surgical procedures. Local anesthesia injections are widely performed successfully in most of the Oral and Maxillofacial surgical cases, but failures of Anesthesia do occur even after careful injection techniques[1].

Failures can be attributed to many factors, but failure in patients with history of scorpion bite priory to third molar surgery was not much reported in the literature compared to spinal anesthesia. The scorpion venom is known to affect the pumping mechanism of sodium channels in the nerve fibers, which are involved in the mechanism of action of local anesthetic drugs, it may be responsible for the development of 'resistance' to the action of local anesthetic agents[2]. Local anesthetics are the safest and most effective drugs available for the prevention and the management of pain. Indeed, there are no other drugs that truly prevent pain. Depositing a local anesthetic drug in close proximity to a sensory nerve and clinically adequate pain control will result in essentially all clinical situations.

2. MATERIALS AND METHODS

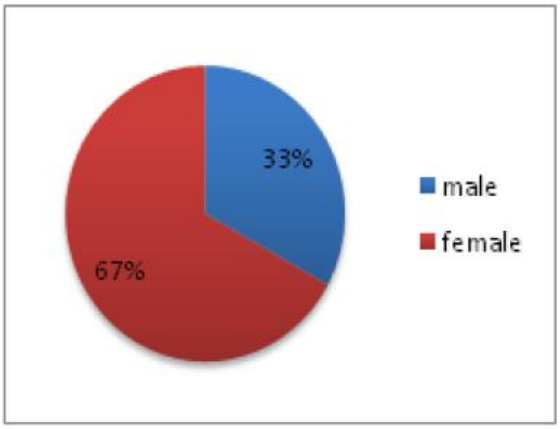
All the patients with age group between 21-58 yrs reported to the Department of Oral and Maxillofacial surgery who has given history of scorpion bite were included in the study. The total duration of the third molar surgery was expected at 20-40 minutes. The Management of local anesthesia in third molar patient with

history of scorpion bite is a challenging task, as most of the cases show failure of anesthesia. The patients were given repeated blocks of anesthesia with three different drugs with Lidocaine 2%, 1:200000 adrenaline, Mepivacaine 3%, Articaine 4%, 1:200000 adrenaline with similar onset of action, similar pka values. Patients were evaluated for signs and symptoms of sensory blockade for a period of 30 minutes and the other block were carried out in the same way and was observed for signs of anesthesia. Patients were given left median, ulnar and radial nerve block at the wrist and local infiltration near the anatomical snuff box. There was no sensory or motor block. We report series of 18 cases that had scorpion bite with single/multiple history who were treated with midazolam 1mg/1ml with incremental dosing and ketamine 2mg/kg to achieve adequate anesthesia for a period of 30 minutes.

3. RESULTS

All the patients in the study did not show any signs and symptoms of Anesthesia even after repeated local anesthetic blocks with Lidocaine, Mepivicaine, and Articaine. However, 12 patients who had history of single/multiple scorpion bite in the recent times within a year did not show any anesthesia. 6 patients who had scorpion bite more than 2yrs showed delayed response for the block with Articiane with an average onset of action at 20 minutes and was not responsive to Lidocaine and Mepivicaine. The procedures were completed within 20-26 minutes. Thermal response was not elicited as a part of the study. All the patients who showed failure were all from the same tribal area where incidence of scorpion bite was more and can be attributed to the natural habitat of scorpions.

The cause of the failures may be due to technical inability to achieve block. However, failure that occurs despite of technically correct injection of the correct drug can be disappointing to the surgeon. As the scorpion venom is known to affect the pumping mechanism of sodium channels in the nerve fibers, which are involved in the mechanism of action of local anesthetic drugs, it may be responsible for the development of "resistance" to the action of local anesthetic agents. All the patients were planned prior to the surgery with history of scorpion bite and were treated successfully without any post operative complications.



