IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 16, Issue 12 Ver. II (Dec. 2017), PP 30-35
www.iosrjournals.org

Corrosive Injury To Upper Gastrointestinal Tract – Management Strategy And Outcome – Experience In A Tertiary Care Hospital of West Bengal

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Abstract
Introduction: *Corrosive ingestion for suicidal purpose is common in Indian society. Mucosal injury begins immediately after corrosive ingestion and continue for a variable period resulting into mild to severe complications. These complications affect the nutritional status and psychological condition of the patients reducing their quality of life.*
Objective: *to explore the management strategy, long and short term complications and their final outcome.*
Methodology: *A prospective study was conducted in the Department of Cardiothoracic Surgery at RGKar Medical College & Hospital, Kolkata among patients with corrosive injury.*
Results: *Female patients clearly outnumbered the male Most of the female patients belonged to second to fourth decade of life. Dysphagia was the commonest complaint. Procedures like oesophageal dilatation, feeding jejunostomy, gastrojejunostomy, colonic transposition was performed. 18.7% of patients were completely cured &71.4% were relatively symptom free. Mortality was observed to be 4.5%.*
Conclusion: *So the patients need individualized treatment and psychological counseling from time* to time.
Keywords: *corrosive injury, oesophageal stricture, dysphagia, dilatation, feeding jejunostomy.*

Date of Submission: 21-11-2017 Date of acceptance: 07-12-2017

I. Introduction

Injury to upper gastrointestinal tract following corrosive, acid or alkali, ingestion is a common problem throughout the world and particularly in eastern part of India. Young females are commonly the victims and suicidal ingestion is by far the commonest [1]. In India majority of the injuries are due to the easy availability of cheap corrosive acids.(2,3). The amount and nature of the damage depend on several factors like quantity and concentration of the corrosive agent ingested, presence of food in the stomach, time to reach the hospital etc. Mucosal injury begins immediately after caustic ingestion characterized by necrosis, hemorrhagic congestion secondary to thrombus formation in the small vessels. These reactions continue for approximately 4 to 7 days when mucosal sloughing, bacterial invasion, granulation tissue and collagen deposition occur. The healing process typically begins three weeks after ingestion A significant number of patients die during the early period due to corrosive burn causing damage to the airways, mediastinitis, injury to the abdominal organs, electrolyte imbalance, sepsis etc. Patients who survive the initial trauma usually suffer for prolonged period due to various affections of the upper gastrointestinal tract, repeated surgical interventions and various complications arising out of the surgical procedures. The patients are initially admitted usually in emergency observation ward or medicine ward and ultimately referred to cardiothoracic surgery unit or dedicated G.I. Surgery unit for definitive management. Timely management of esophageal stricture is important because strictures reduces the quality of life of patients by increasing the risks of dysphagia, nutritional imbalance, weight loss and pneumonia due to aspiration. Most commonly the corrosive ingestion occurs for suicidal purpose. Proper psychiatric treatment is very crucial in order to continue the definitive management which often requires prolonged hospitalization or repeated hospitalizations, multiple or repeated surgical procedures and many a times yielding poor or suboptimal results. Therefore, cooperation and patience of the patient and relatives throughout this long period of treatment are extremely essential. This study was carried out to explore the management strategy, long and short term complications and their final outcome among patients with corrosive injury of upper gastrointestinal tract.

II. Methodology

This is a prospective study which was conducted in the Department of Cardiothoracic Surgery at RGKar Medical College & Hospital, Kolkata. All cases with history of corrosive ingestion who attended the OPD or were referred between September 2013 to August 2015 were considered for the study. Ethical clearance was obtained from institutional ethical committee. Informed consent was taken from the participants. A predesigned pretested schedule was used for data collection which included the nature of injury, clinical presentations, treatment undergone, complications and their outcome. Follow up was done at regular intervals. Proportions were used for data presentation.

III. Results And Analysis

In this study, 112 patients of corrosive injury to upper gastro intestinal tract were observed over 2 years spanning from September 2013 to August 2015. Female patients clearly outnumbered the male counterparts as only 16 patients were male. Most of the female patients belonged to second to fourth decade of life. Among male patients no such age preponderance could be marked out. Adolescent girls and women in their early second decade were found to be most vulnerable. We had treated a 4 year old girl child in whom the corrosive agent was consumed accidentally. For most of the patients, particularly among the female population the corrosive agent was taken for suicidal purpose. The corrosive agent was mostly acid – either muriatic acid or commercially available toilet cleaning agent 'Harpic'. In one patient the agent was lime water which is a strong alkali.(Fig 1& 2)

Esophagus was damaged in all patients. Majority (84.8%) of the patients suffered from dysphagia of varying degree at least in some stage of the clinical course. Stricture of esophagus of varying severity was noted affecting short or long segments and involving upper, middle and lower third including the gastroesophageal junction. (table-3)

