

Hypochlorite Accident in a Pediatric Patient

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INTRODUCTION

Sodium hypochlorite (NaOCl) solution containing 0.5% to 5.2% can be used as an endodontic irrigant based on published data. The advised concentration of sodium hypochlorite for endodontic purposes is 5.2%.¹ Because of its tissue-dissolving action and effectiveness against a wide range of pathogens, NaOCl is mostly utilized as an irrigant.² Even though it offers benefits, inadvertent spillage or injection damages protein and lipid membranes, leading to necrosis, hemolysis, and skin ulcerations. NaOCl is widely used in the procedure of pulpotomy. Pulpotomy is the amputation of the coronal portion of the pulp followed by suitable medicament on the remaining radicular portion in order to preserve the vitality of the remaining pulp tissue under local anesthesia.³ NaOCl in pulpotomy is beneficial for the control of hemorrhage from the pulp and for disinfecting the remaining pulp tissue. NaOCl is best known for its strong antimicrobial activity even at low concentrations. In the present case report, hypochlorite was accidentally injected in place of the anesthetic solution, which was successfully managed.

ABSTRACT

Sodium hypochlorite (NaOCl), the most used irrigation solution is a reducing agent that is a clear, yellowish solution. Since hypochlorite is one of the most commonly used solutions in dental procedures, accidents are common. The report describes a case of sodium hypochlorite accidentally being injected into a 10-year-old girl instead of local anesthesia who was appointed for a pulpotomy procedure. The accident was followed by prompt management, which included a thorough lavage with a mixture of normal saline and local anesthetic injection. She was later kept under oral antibiotics and was followed routinely to find a well-healed region.

KEY WORDS

Accidental, Flushing, Hypochlorite, Injection

A submucosal injection of 40% normal saline and 60% lidocaine solution was administered immediately to relieve the pain. The mixture was injected to reduce pain immediately and anesthetize the area to prepare it for lavage and remove any sodium hypochlorite residue. This resulted in full recovery in two weeks.

CASE REPORTS

A 10-year-old girl visited with Ellis class III fracture with respect to 11 and Ellis class II fracture with respect to 21. She was scheduled for pulpotomy for 11 and topical local anesthetic gel was applied and the area was prepared for local anesthetic injection as an infiltration in the labial vestibule adjacent to the central incisor. The assistant had loaded two syringes, one with hypochlorite and one with local anesthesia and placed it on the same procedural tray from which the operator mistook sodium hypochlorite for local anesthesia. She was inadvertently infiltrated with 1 ml

of 1:1 dilution of 5.25% sodium hypochlorite and normal saline. The patient immediately complained of severe pain and a burning sensation. Extra-orally swelling was observed corresponding to the infiltrated area (Fig. 1). The patient was then referred to the oral and maxillofacial surgery department on an emergency basis due to the availability of proper monitoring devices and was seen immediately.



Figure 1. Extra oral swelling after inadvertent infiltration of 1:1 dilution of 5.25% sodium hypochlorite and normal saline corresponding to the infiltrated area.

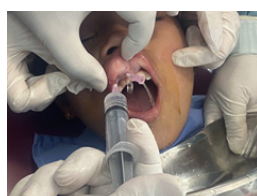


Figure 2. Lavage process with two needle hubs of 25 gauge inserted in the vestibule area of the infiltrated site circulating normal saline to wash out all unabsorbed hypochlorite.

Taking pain relief into first consideration, an infiltration was administered with a mixture of lignocaine and normal saline (2:1 dilution) to anesthetize the injected region. Two needle hubs of 25 gauge was inserted in the vestibule area of the infiltrated site to create a lavage passage. Normal saline was injected through it to wash out all the unabsorbed hypochlorite from the tissue (Fig. 2). A total of 20 ml was lavaged through the injected area. An ice pack was given to reduce the inflammatory process. The patient was under observation for 3 hours and was followed up after 24 hours with the prescription of tablet. Amoxicillin and Clavulanic acid 375 mg, per oral 8 hourly for 5 days and half tablet Paracetamol (500 mg) + Ibuprofen (400 mg) per oral 8 hourly for 2 days.



Figure 3. Significant decrease in the swelling after 24 hours.

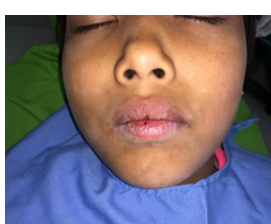


Figure 4. Extra-oral swelling subsided after 2 weeks.

After 24 hours, significant decrease in swelling was observed and the patient was advised to continue the medications until another appointment (Fig. 3). The patient was again recalled after 2 weeks for the further procedure of pulpotomy. The extraoral swelling subsided (Fig. 4) and the intra-oral wound was healed completely (Fig. 5).

DISCUSSION

In endodontics, sodium hypochlorite (NaOCl) is the most often utilized irrigating solution. In water, hypochlorous acid, HOCl, and the hypochlorite ion, OCl⁻, ionize to form



Figure 5. Complete healing of intra-oral wounds after 2 weeks.

Na⁺ and OCl⁻, which are in equilibrium with one another. DNA synthesis is interfered with by hypochlorous acid, along with oxidative phosphorylation and other membrane-related processes.⁴

It effectively dissolves the pulpal remains and organic components of dentin and is a very active antibacterial agent. It is employed both as an unbuffered solution at pH 11 at the previously mentioned amounts and as a buffered solution at pH 9.0, typically in concentrations of 0.5% (Dakin's solution) or 1%.⁵

According to research on sodium hypochlorite's cytotoxic effects on important tissues, the substance harms cells and produces severe vasculitis, bleeding, ulceration, and vasculitis. Therefore, the 5.25% concentration utilized for root canal irrigation can result in a number of issues, some of which have been discussed.³

If used in higher concentrations, sodium hypochlorite can cause harm that cannot be repaired with any specific therapy.⁶ The type and extent of the damaged tissues will determine how the NaOCl accident is managed. Stopping the NaOCl solution from penetrating deeper into the tissue during management will lessen tissue injury.⁷ The patient should be reassured over the frightening enlargement of the affected area. Additionally, narcotic analgesics can effectively reduce pain, but non-steroidal anti-inflammatory medications and aspirin should be avoided during the acute stage due to interstitial hemorrhage in the soft tissue.⁸ In the first 24 hours, cold compression may aid in lowering discomfort and inflammation. After that, warm compression is preferred to speed up the healing of severe ecchymosis by boosting blood flow to the affected area. Rinsing with normal saline can help improve circulation to the troubled intraoral tissue.⁹

Accidental spills of the hypochlorite solution during root canal irrigation are typically the cause for hypochlorite accidents. Accidental injection of the solution is possible in various circumstances. Although corticosteroids have been utilized, they have never been injected directly at the site, despite the fact that they have a strong anti-inflammatory effect. Corticosteroids may be effective in some circumstances.¹⁰

Prophylactic antibiotic therapy is imperative because of the substantial necrotic tissue in the dead space, which serves

as a favorable environment for the growth of bacteria that are pushed into the periapical space along with the debris in the root canal.^{8,11} The patient's airway patency needs to be carefully watched. It is important to schedule an early examination by a dental surgeon and ongoing follow-up for symptom evaluation. Due to the ensuing soft tissue fibrosis, prolonged healing time is anticipated.

Sodium hypochlorite accident is one of the complications of endodontic procedure. Without surgery, supportive care helps the majority of patients recover, but they may still experience potentially fatal complications like airway compromise. All the dentists should be extra careful for not causing accidental injection when doing the procedure involving sodium hypochlorite.

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