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Soft Tissue Injuries after Administration of Local Anaesthesia

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ABSTRACT

Local anaesthesia is a very important in oral and maxillofacial surgery for management of pain. LA helps to decrease the post-operative pain in orofacial region. One should understand the anatomy of trigeminal nerve and should know about the sensory and motor innervation. It is very important to examine patient to choose correct local anaesthesia. Success rate of local anaesthesia depends on local anaesthesia we choose. No particular local anaesthetic technique ensures 100% success rates. To solve this many other new local anaesthetic agents were developed. This new local anaesthetic agents also reduces complications. Aim of this article is to review the soft tissue injuries after administrating local anaesthesia.

Key words: Local anaesthesia, Orofacial region, Maxillofacial surgery, Sensory and motor innervation

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INTRODUCTION

Local anaesthesia can be described as a lack of or absence of sensation in a particular area or location of the body produced by decrease stimulation in nerve stimulation. Quick and safe LA allows patient to receive great quality treatment, additionally, it also aids in the patient's anxiety relief in the clinics and makes operation process easier. An unintended allergic reaction or unexpected allergic reaction is less likely if you have a detailed medical history and you have chosen the right local anaesthetic agent. In addition to type of anaesthetic used, it is also very important to pay attention on the infiltration technique which is being used. If anatomical structure and techniques are ignored and if there is wrong selection of armamentarium than there is increased risk of adverse effect and complications [1]. Local anaesthetic complications can be assessed both systemically and locally. Local anaesthesia may cause number of systemic effects like psychogenic effects, systemic toxicity, allergy, and Methemoglobinemia, it may also cause many local effects like pain at injection, fracture of needle, increases the duration of anaesthesia and many other sensory disorders. Lack of sensation, lesion on gingiva, ophthalmologic complications hematoma, oedema, infection, soft tissue injury can also occur [2,3]. Consent should be obtained from the patient like other procedures because almost every form of anaesthesia is invasive. Clinician should explain the patient about risk and benefits of anaesthesia and patient should be given a leaflet about anaesthesia, about its risk and benefit. Prolong anaesthesia or parathesia or neuralgia may occur due to local anaesthetic blocks. Trauma during infection, injection, allergy, haemorrhage, and injecting irritating solution can lead to swelling. Administration of LA can be associated with the complications of adverse events. The dose of LA should be carefully calculated based on body weight and maximum suggested amount should be taken into account

LITERATURE REVIEW

Need of LA in orofacial region

Surgical and dental procedures are commonly performed in outpatient procedures. The most prevalent way of anaesthetizing a patient prior to office based operations is regional anaesthesia. To establish anaesthesia of teeth and hard and soft tissues around the teeth of the maxilla and mandible, a variety of extremely effective and practical procedures can be used. The procedure to be conducted as well as the procedure's area or location determines the technique of anaesthesia to be used. Local infiltration, a field block, and nerve block are the three primary types of orofacial anaesthetic procedures.

Currently, LA is the most used form of pain relief in maxillofacial surgery. LA is a type of anaesthetic in which drugs are injected into particular places to keep the patient awake and pain free. The benefit of this procedure is that patients do not require systemic medication and

don't have to wait for a long period of time to recover from anaesthesia. Local anaesthetics diminishes the permeability of sodium channels in peripheral nerves and binds with calcium, inhibiting nerve impulse transmission to the brain and rendering the patient painless [4,5]. Effective pain management can make operation processes more pleasant for patients and lessen their dental fear.

Types of LA in orofacial region

Composition of LA

- Lignocaine hydrochloride-local anaesthetic agent
- Adrenaline-vasoconstrictor
- Sodium meta bi-sulphide-reducing agent
- Methyl parabene-bacteriostatic agent
- Thymol-fungicide
- Distilled water-volume and isotonicity

The LA agent has two important that is Esters and Amides groups. Amides which are mainly used are Lidocaine, Articaine, and Bupivacain [6].

