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Research Article

Management of Caustic Esophageal Stricture - A 10 Year Followup Study from the Developing World

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Abstract

Introduction: Corrosive substance ingestion is commonly noted in the developing as well as the developed world, with children accounting for around 80% of the cases. Majority of these cases are accidental, while in adults are mostly due to suicidal intent.

Aims: We tried conducting an audit of patients diagnosed with corrosive ingestion, classifying them according to the Zarger classification, and outlined how they were managed

Materials and Methods: We hereby in our study followed 21 patients over a period of 10 years and classified them and looked at their treatment along with their outcomes.

Results: Majority of whom belonged to the pediatric age group with acid ingestion seen in most of them. On EGD most of these patients fell in Zargers class IIA. Dilation via savary dilator was done in most cases with triamcinolone being used in refractory cases.

Conclusion: Hence our study highlights the timely management of caustic strictures is needed, with steroids being useful in refactory strictures.

Keywords: Caustic Ingestion; Savary Dilator; Suicide; Accidental Ingestion; Zarger's Classification

Introduction

Ingestion of corrosive substances is an important public health issues not only for the developed world but also in the developing countries, where their numbers are increasing steadily [1,2].

Globally, children are the main population that are affected and represent about 80% of the cases, with caustic ingestion in them being mainly due to accidental causes [3,4]. In adults, cases of caustic ingestion are mostly due to suicidal intention and are life threatening most of the time [5].

Methods

This study was conducted retrospectively over a 10 year period at the department of Hepato-gastroenterology, Sindh Institute of Urology and Transplantation, SIUT, Karachi, Pakistan. All those patients admitted with suspicion of caustic ingestion were included in this study. Patients record were check for baseline laboratory parameters, chest Xray/XR abdomen and any endoscopy interventions. Later on the endoscopic videos were reviewed and the zarger classification was noted. Stricture location and length was also acknowledged. Finally, any documented complications were also noted. Later on the treatment implemented was also noted.

Results

Twenty one patients (21) were included in our study, with the mean age of all the patients being 21 ± 19.4 years. Out of these twenty one, 12(57.1%) were males while the rest were females (As shown in Table 1).

Table 1: Baseline characteristics of study population and treatment outcome.

Characteristics	N (%); Mean ± SD
Age	21.4 ± 19.5
Gender Male Female	 12(57.1%) 9 (42.9%)
Acid	14(66.7%)
Alkali	7 (33.3%)
Accidental	14 (66.7%)
Suicidal	5 (23.8%)
Simple	17 (81%)
Complex	4 (19%)
Complete Resolution	18 (4.8%)
Gastrojujenostomy	3 (14.3%)
Perforation	1 (4.8%)
Zargars class I	1 (4.8%)
Zargars class IIA	12 (57.1%)
Zargars class IIB	8 (38.1%)

More than half of these patients fell in the pediatric age group that is 11/21 (52.4%). Acid ingestion was seen in 14(66.7%) cases, while 7(33.3%) of these patients had alkali ingestion. Accidental corrosive intake was found in 16(76.2%) patients, however 5(23.8%) patients had taken it with a suicidal intent.

Standard gastroscope was negotiated in 15(71.4%) patients while in 6(28%) cases a guidewire was negotiated under fluoroscopy beyond the stricture.

Most of our patient fell in the Zargar's class IIA that is 12 cases (57.1%) followed by zargar's class II B seen in 8(38.1%) cases.

Twelve (57.1%) patients had stricture length of more than 4cm while 9(42.9%) patients had a stricture length less than 4cm in length (As see seen in Table 2).