Figure 1: Age and sex distribution of the patients studied

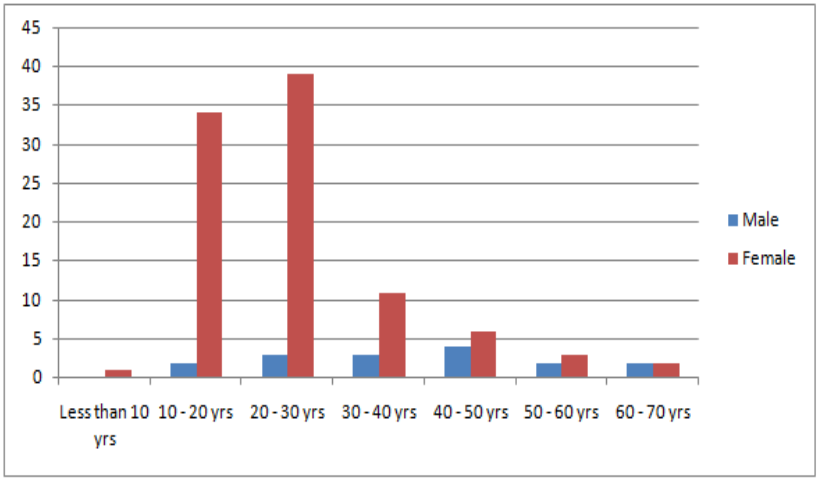

Figure 2: Nature of injury among the patients

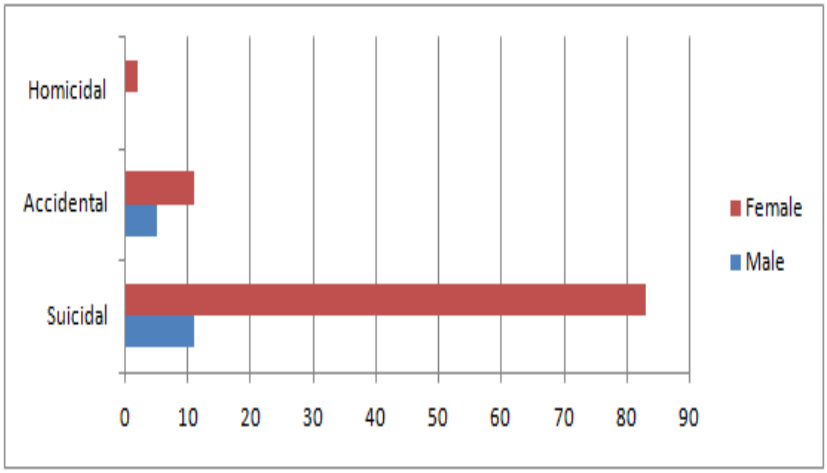

Table 3: Predominant symptoms of the patients under study.

Predominant symptom	**No. of patients**
Dysphagia	95
Gastric outlet obstruction (vomiting)	32

Table 4 depicts the various surgical procedures performed. Esophageal dilatation was performed 1561 times during the study period. Most of the patients required periodic dilatations at an interval varying from 2 weeks to 3 months. Esophageal dilatation was done with malleable gum elastic bougies of gradually increasing diameter. Although it may be done without anesthesia as self dilatation by the patient is reported in some literature, we prefer the procedure to be performed under general anesthesia. The advantages are the procedure is painless, and provides adequate muscle relaxation. The dilators should be gently maneuvered and extreme caution and precision is required. The procedure is simple, nevertheless, we recommend only experienced person to do it. Accidental perforation of esophagus during dilatation is the common but most dreaded complication and at times may be fatal. The causes are lack of serous coat in esophagus and the fibrotic process affects various parts of it unevenly and irregularly.

The procedure was usually performed as day care case and patients were discharged after 3 to 4 hours of observation period. Most of the patients required dilatation at an interval of 3 to 6 weeks. Few patients needed it at longer intervals of 3 to 4 months also. We routinely performed the first esophageal dilatation at least 6 weeks after the injury. Any intervention earlier than this carries very high risk of iatrogenic esophageal perforation. In few patients periodic esophageal dilatation itself was curative; in the sense that they remained symptom free when followed up over a period of at least 2 years. But, we had found that patients may develop dysphagia even after a long interval. The cause of this might be ongoing fibrosis of the esophagus in a very slow but sustained manner.

Anterior gastrojejunostomy was performed on 32(28.5%) patients with gastric outlet obstruction. Colon transposition was carried out in 30 patients. Most of our patients had already had feeding jejunostomy performed on them when they reported to our department. Feeding jejunostomy was usually performed at general surgery unit 2-3 weeks after corrosive ingestion. Nevertheless, we performed feeding jejunostomy on 15 patients who developed near absolute dysphagia relatively late. Feeding jejunostomy was done on 78 (69.6%) patients of our study population to maintain nutrition.

