



## Case Report

## When your lungs get cleaned by Harpic: A case report

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## ABSTRACT

**Introduction:** The use of household cleaning agents as a method of self-harm has been reported in the literature frequently. However, reports of Harpic ingestion a commonly used toilet cleaner is significantly lacking. Due to the ease of access of household cleaning agents, people tend to choose it as quick method of self-harm. The main focus after ingestion of acid is on the digestive tract injury. But due to the tendency to vomit after ingestion of such substance and inhalation of fumes generated there is a high possibility of injury to the respiratory tract as well.

**Case presentation:** Here we present a case of 19-year-old female with injury to the aerodigestive tract presenting with stridor after ingestion of Harpic - a hydrochloric acid-based cleaning solution. In addition to the gastric mucosal injury a diagnosis of chemical pneumonitis was made and her airway was protected in time for her to have a good recovery.

**Discussion:** Inducing vomiting in patients with hydrochloric acid is not advised because it can increase the risk of pulmonary complications as a result of aspiration [8]. Moreover, blind insertion of a nasogastric (Ryle's) tube is not done due to the risk of perforation and induction of regurgitation or vomiting. In few cases steroids have also been tried with no promising results [9]. Since there are no therapeutic standards for caustic injuries, treatment centers on correcting metabolic imbalances, coagulopathy, and emergency surgical intervention for severe injury and late sequelae. However, it is crucial to watch out for aspiration and respiratory tract injury and perform timely protection of the airway.

**Conclusion:** An awareness of the potential impacts of acid ingestion on the respiratory tract with a high level of suspicion towards airway injury and timely protection of airway is crucial for proper management of the patient.

## 1. Introduction

Harpic is a commonly used toilet cleaning solution launched in the UK in the early 1932 and available across the world mainly in South Asia. The main active ingredient in Harpic is Hydrochloric acid (HCL) [1]. Acids cause coagulation necrosis mainly of the stomach and the extent and severity of gastric injury is directly related to the amount of acid ingested, time for which it was in the stomach, concentration of the acid and the amount of gastric content during the ingestion [2]. Strong Acids like HCL produce superficial injuries to the esophagus and deep injuries to various portions of the stomach in contrast to alkali making the prognosis grave. In addition, the treatment of such acid ingestion is quite tricky as we cannot go for the traditional dilution or neutralization method due to extraordinary heat production causing even more

damage [3]. Moreover, inhalation of these chemicals can also result in severe damage, with aerosols causing irritation of the upper respiratory tract, aspiration of the acid causing pulmonary edema, chemical pneumonia, and structural alterations that may result in chronic lung disease and severe impairment of lung function [4].

## 2. Case report

We report a case of 19 year old South Asian female patient student by occupation who was admitted to the ICU of Shree Birendra Hospital, (Nepal Army Institute of Health Sciences) [5], 8 hrs after ingestion of Harpic the major component of it being Hydrochloric acid. She gives a history of intentional ingestion of acid for self harm. She swallowed approximately 30 ml of the substance. Immediately after she had

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multiple episodes of vomiting mixed with blood. She also mentions taking lemon water to neutralize at home given by her parents. After which she had more episodes of vomiting. Upon presenting to the ER via ambulance, she had retrosternal burning sensation associated with retching and tenderness in epigastric region along with muffled voice with stridor. Proton pump inhibitors and antibiotic coverage was initiated. She was also given pain relief by morphine and ondansetron to prevent nausea and subsequent vomiting. She does not give a history of similar episodes in the past and/or medical and surgical interventions. There is no relevant significant family history. A thorough clinical examination was done and she underwent full laboratory and coagulation studies including chest x ray and arterial blood gas analysis. On examination she had bilateral equal air entry and wheeze was present in both lung fields. Her vital signs at presentation were Pulse of 80/min, Respiratory rate of 20/min, Blood pressure of 110/70 mmhg, temp 98 F, and saturation of 98% on RA. Her laboratory studies showed mild leukocytosis of 13,800, Neutrophils 91, Lymphocytes 3. Her total protein was slightly higher of 9.4 g/dl. Her PT/INR value was 17.5/1.3. Her ABG showed Ph of 7.41, Po2 65, Pco2 30.3, Hco3: 20.7, So2 93%. Chest X ray did not show free air under diaphragm. She was kept on Nil per oral and an endoscopy was done on the same day which showed corrosive injury in esophagus and gastric region, Zargar III A classification which means small scattered areas of necrosis.

Zargar Classification	Description
Grade 0	Normal Mucosa
Grade I	Edema and erythema of the mucosa
Grade II A	Hemorrhage, erosions, blisters, superficial ulcers
Grade II B	Circumferential lesions
Grade III A	Focal deep gray or brownish black ulcers
Grade III B	Extensive deep gray or brownish black ulcers
Grade IV	Perforation

Fig. 1: Classification of corrosive induced mucosal injury [13].