Table 2

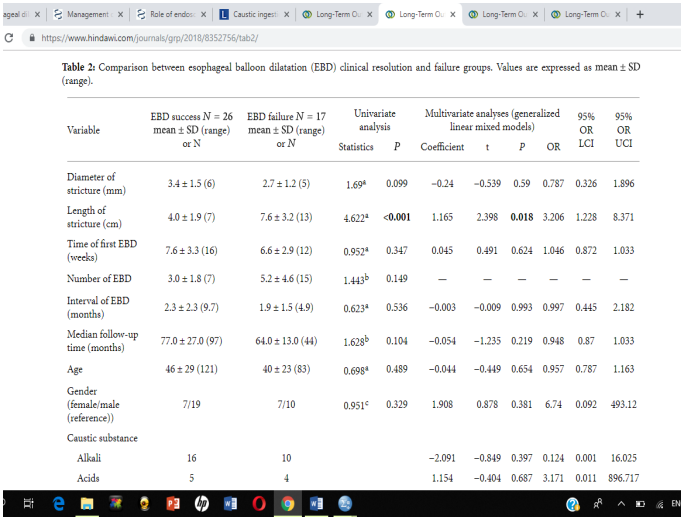

Table 2: Comparison between esophageal balloon dilatation (EBD) clinical resolution and failure groups. Values are expressed as mean ± SD (range).

Variable	EBD success $N = 26$ mean ± SD (range) or N	EBD failure $N = 17$ mean ± SD (range) or N	Univariate analysis		Multivariate analyses (generalized linear mixed models)				95% OR LCI	95% OR UCI
			Statistics	P	Coefficient	t	P	OR		
Diameter of stricture (mm)	3.4 ± 1.5 (6)	2.7 ± 1.2 (5)	1.69[a]	0.099	−0.24	−0.539	0.59	0.787	0.326	1.896
Length of stricture (cm)	4.0 ± 1.9 (7)	7.6 ± 3.2 (13)	4.622[a]	**<0.001**	1.165	2.398	**0.018**	3.206	1.228	8.371
Time of first EBD (weeks)	7.6 ± 3.3 (16)	6.6 ± 2.9 (12)	0.952[a]	0.347	0.045	0.491	0.624	1.046	0.872	1.033
Number of EBD	3.0 ± 1.8 (7)	5.2 ± 4.6 (15)	1.443[b]	0.149	—	—	—	—	—	—
Interval of EBD (months)	2.3 ± 2.3 (9.7)	1.9 ± 1.5 (4.9)	0.623[a]	0.536	−0.003	−0.009	0.993	0.997	0.445	2.182
Median follow-up time (months)	77.0 ± 27.0 (97)	64.0 ± 13.0 (44)	1.628[b]	0.104	−0.054	−1.235	0.219	0.948	0.87	1.033
Age	46 ± 29 (121)	40 ± 23 (83)	0.698[a]	0.489	−0.044	−0.449	0.654	0.957	0.787	1.163
Gender (female/male (reference))	7/19	7/10	0.951[c]	0.329	1.908	0.878	0.381	6.74	0.092	493.12
Caustic substance										
Alkali	16	10			−2.091	−0.849	0.397	0.124	0.001	16.025
Acids	5	4			1.154	−0.404	0.687	3.171	0.011	896.717

Most of stricture were found in proximal esophagus seen in 14 patients (66.7%) followed by mid esophagus noted in 5(23.8%), while only 2(9.5%) had stricture in distal esophagus.

The rule of three was followed for esophageal dilatation in all patients and maximum dilatation was performed upto 15mm in the adult population and upto 12.8 mm in the pediatric population.

Triamcinolone was injected in 6(28.6%) of the cases, particularly in those patients having a complicated stricture.

A total number of 428 sessions of dilatations were performed in 21 patients. The numbers of dilatations required by the patients' ranged from a minimum of 3 to a maximum of 59 sessions. Patients over all required 20 ± 16.6 sessions of dilatations.

Complete resolution of stricture was noted in 18(85.7%) patients while 3(14.5%) patients with complex stricture still require dilatations (As shown in Figure 1).

