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Case Report

Dentistry Section

Oral Manifestations of Household Disinfectant Exposure: Two Case Reports and Review of Literature

JEYASEELAN RAMASAMY[1], RJ VIJAYASHREE[2], PREETHI MURALI[3], LOGESWARI JAYAMANI[4]

ABSTRACT

The main chemical component of household disinfectants is Hydrochloric acid (HCl). Exposure to this harmful chemical can result in mild to severe tissue injuries and is termed as allergic dermatitis. When the oral mucosa undergoes such state, termed allergic or contact stomatitis, which may manifest as chemical burn. Due to unrestricted availability of these substances, accidental exposure of oral cavity to commonly used disinfectants may produce mild to severe injuries and even be life-threatening. Two cases are presented here to insist on the allergic reaction caused by the accidental and misconceptional exposure of oral mucosa to household disinfectants, along with their clinical presentation and management. The first case involves accidental exposure of oral mucosa to a drain cleaner in a 30-year-old female patient. The second case is about a 26-year-old male patient who has placed the disinfectant over the decayed tooth. Oral allergic lesions results in allergic stomatitis, an allergic condition associated with significant morbidity. The severity of these lesions may be directly related to the type and quantity of the materials and the duration of exposure. Timely diagnosis, appropriate management, along with elimination of causative allergen quickly may be helpful in complete resolution of the manifestations.

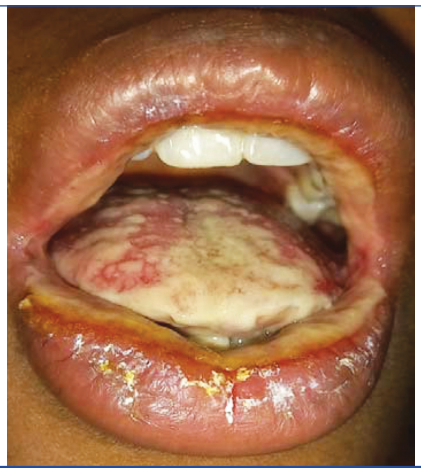
Keywords: Acid ingestion, Allergic stomatitis, Chemical burn, Corrosion, Drain cleaner, Household chemicals, Hydrochloric acid, Toilet cleaner

CASE REPORT

Case 1

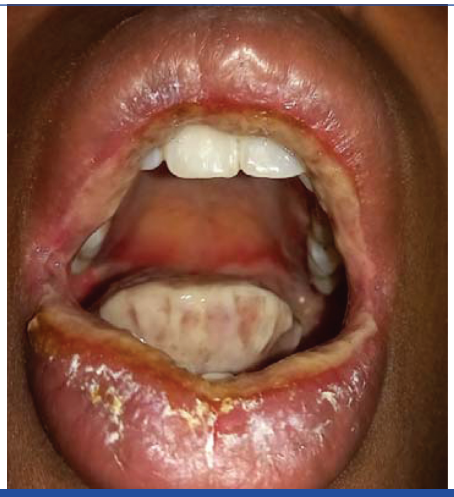
A 30-year-old female patient reported with swelling of the upper and lower lips, inability to open her mouth and difficulty in swallowing. Patient gave a history of accidental exposure to a drain cleaner powder while attempting to open the sachet using her teeth. Upon opening, the powder filled the oral cavity. She rinsed her mouth immediately and presented to the clinic within an hour of the incident.

Upon examination, swelling of both the lips was noted. The surface of the swelling was smooth and had the same colour as the surrounding mucosa, with no secondary changes. Intraorally, multiple erythematous and whitish areas were evident on the floor of the mouth, dorsal, ventral and lateral surface of the tongue, vestibular regions and posterior part of the soft palate, where the substance had contact initially [Table/Fig-1,2].



[Table/Fig-1]: Clinical image showing the lesion on the dorsal surface of the tongue and labial mucosa covered with pseudomembranous slough.

