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Ministry Of Higher Education
And Scientific Research
University of Diyala
Collage of Medicine**



**Advanced surgical techniques using local anesthesia in
nasal surgeries**

**A project submitted to the council of College of Medicine
/University of Diyala in Partial fulfillment of the
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بِسْمِ اللّٰهِ الرَّحْمٰنِ الرَّحِیْمِ

﴿ يَرْفَعِ اللّٰهُ الَّذِیْنَ اٰمَنُوْا مِنْكُمْ وَالَّذِیْنَ اٰتَوْا
الْعِلْمَ دَرَجٰتٍ وَّاللّٰهُ بِمَا تَعْمَلُوْنَ خَبِیْرٌ ﴾

صدق الله العلي العظيم

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الاهداء

الاهداء اولاً الى وجه الله تعالى

في جميع مراحل الحياة اناس يستحقون منا الشكر والتقدير واولى الناس

بالشكر **والدي العزيز** الذي جرع الكأس فارغاً ليسقيني قطرة حب

والدتي العزيزة التي وضعتني على طريق الحياة وكان لها الفضل الكبير لنجاحي

والى جميع من وقفوا بجانبني وساعدوني وبالخصوص

الى اصدقائي والى جميع اساتذتي الكرام بوجه عام والى المشرف على البحث

الدكتور **دريد حميد عبد الكاظم** بوجه خاص الذي كان له دور كبير في اعطائي

المعلومات القيمة اهدي لكم بحث تخرجي واتمنى ان يحوز على رضاكم.

الشكر والتقدير

الحمد لله الذي هدانا واعدنا وامدنا والهمنا الصبر على المشاق ووفقنا لما نحن

عليه

فله الحمد والشكر ابتداءً وانتهاءً

وارفع كلمة الشكر الى الدكتور

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وفقه الله فقد كان سنداً لي على طول الطريق

والى كل من مد يد العون لي من قريب او بعيد

وقبل ان امضي اقدم اسمى ايات الشكر والامتنان والتقدير والمحبة الى الذين

مهدوا لي طريق العلم والمعرفة

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Abstract :-

local anesthesia is Any technique that causes a loss of sensation in a specific part of the body. Despite the fact that this definition is correct in general, local anaesthesia also results in the loss of other sensations. Reversible local anaesthesia is ideal for surgical treatment. Cocaine was the first local anesthetic to be used. Local anesthetics cause anesthesia by inhibiting nerve ending excitation and blocking peripheral nerve conduction. This is usually caused by sodium channel inactivation and reversible binding. To understand the effect of Local anesthetics should know the innervation on nose , The innervations of the nose are classified as follows Innervations of mucosa within the nasal cavity and Innervations of external nose and its skin covering Skin cancer, specifically basal cell carcinoma, the most common nasal skin cancer, as well as squamous cell carcinoma and melanoma, is the most common etiology of nasal defects that involve reconstruction. Mucosal surface anesthesia can be achieved by Nasal spray containing 10% xylocaine , Nasal packing, which consists of cottonoids or pledgets soaked in 4% xylocaine and 1% adrenaline , Infiltration is performed with 2% xylocaine and 1 in 10,000 adrenaline. The External approaches. Include Pressure facing procedures and soft-tissue work, such as local flaps and scar revision, For septoplasty, turbinate reduction, polypectomy, and balloon catheter dilation, the nasal mucosa must be discussed. While Internal approaches include Anesthetic and decongestant solutions are sprayed into the nose with a powered nebulizer for internal nasal approaches; we use topical 4 % lidocaine spray with oxymetazoline or epinephrine.

This study aimed to: identify advanced rhinoplasty operations as well as to identify topical anesthetics used in these operations.