Few hours later she had dark brown stool, also her saturation dropped to 90% on RA, she wasn't able to swallow saliva and also developed a fever of 101 f. In regards to the drop in saturation a Contrast Enhanced CT of thorax and abdomen was done and she was transferred to ICU. The CECT report was suggestive of chemical pneumonitis. In the ICU her saturation constantly dropped and was maintained at 90% in Reservoir mask at 15l of O2. Within an hour, her respiratory rate had gone from 20 to 40/min and she was in the verge of respiratory fatigue. To correct hypoxia, prevent respiratory fatigue and airway collapse, she was intubated and put on mechanical ventilation. Her Arterial blood gas had also deteriorated showing PCO2 of 51.5, Ph of 7.25 HcO3 of 20.4 and Po2 of 61.3. After mechanical ventilation her blood gas disorders were corrected, electrolyte abnormalities developed were corrected accordingly. She was kept on mechanical ventilation for 3 days after which she

was extubated following a spontaneous rebreathing trial and feeding was also initiated. Furthermore, the next day she developed a new patch on chest x ray following which antibiotic coverage was extended. She was started on Durataz (piperacillin and tazobactam) 4.5 gm TDS and Clindamycin 600 mg BD. Subsequently sputum gram stain showed gram negative coccobacilli. She gradually regained her voice and got better and was shifted to ward. The patient was followed up in the hospital on one week and one-month time during which a chest x-ray was performed and stool occult blood was sent. The stool occult blood was negative during the follow up period and her chest x ray was clear with no significant changes in the one month follow up period. In her follow up period she was also referred to a psychiatric assessment for future possible attempts of self harm.

### 3. Discussion

Harpic is a commonly used toilet cleaning solution and contains hydrochloric acid (~10%) as the active ingredient, along with butyl oleylamine and others in a water solution [1]. Acute corrosive poisonings are caused by ingestion of corrosive chemicals which are most commonly used as household agents. Intoxications with these kind of agents produce numerous and severe post-corrosive complications of the upper gastrointestinal tract. On the other hand, corrosive agents may also cause injuries of the respiratory system, which makes the treatment very hard and additionally complicates the severe clinical condition of the patient [6]. Chemical pneumonitis, as was present in our patient, can also be seen with corrosive ingestion. It can be caused by aspiration of the caustic compound, through necrotic extension from an extensively injured upper gastrointestinal tract, or through involvement of the mediastinum. Pulmonary edema may also accompany chemical pneumonitis [7]. Respiratory symptoms generally begin in the first few hours after exposure and usually resolve in 2–8 days. Symptoms such as cough and broncho-obstruction may occur shortly after oral intake. Tachypnea, wheezing, and chemical pneumonitis may follow thereafter [8]. In such cases death due to chemical exposure, which is usually related to bacterial infections and other respiratory complications, may ensue [8]. Our patient, who had vomited after accidentally having drunk harpic, developed fever and respiratory signs. Inducing vomiting in such patients is not advised because it can increase the risk of pulmonary complications as a result of aspiration [9]. Blind insertion of a nasogastric (Ryle's) tube is not done due to the risk of perforation and induction of regurgitation or vomiting. Steroids have been tried with no promising results [10]. Though there are no therapeutic standards for caustic injuries, treatment centers on correcting metabolic imbalances, coagulopathy and emergency surgical intervention for severe injury and late sequelae.

### 4. Conclusion

An awareness about the potential impacts of acid ingestion to the respiratory tract is crucial for proper management of a patient. A physician who has an experience about the complication of acid injury will have a high suspicion for the subtle respiratory tract injury which might lead to devastating outcomes and take timely intervention to protect the patient's airway. Moreover, the number of poisonings from corrosive chemicals is inclining, especially in less developed countries with lower health standards. It is one of the important causes of morbidity and mortality in developing countries, where the majority of the cases are suicidal. There has been a total of 1029 cases of suicide due to ingestion of poison in Nepal in the year of 2020–2021 among which 426 cases have been due to poisons whose name has not been classified and this includes household cleaning agents as well [11]. In Ahmedabad, south asian city in India reported Agricultural pesticides (28.5%) followed by household products and cleaning agents (25.3%) were the most common types of poisoning in concurrence with other studies [12]. Easy access to corrosive chemicals for the general public resulted in

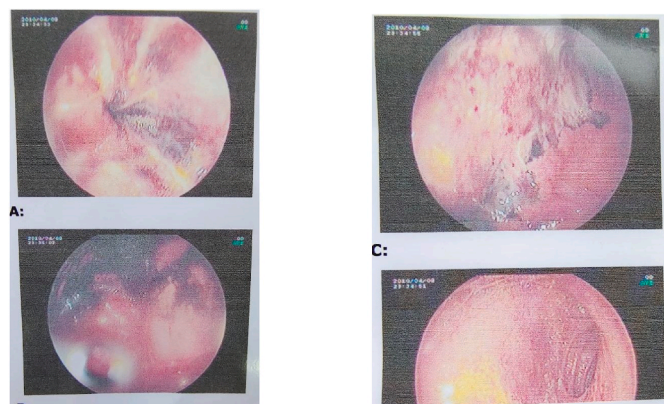


Fig. 1. Endoscopy findings showing necrosis in lower esophageal sphincter and body of the stomach.

increased percentile of post-corrosive complications, which often lead to permanent disability in patients. The lack of appropriate laws for the import, licensing, packing and transport of these dangerous chemicals, made them one of the most commonly abused substances [13].