Based on the history and clinical presentation, diagnosis of acute allergic angioedema for the perioral region and contact stomatitis for the intraoral lesions was made. Immediately, the patient was advised to rinse her mouth with antiseptic mouthwash. The erosive areas were then mopped with an antiseptic solution (Povidone-Iodine Solution IP 10% w/v, Betadine Standardised Microbicidal Solution 10%). Intramuscular dexamethasone (corticosteroid) injection was given intramuscularly to reduce the inflammatory/allergic reaction. Topical anaesthetic (Benzocaine Gel USP, Mucopain I.P. 20%) relieves mucosal pain, along with a topical antiseptic/antibiotic gel (Metronidazole gel, Metrogyl DG Gel—Chlorhexidine Gluconate 0.25% w/w + Metronidazole 1% w/w). Systemic antibiotic and analgesic were prescribed for five days: Amoxicillin and potassium clavulanate tablets IP (Clavam 625: Amoxycillin 500 mg + Clavulanic Acid 125 mg) and ibuprofen, paracetamol and caffeine tablets, (IMOL Plus: Ibuprofen 400 mg + Paracetamol 325 mg + Caffeine 25 mg), to be taken after food in the morning and evening. The patient was advised to take soft diet and avoid spicy foods as it may trigger burning sensation. After the clinical diagnosis patient was advised to come for periodic follow-up.



[Table/Fig-2]: Clinical image showing the lesion are on the ventral surface of the tongue and angle of the mouth with sloughing.

When reviewed after two days, oral mucosal lesions showed pseudomembranous sloughing. Mouth was rinsed with antiseptic mouthwash and the lesions were re-evaluated. Patient was advised to follow the same medications as the lesions started responding to the medications [Table/Fig-3,4]. After one week, the lesions appeared to heal. The mouth opening had improved [Table/Fig-5]. A biopsy was not performed as the lesion were responding to the medication.

[Table/Fig-3]: Clinical image showing pseudomembranous slough covers the lesion involving the palatal mucosa.

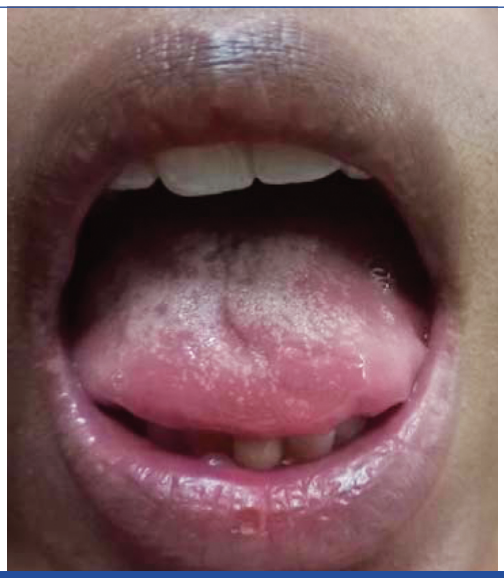
[Table/Fig-4]: Clinical image showing the lesion involving the floor of the mouth with restricted tongue movements.

[Table/Fig-5]: Clinical image showing reduction of inflammation and healing on the ventral surface of the tongue after one week.

After two weeks, the lesions had almost completely resolved, allowing the patient to take regular diet [Table/Fig-6,7]. A month later, when the patient reported back for review she was apparently normal and intraoral lesions completely resolved [Table/Fig-8].

[Table/Fig-6]: Clinical image showing lesional area completely resolved in the palatal mucosa after two weeks.

[Table/Fig-7]: Clinical image showing lesional areas on the dorsal surface of the tongue are completely resolved after two weeks.



[Table/Fig-8]: Clinical image showing all the mucosal lesions are completely resolved after one month.

Case 2

A 26-year-old male patient reported with a chief complaint of severe tooth pain in the left lower back tooth for past day. Upon clinical examination, 36 was decayed and tender on percussion. A greyish-white membrane was evident on the left buccal mucosa, approximately to buccal vestibule in relation to tooth 36 [Table/Fig-9]. The membrane was easily removable and was not painful. There was no ulceration in the underlying mucosa and it appeared normal.

[Table/Fig-9]: Clinical image showing presence of greyish-white membrane on the left-side buccal mucosa.

Upon eliciting the history, it was known that the patient had kept cotton soaked in a toilet disinfectant over tooth 36 to get relieved of the tooth pain. The cotton was kept for approximately two minutes, after which the patient immediately withdrew due to severe burning sensation. During the dental visit, the patient was asymptomatic and not aware of the membranous lesion. Based on the clinical examination and history, the lesion was diagnosed as a chemical burn due to inadvertent use of toilet disinfectant. No other significant signs or symptoms were noted. The patient was comfortable and instructions were given for oral care. Follow-up was advised to monitor the status of the burn. Tooth 36 was identified with dental caries and restoration was recommended for the same.