1. Introduction:

Any technique that causes a loss of sensation in a specific part of the body is referred to as local anesthesia. Despite the fact that this definition is correct in general, local anaesthesia also results in the loss of other sensations. Drugs can be used to produce local anaesthesia. Reversible local anaesthesia is ideal for surgical treatment. Cocaine was the first local anesthetic to be used. Cocaine was extracted from the leaves of the Coca plant. It was first popular among Andes mountain dwellers. Koller, an Australian surgeon, was the first to operate on a cocaine-affected eye. (1)

This resulted in an increase in the use of cocaine as a local anesthetic agent in the United States and the United Kingdom. Cocaine's ramifications, including its addictive potential, became clear quickly. It was first used as a local anesthetic agent by dentists, then as a topical anesthetic agent in the nasal cavity by otolaryngologists. Because of its associated vasoconstrictive property, this drug was widely used in nasal surgeries. Cocaine was initially available in two concentrations for otolaryngological use (4 percent and 10 percent). Because the nasal mucosa provided such a large absorptive surface, the incidence of cocaine toxicity was quite high .(2)

Despite its high toxicity, Halstead began using it as a nerve block for his surgeries in 1885 in the United States. The irony is that Halstead became addicted to cocaine as a result of his own self-experimentation. The first synthetic derivative of cocaine was created as a result of the search for safer synthetic alternatives. It was given the name Procaine (1904). Lofgren invented lidocaine, which is still widely used as a local anesthetic. It was widely used during the Second World War .(3)

2. Mechanism of action of Local Anesthetics:

Local anaesthetics cause anaesthesia by inhibiting nerve ending excitation and blocking peripheral nerve conduction. This is usually caused by sodium channel inactivation and reversible binding. Normal sodium channel function in a nerve is critical for the depolarization process that leads to nerve conduction. Local anaesthetics' chemical structure An intermediate chain connects an amine to one end and an aromatic ring to the other in all local anesthetics. The aromatic end is lipophilic, while the amine end is hydrophilic. Chemical changes to the amine end / aromatic end change the drug's chemical activity.(4)

In chemical terms there are two classes of local anaesthetics available:

- a) Amino amides: This category includes amino amides, which have an amide connection between the intermediate chain and the aromatic end.
- b) Amino esters: This group is distinguished by the presence of an ester bond between the intermediate chain and the aromatic end.

3. Anatomical Considerations:

Effective nasal reconstruction necessitates a detailed understanding of nasal anatomy. Defects in the external soft tissue envelope, nasal structure, and internal mucosal lining must be addressed in order to achieve the best cosmetic and functional results. (5)

4. Innervations of nose:

A thorough understanding of the sensory innervation of the nose and nasal cavity is needed for successful local anaesthesia administration. The innervations of the nose are classified as follows:

- a. Innervations of mucosa within the nasal cavity
- b. Innervations of external nose and its skin covering

External nose sensory innervations The ophthalmic and maxillary divisions of the trigeminal nerve innervate the external nose and its skin lining.

Supratrochlear and Infratrochlear nerves (branches of the trigeminal nerve) and the external nasal branch of the anterior ethmoidal nerve supply the superior part of the nose. The infraorbital nerve supplies the inferior and lateral portions of the nose (Figure 1).(6)

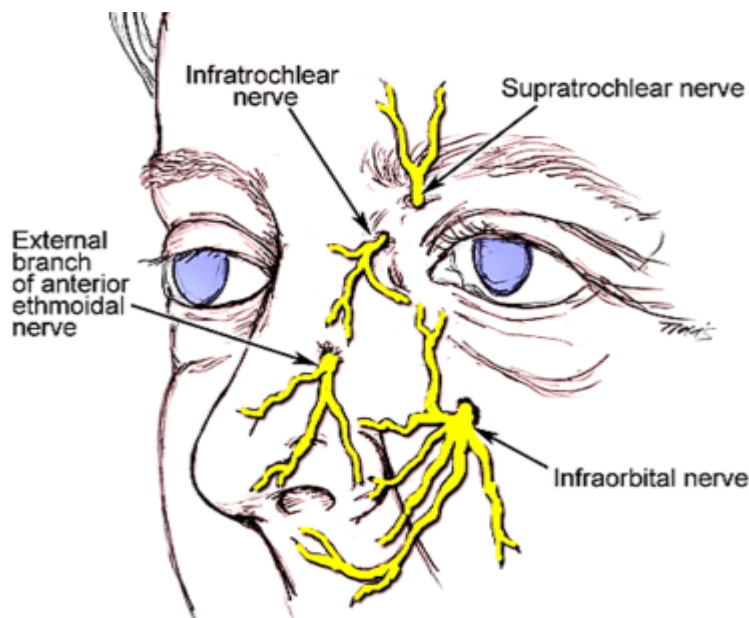


Figure 1: sensory innervations of external nose.

