



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

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ABSTRACT:

Introduction: 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. Oral mucosa undergoes such state, termed allergic/contact stomatitis manifesting as chemical burn when exposed to these chemicals. Due to unrestricted availability, accidental exposure of oral cavity to commonly used disinfectants may produce mild to severe injuries and even life-threatening in certain scenarios. Two cases presented here to insist on the allergic reaction caused by the accidental and misconceptual exposure of oral mucosa to household disinfectants and their clinical presentation with management. In the first case the accidental exposure of oral mucosa to a drain cleaner and its clinical presentation in a 30 year female patient. The second case is about a 26 year male patient who has placed the disinfectant over the decayed tooth.

Conclusion: Oral allergic lesions results in allergic stomatitis, an allergic condition with significant morbidity. The severity may be directly related to the type, quantity of the materials and the duration of exposure to the material. Timely diagnosis and appropriate management along with elimination of causative allergen quickly may be helpful in complete resolution of the manifestations.

1. Introduction:

Oral cavity is considered to be the main portal of entry to our body and also the mirror of systemic health. Oral mucosa lines the oral cavity and has many functions (17). One of the important functions is protection of the oral cavity from injuries – thermal, physical and chemical (17). However, it easily gets injured by physical, thermal and chemical stimuli and manifests clinically in diverse manner. Among the burns, chemical burns are considered to be rare and it can be either by accidental contact or intentional ingestion of chemicals.

Accidental exposures are usually seen among children and housekeeping workers by carelessness/ mishandling but, occasionally intentional ingestion is seen among people who attempt suicide (1,2). Worldwide annually 35000 cases of death in children due to lethal poisoning are being reported (18). Most household disinfectants are easily accessible and available in the market with no restrictions; hence possibility of exposure is very common. Though the manufacturers insist on the proper handling and precautionary measures to be taken while handling, the situations of mishandling such materials do arise and may end up in severe burns and fatality.



The commercially available disinfectants are usually HCL based and may result in mild to severe clinical manifestations when exposed to skin or mucosa. Inhalation of chemical vapors causes severe respiratory problems. Suicidal attempts related to ingestion of household chemicals are frequently increasing among the adults in recent days. In the event of suicide attempts, chemical affects the oral cavity and continues to act on the gastrointestinal tract as it has corrosive properties (eating away). Exposure to oral mucosa may show clinical manifestations like mild to severe erosive lesions in the contacted areas with symptoms of burning sensation, dysphagia, xerostomia and trismus (1,2).

2. Case presentations:

CASE 1: A 30-yearold female patient reported with upper and lower lip swelling, inability to open her mouth and difficulty in swallowing. Patient gave 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. The patient immediately rinsed her mouth with water. Eventually patient developed swelling on both lips with burning mouth.

Upon examination there was swelling of both the lips. The surface over the swelling was smooth and the colour was same as the surrounding mucosa with no secondary changes. Intra-orally multiple erythematous and whitish areas were evident in relation to 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.(Figure 1). Based on the history and clinical presentation, diagnosis of acute allergic angioedema for the perioral region and contact stomatitis for the intra oral lesions was made.

Immediately, the patient was advised to rinse her mouth with antiseptic mouth wash. Then, the erosive areas were mopped with antiseptic solution (Povidine-Iodine Solution IP 10% W/V, Betadine Standardised microbicidal solution 10%). Dexamethasone (corticosteroid) injection was given intramuscularly to reduce the inflammatory/allergic reaction. Topical anaesthetic (Benzocaine Gel U.S.P, Mucopain (I.P.20%) Relieves Mucosal Pain) and topical antiseptic/antibiotic (Metronidazole gel, Metrogl DG Gel-

ChlorhexidineGluconate 0.25% w/w + Metronidazole 1% w/w) were prescribed along with systemic antibiotic and analgesic medications for five days (Clavam 625,Amoxicillin and potassium clavulanate tablets IP, (Amoxycillin 500 mg + Clavulanic Acid 125mg) and Ibuprofen Paracetamol and Caffeine Tablets, IMOL Plus (Ibuprofen 400mg+Paracetamol 325mg +Caffeine 25mg) after food in the morning and night.

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 if the lesion not responding biopsy was advised.

