ORAL AND MAXILLOFACIAL SURGERY

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Local anaesthetics in dentistry
Complications of local anaesthesia
Each dentist dealing with local anaesthesia should be know:

- The possible complication of local anaesthesia.
- The preventive measures of these complication.
- The treatment possibilities of these complication.
Local complication: complication occurred in the region of the injection.

Systemic complication: complications occurred in the other parts of body.
Local complication
Failure to obtain anaesthesia
Anatomical reasons: which include

- Accessory nerve supply.
- Abnormal course of the nerve.
- Thick cortical plate of the mandibular alveolar process precludes infiltration of anaesthesia and therefore infiltration anaesthesia is insufficient in the lower jaw.
- Variation in the foramen location
- Some times the teeth can be innervated by more than one nerve.
Pathological reasons are:
- Trismus (limited mouth opening)
- Infection and inflammation
- Previous surgery or trauma.
Psychological reasons

The fear and anxiety can cause failure in local anaesthesia. Relaxation of the patient is needed. For this cause, the use of sedative agents like benzodiazepine may be helpful.
Faulty technique:

- An inadequate amount of local anaesthetic solution being deposited in close proximity to the nerve.
- Injection in blood vessels
- Injection of local anaesthetic solution away from the nerve and mainly if anatomical variation present.
- When used of solution after the expiration date recommended by the manufacture.
- Very rarely patients are seen who appear to exhibit an individual resistance to the effect of certain drugs.
Pain during and after injection

Pain on deposition a local anaesthetic can best be prevented through careful adherence to the basic protocol of atraumatic injection
psychological reasons
The sharpness of the needle
Fast injection under high pressure
Aggressive insertion of the needle
Low PH value
Other measures which minimize discomfort
An incorrect injection site
Haematoma formation
- the pterygoid venous plexus
- the infra-orbital venous plexus
- The inferior alveolar vessels in the pterygo-mandibular space
- the posterior superior alveolar vessels
- the mental vessels
The patient should be told that the bleeding will stop spontaneously that these swellings usually disappears within 24-48 hours and the discoloration disappear. If the dentist thinks the haematoma is likely to become infected antibiotic therapy must be instituted promptly.
The intra-vascular injection of any drug increases its possible toxic effects.
Blanching

The ischaemia is transitory and may last from 30 second to 30 minutes.

No treatment other than reassurance is required.
Trismus

Trismus is difficulty in opening the jaws due to muscle spasm.
Penetration of the muscle by needle during administration.

haematoma

Infection in area close to one of the muscle of mastication
The main symptom is the limitation of movement of mandible which is often associated with pain, symptoms arise within 1-4 days of injection.

The management:
- by apply hot moist towel to the site for approximately 20 minute every hour.
- Give analgesia as required.
- Instruct the patient to gradually open and close the mouth as physiotherapy.
Facial paralysis

This complication arises if the tip of the needle is inserted too far back and behind the ascending ramus. The solution is then deposited in the substance of the parotid gland where it anaesthetizes the branches of the facial nerve causing paralysis of the muscles they supply.
If the nerve supply to the eyelids has been affected it is a wise precaution to close the lids and apply protective pad or eye-shade.
Prolong impairment of sensation
Anaesthesia: is total loss of sensation.
Pararesthesia: is an altered sensation, characterized by burning, tingling, pricking sensation experienced by the patient.
Dyaesthesia: is an abnormal, unpleasant sensation experienced by the patient in the absence of stimuli.
Hyperaesthesia: is an increased sensitivity to noxious stimuli.
Direct trauma from the bevel of the needle.
Injection of anaesthetic solution that is contaminated with a neurtoxic substance such as alcohol.
Haemorrhage and infection in close proximity to a nerve.
Most of these are transient and resolve within 8 weeks to 2 years but become irreversible in rare occasions.

The management by reassurance of the patient that the condition is transient, note the sign, symptom, and follow up of the patient, and refer the patient to specialist if the symptoms persist.
Broken needles
Weakness of the metal of the needles when corroded the metal.

Re-usage of the needle lead to fatigue of metal.

Incorrect technique by:
- Aggressive insertion of the needle into the tissue.
- Sudden change in the direction the needle inside the tissue.
- Too deep penetration, the needle should never be embedded completely to the hub within the tissue but at least 5 mm must project from the mucosal surface, so may be fracture at this point.
- Sudden movement of the patient or practitioner.
- Manufacturing defect.
If a fragment of a needle is retained within the tissue:
- the patient should be informed and the situation explained to him
- radiographs should be taken to confirm its presence and position
- refer the patient to oral and maxillofacial surgeon to remove the fragment under general anaesthesia.
Infection

but if the needle has been contaminated prior to insertion the infection will likely manifest as pain and trismus one day after injection.

If these symptoms persist for days so must give the patient antibiotic treatment.
Children who have had an inferior alveolar block injection should be warned that it is possible to chew the anaesthetized part of the lower lip and so produce a very sore ulcer.

In spite of this warning the complication can occur but fortunately such lesions heal rapidly.
Adults given an inferior alveolar block injection for the 1st time should be warned of the risk of thermal damage to the lower lip from either hot drinks or cigarette smoking.
Visual disturbances

On very rare occasions patients complain of unilateral or bilateral disturbance of vision as squints or double vision and even transient blindness has been reported.

An adequate explanation is known but vascular spasm or accidental intra-arterial injection is most likely cause.