### Ethical approval

This is a case report for which the consent has been taken from the patient in their native language, all the conditions and the process have been explained to the patient properly and also explained about their authority to decline and withdraw from the study at any given moment. The Consent has been attached.

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### Author contributions

Please specify the contribution of each author to the paper, e.g. study concept or design, data collection, data analysis or interpretation, writing the paper, others, who have contributed in other ways should be listed as contributors.

Abhishek Sharma: Study concept, design, writing the paper.

Aavash Mishra: Study concept design, writing the paper.

Sampada Shrestha: Writing the paper, Reviewing the paper, editing the paper.

Anand Mishra: Data collection.

Amar kumar mahato: Data collection.

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### Registration of research studies

1. Name of the registry:
2. Unique Identifying number or registration ID:
3. Hyperlink to your specific registration (must be publicly accessible and will be checked):

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### Consent

A written consent has been taken from the patient in their native language, all the conditions and the process have been explained to the patient properly and also explained about their authority to decline and

withdraw from the study at any given moment. The consent has been taken for publication of images necessary to this article.

### Patient perspective

I am grateful to have received timely treatment in a big hospital and will follow up as needed to take care of my health.

### Declaration of competing interest

No conflicts of interest is present between any authors, or organizations.

### References

- [1] Harpic, the toilet cleaner. Accessed on 13/01/2014, URL: <http://en.wiki.pedia.org/wiki/Harpic>.
- [2] D. Jurisic, J. Samardzic, B. Hreckovski, V. Bano, T. Jakovina, R. Held, Massive necrosis of the upper gastrointestinal tract with acute gastric perforation and metabolic acidosis after hydrochloric acid (HCl) ingestion, *Zentralbl Chir.* 136 (3) (2011 Jun) 289–290, <https://doi.org/10.1055/s-0030-1262623>. Epub. 2011. Feb. 23. PMID: 21348002.
- [3] E. Gary, Penner, Acid ingestion: toxicology and treatment, *Ann. Emerg. Med.* 9 (Issue 7) (1980) 374–379, [https://doi.org/10.1016/S0196-0644\(80\)80116-8](https://doi.org/10.1016/S0196-0644(80)80116-8). ISSN 0196-0644.
- [4] Rossi A, Grosso C, Bini M, Zanasi G. Ingestione di sostanze caustiche: sintesi clinico patologica e guida al management del paziente in acuto. <http://www.sied.it/files/IngestionedisostanzecaustichesintesclicopatologicaeguidaalmanagementdelpazienteinacutoacuradiAlfredoRossiClaudioGrossoMar taBiniGiulioZanasi.pdf> (last checked 01 november 2016).
- [5] R.A. Agha, T. Franchi, C. Sohrabi, G. Mathew, for the SCARE Group, The SCARE 2020 guideline: updating consensus surgical CASE REport (SCARE) guidelines, *Int. J. Surg.* 84 (2020) 226–230.
- [6] Andon A. Chibishev, et al., Respiratory complications from acute corrosive poisonings in adults, *Mater. Soc. Med.* 26,2 (2014) 80–83, <https://doi.org/10.5455/msm.2014.26.80-83>.
- [7] A. Kumar, R. Chetiwal, P. Rastogi, S. Tanwar, S. Gupta, R. Patnaik, M. Vankayalapati, S. Gupta, A. Arya, Severe esophagitis and chemical pneumonitis as a consequence of dilute benzalkonium chloride ingestion: a case report, *Int. J. Med. Stud.* 9 (3) (2021) 231–234, <https://doi.org/10.5195/ijms.2021.969>.
- [8] M. Jayashree, S. Singhi, A. Gupta, Predictors of outcome in children with hydrocarbon poisoning receiving intensive care, *Indian Pediatr.* 43 (2006) 715–719.
- [9] C.C. Yang, J.F. Wu, H.C. Ong, S.C. Hung, Y.P. Kuo, C.H. Sa, et al., Taiwan national poison center: epidemiologic data 1985–1993, *J. Toxicol. Clin. Toxicol.* 34 (1996) 651–663.
- [10] K.D. Anderson, T.M. Rouse, J.G. Randolph, A controlled trial of corticosteroids in children with corrosive injury of the esophagus, *N. Engl. J. Med.* 323 (1990) 637–640.
- [11] Central Forensic Science Laboratory Nepal, Data from, 2020–2021.
- [12] T. Prajapati, K. Prajapati, R.N. Tandon, S. Merchant, A study of acute poisoning cases excluding animal bites at civil hospital, Ahmedabad, *J. Indian Acad. Forensic Med.* 3 (2) (2013) 120–122.
- [13] Chronic corrosive injuries of the stomach—a single unit experience of 109 patients over thirty years, Ananthakrishnan N, Parthasarathy G, Kate V. *World J. Surg.* 34 (4) (2010 Apr) 758–764.