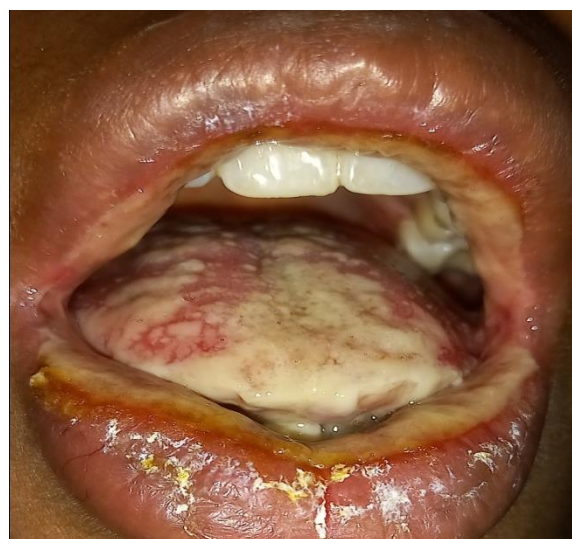


Figure 1: Clinical image showing the lesion on the dorsal surface of the tongue and labial mucosa covered with pseudomembranous slough

When reviewed after two days, oral mucosal lesions showed pseudomembranous sloughing. Mouth was rinsed with antiseptic mouth wash and then lesions were evaluated. Patient was advised to follow the same medications as the lesions started responding to the medications. (Figure 2,3)

Patient was reviewed after one week and the lesions appeared to heal. The mouth opening significantly improved.(Figure 4,5) as the lesion was responding to the medication biopsy was performed. After two weeks' duration the lesions almost resolved and the patient was able to take regular diet.(Figure 6,7)



Figure 2: Clinical image showing the lesion are on the ventral surface of the tongue and angle of the mouth with sloughing.



Figure 4: Clinical image showing the lesion involving the floor of the mouth with restricted tongue movements



Figure 3: Clinical image showing pseudomembranous slough covers the lesion involving the palatal mucosa



Figure 5: Clinical image shows reduction of inflammation and healing on the ventral surface of the tongue during the subsequent visit after one week



Figure 6: Clinical image shows lesional area completely resolved in the palatal mucosa after two weeks



Figure 7: Clinical image shows lesional areas on the dorsal surface of the tongue are completely resolved after two weeks

A month later, when the patient reported back for review she was apparently normal and was able to take

regular diet. The intra oral lesions completely resolved. (Figure 8)



Figure 8: Clinical image shows 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 left lower back tooth for past one day. Upon clinical examination, 37 was decayed and tender on percussion. Presence of greyish white membrane was evident on the left side buccal mucosa in approximation to buccal vestibule in relation to 37 region (Figure 9). The membrane was easily removable and was not painful. There was no ulceration in the underlying mucosa and the mucosa appeared normal. Upon eliciting the history, it was known that the patient has kept cotton soaked in a toilet disinfectant (containing hydrochloric acid 10.5% w/v) over 37 to get relieved of the tooth pain, the previous night. The cotton was kept for approximately 2 minutes, after which he immediately withdrew due to severe burning sensation. However, during the dental visit, the patient was asymptomatic and not aware of the membranous lesion present. Based on the clinical examination and history, the lesion was diagnosed as chemical burn due to inadvertent use of toilet disinfectant. There were no other significant signs or symptoms. The patient was comfortable, thereby instructions were given for oral care



and follow up was advised for monitoring the status of the burn.



Figure 9: Clinical image shows presence of greyish white membrane on the left side buccal mucosa

3. Discussion:

Oral cavity is lined by mucous membrane of varying thickness and acts as protective barrier from the external factors. At times, it is injured when exposed to physical, thermal, electrical or chemical stimuli and show diverse clinical manifestations. Among these, chemical burns are considered to be second most common.⁽³⁾ These incidences depend on the type, quantity and properties of causative agents and duration of exposure. In concern to chemical burns/ injuries, accidental exposure among dementia patients and children is common and intentional intake was seen among adults.^(3,4) Since use of chemicals in industries and day-to-day household purposes has become common, incidence of chemical exposure has increased.—These include substances like medications, dentifrices, household cleaning agents, cosmetics, food flavours and colouring agents. Exposure of chemicals to lip (labial mucosa) results in superficial inflammation named as cheilitis and can be named as Contact/eczematous stomatitis when associated with other mucosal involvement.^(3,4,5)

Accidental/ intentional ingestion of commonly used household agents (corrosive chemicals) results 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 makes the treatment worsen. The first case shows manifestations due to similar mishandling.⁽⁶⁾

Sometimes patients use medications like aspirin in the area of pain for relief resulting in induced chemical burn due to improper use of medication. Such use is reported commonly in the literature. Similarly, the second case of our report revealed that patient had placed acid based toilet cleaner on the decayed tooth which resulted in surrounding mucosal tissue destruction causing sloughing.⁽⁶⁾

Chemical pneumonitis can also be seen among the patients with corrosive chemical ingestion due to aspiration of the caustic compound. It can also be associated with pulmonary oedema. Respiratory symptoms generally begin in the first few hours after exposure and resolve within a week. Patients after ingestion may present with symptoms of cough and broncho-obstruction. Other symptoms like tachypnea, 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.⁽⁷⁾

In developed countries, the rate of mortality from poisoning is estimated to be 1% to 2%. However, India reports a higher rate, varying between 15 to 30% due to the easy availability, mishandling/ misuse of chemicals and lack of parental monitoring among children⁽⁸⁾.

