



Sodium Hypochlorite Accident an Unfortunate Event: Clinical Features and Management

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Success of Endodontics therapy strive on ability of treatment modalities to eliminate pathogens from the root canal system. Chemo-mechanical preparation is a critical step to eliminate root canal. Pathogens the microbial load is decreased by mechanical preparation of canal and use of antimicrobial chemical solutions to disinfect the unreachable areas such as fins, isthmus and apical third of the canal.

Sodium hypochlorite is one such solution which has been used for disinfection since 1843; it was recognized as an antibacterial hand disinfectant. Usage of sodium hypochlorite in Endodontics dates back in 1920. In World War I, chemist Henry Drysdale Dakin and the surgeon Alexis Carrel extended the use of a buffered 0.5% sodium hypochlorite solution to the irrigation of infected wounds, based on Dakin's meticulous studies on the efficacy of different solutions on infected necrotic tissue [1].

NaOCl is a very sensitive irrigant to be used because of its associated toxicity and caustic nature. Various concentration of NaOCl is used in Endodontics, as the concentration of the solution increases so does the toxicity associated with it. The side effects of NaOCl vary from the range of mild to very severe and life threatening.

The mild effects include bad odour, bad taste whereas the severe side effects include chemical burns, tissue necrosis, paresthesia, disfigurement, respiratory distress etc.

This article reviews the prevalence, factors associated with NaOCl extrusion clinical, manifestation, management and outcomes of NaOCl extrusion.

Definition

NaOCl extrusion during root canal therapy (RCT) is commonly referred to as "the hypochlorite accident"; it causes acute immediate symptoms and potentially serious sequel [2].

Prevalence

- NaOCl extrusions more in females
- More in maxillary teeth

Irrigation factors influencing the occurrence of NaOCl accident

- Concentration of NaOCl
- Volume of NaOCl
- Pressure of extrusion: irrigation method, needle design, and syringe capacity
- Wedging of irrigating needle
- Anatomical Factors: open apices, maxillary sinus
- Either iatrogenic or anatomic undiagnosed perforation
- Close approximation with surrounding Structures such as an antral tooth

Manifestation of NaOCl accident: there is no single clinical feature; it is a constellation of signs/symptoms depending upon multiple factors such as surrounding tissue, nerve, organ etc.

- Acute and of sudden onset [3]
- Severe pain despite the patients is anesthetized
- Profuse hemorrhaging through the root canal
- Swelling: large and diffused appearing within a few minutes up to a few hours after the accident
- Sometimes resulted in difficulties opening the ipsilateral eye
- Extrusion involving maxillary sinus:
- Rather than acute pain, the first signs were irrigant flowing from the nostrils along with the taste of NaOCl in the throat.
- A burning sensation in the maxillary sinus rather than severe

pain was usually present, with little or no bleeding from the canal

- No evidence of immediate swelling.
- Epistaxis
- Sinus congestion.
- The subsequent symptoms in the hours and day:
- Hemolysis
- Immediate or secondary facial hematomas
- Mucosal and bone necrosis
- Secondary infection
- Involving purulent discharge

Neurologic signs

- Sensory and/or motor defects
- Residual anesthesia and/or paresthesia occurred when the trigeminal nerve was affected
- Trismus

Air emphysema

Ophthalmologic symptoms may be present

- Including eye pain
- Blurring of vision
- Diplopia
- Corneal patchy coloration.

Life-threatening airway obstruction caused by massive swelling in the sub mental and sublingual spaces with elevation of the floor of the mouth after extrusion through the mandibular teeth.

Management of NaOCl Extrusions

The treatment should be palliative and protective.

Early management, included minimizing the exquisite pain and hemorrhage control as well as patient's reassurance, along with close follow-up in the hours and days after the accident pain relief.

Anesthetic infiltration can be attempted however; local anesthesia usually will cause additional pressure in the soft tissues with little benefit. In the presence of diffuse swelling, infiltration anesthesia is contraindicated to avoid spreading of any existing infection; a nerve block should be used instead immediate canal irrigation after extrusion, mostly using a saline solution aspiration with a high-volume aspirator would help to evacuate NaOCl.

Post-treatment instructions included

Frequently application extra oral cold packs on the day of the extrusion to minimize edema. Some authors recommended that to apply warm compresses and warm saline rinses following initial cold. This is intended to reestablish microcirculation preventing tissue necrosis to accelerate healing along with conventional treatment, low-intensity laser therapy over the necrotic area is also Shown to have a promising choice promising choice.

The pharmacological management includes mostly analgesics, antibiotics, and steroids. Paracetamol (i.e., acetaminophen) appeared to be the most commonly used analgesic with or without codeine. Combination of Paracetamol and NSAIDs (acetaminophen + ibuprofen) has been found to be very effective in pain management in absence of history of allergy. Penicillin is the drug of choice, with or without sometimes combined with Clavulanic acid or Macrolide. Tetracycline and Cephalosporin were prescribed anecdotally. An impaired immune system is associated with risk of spreading infection hence should be criterion for prescribing antibiotics.

Antihistamines can be prescribed in some cases to limit the extension of edema.

Additionally, a nasal decongestant can also be prescribed in case the maxillary sinus is involved.

Healing and Prognosis

- Initial nerve damage
- Altered sensitivity and/or motor impairment
- Variations in the healing process and duration
- The pain and swelling could last up to 30 days
- Mucosal healing could take up to 60 day
- fibrosis and scar tissue
- Possibly leading to a disfiguring scar [4]

Hence judicious use of NaOCl is recommend, and in case of any unfortunate situation of sodium hypochlorite accident, a prompt management approach should be taken.

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