DISCUSSION

Oral cavity is lined by mucous membrane of varying thickness, which acts as protective barrier against external factors. Occasionally, it may be injured when exposed to physical, thermal, electrical, or chemical stimuli and show diverse clinical manifestations [1]. These incidence depend on the nature, quantity and properties of causative agent, as well as the duration of exposure.

Accidental chemical burns or injuries are commonly observed in children and individuals with dementia, whereas intentional ingestion is more frequently reported in adults [1,2]. With the widespread use of chemicals in industrial and household purposes the incidence of chemical exposure has increased. These include substances like medications, dentifrices, household cleaning agents, cosmetics, food flavourings and colouring agents.

Exposure of chemicals to lip (labial mucosa) results in superficial inflammation, termed cheilitis. When associated with other mucosal involvement, it may be classified as contact or eczematous stomatitis [3,4].

Accidental or intentional ingestion of commonly used household agents (corrosive chemicals) can result in acute corrosive poisoning. Intoxications related to these materials can produce numerous and severe post-corrosive complications in the upper part of gastrointestinal tract. It can also produce severe tissue injuries in the oral cavity and respiratory system, which needs treatment [5]. The first case shows manifestations resulting from similar mishandling. Sometimes patients use medications like aspirin in the area of pain for relief resulting in chemically induced burn due to improper use [3]. Such use is reported in the literature. Similarly, in the second case, the patient applied an acid-based toilet cleaner to a decayed tooth, resulting in destruction of the surrounding mucosal tissue and causing sloughing.

Chemical pneumonitis can also be seen among the patients with corrosive chemical ingestion due to aspiration of the caustic compound. It can be associated with pulmonary oedema. Respiratory symptoms generally begin within the first few hours of exposure and may resolve within a week. Patients may present with cough and broncho-obstruction, Other symptoms like tachypnoea, wheezing and chemical pneumonitis may also manifest later. Death related to chemical exposure could be due to occurrence of bacterial infections and other respiratory complications [6]. In developed countries, the rate of mortality from poisoning is estimated at 1-2%. In contrast, India reports a higher rate, varying between 15-30%, due to the easy availability of chemicals, mishandling or misuse and lack of parental monitoring among children [7].

Among household products, exposure to household cleansers is relatively rare compared to other commonly used products like pesticides, mercury from thermometers, antiseptics, kerosene, paint thinners and other chemical agents [2,8]. The National Poisons Information Centre (NPIC) at the All India Institute of Medical Sciences, New Delhi, provides information on management of poisoning to physicians regarding poisoning management. Of the total cases recorded, 45.5% constituted to household chemicals used for various purposes and 21.8% were exclusively due to the household cleaners. Within this category, 38.7% of cases were reported among adults and 61.2% involved children less than 18 years. Incidents were more frequent in males (62.4%) than females (37.5%) and 66.8% of cases were unintentional. Oral exposure accounted for 95.6% of the incidents [2]. The American Association of Poison Control Centres (AAPCC) highlights that household products rank among the top five agents involved in poisoning cases [9]. Among the household materials detergents, toilet bowl cleaners and phenyl-containing cleaners are corrosive in nature [10].

Exposure of the oral mucosa to allergens can results in condition commonly termed Oral Hypersensitivity Reactions (OHRs). These reactions show diverse clinical presentations with often ambiguous histopathological findings. Physical signs of OHRs may include erythema, ulceration and lichenification, associated with burning sensation, pain, itching and sometimes paraesthesia. However, OHRs need to be differentiated from other lesions like common inflammatory mucosal lesions due to their similar clinical manifestations [11].

Cheilitis granulomatosa, the condition usually presents as swollen, cracked and fissured lips with nodular swelling without any association with allergic agents, differentiating it from the first case [12]. Erythema Multiforme (EM) also need to be differentiated from current case as it shows oedematous, erythematous lesions. In the later stages, it presents with multiple shallow, larger painful ulcerations surrounded by perilesional erythema and covered with a pseudomembrane formed from the desquamated epithelial cells. However it exhibits some similar clinical manifestations, it is different from current case by characteristic “target” lesions. Proper differentiation and timely identification is needed for early intervention, as these lesion can become fatal [13].