Amongst the household products, household cleanser exposure is very rare compared to other commonly used products like pesticides, thermometer mercury, antiseptics, kerosene, paint thinners and other chemical materials/ agents.^(9,10) The National Poisons Centre (NPIC) at the All India Institute of Medical Sciences, New Delhi, provides information on management of poisoning to physicians. Among the total number of cases recorded so far by the Centre, 45.5% constituted to household chemicals used for various



purposes and 21.8% are exclusively due to the household cleaners. In this category 38.7% of cases were reported among adults, remaining 61.2% were children less than 18 years. More cases seen among males than females (M=62.4%, F=37.5%) and among the 66.8% cases mode of poisoning was unintentional and 95.6 % cases route of exposure was oral.⁽⁹⁾ Swedish Poison Control Centre also reported 41.6% poisoning cases to be among children.⁽¹⁰⁾ The American Association of Poison Control Centers (AAPCC) highlights that household products are among the top five ranking agents involved in poisoning.⁽¹¹⁾ Among the house hold materials detergents, toilet bowl cleaning agents and chemicals containing phenyl are corrosive in nature.^(12,13)

The oral mucosa exposure to any form of allergens results in condition commonly termed as Oral hypersensitivity reactions (OHRs). These conditions show diverse clinical presentations with ambiguous histopathologic findings. When present, physical signs of OHR can 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.⁽¹⁴⁾ Cheilitis granulomatosa, the condition usually presented with swollen, cracked and fissured appearance of the lips with nodular swelling without any association of allergic agents in the episodic nature, which differentiates it from the first case.⁽¹⁶⁾ Erythema multiforme (EM) also need to be differentiated from current case as it shows oedematous, erythematous changes at the earlier state and later results in manifestations like multiple shallow larger painful ulcerations usually irregular in size and shape with perilesional erythematous changes covered by the pseudomembrane formed from the desquamation of epithelial cell. However it exhibits similar clinical manifestations, it is different from current case by its characteristic “target” lesions. Proper differentiation and identification is needed for early intervention as the lesion can become fatal.¹⁹ Stevens Johnson syndrome is a severe form of EM which show typical involvement of skinoral cavity, eyes and genitalia. in oral cavity it manifest as mucosal vesicles, bullae which get ruptures and form bloody crusting painful ulcerations, ocular lesions may results in blindness and genital areas may show ulcerations.²⁰

Oral mucous membrane pemphigoid (OMMP) shares similar oral manifestations like multiple erythematous ulcerated regions covered by pseudomembrane in the lesional areas where vesicles and bullae present earlier. However this can be differentiated from current case by lesions are confined to the areas of chemical exposure and no lesions in other non exposed areas but OMMP will have mucocutaneous involvement as well it was not seen in our case, interestingly the lesions in OMMP will involve gingival tissue and the persistent gingival erythema will be lost for weeks or months time for healing.^(20, 21)

Prevention is better than cure so it is advisable to avoid exposure by proper handling. In dentistry, performing the procedures under rubber dam reduces the risk of iatrogenic chemical burns in most of the endodontic procedures. Superficial burns of mucosa can heal within 10-14 days as the turn-over rate of the oral mucosa is faster. Oral surgical procedures and antibiotics may be needed in very rare cases. Gel with hyaluronic acid can accelerate the healing process. Treatment can be decided according to the site, size, extent and severity of the lesion. Topical and/or intralesional corticosteroids and mucosal injuries managed by flap surgeries using electro-cautery or soft tissue laser, and wound coverage by periodontal pack are other treatment options. Intraoral lesions caused by acids most of the time remains at superficial level without affecting the basement membrane hence intense irrigation would be sufficient, but in severe cases, surgical debridement becomes necessary.⁽¹⁷⁾

4. Conclusion

Due to the scarcity of data and non-reporting to the NPIC, the exact magnitude with regards to poisoning is not known in India. Oral chemical burns are relatively rare to occur compared to other kind of burns, but in the recent days' exposure and availability of chemicals has increased due to lack of strict regulations. Mishandling and misuse are the main two reasons for adult accidental exposures, but lack of parental monitoring usually results in exposure to children. Allergic/ contact stomatitis can be simple or severe, sometimes with systemic complications and even lethal. Hence prevention and early diagnosis of such accidents can be minimized/avoided by keeping such materials away from children reaching sites. Educating the workers about the



proper handling techniques and conducting awareness programs can prevent the accidental exposures of such harsh chemicals.

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