4.1 Sensory innervations of interior of nasal cavity:

- a.** The anterior and posterior ethmoid nerves supply the superior inner aspect of the lateral nasal wall
- b.** The posterior nasal cavity is innervated by the sphenopalatine ganglion, which is located at the back end of the middle turbinate.
- c.** The anterior and posterior ethmoidal nerves supply the nasal septum. The nasopalatine branch of the sphenopalatine ganglion also contributes to the sensory supply to the nasal septum.
- d.** The cribriform plate holds the olfactory special sensation fibers in a superior position.

4.2. External Blood Supply and Sensory Nerve Supply:

The external and internal carotid arteries also contribute to the nose's superficial supply. The lateral caudal surface of the nose is supplied by the angular artery (which emerges from the facial artery) and the lateral nasal artery (branch of the angular artery). The dorsal nasal artery (a branch of the ophthalmic artery) supplies the dorsal nasal skin with a plentiful supply of axial blood. The external branch of the anterior ethmoidal artery, as well as the columellar artery, supply the nasal tip.(7)

The facial veins, the pterygoid plexus, and the ophthalmic veins drain the venous drainage of the external nose, which is made up of veins with names that refer to the corresponding arteries. The ophthalmic and maxillary divisions of the fifth cranial nerve provide the nasal skin with sensory nerves. The skin covering the radix, rhinion, and cephalic parts of the nasal sidewalls is supplied by branches of the supratrochlear and infratrochlear nerves. The skin over the caudal half of the nose is supplied by the anterior ethmoidal nerve's external nasal branch.. (8)

5. Etiology of Nasal Defects:

Skin cancer, specifically basal cell carcinoma, the most common nasal skin cancer, as well as squamous cell carcinoma and melanoma, is the most common etiology of nasal defects that involve reconstruction. The epidemiology favors those who live in high-sun areas and the elderly, especially those who are fair-skinned and of Celtic ancestry.(9)

The most common cancer in humans is skin cancer, with the majority of cases occurring on the face. Basal cell carcinoma is the most common cancer in humans, accounting for about 65 percent of all epithelioid tumors, 20% of all cancers in men, and 10% to 15% of all cancers in women.(9)

Traumatic nasal defects are much less common, but the reconstruction concepts are the same as for oncologic defects, with the exception that the patient population is younger and donor site wounds are more visible. As a result, scar positioning becomes much more essential. Congenital nasal deformities are the third type of nasal deformity. Congenital deformities, on the other hand, are extremely rare and have particular characteristics that necessitate unique reconstruction techniques.(10)

6. Mucosal surface anesthesia can be achieved by:

- a. Nasal spray containing 10% xylocaine: The duration of topical surface anaesthesia is approximately 45 minutes. When performing diagnostic nasal endoscopy or minor procedures involving the nasal cavity, such as nasal packing, this type of anaesthesia is preferred.
- b. Nasal packing, which consists of cottonoids or pledgets soaked in 4% xylocaine and 1% adrenaline, is useful for performing minor surgical procedures inside the nasal cavity. Cottonoids are superior to cotton pledgets in terms of quality.