Stevens-Johnson Syndrome (SJS) is a severe form of EM which shows typical involvement of skin, oral cavity, eyes and genitalia. In the oral cavity, it manifests as mucosal vesicles and bullae, which ruptures and form painful ulcerations with bloody crusting. Ocular lesions may result in blindness and genital areas may show ulcerations [14].

Oral Mucous Membrane Pemphigoid (OMMP) shares similar oral manifestations like multiple erythematous ulcerated regions covered

by pseudomembrane in areas where vesicles and bullae were previously present. However, OMMP can be differentiated from current case by lesions which are confined to the areas of chemical exposure, with no lesions in other non exposed areas, but OMMP can have mucocutaneous involvement as well, but was not seen in the present case. Interestingly, the lesions in OMMP can involve gingival tissue and the persistent gingival erythema can be lost for weeks or months time for healing [14,15].

Prevention is better than cure; therefore, proper handling of chemicals is strongly recommended. In dentistry, performing procedures under rubber dam significantly reduces the risk of iatrogenic chemical burns, in most of the endodontic procedures. Superficial mucosal burns generally heal within 10-14 days due to the rapid turnover rate of the oral mucosa. Oral surgical procedures and antibiotics may be needed in very rare cases. Treatment can be decided according to the site, size, extent and severity of the lesion. Management options include topical and/or intralesional corticosteroids, flap surgeries using electrocautery or soft-tissue laser and wound coverage with a periodontal pack.

Intraoral lesions caused by acids are often superficial and usually do not penetrate deep enough to affect the basement membrane; therefore, thorough irrigation would be sufficient. But in severe cases, surface irrigation alone may not be adequate and surgical debridement may becomes necessary [12].

CONCLUSION(S)

Underreporting and limited data from the National Poisons Information Centre (NPIC) obscure the true extent of chemical poisoning in India. Although oral chemical burns are relatively rare compared to other burns, their incidence has increased due to greater access to hazardous substances and inadequate regulations. In adults, improper handling or overuse often leads to unintentional exposure, while in children, lack of supervision is the main cause. Chemical injuries to the oral mucosa, including allergic or contact stomatitis, can range from mild irritation to severe tissue damage with potential systemic effects. Prevention is key and can be achieved through proper storage of chemicals in labelled, childproof containers, parental education and stronger regulatory enforcement. In the workplace, safety training, proper use of Personal Protective Equipment (PPE) and regular awareness campaigns are essential. If exposure occurs, conscious individuals should gently rinse their mouth with water, avoid inducing vomiting and seek immediate medical help. Contacting a poison control centre is strongly advised. Public education, strict workplace safety enforcement and improved labelling can significantly reduce incidents and their potentially fatal outcomes.

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PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of Oral and Maxillofacial Pathology and Oral Microbiology, Meenakshi Ammal Dental College and Hospital, Meenakshi Academy of Higher Education and Research (Deemed to be University), Chennai, Tamil Nadu, India.
2. Assistant Professor, Department of Oral and Maxillofacial Pathology and Oral Microbiology, Meenakshi Ammal Dental College and Hospital, Meenakshi Academy of Higher Education and Research (Deemed to be University), Chennai, Tamil Nadu, India.
3. Professor, Department of Oral and Maxillofacial Pathology and Oral Microbiology, Meenakshi Ammal Dental College and Hospital, Meenakshi Academy of Higher Education and Research (Deemed to be University), Chennai, Tamil Nadu, India.
4. Associate Professor, Department of Oral and Maxillofacial Pathology and Oral Microbiology, Meenakshi Ammal Dental College and Hospital, Meenakshi Academy of Higher Education and Research (Deemed to be University), Chennai, Tamil Nadu, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Jeyaseelan Ramasamy,
Assistant Professor, Department of Oral and Maxillofacial Pathology and Oral Microbiology, Meenakshi Ammal Dental College and Hospital, Alapakkam Main Road, Maduravoyal, Chennai-600095, Tamil Nadu, India.
E-mail: drjeymds@gmail.com

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