



Caustic Ingestion in Children in South of Iran: A Two-Year Single Center Study

Seyed Mohsen Dehghani¹, Maryam Bahmanyar^{2,*}, Hazhir Javaherizadeh³

1. Gastroenterohepatology Research Center, Nemazee Teaching Hospital, Shiraz University of Medical Sciences, Shiraz, Iran
2. Department Of Pediatrics, Valiasr Hospital, Fasa School of Medicine, Fasa, Iran
3. Research Center for Infectious Diseases of Digestive System [Alimentary Tract Research Center], Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

ABSTRACT

BACKGROUND

Caustic ingestion is one of the most important injuries during childhood, which leads to serious sequel. In this study, we evaluated the clinical manifestations, endoscopic appearance, complications, and treatment results in patients with caustic ingestion in our hospital.

METHODS

Hospital chart of patients with caustic ingestion who admitted to Nemazee Teaching Hospital affiliated to Shiraz University of Medical Sciences during a 2-year period (2015-2016) were reviewed retrospectively. The age, sex, nature of the caustic agent, clinical presentations, grade of injury in endoscopy, degree of parents' education, site of ingestion, accidental or intentional attempts, complications, and outcomes were reviewed.

RESULTS

In this study the charts of 41 patients (26 boys and 15 girls) with caustic ingestion over the 2-year period were reviewed. The mean age of the patients was 4.4 year. Of them, 95.1% had ingested the materials accidentally, and 2 (4.9%) patients had ingested unknown substances for suicidal attempt. Of all cases, 68.3% of caustic ingestion occurred in the kitchen. 19 (46.3%) agents were acidic substances and 17 (41.5%) were alkali agents. 5 (12.1%) patients ingested unknown substances. 24.3% of the patients were asymptomatic and the most common presentation was drooling (34.14%). 26.8% of the patients had dysphagia, and 24.3% presented with oral ulcer. 7.3% had abdominal pain, 4.8% had fever, and 2.4% had hematemesis. 14 (34.1%) patients had normal feature, 6 (14.6%) had grade I injury, 12 (29.3%) had grade II injury, and 8 (19.5%) had grade III injury in endoscopic evaluation.

CONCLUSION

Most of the caustic ingestion occurred in kitchen. Male was the dominant sex in the caustic injury.

KEYWORDS:

Caustic, Esophageal Dilatation, Esophagus

Please cite this paper as:

Dehghani SM, Bahmanyar M, Javaherizadeh H. Caustic Ingestion in Children in South of Iran: A Two-Year Single Center Study. *Middle East J Dig Dis* 2018;**10**:31-34. doi: 10.15171/mejdd.2017.87.

* Corresponding Author:

Maryam Bahmanyar, MD
Department Of Pediatrics, Valiasr Hospital,
Fasa School of Medicine, Fasa, Iran
Telefax: + 98 71 53315011
Email: maryam.bahmanyar06@gmail.com

Received: 04 Sep. 2017

Accepted: 02 Dec. 2017

INTRODUCTION

Caustic burn is a significant medical concern, which may cause important complications such as esophageal stricture, Barrett esophagus,¹ and gastric outlet obstruction.² Substances with a pH greater than 12 and lesser than 2 are highly corrosive. Most of caustic ingestion in children happen accidentally and is more frequent in male. The most common type of substances that are ingested by children is alkali material.



© 2018 The Author(s). This work is published by Middle East Journal of Digestive Diseases as an open access article distributed under the terms of the Creative Commons Attribution License (<https://creativecommons.org/licenses/by-nc/4.0/>). Non-commercial uses of the work are permitted, provided the original work is properly cited.

Table 1: Classification of caustic ingestion according to endoscopic appearance

Grade 0	No detectable mucosal change
Grade 1	Erythema of mucosa
Grade 2	Erythema, sloughing, ulceration, and non-circumferential exudates
Grade 3	Deep mucosal ulceration and circumferential mucosal sloughing
Grade 4	Eschar, full thickness changes, and perforation

In this study, we evaluated the clinical manifestations, endoscopic appearance, complications, and treatment results in patients with caustic ingestion in our hospital.

MATERIALS AND METHODS

Hospital chart of 41 children with caustic ingestion who admitted to Nemazee Teaching Hospital affiliated to Shiraz University of Medical Sciences during a 2-year period (2015-2016) were reviewed retrospectively.

The age, sex, nature of the caustic agent, clinical presentations, grade of injury in endoscopy, degree of parents' education, site of ingestion, accidental or intentional attempts, complications, and outcomes were reviewed. The severity of caustic ingestion was classified according to endoscopic appearance, based on the accepted Estreta system into 4 grades.³

Patients with grade 0 and 1 were discharged after tolerating feeding but those with grade II and III were observed. After discharge, the patients were visited again at 4 weeks.