Three packs should be placed in each nasal cavity. The first is placed in the nasal cavity's floor, the second is placed above it to encroach into the middle meatus, and the third is placed above the second to anesthetize the frontal recess area. The addition of adrenaline to the mixture causes the nasal mucosa to shrink and the duration of topical anaesthesia to be extended.(2)

- c. When performing surgeries inside the nasal cavity, infiltration anaesthesia is preferred. Infiltration is performed with 2% xylocaine and 1 in 10,000 adrenaline. The anterior ethmoidal nerve and infraorbital nerve can be anesthetized with infiltration through the canine fossa. This comes in handy when reducing the size of a fractured nasal bone (Figure 2).(11)

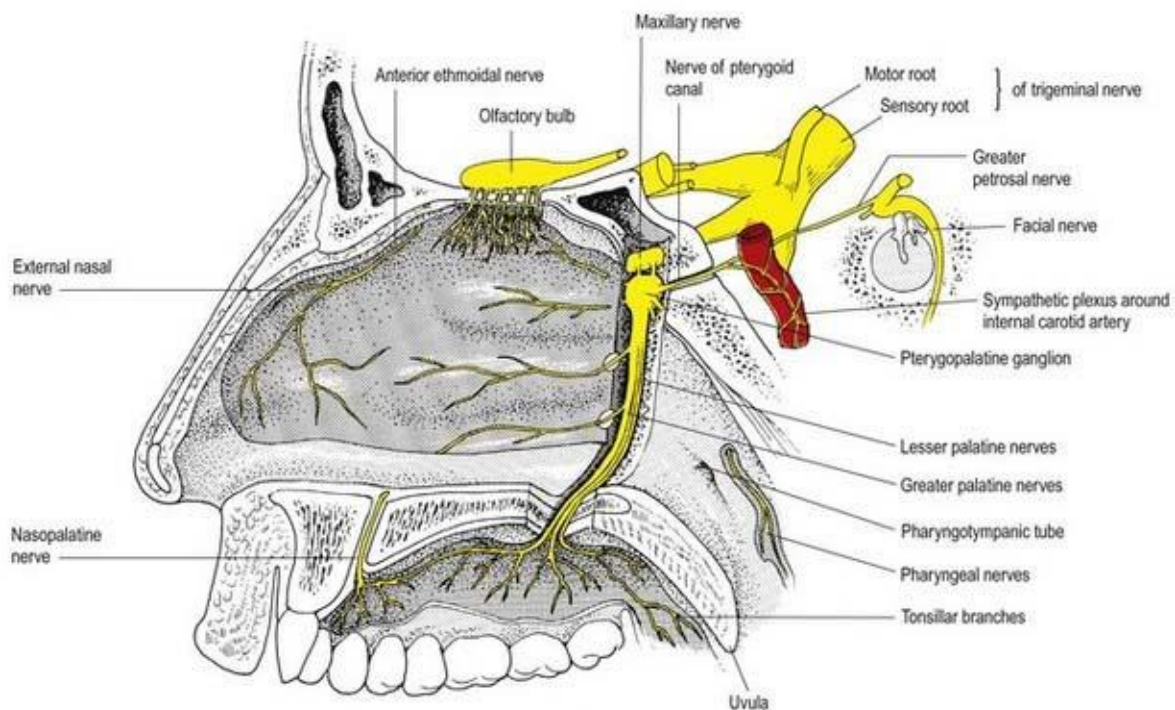


Figure 2: sensory innervations of lateral wall of nose.

While using 4% topical xylocaine for anaesthesia the maximum volume of the drug used should not exceed 7 ml. Pharyngeal wall mucosa gets anaesthetized

when pledgets dipped in 4% xylocaine is used to pack the nose. This may cause the patient to aspirate blood and secretions. Periodical suction should be applied to the patient's throat while performing nasal surgeries under local anaesthesia.

The effectiveness of general otolaryngologists' office-based nasal procedures is dependent on proper patient selection, counseling, supplies, and sufficient local anesthesia. The techniques for nasal anesthesia may be divided into external and internal approaches.