Classification of LA

- **Esters: Esters of benzoic acid:** Butacaine, Cocaine, Hexylcaine, Piperocaine, Tetracaine
- **Esters of p-aminobenzoic acid:** Procaine, Chloroprocaine
- **Amides:** Atricaine, Bupivacaine, Lidocaine, Mepivacaine, Prilocaine, Ropivacaine
- **Quinolones:** Centbucridine

Based on duration of action local anaesthetic agents can be classified as:

Ultra short Acting

- Pulpal anaesthesia is less than 10 min
- Soft tissue anaesthesia is less than 30-45 min
- **Example:** Chloroprocaine, Procaine

Short Acting

- Pulpal anaesthesia is 5-10 min
- Soft tissue anaesthesia is 60-120 min
- **Example:** Lidocaine, Prilocaine

Medium Acting

- Pulpal anaesthesia is 45-90 min
- Soft tissue anaesthesia is 120-240 min
- **Example:** Mepivacine, Articaine

Long Acting

- Pulpal anaesthesia is 90-180 min
- Soft tissue anaesthesia is 240-540 min
- **Example:** Bupivicaine, Etidocaine

Lidocaine: Lidocaine is most accepted first choice of drug in patients with acute myocardial infraction and ventricular arrhythmia. Lidocaines have ability to dilate blood vessels and drugs are absorbed by the body in short period of time. This will reduce the duration of action of anaesthesia and also it will increase the risk of poisoning [7-9]. So therefore Lidocaine is used with adrenaline which is a vasoconstrictor.

Articaine: Articaine has higher lipid solubility so therefore it will have higher rate of solubility in hard tissues, soft tissues and nerve ending so it anaesthetise target organ rapidly. Articaine metabolise in liver and blood [10]. Atricaine has strong tissue permeability so it is used in infiltrations injection which anesthetizes jaw bone.

Techniques of anaesthesia for treatment of a localized area or one or two teeth.

- Supra periosteal
- Intra pulpal injections
- Intaseptal injections
- Periodontal ligament injections

DISCUSSION

Complications of LA: Local complications includes

- Trismus (also called as lock jaw) may be caused by spasm of muscles of mastication. Multiple injections in a same area in a short period of time can also cause trismus.
- By penetrating tissues with a needle that has been infected before the surgery, infection might spread to tissues. Injecting LA through an infected area should be avoided [11].
- Pain on injection can occur because of temperature of the solution, velocity of injecting solution damaging soft tissues etc.
- Needle breakages have been reported with 30 gauge needle and during inferior alveolar nerve blocks.

Systemic complications includes

- Systemic toxicity, allergy, Methemoglobinemia, psychogenic reactions. Some central nervous system signs include seizures or convulsions, unwanted excitation of nerves, respiratory distress. Some of the symptoms can be associated with cardiovascular system which can lead to hypertension, ventricular contractions, tachycardia etc.
- Allergy is mainly caused by amide type of local anaesthetic agents. Allergic effects may include severe itching, erythema, urticarial. Skin prick test is to detect allergic reactions
- Methemoglobinemia can lead to oxygen deficiency in tissues and can lead to cyanosis. Headache, breathlessness, dizziness are common signs.

Types of soft tissue injury after administration of local anaesthesia

- When tissues are anaesthetized patient can bite or chew his lips or tongue and can cause soft tissue trauma to the lips or tongue. In children with special needs or disabled patients, biting and chewing of lips and tongue can occur because of dental local anaesthesia with the unfamiliar sensation of being numb [12].

