

Facial Nerve Paralysis after Anaesthetic Usage- A Review

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ABSTRACT:

The administration of local anaesthesia is an integral procedure in dentistry. However, this common procedure may trigger a variety of complications, systemic or localized. Systemic complications as a result of accidental intravascular injection, drug overdose, rapid absorption, delayed metabolism of the anaesthetic solution, or even allergic and anaphylactic reactions mostly affect the cardiovascular and the central nervous system.^[1] Localized complications include, among others, hematoma formation with the risk of trismus or infection, needle breakage, persistent post injection paresthesia, soft tissue necrosis, spread of infection, self-inflicted soft tissue trauma, and ocular complication.^[1] A rarely reported localized neurologic complication after inferior dental nerve block anaesthesia is facial nerve palsy. The paralysis could be either immediate or delayed, based on the time elapsed from the moment of the injection to the onset of the symptoms. In the immediate type, the paralysis occurs within minutes of injection with a recovery period of 3 hours or less. However, in the delayed type the symptoms appear within several hours to several days, while recovery may expand from 24 hours to several months.^[2,3]

HISTORY OF ANAESTHESIA:

The history of local anaesthesia started when cocaine was isolated by Niemann. In 1884, Koller was the first person who used cocaine for topical anesthesia. In 1884, regional anaesthesia in the oral cavity was first performed by the surgeon Halsted, when he removed a wisdom tooth without pain. In 1905, Einhorn reported the synthesis of procaine, which was the first ester-type local anesthetic agent. Procaine was the most commonly used local anesthetic for more than four decades. In 1943, Löfgren synthesized lidocaine, which was the first modern local anesthetic agent. Lidocaine was marketed in 1948 and is currently the most commonly used local anesthetic in dentistry worldwide. In 1969, articaine was synthesized by the chemist Muschwack and used as a local anesthetic in Germany. The use of reversible local anesthetic chemical agents is the most common method to achieve pain control in dental practice.^[4]

ALLERGIC REACTIONS AND TOXICITY:

Patient reports of allergic reactions to local anaesthetics are fairly common, but most of these are of psychogenic origin.^[5,6] Toxic complications as a result of an overdose of local anesthetic solution, resulting in dangerously high concentrations in the brain, are usually produced only by rapid injection directly into a blood vessel.^[7] It should be remembered that for fit adults the recommended maximum safe dose of 2% lignocaine in 1:80 000 adrenaline is four-and-a-half 2 or 2.2 ml cartridges (180 to 198 mg lignocaine); for 3% prilocaine, and felypressin 0.03 i.u./ml, the maximum safe dose is 400 mg (six 2 ml cartridges).^[8] Some studies have shown that intravascular injection may occur in between 3 and 12% of cases.^[9] To avoid accidents with hazardous results, routine aspiration is essential. As the anaesthetic solutions of the amide type (e.g., lignocaine and prilocaine) rely on the liver for hydrolysis and metabolism, any patient with impaired liver function is in danger of inadequate elimination of the solution: A normal volume of anaesthetic will become potentially toxic in such

people. The final route for elimination of the metabolized anaesthetic solution is excretion in the urine and so any patient with impaired renal function will also be unable to eliminate these products.

CASE REPORT 1:

In 2008, a 20-year-old female patient visited her dentist for a restorative procedure, carried out on the lower left first molar. She was in good health with no history of hospitalization. A left inferior alveolar block anaesthesia was administered, using a cartridge dental syringe. The local anesthetic used was articaine hydrochloride 4% with adrenaline 1 : 100.000.

However, the next day, the patient returned to the dental office with a generalized weakness of the left side of her face and inability to close her left eye, symptoms which appeared that same morning. She was referred by her dentist to a private oral and maxillofacial clinic.