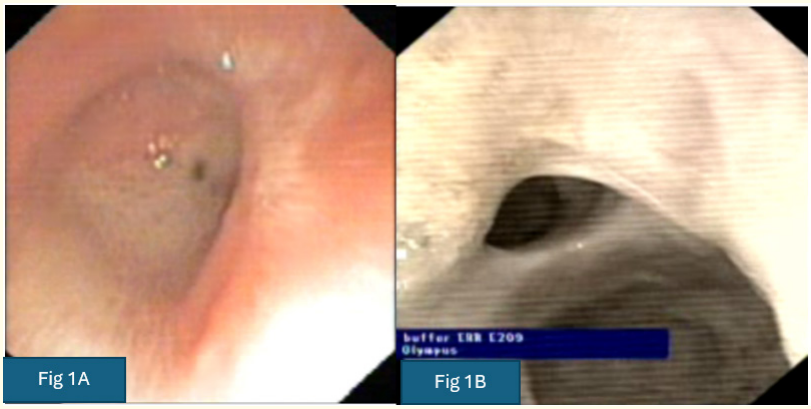

Figure 1: Figure 1a. Simple esophageal stricture following corrosive intake. Figure 1b: Complicated esophageal stricture associated with diverticula.

Resolution dysphagia noted in 6(28.6%) patients within 12 months of treatment while 14(66.6%) became dysphagia free status in 12-18 months of treatment.

Mean length of stricture was 7.3 ± 4.5 cm and range of number of dilatation required was 4 to 59 sessions.

Over all pediatric patients required less number of session as compare to adults (p value = 0.008). Four patients had complex stricture. Complex stricture (p = 0.018) and stricture longer then 10 cm (p = 0.028) required more sessions of dilatations.

Six patients had associated pyloric stenosis, managed via CRE balloon dilatation and while two required gastrojujenostomy. One patients developed minor perforation during the procedure and managed conservatively via bowel rest, parenteral nutrition and intravenous antibiotic.

Discussion

Caustic substances that are ingested are either acidic or alkaline, with acidic injuries being more common in the developing and alkaline injuries being more evident in the developed world.[6] The type of tissue damage produced by these two substances varies, with acidic injuries causing coagulative necrosis while alkaline injuries resulting in liquefactive necrosis [6].

Ingestion of a strong acid causes more systemic manifestations like disseminated intravascular coagulation (DIC), renal failure and liver problems [7].

After caustic ingestion an immediate upper esophagogastroduodenoscopy (EGD) should be done to evaluate for the extent of damage to the oropharynx, the esophagus and the stomach [8].

Injuries following caustic ingestion ranges from a minimal mucosa erythema to transmural necrosis of the esophagus along with the stomach and even perforation of the involved organ [9].

Following recovery from the initial injury, esophageal stricture develops in around 5-12% of the cases, despite of receiving good initial treatment [10].

Acids and alkalis vary in their characteristics and mode of tissue damage, with alkalis being odourless and tasteless and hence are taken in a larger amount and have a tendency to cause deeper tissue damage [11]. On the other hand, acids have a pungent odour along with an unpleasant taste and are taken in a small quantity, being swallowed immediately upon ingestion [11].

Following a caustic intake, an EGD done within 12 hours up to 24 hours is considered safe and is not recommended after 2-3 days upto 2 weeks post ingestion due to the softness of the wound [12].

The mucosal damage following caustic ingestion is graded by using the Zarger's classification [12].

According to Zarger's classification, Grade 0 shows normal mucosa, Grade I depicts edema and erythema, Grade IIA hemorrhage, blisters and erosions along with ulcers that are superficial. Grade II B are circumferential ulcers. Grade III A focal deep gray or brown black ulcers, III B are extensive deep gray or brown black ulcers. While Grade IV is perforation [13].

The main treatment option available for these strictures are graded dilation, with dilations commencing immediately once the presence of stricture has been confirmed [10]. Other options include stent placement, surgical resection and esophageal replacement [14]. Poor predictors of outcome include a delay in initiation of dilation following diagnosis [10].

