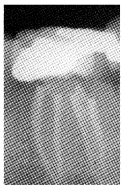

CASE REPORT

Palatal mucosa necrosis because of accidental sodium hypochlorite injection instead of anaesthetic solution

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Abstract

Gursoy UK, Bostancı V, Kosger HH. Palatal mucosa necrosis because of accidental sodium hypochlorite injection instead of anaesthetic solution. *International Endodontic Journal*, **39**, 157–161, 2006.

Aim A case is reported in which sodium hypochlorite (NaOCl) was inadvertently injected into the palatal mucosa instead of local anaesthetic solution.

Summary An adult male was referred to the University clinic 15 days after an inadvertent NaOCl injection into the palatal mucosa. Soft tissue necrosis was evident, without obvious bony involvement. Tissues healed without scarring within 30 days. No surgical intervention was required.

Key learning points

- NaOCl is highly irritant when extruded into vital tissues
- Dentists should be careful to avoid the misuse of NaOCl, and should check the nature of any agent before injecting it into patients
- NaOCl should not be dispensed in a way that could allow it to be mistaken for local anaesthetic solutions
- The well-perfused tissues of the oral cavity have considerable healing ability

Keywords: irrigation, mucosal necrosis, sodium hypochlorite.

Received 30 September 2005; accepted 10 October 2005

Introduction

Sodium hypochlorite (NaOCl) is one of the most frequently used irrigating solutions in endodontic treatment. It is effective against a broad spectrum of microorganisms,

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dissolves necrotic tissues, and has lubricant properties (Jeansonne & White 1994, Heling & Chandler 1998). However, it is also toxic to vital tissues, has an unpleasant odour and causes damage if it comes into contact with clothing (Serper *et al.* 2004).

A 1% concentration of NaOCl provides sufficient tissue dissolution and antimicrobial effect, but the concentration used in dentistry has been as high as 5.25% (Spangberg 2002). Many recommend the use of NaOCl at high concentrations, because of enhanced anti-microbial activity (Yeşilsoy *et al.* 1995). However, numerous reports have described clinical complications because of the misuse of NaOCl, including inadvertent injection into the periapical tissues (Sabala & Powell 1989, Hülsmann & Hahn 2000) or maxillary sinuses (Ehrich *et al.* 1993), hypersensitivity or allergic reactions (Kaufman & Keila 1989) and splashing into the eyes (Ingram 1990).

This report presents a case in which NaOCl was inadvertently injected instead of anaesthetic solution, resulting in severe palatal tissue necrosis.

Case report

A 21-year-old male was referred to Department of Periodontology, Cumhuriyet University Dental Faculty suffering from mucosal necrosis of the palate. He was medically healthy and was a nonsmoker. Two weeks before referral, he had attended a private dentist in another city with the chief complaint of toothache in the maxillary right pre-molar area. A clinical diagnosis of pulpitis was made and pulpectomy was performed on both right maxillary premolars under local anaesthesia. Treatment was continued the next day, and as pain was experienced, the dentist decided to administer local anaesthesia. However, instead of anaesthetic solution, NaOCl (2.5%) was injected into the maxillary palatal mucosa. This mistake occurred because both solutions were dispensed in identical containers, and because the dentist did not carefully check before injecting. The patient reported sudden, severe pain and at that time, the dentist realized the mistake. Severe pain continued for 2 days, after which it subsided.

Intraoral examination revealed a 1.2-mm diameter area of tissue necrosis in the right palate (Fig. 1). The yellow–white coloured centre was covered with newly forming connective tissue, and the surrounding area was purple and swollen. The area was painless, even during palpation.

An intra-oral radiograph showed no evidence of bone loss (Fig. 2). Treatment options included debridement and surgical coverage with a sliding flap or free gingival graft.

Figure 1 Clinical appearance at the initial visit.

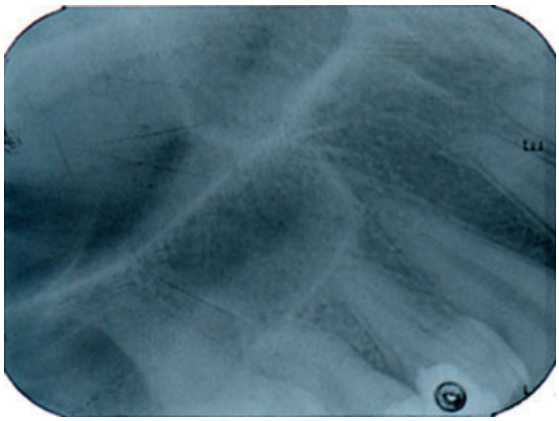

Figure 2 Periapical radiograph from the initial visit. Bone loss was not evident.

However, as the mucosa had begun to heal after 15 days and as the patient had no complaints, a decision was made to manage the case conservatively. Fifteen days later, the mucosal tissue was totally healed and there was no evidence of tissue necrosis.

Discussion

Higher concentrations of NaOCl have increased toxicity and can irritate periodontal and periapical tissues (Gernhardt *et al.* 2004). Intradermal injections of undiluted and 1 : 1, 1 : 2, and 1 : 4 dilutions of NaOCl produced skin ulcerations in animals (Pashley *et al.* 1985). Heling *et al.* (2001) reported that NaOCl concentrations >0.001% are lethal to fibroblasts *in vitro*. Inadvertent use may cause several complications (Kaufman & Keila 1989, Ingram 1990, Ehrich *et al.* 1993). Swallowing NaOCl may cause pharyngeal oedema and oesophageal burns (Seltzer & Farber 1994), whilst damaged permanent tooth follicles, peripheral tissues and oral mucosa (Oncag *et al.* 2003) have been reported during careless use in paediatric endodontics.

The literature contains several reports of complications during root canal irrigation. Incorrect determination of the working length, lateral perforation and wedging of the irrigating needle are the most common procedural accidents associated with the adverse NaOCl reactions (Hülsmann & Hahn 2000).

In the current case, the dentist injected 2.5% NaOCl into the palatal mucosa. Approximately, 0.1–0.2 mL of NaOCl was injected, but this was enough to cause tissue necrosis. It was impossible to determine if there was any superficial damage to subjacent bone.

The capacity of oral tissues to heal was important in this case. Oral epithelium on the hard palate has the second highest mitotic activity in the mouth (Trott & Gorenstein 1963), with turnover of the oral epithelium occurring in 5–6 days (Beagrie & Skougaard 1962). The palatal mucosa is well perfused from the greater palatine vessels (Itoiz & Carranza 1996), and the fact that the patient was a nonsmoker may have been advantageous in ensuring rapid wound healing (Preber & Bergstrom 1990, Jones & Triplett 1992).

Instrumentation of the root canal system must always be supported by irrigation as pulp tissue remnants and dentine debris must be removed (Sen *et al.* 1995). Some clinicians deliver NaOCl from standard dental syringes, in the belief that the long, fine needles are helpful. The present case, however, shows that this practice is potentially dangerous. In order to avoid future risks, clinicians should refuse to use NaOCl presented in local

anaesthetic delivery devices, or unclearly labelled cartridges and carefully check them before injecting into patients.

Conclusions

- NaOCl is highly irritant when extruded into vital tissues.
- Dentists should be careful to avoid the misuse of NaOCl, and should check the nature of any agent before injecting it into patients.
- NaOCl should not be dispensed in a way that could allow it to be mistaken for local anaesthetic solutions.
- The well-perfused tissues of the oral cavity have considerable healing ability.

Disclaimer

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Acknowledgements

The authors wish to thank Prof. Ahmet Serper and Dr Kursat Er for their literature support.

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