On clinical examination the patient exhibited generalized weakness of the left side of her face with a flat and expressionless appearance, while the muscles of that side were immobile. Obliteration of the nasolabial fold and drooping of the corner of the mouth were also present. On the attempt to smile, her mouth was drawn to the right side. The patient was unable to raise her left eyebrow or close her left eyelid. When she was prompted to close her eyes, the left eyeball rolled upwards.^[10]

DISCUSSION:

As mentioned, there are two types of facial palsy following inferior alveolar block anaesthesia, whose differences in clinical appearance derive from their separate pathogenic backgrounds. The immediate type is due to the direct accidental anesthesia of one or more branches of the facial nerve.^[11] This is possible when an intraglandular injection of the anaesthesia occurs. If the injection is administered too far posteriorly, the anaesthetic solution could be injected into the parotid substance. Most often, the gland envelopes the facial nerve, thus leading to the direct anesthesia of the

latter.^[1] However, there are cases in which the gland fails to envelop the nerve and its divisions,^[3] or the branches of the facial nerve appear to be aberrant in the retromandibular space.^[2,12] Such deviations from normal anatomy increase the chances of direct exposure to local anesthetic solution even if the anesthesia is administered properly. The palsy could result from a sympathetic vascular reflex, leading to ischemic paralysis in the stylomastoid foramen region. The anesthetic solution, its breakdown products, or even the mechanical action of the needle itself, may lead to stimulation of the sympathetic plexus associated with the external carotid artery, which in turn communicates with the plexus covering the stylomastoid artery^[3,13] as it enters the parotid gland. The stimulation of the latter plexus causes delayed reflex spasm of the vasa nervorum of the facial nerve, resulting in ischemic neuritis and secondary edema.^[3]

CASE REPORT 2:

A 62-year-old female, weighing 65 kg, was scheduled for total laparoscopic hysterectomy and cholecystectomy for dysfunctional uterine bleeding and cholecystitis, respectively. She had type II diabetes mellitus for 3 years and her blood sugar was controlled on tablet Metformin 250 mg twice-daily. Chest X-ray, electrocardiography and haematological and biochemical investigations were normal. Anaesthesia was intravenous fentanyl 100 mg and propofol 80 mg. Surgery was uneventful and lasted for 4 hrs. On postoperative day 1, the patient noticed deviation of lower lip towards the left on opening the mouth. On examination, she had decreased sensation over the right lower corner of the mouth. Distal facial nerve branch paresis (mental and buccal branch) was provisionally diagnosed after neurology evaluation. Complete recovery of the facial nerve was observed after 6 weeks.^[14]

DISCUSSION:

Various mechanisms for nerve injuries have been proposed, like ischaemia, direct mechanical compression, stretching of the nerve due to faulty positioning, direct needle trauma or injection of neurotoxic material.^[15]

The presence of diabetes is also associated with an increased incidence of nerve injury. Other risk factors include intraoperative hypotension, hypovolaemia, hypoxia, hypothermia or electrolyte imbalance.^[15,16]

OTHER CASES:

Glabaur reported a case of bilateral facial nerve palsy following general anaesthesia provided through a mask for 75 min in a spontaneously breathing patient. The mask was supported with Connell harness and bilateral digital pressure was exerted behind the angle of the jaw. The paresis resolved after 3 weeks.^[17]

Fuller and Thomas reported two cases of facial nerve weakness. Postoperatively, one patient manifested

weakness and asymmetry of face with impaired control of food during chewing and the second patient had minor weakness of one side of the mouth. Forward digital pressure was given behind the angle of mandible for 30 min in the first patient and 10 min in the second patient. Complete recovery was observed after 3 months and 3 weeks, respectively.^[18]

CONCLUSION:

Although neurologic occurrences are rare, dentists should keep in mind that certain dental procedures, such as inferior alveolar block anesthesia could initiate facial palsy. Attention should be paid during the administration of the anesthetic solution. Standard precautions such as aspiration, slow injection, and continuous monitoring of the patient could minimize possible side effects.

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