- After injecting local anaesthetic agent gingival lesion can occur intraoral. Gingival lesion consists of aphthous stomatitis and herpes simplex. The specific method is unknown, but any needle trauma to tissues may trigger a dormant form of the disease process that was present in the tissues prior to the injection.
- Local anaesthesia can cause hematoma which is due to the result of an arterial laceration or venous laceration, increase in intra-arterial blood pressure causes blood to effuse into the surrounding soft tissues. If you experience a lot of pressure while injecting, it could be a sign that you're injecting against the bloodstream. The extent of a hematoma is determined by the density and compactness of the damaged tissue; nevertheless, hematoma is not always present when a vein ruptures. A hematoma may be accompanied by discoloration and a bruise [13].
- Swelling of tissues occurs because of trauma which is caused by injection, infection, allergy, haemorrhage.
- First sign of soft tissue injury is localized pain redness and swelling over affected area.
- A systemic fever and feeling of discomfort may indicate infection, and the patient should be advised for further assessment.
- Sloughing of tissue can be caused by prolong irritation or ischemia of gingival soft tissue may lead to a many complications, epithelial desquamation and sterile abscess. Applications of topical anaesthetic to the gingival tissue for prolong period and sensitivity of the tissue topical and injectable local anaesthesia can lead to epithelial desquamation.
- Pain can occur due to epithelial desquamation or sterile abscess.
- Numbness will occur when needle insertion is too high or too deep. Inserting needle too high or too deep will affect the auricular temporal nerve.
- When different nerves and venous plexus are affected than hematoma is very common. Hematoma is very common in chin area.
- Oral lesions due to herpes simplex can occur due to local anaesthesia.

Management of soft tissue injury

One should understand the anatomy of trigeminal nerve and should know about the sensory and motor innervation. It is very important to examine patient to choose correct local anaesthesia. Success rate of local anaesthesia depends on local anaesthesia we choose. No particular local anaesthetic technique ensures 100% success rates. To solve this many other new local anaesthetic agents were developed. This new local anaesthetic agent also reduces complications. Clinician should explain the patient about risk and benefits of anaesthesia and patient should be given a leaflet about anaesthesia, about its risk and benefit. Prolong anaesthesia or paraesthesia or neuralgia may occur due to local anaesthetic blocks

- Rinse the mouth with salt water this will help to keep the wound clean.
- To reduce swelling in the mouth an ice pack or cold compress can be used.
- Before insertion of needle area of insertion should be cleaned with topical anaesthetic.
- Antiseptic Chlorhexidine gluconate should be used for regional techniques.
- If bleeding is present than gauze is applied to reduce the blood flow. Wounds in oral cavity heal faster than in others parts of body. Saliva helps in survival and functioning of inflammatory cells that are very essential for wound healing.
- Edema can be managed by different ways depending upon the cause. Allergy induced oedema can be treated with intramuscular epinephrine injections. Infection induced oedema can be treated with antibiotics [14-17]
- In some cases of edema histamine blockers can be used. Corticosteroids can be given intramuscularly or intravenously.
- To decrease the recovery time for sensation an alpha adrenergic receptor phentolamine can be injected.
- For pain complains analgesics can be given or topical anaesthetics gels can be applied over the area.
- If there is secondary infection than only medical and surgical intervention is necessary otherwise no such intervention is required.
- Swelling reduces and lesion heals after 2 to 3 days and 10 to 12 days respectively.
- For gingival lesions no as such management is needed until there is severe pain.
- Petroleum jelly or other lubricant can be used to cover a lip lesion and can minimize irritation.
- Patient should be advice to take a liquid diet until the anaesthetic actin is worn off.
- For epithelial desquamation as such no management is needed. Management of this is usually depends on symptoms like for pain analgesics like aspirin or other NSAIDS and other topical ointment are used.

Prevention

- Patient or patient's parent should be warned about drinking hot fluids, biting of lips, eating.
- Chewing can be prevented by placing cotton roll between soft tissue and teeth.
- The cotton roll is secured with dental floss which should be wrapped around the teeth.
- Self-adherent warning stickers can be used for children.
- Before injecting the local anaesthetic solution aspiration of fluids should be done to prevent formation of hematoma.
- Use of short needle, minimum number of penetration into the tissue.
- Edema can be prevented by proper use of local anaesthetic instruments.
- Using traumatic injection techniques.

CONCLUSION

Complications which are caused by local anaesthetic agent cannot be completely prevented. Choosing right local anaesthetic agent reduces the chances of complications. To prevent soft tissue injuries, aspiration of fluids before injecting, proper use of local anaesthesia, use of short needle, use of cotton roll, self-adherent warning stickers etc. all this are very important. Patient or patient's parent should be warned about drinking hot fluids, biting of lips, eating. Pain analgesics like aspirin or other NSAIDS and other topical ointment are used.

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