7. External approaches:

Pressure facing procedures and soft-tissue work, such as local flaps and scar revision, are among the procedures that affect the external nose. For septoplasty, turbinate reduction, polypectomy, and balloon catheter dilation, the nasal mucosa must be discussed. Nasal fracture reduction, rhinoplasty, and nasal valve correction are all procedures that include each of these regions. The first and second branches of the trigeminal nerve innervate the nose. The external nasal branch of the infraorbital nerve, which exits its foramen just medial to the midpupillary line, innervates the skin of the lateral nasal wall.(12)



Figure 3 : Approach the infraorbital foramen near the alar facial groove aiming superiorly and laterally, using the middle finger of the free hand to palpate the notch and protect the eye. A control-top syringe assists in precise placement

8. Internal approaches:

Anesthetic and decongestant solutions are sprayed into the nose with a powered nebulizer for internal nasal approaches; we use topical 4 % lidocaine spray with oxymetazoline or epinephrine. (It's worth noting that while both epinephrine and oxymetazoline are excellent vasoconstrictors, phenylephrine should be used with caution.) a. The anterior and posterior ethmoid, sphenopalatine, and nasopalatine nerves are then decongest and anesthetized with pledgets soaked in topical agents. In patients with no prior cardiac history, we use a 4% cocaine solution.(13)

After 5 minutes, advance the pledgets under endoscopic guidance toward the anterior ethmoid and sphenopalatine nerve regions, as well as the surgical interest

area, to improve decongestion and anesthesia. This is best done with a straight metal ear curette (figure 2).



Figure 4: A straight ear curette works well for placing the pledget soaked with topical anesthetic into the frontal recess under endoscopic guidance. Injection at the middle turbinate axilla blocks the anterior ethmoidal nerve.

After 10 minutes, the pledgets are removed, and 1 percent lidocaine with 1:100,000 epinephrine is injected into the middle turbinate's axilla to block the anterior ethmoidal nerve, which supplies the anterior septum and mucosa around the nasofrontal recess.

A 25-gauge spinal needle bent at the tip works well, but the shaft flexibility is difficult to achieve; instead, a curved tonsil needle is ideal. The sphenopalatine

ganglion, which supplies the posterior nasal cavity, is blocked by injecting at the middle turbinate's posteroinferior attachment. Depending on the procedure, additional injections may be made along the inferior turbinate or septum. To ensure that adequate anesthesia and vasoconstriction are achieved, the practitioner should wait 10 minutes.(14)

The otolaryngologist can easily perform a wide range of nasal procedures using local anesthesia thanks to his or her knowledge of nasal anatomy, the use of decongestants, a mixture of topical and injectable drugs, and enough time for the anesthesia to take effect.

9.Conclusion:

Local anesthesia is one of the types of anesthesia that is used in operations, especially in dental, nose, and ear and throat operations. Cocaine is a local anesthetic that has been used at a concentration of 4% or 10%. Local anesthesia occurs due to inhibition of nerve end excitation and peripheral nerve conduction due to disruption of the sodium channel. Depending on the chemical composition there are two types of topical drugs. important to know the mucous lining, the outer structure, and the soft membranes. It is also important to know the nasal nerves, veins and nasal arteries.

Sensory innervations of interior of nasal cavity:

The anterior and posterior ethmoid nerves , sphenopalatine ganglion,The anterior and posterior ethmoidal nerves,The cribriform plate .The external and internal carotid arteries also contribute to the nose's superficial supply. The facial veins, the pterygoid plexus, and the ophthalmic veins drain the venous drainage of the external nose, which is made up of veins with names that refer to the

corresponding arteries. Skin cancer, specifically basal cell carcinoma, the most common nasal skin cancer, as well as squamous cell carcinoma and melanoma, is the most common etiology of nasal defects that involve reconstruction.

Local anesthesia for the nose is done by using a spray of xylocaine at a concentration of 10% for 45 minutes or by using cotton soaked in 4% xylocaine and 1% epinephrine. infiltration anaesthesia is preferred when performing operations inside the nasal cavity. One of the important notes when using xylocaine is that the sample size should not exceed 7 milliliters because it may cause anesthesia of the esophagus and cause problems such as the patient swallowing blood and other liquid.

Pressure facing procedures and soft-tissue work, such as local flaps and scar revision, are among the procedures that affect the external nose. Internal approaches. Anesthetic and decongestant solutions are sprayed into the nose with a powered nebulizer for internal nasal approaches; we use topical 4 % lidocaine spray with oxymetazoline or epinephrine.

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