Accidental injection of sodium hypochlorite instead of local anesthetic in a patient scheduled for endodontic procedure

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ABSTRACT

We present here a case of tissue destruction and paresthesia following the accidental injection of sodium hypochlorite instead of local anesthetic in a patient scheduled for endodontic procedure. The accident was managed by the local injection of steroid, debridement of necrotic tissue, daily dressings and medications. Wound healing was satisfactory at the end of 1 month. An extra-oral scar and a small area of paresthesia persisted even after 5 years.

Keywords: Accidental, hypochlorite, injection.

INTRODUCTION

A 0.5% solution of sodium hypochlorite was effectively used during World War I to clean contaminated wounds and was a preferred endodontic irrigant. Its tissue dissolving action and efficacy against a broad spectrum of organisms have been documented in many textbooks.¹ We present here a case of accidental injection of hypochlorite instead of the anesthetic solution. This was treated immediately by the submucosal injection of steroid to reduce the inflammation leading to satisfactory wound healing with minimum complications. The objective of injecting the steroid locally was for the maximum effect and the reduction of edema. This led to a complete healing in 4 weeks but a scar was evident even after a 5-year follow-up.

CASE REPORT

A 33-year-old female was scheduled for endodontic therapy. She was inadvertently infiltrated with 1.2 mL of 3% sodium hypochlorite in the labial vestibule adjacent to the canine. The patient immediately complained of severe pain and burning sensation. The assistant had loaded a syringe with hypochlorite which the operator mistook for local anesthetic. The patient

was then referred to the author on an emergency basis and was seen immediately as the author was in the hospital campus at that time.

A wound was seen in the vestibule. Extra-orally ecchymosis was observed corresponding to the infiltrated area (Figure 1). A nerve block was administered to reduce pain; 2 mL of dexamethasone (4 mg/mL) was injected around the wound. The necrotic tissue was removed following copious irrigation with normal saline. Gauze soaked in povidone iodine was placed. Antibiotics and nonsteroidal anti-inflammatory

Figure 1 Extra-oral view after accident.

Figure 2 Extra-oral view 5 years postoperative.

drugs (NSAIDs) were administered for 5 days. Dressing was changed daily for 7 days and wound healing was intended by secondary intention.

Healing was complete by 4 weeks with residual scar and paresthesia in the area of mental nerve. Five-year follow-up showed an improvement in paresthesia which had localized to a small area on the lower lip. A depression persisted which could be seen extra-orally (Figure 2).

DISCUSSION

The cytotoxic effects of sodium hypochlorite on the vital tissues have been studied and hypochlorite causes severe vasculitis, hemorrhage, ulceration and cellular injury.² The use of 3% concentration used during root canal irrigation therefore can cause many complications, which have been reviewed.³

The inflammatory reaction to hypochlorite is often out of proportion to the volume of the solution in contact with the tissues. This led us to inject the steroid locally, submucosal directly near the site of the accident in an attempt to prevent/reduce the severity of inflammatory reaction. Corticosteroids may be useful due to their marked anti-inflammatory property but in none of the cases have they been injected intra-orally. The submucosal injection of dexamethasone has been demonstrated to reduce postoperative discomfort after third molar surgery.⁴ Generally, hypochlorite accidents can occur due to the accidental spilling of the solution during irrigation of the root canal. In some cases, there may be accidental injection of the solution. Corticosteroids may be useful due to their marked anti-inflammatory property and have been used,⁵⁻⁷ but in none of the cases have they been injected directly at the site. The effect of submucosal injection of dexamethasone

has been demonstrated to reduce the postoperative discomfort after third molar surgery.⁴ The injection of low-dose dexamethasone in the surgical site achieves a concentration at the site of injury without the loss due to distribution to other compartments or the onset of elimination.⁴ Parenteral use of dexamethasone 4 mg given as an intra-oral injection at the time of surgery was effective in the prevention of post-operative edema, similar to what we have experienced.

Dexamethasone was injected around the area of injury. This may have reduced pain and discomfort as adequate pain control was seen with the medications without more potent analgesics. The patient's age, daily dressings and unremarkable medical history have contributed to the rapid recovery.

There was a decrease in the area of paresthesia and improvement of sensation; mild deficit was still noted on the depressed area after 5 years which is consistent with other reports.⁶⁻⁸ Motor deficit observed by some authors did not occur here.^{6,7} The depression is suggestive of the subcutaneous tissue loss and scar contracture. Use of local anesthesia and hypochlorite is almost simultaneous during endodontic treatment and there is a real possibility that the clinician mistakes one for another. Use of different types of syringes and needles for both these purposes can help identify the contents. In this case, both were loaded in a similar 2 mL syringe, and therefore the gross error. It cannot be stressed that the clinician should ensure the content of the syringe if it is the assistant who has loaded the syringe. We recommend that to remove any ambiguity, the dentist himself should load the anesthetic solution into the syringe despite his busy schedule to prevent such gross mishaps. In Western countries, a rubber dam makes it impossible for accidents to occur due to spillage of hypochlorite during root canal irrigation. The possible contact is during injection which is avoided by the use of the color-coded syringes and Endocart, which makes sure that the instruments required for that step only are taken out. The hypochlorite till date has not found a suitable replacement due to its tissue-solvent nature. The precautions mentioned make hypochlorite accidents very remote but yet have been reported.

CONCLUSION

The signs and symptoms of accidental hypochlorite contact therefore must be kept in mind during endodontics. When hypochlorite contacted vital interstitial tissues, a violent reaction ensued. Intense pain followed by swelling and tissue destruction was common to all, as seen in our patient. Patients experienced severe pain even when they were anesthetized before initiating endodontic procedure.^{9,10}

In the unfortunate instance, the patient must be informed regarding what has happened. Dilution of the irritant at the site is extremely important to minimize the damage, and local use of steroids injected directly at the site seems of value. Their use should be case specific due to difficulty in obtaining experimental evidence. A daily recall is mandatory with hospital admission advocated in the event of expanding swelling, tissue destruction and airway obstruction.

ACKNOWLEDGMENTS

We thank Dr. Ashwini Saraf and Dr. N Mahesh for literature support during the manuscript preparation.

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