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CLINICAL VIGNETTE

Sodium Hypochlorite Accident: A Cause of Facial Swelling and Ecchymosis

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Case Presentation

A 74-year-old female with hypothyroidism and myelodysplastic syndrome presented to the emergency department (ED) for evaluation of acute left facial swelling and bruising following a dental procedure five days prior. The patient underwent a root canal of the left first maxillary pre-molar. During the procedure she reported acute pain, swelling of the left cheek and subsequent bruising of the upper lip and below both eyes. The patient was given antibiotics and analgesics and told to follow up with her primary care physician. The patient continued to have pain and swelling, over several days and friends prompted her to go to the ED for concerns of anaphylaxis.

On exam, the patient was afebrile and hemodynamically stable. Her temperature was 37°C, pulse was 81 beats/min, blood pressure was 137/70, and respiratory rate was 18 breaths/min. Examination showed multiple bruises under both eyes and the upper lip, and non-fluctuant swelling of the left cheek. Oral examination noted a mucosal lesion near the left first maxillary pre-molar draining seropurulent fluid (Figure 1).

Diagnostic Tests

WBC: 3.25 (N 4.16 – 9.05 x10E3/uL)

Hemoglobin: 15 (N: 11.6 – 15.2 g/dL)

Platelet Count: 254 (N: 143 - 398 x10E3/uL)

Creatinine: 0.75 (N: 0.60 – 1.30 mg/dL)

Bacterial culture of mucosal lesion drainage grew normal oral flora.

CT Face Without IV Contrast: No acute fracture or subluxation of the face. Subcutaneous stranding with a few locules of air within the left pre-maxillary region.

CT Face with IV Contrast: continued asymmetric soft tissue thickening and stranding in the left face, suggestive of cellulitis, without fluid collection. No obvious dental abnormality, although most of the maxilla and mandible was obscured by streak artifact from dental implants.

Discussion

Sodium hypochlorite (NaOCl), the common ingredient in household liquid bleach, is a highly alkaline solution and a strong oxidizing agent of proteins, giving it antimicrobial and organic tissue-dissolving properties. For this reason, it is commonly used as a root canal irrigant in endodontic therapy. “Sodium hypochlorite accident” is the term used to describe accidental extrusion of NaOCl into surrounding tissue and

vasculature causing acute symptoms and serious long-term functional and cosmetic outcomes.¹

The extrusion of NaOCl beyond the root canal into the periradicular tissue causes a chemical burn-like effect leading to a localized or widespread tissue necrosis called “hypochlorite accident.” The accident causes a severe acute inflammatory reaction occurring in the tissues, leading to rapid swelling in both the surrounding mucosa of the treated root canal system and within the nearby skin and subcutaneous tissues.^{2,3}

While NaOCl accidents during endodontic treatment are uncommon, rates are higher in females than in males. While there is no clear reason for the higher incidence in females, it is hypothesized to be related to decreased bone density. Additionally, accidents occur more frequently with maxillary than with mandibular teeth. Radiographically, the most common feature is periradicular radiolucency. For most patients, signs and symptoms of the injury reduce within two weeks and completely resolve within one month. Some cases result in long-term sequelae, including a case with unilateral atrophy of the buccal fat pad following NaOCl injury.^{4,5}

Most reported cases involved regional and facial swelling and ecchymosis. One case was life-threatening due to swelling causing airway obstruction. This swelling was due to NaOCl extrusion through the mandibular molar into the sub-mental and sublingual spaces.⁶

Management depends on the severity of symptoms and is typically initiated by the dental practitioner. Options include analgesics, antibiotics to prevent secondary infection, cold packs in the first 24 hours followed by warm packs thereafter, and referral to maxillofacial specialty in cases of severe injury.⁶

Case Treatment and Follow-up

Immediately following the iatrogenic injury, the patient’s dental practitioner treated her with a five-day course of azithromycin. The patient was not informed of the cause of the injury. She was diagnosed subsequently with a dental infection, and her antibiotics continued to be escalated. On subsequent follow-up with her primary physician, she was prescribed clindamycin 300mg TID and later, due to a lack of clinical improvement and continued facial edema and asymmetry (Figure 2), the antibiotic was changed to cefdinir 300mg twice

daily with metronidazole 500mg three times a day. The patient returned to the ED due to continued pain and was able to see an oral and maxillofacial specialist, who diagnosed her with sodium hypochlorite injury. Over the following months, the patient had gradual improvement in symptoms. After three-months she still noted continued asymmetry and restriction in movement of the left cheek.

Conclusion

When a patient presents with edema, ecchymosis, and asymmetry of the face following a root canal procedure, sodium hypochlorite accident should be considered. Treatment is usually initiated immediately by the dental practitioner and should focus on controlling pain, reducing swelling, and preventing secondary infection. If pain and swelling are significant, referral to an oral and maxillofacial surgeon should be considered. Antibiotics should cover potential infection with streptococcus and oral anaerobes.^{6,7}



Figure 2 Edema and asymmetry 16 days following NaOCl accident.

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Figure 1 Facial edema and ecchymosis as well as intra-oral mucosal lesion with discharge five days following NaOCl accident.