During the follow-up visits physical examination and contrast swallow were done and balloon dilatation and/or stent were performed for patients with esophageal stricture. Symptomatic patients who presented with dysphagia, odynophagia, and vomiting were evaluated with esophagogram or endoscopy. All the patients on admission received proton pump inhibitors, but corticosteroid and antibiotic were prescribed for patients with grade II injury according to endoscopic appearance (29.3%).

Ethics Committee of Shiraz University of Medical Sciences approved the study (EC-P-8393-8673).

Data were analyzed using SPSS software version 16 (Chicago, IL, USA) and Chi-square and t tests were used appropriately.

RESULTS

We reviewed the charts of 41 patients with caustic ingestion over the 2-year period. There were 26 (63.4%) boys and 15 (36.6%) girls. The mean age of the patients was 4.4 year. Of all the patients, 39 (95.1%) had ingested the materials accidentally, and 2 (4.9%) patients had ingested unknown substances for suicidal attempt. 68.3% of the caustic ingestions occurred in the kitchen.

Caustic agents were acidic in 19 (46.3%) cases and were alkali in 17 (41.5%) cases. 5 (12.1%) patients ingested unknown substances. 24.3% of the patients were asymptomatic. The most common presentation was drooling (34.14%). 26.8% of the patients had dysphagia, and 24.3% presented with oral ulcer. 7.3% had abdominal pain, 4.8% had fever, and 2.4% had hematemesis.

14 (34.1%) patients had normal feature, 6 (14.6%) had grade I injury, 12 (29.3%) had grade II injury, and 8 (19.5%) had grade III injury in endoscopic evaluation. 48.2% of the patients had esophageal injury and 14.6% had gastric injury. 82.3% the patients with alkali ingestion had esophageal injury.

In our study, 36% of the patients with acid ingestion had esophageal injury and 26.3% had gastric injury. 100% of the patients with alkali ingestion (grade III) had esophageal stricture in the follow-up visit for whom balloon dilatation were done for 8 (19.5%) cases, and esophageal stent was replaced for 4 (9.8%) cases without any complication.

A 1-year-old boy with alkali ingestion presented to our emergency room with very poor condition. He was intubated and referred to pediatric intensive care unit but unfortunately expired.

For a 2-year-old boy with alkali ingestion and esophageal stricture who did not respond to balloon dilatation after three times, colon interposition was performed. In the follow-up visit he had stricture in the site of anastomosis so balloon dilatation was done for him in seven sessions.

One patient developed esophageal perforation during endoscopy who was referred to operation room.

DISCUSSION

In the current study, alkali ingestion constituted 41.5% of the cases. But in the study by Honar and colleagues during 2006-2011, alkali ingestion was seen in

63% of the cases.⁴ In the study by Rafeey and Shoaran which was published in 2008, of the 51 children with caustic ingestion, 43 (84.3%) were due to alkali material.⁵ In another study done from 2011 to 2013, 30.8% of the caustic ingestion was alkali material.⁶ As a result, we see a decreasing trend of caustic ingestion with alkali material during 2006-2016.

Accidental ingestion of caustic material constitutes 95.1% of the cases in our study. In the study by Riffat and Cheng, 98% of caustic ingestions were due to accidental causes.⁷

The most common presentation in our study was drooling. Dysphagia was the most common symptom in the study by Honar and co-workers.⁴

In our study, 24.3% were asymptomatic. In the study by Lamireau and colleagues from France, 57% of the cases, had no symptom.⁸ They concluded that endoscopy was not recommended for children living in developed countries who were asymptomatic after accidental caustic ingestion.⁸ In another study from our country, 69 of 75 cases with caustic ingestion were symptomatic.⁴

Among 41 patients in our study, 12 (29.26%) patients had esophageal stricture that underwent esophageal dilatation or stenting. In the study by Kucuk and co-workers on 154 children with caustic ingestion, 20 (12.98%) children developed esophageal stricture.⁹ In the study by Karaman and others,¹⁰ stricture development rate was 13.5%, which is similar to our study. In the study by Honar and colleagues, 20% of children developed esophageal stricture during the follow-up period.⁴ These differences may be due to difference in the severity of esophageal injuries between patients in different studies. In the study by Karaman and others, early endoscopy was not used.¹⁰

Male sex was predominant in the caustic injury in our study. Honar and co-workers reported the similar results, which is about 68%.⁴ In another study from Turkey, male sex was the predominant sex with slight difference.⁹ In the study by Riffat and Cheng, of 50 cases, 28 were male, which is similar to other studies.⁷ In the study by Karaman and others, male was also the dominant sex.¹⁰ Similar finding was also reported by Urgancy and colleagues.¹¹

In our cases, corticosteroid was given to children with caustic ingestion grade 2b or higher. Some studies report

the ongoing use of steroids as the standard treatment for all cases with caustic ingestion.^{7,12}

Mortality in our study was a 1-year-old boy and in the study by Honar and co-workers was a 2-year-old boy.⁴ Mortality following caustic ingestion was reported between 0 to 0.6% in different studies.^{10,13} The rate of mortality was not changed from 2006 to 2016 in these two studies.