In-order to decrease the rate of perforation with a rigid scope an EGD along with a endoscopic ultrasound (EUS) with a high frequency catheter can be used [15]. The degree of esophageal injury seen at endoscopy predicts the risk of complication and even death [13]. Kochhar., *et al*. in their study of 71 patients having benign esophageal stricture showed that giving intralesional steroids in all types of stricture resulted in a lower rate in the number of esophageal dilation sessions [16]. Chorbaporn., *et al*. in their study showed that only a fifth of their patient responded to dilatation, with majority of them requiring endoscopic reconstruction [17].

Conclusion

Caustic esophageal strictures (CES) can be successfully managed via savary dilatations, long and complicated stricture required more sessions of dilatations while pediatric patients are better responders to treatment.

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Conflict of Interest

None.

Bibliography

1. Ghelardini C., *et al*. "Investigation into atropine-induced antinociception". *British Journal of Pharmacology* 101 (1990): 49-54.

2. Ekpe EE and Ette V. "Morbidity and mortality of caustic ingestion in rural children: experience in a new cardiothoracic surgery unit in Nigeria". *ISRN Pediatrics* 2012 (2012): 210632.

3. Gumaste VV and Dave PB. "Ingestion of corrosive substances by adults". *American Journal of Gastroenterology* 87 (1992): 1.

4. Watson WA., *et al*. "Annual report of the American Association of Poison Control Centers Toxic Exposure Surveillance System". *American Journal of Emergency Medicine* 23 (2004): 589-666.

5. Contini S and Scarpignato C. "Caustic injury of the upper gastrointestinal tract: a comprehensive review. *World Journal of Gastroenterology* 19.25 (2013): 3918-3930.

6. Zargar SA., *et al*. "Ingestion of corrosive acids. Spectrum of injury to upper gastrointestinal tract and natural history". *Gastroenterology* 97 (1989): 702-707.

7. Poley JW., *et al*. "Ingestion of acid and alkaline agents: outcome and prognostic value of early upper endoscopy". *Gastrointestinal Endoscopy* 60 (2004): 372-377.

8. Katzka DA. "Caustic Injury to the Esophagus". *Current Treatment Options in Gastroenterology* 4.1 (2001): 59-66.

9. Browne Y Dale and Thompson N James. "Caustic ingestion in the book of pediatric otolaryngology head & neck surgery". In: edited by Charles W, Cummings, John M, Fredrickson , Lee A, Richardson David E Schuller., editors. 3th edition. volume 5 . Mosby-year book Inc (1998): 366-376.

10. Rajabi MT., *et al*. "Corrosive injury of the upper gastrointestinal tract: review of surgical management and outcome in 14 adult cases". *Iranian Journal of Otorhinolaryngology* 27.78 (2015): 15-21.

11. De Lusong MAA., *et al*. "Management of esophageal caustic injury". *World Journal of Gastrointestinal Pharmacology and Therapeutics* 8.2 (2017): 90-98.

12. Cheng HT., *et al*. "Caustic ingestion in adults: the role of endoscopic classification in predicting outcome". *BMC Gastroenterology* 8 (2008): 31.

13. De Lusong MAA., *et al*. "Management of esophageal caustic injury". *World Journal of Gastrointestinal Pharmacology and Therapeutics* 8.2 (2017): 90-98.

14. Geng LL., *et al*. "Long-Term Outcomes of Caustic Esophageal Stricture with Endoscopic Balloon Dilatation in Chinese Children". *Gastroenterology Research Practice* (2018): 8352756.

15. Chiu HM., *et al*. "Prediction of bleeding and stricture formation after corrosive ingestion by EUS concurrent with upper endoscopy". *Gastrointestinal Endoscopy* 60 (2004): 827-833.

16. Zhang YW., *et al*. "Efficacy and Safety of Endoscopic Intralesional Triamcinolone Injection for Benign Esophageal Strictures". *Gastroenterology Research Practice* (2018): 7619298.

17. Chobarporn T., *et al*. "Endoscopic and surgical treatment of refractory caustic esophageal strictures". *Surgical Endoscopy* 39.7 (2025): 4513-4524.