Representation of Patients in the Study

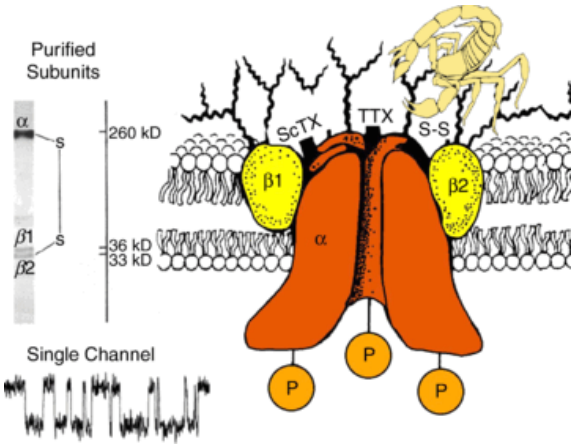
4. DISCUSSION

Mandibular block anesthesia or conventional intraoral inferior nerve block has a high success rate, one of the most commonly used block for third molar surgery as well as in achieving anesthesia for most of the procedures in oral and maxillofacial surgery[3]. Vinckier has estimated failure rates of 10% for inferior alveolar nerve block and 7% for the rest of anesthetic procedures with only few ml is required for additional blocks[4]. Wong and Jacobsen had reported that inferior alveolar nerve injections using the conventional technique fail in 5-15% of cases[5]. However evaluating exact cause of the local anesthesia failure is essential for identification of failed blocks and provides pain free treatments in third molar surgery. Clinician (choice of anesthetic technique) and patient (anatomical, pathological or psychological) related factors play a major role[6]. The underlying cause has to be evaluated careful to ensure painless surgeries. It is important to take into consideration that the anatomy varies with age and development of the facial structures changes over a period with edentualism[7].

In our country, scorpion bites are a relatively a common phenomenon. The failure of anesthesia due to scorpion bite is not even recorded as a part of medical history which accounts to few cases of local anesthesia failure as explained by competitive antagonism in spinal anesthesia failures[8]. Experiments have shown that these scorpion toxins are modifiers of the gating mechanism of the Na+-channel function, affecting either the inactivation (a-toxins) or the activation (b-toxins) kinetics of the channels. Mostly our study results can also be attributed to the antagonism at the binding site[9-14]. However,

many authors attribute antagonism as one of the important factor for the failure but, more research at the molecular level has to be conducted to find out the exact cause of failure of anesthesia[15-16].

Anesthetic response varies among individuals within the same family with different pain threshold. Interestingly, our study found our all the patients belong to a particular tribe had anesthetic failure. In effect, 1% of the population may refer no response at all, while another 1% may refer an extraordinary effect, and 70% tend to respond as expected[17]. Many authors attribute loco regional anesthesia failure to a lack of knowledge or experience that can only be avoided with full knowledge of the anatomy and mechanisms of anesthetic effect[18]. Various methods of pain control have their own merits and demerits[19, 20]. The clinician must choose the most appropriate method in the best interests of the patient while performing the nerve block and providing painless surgical treatment. Even though proper, scientific, skilled professional is mastered in anatomical and patient management concepts, awareness on local anesthetic failure should raise the suspicion of previous history of scorpion bite as the number of cases of local anesthesia failure has been on the rise in oral and maxillofacial surgery[21].



Diagrammatic representation of Scorpion Toxin Mechanism and Inhibition

5. Conclusion

The management of pain is challenging even after the advent of many recent drugs to combat pain in the present day clinical scenario. Development of many recent techniques to overcome local anesthetic failure in oral and maxillofacial surgery has been mentioned in the literature but, Patients with previous history of scorpion bite need to further evaluated carefully, treatment has to be planned priory with alternate techniques of anesthesia to avoid unnecessary psychological trauma to the patient and educate and bring awareness about the failure of injections among the fraternity and in the patients. We firmly believe, it has immunological basis and the mechanism of this 'resistance' involves possible 'competitive antagonism'. Interestingly the phenomenon is noticed in tribal population which was interesting. Studies have to be performed and further evaluated in the years to come.

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