ACKNOWLEDGEMENTS

This research was supported by the Vice Chancellor for Research Affairs, Shiraz University of Medical Sciences (Registration no#93-01-13-8673).

Source of funding

This study was supported by Shiraz University of Medical Sciences

Authors' contribution

Dehghani SM: Main idea, supervision of research, data collection, and revision of the final draft, Bahmanyar M: Data collection and writing draft; Javaherizadeh: Writing discussion, revision of the manuscript, revision of the final manuscript, and final approval.

ETHICAL APPROVAL

There is nothing to be declared.

CONFLICT OF INTEREST

The authors declare no conflict of interest related to this work.

REFERENCES

1. Andreollo NA, Lopes LR, Terciotti V, Jr., Brandalise NA, Leonardi LS. [Barrett's esophagus associated to caustic stenosis of the esophagus]. *Arq Gastroenterol* 2003;**40**:148-51.
2. Dehghani SM, Aldaghi M, Javaherizadeh H. Endoscopic pyloroplasty for severe gastric outlet obstruction due to alkali ingestion in a child. *Gastroenterol Hepatol Bed Bench* 2016;**9**:64-7.
3. Estrera A, Taylor W, Mills LJ, Platt MR. Corrosive burns of the esophagus and stomach: a recommendation for an aggressive surgical approach. *Ann Thorac Surg* 1986;**41**:276-83.
4. Honar N, Haghghat M, Mahmoodi S, Javaherizadeh H, Kalvandi G, Salimi M. Caustic ingestion in children in

- south of Iran. Retrospective study from Shiraz - Iran. *Rev Gastroenterol Peru* 2017;**37**:22-5.
5. Rafeey M, Shoaran M. Clinical characteristics and complications in oral caustic ingestion in children. *Pak J Biol Sci* 2008;**11**:2351-5. doi: 10.3923/pjbs.2008.2351.2355.
 6. Sabzevari A, Maamouri G, Kiani MA, Saeidi M, Kianifar HR, Jafari SA, et al. Clinical and endoscopic findings of children hospitalized in Qa'em Hospital of Mashhad due to caustic ingestion (2011-2013). *Electron Physician* 2017;**9**:4248-50. doi: 10.19082/4248.
 7. Riffat F, Cheng A. Pediatric caustic ingestion: 50 consecutive cases and a review of the literature. *Dis Esophagus* 2009;**22**:89-94. doi: 10.1111/j.1442-2050.2008.00867.x.
 8. Lamireau T, Rebouissoux L, Denis D, Lancelin F, Vergnes P, Fayon M. Accidental caustic ingestion in children: is endoscopy always mandatory? *J Pediatr Gastroenterol Nutr* 2001;**33**:81-4.
 9. Kucuk G, Gollu G, Ates U, Cakmak ZA, Kologlu M, Yagmurlu A, et al. Evaluation of esophageal injuries secondary to ingestion of unlabeled corrosive substances: pediatric case series. *Arch Argent Pediatr* 2017;**115**:e85-e88. doi: 10.5546/aap.2017.eng.e85.
 10. Karaman I, Koç O, Karaman A, Erdogan D, Çavusoglu YH, Evrim Afsarlar Ç, et al. Evaluation of 968 children with corrosive substance ingestion. *Indian J Crit Care Med* 2015;**19**:714-8. doi: 10.4103/0972-5229.171377.
 11. Urganci N, Usta M, Kalyoncu D, Demirel E. Corrosive substance ingestion in children. *Indian J Pediatr* 2014;**81**:675-9. doi: 10.1007/s12098-013-1170-0.
 12. Temiz A, Oguzkurt P, Ezer SS, Ince E, Hicsonmez A. Predictability of outcome of caustic ingestion by esophago-gastroduodenoscopy in children. *World J Gastroenterol* 2012;**18**:1098-103. doi: 10.3748/wjg.v18.i10.1098.
 13. Previtera C, Giusti F, Guglielmi M. Predictive value of visible lesions (cheeks, lips, oropharynx) in suspected caustic ingestion: may endoscopy reasonably be omitted in completely negative pediatric patients? *Pediatr Emerg Care* 1990;**6**:176-8.