Introduction

Various dental procedures demand application of local anaesthetics, which are used in modern day practice. Generally, few complications are associated with this procedure such as tissue necrosis, infections, trismus, prolonged pain, needle breakage, and paraesthesia.

The palate is a favourable site for soft tissue lesions because it has a rich blood supply via the greater and lesser palatal arteries, which play a role in wound healing and sustaining metabolism and by providing oxygen and nutrients.

Patients in need of palatal injection, may present many risk factors that should be taken into consideration, especially the ones that compromise the blood supply. Osteonecrosis usually affects the patients that are given drugs to reduce loss of bone density (osteonoporosis or cancer patients) such as bisphosphonate because it is responsible of the cessation of bone remodelling and bone turnover by the basic osteoclast-inhibiting effect. Blood supply can also be compromise in diabetes patients and patients undergoing radiotherapy. Bacterial infections, fungal infections, and some viruses like herpes zoster have been associated with spontaneous necrosis of the maxilla, in fact, trauma induced by the insertion of the needle or the solution itself can lead to burning and swelling of the tissues, which could reactivate latent viruses.

Clinical case description

The patient was referred to our clinic after having a severe pain on his upper right incisor. The tooth was very mobile and a swelling was showing in the buccal area (Fig. 1). According to the available dental record, the patient received restorative treatment, ceramic crowns, 40 days before he showed up (Fig. 2). Vitality test was not accurate due to the fact that he was in pain and the tooth was very mobile. Figures 3 and 4 show the severe bone loss. In order to confirm vitality of the tooth, I decided to drill the ceramic from the palatal side, the patient reacted immediately, which meant that it was a vital tooth (Fig. 5). Radiographs confirmed bone damage from the palatal side, but also revealed that the apex was still surrounded by healthy bone.

Further investigation proved that the patient had repeated anaesthesia injections in the palatal area, which probably led to this clinical situation. A CBCT scan (Figs. 6 & 7) showed the severe bone damage from the palatal to the buccal side, as well as the area where the injection was made and the apex it is still surrounded with healthy bone.

In cases of bone necrosis, it is recommended to avoid any kind of treatment and deal with the infection to stop bone damage. Two antibiotics were recommended: Dalacin C 300 mg two daily and Metronidazole 500 mg two daily for ten days.

The patient was followed for five days later the tooth started to become more stable and the buccal swelling was going down, two weeks later the tooth become even much stable. The patient continued his mouth wash. At one-month follow up, he reported some strange things coming from his palate (Fig. 8). Under microscope
examination, I recognised some necrotic bone at what could be the site of the repeated injections. Carefully, several pieces of necrotic bone were removed (Fig. 9) and the area washed with chlorhexidine solution.

It took almost 45 days for the tooth to regain its normal stability. The small cavity was filled and the vitality was checked again, confirming the tooth vitality.

A six-month follow up radiograph showing the bone regain its normal (Figs. 10 & 11).

Conclusion

The palatal tissues are susceptible to local complications on account of their dense, firm, and adherent nature. Local tissue changes can be produced or influenced by ischemia, osmotic pressure, and pressure from injection, irritating effects of the vasoconstrictors, preservatives, and antioxidants, adventitious metal ions or trauma.

Epinephrine is usually the vasoconstrictor employed in a concentration ranging from 1/50,000 to 1/200,000, it reduces systemic toxicity and prolongs the duration of anaesthesia. The high concentration of the vasoconstrictor 1/50,000 and the repeated injections in the same area at the same appointment cause a greater risk. The vasoconstrictor stimulates the 1 receptors of the peripheral blood vessels of mucus membranes leading to ischemia and may cause a trophic ulcer at the site of injection.

Complications leading to osteonecrosis may be related to many systemic and iatrogenic factors affecting the blood supply: diabetes is associated with vascular problems, which might compromise the wound healing process. Bacterial infections that usually affect immune-compromised people, malnutrition, and poor oral hygiene may also result in ulceration, bone exposure with sequestrum formation and even tooth loss. Viral infections like herpes zoster is an acute viral infection caused by reactivation of the varicella zoster virus that resides in the dorsal root and cranial nerve ganglia. This virus can affect the innervations of the periosteum that lead to alteration of the blood flow and subsequently bone necrosis. Systemic medications like bisphosphonate cause the cessation of bone remodelling and bone turnover by the basic osteoclast-inhibiting effect of these drugs. Post-radiation osteonecrosis is associated with tissue necrosis because when a tissue is radiated, it becomes hypovascular, hypocellular, and hypoxic, knowing that the mandible is more susceptible than the maxilla because it obtains its blood supply primarily only from the inferior alveolar artery.

The treatment of osteonecrosis is centred on systemic antibiotic agents such as penicillin and metronidazole, debridement of non-vital tissues, local antibacterial rinses and improving nutrition, hygiene, and treatment of underlying diseases if present.

Recommendations to minimise local anaesthetic complications:
- Slow deposition of local anaesthetics without pressure,
- knowledge of the palatal anatomy,
- knowledge of dental anaesthetic dose and the risk of the repeated injections in the same area at the same appointment.

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