The reassured that normal vision will be restore within about 30 minutes.
Systemic complications
Fainting (vaso-vagal attack)

Vasovagal attack is a reflex of nervous system that cause heart to slow down bradycardia, at the same time affect the nerves to blood vessel in the legs permitting these vessel to dilate. As a result the heart ejects less blood so the blood pressure drops. The fainting episode occurs. In an attempt to redistribute the Blood to the vital organs.
The most important predisposing factor to vasovagal attacks are pain and anxiety.
The patients often complain of the following symptoms:
- dizziness
- weakness
- nausea

The following signs:
- the skin is pale immediately before the collapse
- cold skin
- clammy skin
- weak and slow pulse.
The head should be lowered quickly by adjusting the back of the dental chair so that the patient assume the supine position with legs elevated. Tight collar belts should be loosened and respiration is stimulated. Spontaneous recovery is usual.

If sign of recovery are not apparent within 30-45 sec of the first aide measure, the collapse probably is not a vasovagal attack and in this case medical emergency team should be asked immediately for help.
Drug interaction

In patient under tricyclic antidepressant (TCA), variable degrees of potentiating of blood pressure response to catecholamine adrenaline & noradrenalin will occur, even to small doses.
Sensitivity reaction

This phenomenon occurs due to sensitivity of some individual to certain substance known as allergens.
Local anaesthesia agent.
Vasoconstrictor.
Additives: e.g. bisulphate which used as preservative
Many of complications suspected to be allergic are actually psychogenic reaction caused by fear of dental treatment.

The presence of adrenalin in local anaesthetic solution which can cause several general symptoms including:

- Palpitation
- Restlessness
- Nausea.
True allergic response to local anaesthesia may be:
- localized
- generalized

And:
- immediate
- delayed in onset.
- mild skin irritation
- rashes
- an anaphylactic reaction.
Anaphylactic shock
- Profound fall in blood pressure.
- Dyspnea and respiratory embarrassment
- Facial and laryngeal edema
- Loss of consciousness.
- Urticaria.
It is life threatening condition since it causes air way obstruction in association with laryngeal edema unless treatment is initiated immediately; the condition may progress to fatal termination.
1-epinephrine is the most important medication for the treatment of anaphylaxis; it is injection into a muscle. Epinephrine works rapidly to make:
- blood vessel contract, preventing them from leaking more fluid
- relax airways helping the individual breathe easier
- relieves cramping in the GIT
- stop itching
- rapidly reverse the life threatening symptom of anaphylactic shock, if given in time.

Even if the individual responds to the epinephrine, it is vitally to go to an emergency room immediately.

2-medication may be given to improve breathing.

3-IV fluid may be necessary to restore adequate blood pressure.

4-additional medication antihistamine to contract the effect of histamine and to help in prevention of delayed allergic reaction.

5-If the victim stops breathing, perform cardio-pulmonary resuscitation (CPR) immediately.
Over dosage and toxicity

It is relatively rare, a toxicity reaction can occur when the concentration of local anesthetic solution in circulation increase too rapidly within a short period of time.

The toxic effect is primarily directed to the CNS and CVS because these tissues are composed of excitable membrane.
Mild over dosage

Sever over dosage
Mild over doge sign and symptom:

- Restlessness
- Retention of consciousness
- Talkativeness
- Agitation, which may end into convulsion along with increased BP, heart rate, respiratory rate
classified according to the onset into:
1- Slow onset <= 5 minuet following administration of local anaesthesia the possible cause rapid absorption & too large total dose.
2- Slower onset >= 15 minuet following administration of local anaesthesia the possible causes are abnormal biotransformation and renal dis.
Step 1: reassure the patient that everything will be all right.
Step 2: administer O2 via nasal cannula or nasal hood.
Step 3: monitor vital signs.
Step 4: administer anticonvulsants. IV infusion for diazepam 5mg/min, for midazolam 1mg/min.
Step 5: permits the patient to recover as long as necessary; the patient can leave the dental office escorted or unescorted if we believe that full recovery has occurred, if the doubt exist regarding the level of recovery then
Step 6: seeks medical help.
Step 7: after termination of reaction be sure that the patient be examined by physician to determine the cause of this reaction.
Unconsciousness with or without convulsion, vascular collapse, coma, cardiac arrest, respiratory arrest
classified into:
1 –Rapid onset with in 1 minuet the possible cause is IV injection.
2 -Slow onset (5 to 15 min) (the possible causes are too large dose, rapid absorption and abnormal biotransformation.
Step 1: Terminate dental treatment.
Step 2: If convulsion occurs, protect the patient's arms, legs, and head; loosen tight clothing and immediately seek emergency medical assistance.
Step 3: Provide basic life support; maintenance of adequate airway and oxygenation are of utmost importance during the management of local anesthesia-induced seizures.
Step 4: Administer anticonvulsants; with good oxygenation and absence of acidosis, seizures will cease within 2-3 minutes. If the seizure is protracted for 4-5 minutes with no indication of termination, consider administering anticonvulsants.
Step 5: Post-seizure, central nervous system depression is usually present and its intensity is equal to that of the excitation phase. The patient may be drowsy or unconscious, with slow or absent breathing, and depressed blood pressure and heart rate. Maintenance of a patent airway and oxygenation is necessary, and initial management of hypotension involves IV fluid administration.
Step 6: Allow the patient to rest until recovery.
- Preoperative complications
- Postoperative complications
Preoperative complications:-

- Pain at injection
- Failure to obtain anaesthesia
- Fainting
- Hypersensitivity to local anaesthesia
- Over dosage and toxicity
- Drug interaction
- Needle breakage
- Facial paralysis
Postoperative complications:-
› Haematoma
› Trisumus
› Infection
› Persistant anaesthesia
› Serum hepatitis
THANK YOU FOR LISTENING