Table 4: Operations performed among study subjects

Operations performed	**No. of patients/ times**
Esophageal dilatation	1561 times
Feeding jejunostomy	78 patients
Gastrojejunostomy	32 patients
Colon transposition	30 patients

Table 5 represents the various post-operative complications encountered in the study. Esophageal perforation occurred in 30 patients (out of the 1561 times the procedure performed). Most of the patients were managed conservatively and they recovered well. Two patients, however, died due to uncontrolled sepsis, malnutrition etc. 5 patients of the gastrojejunostomy group developed surgical site infection, 2 patients had reactionary hemorrhage, and there was no incidence of anastomotic leak. These complications were mostly managed conservatively; one patient had repeat surgery in the form of secondary suturing of burst abdomen under general anesthesia.

Table 5: Post-operative complications observed among patients

Operations	**Procedure related complications**
Esophageal dilatation - 1561 times	Esophageal perforation – 30
Gastrojejunostomy – 30	Surgical site Infection – 5
	Bleeding – 2
Colon transposition – 30	Graft necrosis - 2
	Anastomotic leak- 4
	Anastomotic stricture – 4
	Pulmonary complications - 6
	Mortality – 2

Colon transposition is a complex procedure and many a times is associated with minor or major complication in the post operative period. The commonest problem encountered was pulmonary complications. The worst problem encountered was anastomotic leak especially of the pharyngo or esophago-colonic

anastomosis. That led to persistent discharging sinus at neck or sometimes serious and life-threatening mediastinitis.

Most of the times it healed spontaneously, required adequate drainage of the collection and broad spectrum antibiotics, but almost always led to stricture formation. Treatment of this type of stricture was indeed difficult, required careful dilatation by bougies or endoscopic balloon dilatation. Sometimes, however, redo surgery, i.e. refashioning or reconstruction of the anastomosis was needed usually through sternotomy or even manubriectomy was done in one patient.

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Table 6: Outcome of the treated patients

Outcome	**No. of patients (%)**
Cured	21 (18.7%)
Relatively symptom-free	80 (71.4%)
Oral intake of food not established	06 (5.4%)
Mortality	05 (4.5%)
Total	112 (100%)

21 patients remained absolutely symptom-free when followed up for a period of at least 2 years and were declared cured. Majority of the patients (80 out of 112) lead a relatively symptom-free life mainly requiring esophageal dilatation either regularly or occasionally. In 6 patients oral route for food intake could not be established, 2 of them had undergone colon transposition, but developed graft necrosis. They are undergoing treatment till now and are planned for redo surgery with left sided colon to restore the continuity of gut. In 2 patients there is near absolute dysphagia due to anastomotic stricture after colon transposition. The remaining 2 patients are having absolute dysphagia due to impassable stricture but major surgery in the form of colon transposition could not be performed due to very poor nutritional status. Out of the 5 patients who have died during the study period 2 had iatrogenic perforation of esophagus, 2 had undergone colon transposition (both had pulmonary complications and sepsis) and 1 patient committed suicide.

IV. Discussion

Various studies across the world have demonstrated wide variations in terms of the age and sex distribution of the patients of corrosive ingestion. In a study reported by Jin Hyoung Kim, Ho-Young Song, et al over a period of 1987 to 2006 from Seoul, Korea 1, it was noted that out of 117 patients 41(35.04%) were men and 76(66.7%) were women, and the age range was 18–83 yrs (median, 45 yr). The corrosive agent was acid in 61 cases; i.e., acetic acid or hydrochloric acid, sodium hydroxide in 50 cases and others in 6 patients [4]. But in another study reported by Tom R Demeester university of Southern California school of medicine male patients were more in number than the female patients. [5]. In adults for all practical purposes the corrosive ingestion occurs for suicidal purpose, but in children it is mainly accidental in nature. In a study at the Department of Pediatric Surgery, All India Institute of Medical Sciences, New Delhi, India it was observed that all cases of corrosive ingestion were accidental [6].

Dysphagia following corrosive ingestion is managed in many centers by endoscopic balloon dilatation. Jin Hyoung Kim, Ho-Young Song et al. had classified esophageal strictures according to location and extent as stricture in the cervical esophagus, upper thoracic esophagus, middle thoracic esophagus, lower thoracic esophagus, entire thoracic esophagus or multiple strictures sites [4]. Although endoscopic dilatation is an effective mode of treatment, we did not perform this procedure in any of our patients. In a study on stricture esophagus due to all benign conditions performed by Qureshi S et. al it was seen that only 81.4% corrosive strictures could be adequately dilated at initial dilatation as compared to 100% in cases of peptic strictures and there were 4 cases of procedure related perforations – all in corrosive stricture patients [7]. An UK regional audit reported an overall perforation rate of 2.6% with a mortality of 1%. Elderly patients appeared more at risk. The risks are also greater when the endoscopist is inexperienced and when strictures are complex, particularly when weighted bougies are passed blindly [8]. In our study the perforation rate was noted to be 1.92% which is comparable.

In a series of patients with corrosive stricture of stomach surgeons of the dept. of surgical gastroenterology, SGPGI, Lucknow, India performed procedures like distal, subtotal or total gastrectomy, stricturoplasty and gastrojejunostomy [9]. We, however, avoided any kind of stomach resection in our patients and performed only gastrojejunostomy. For patients with long segment or impassable strictures, replacement with suitable conduit is practiced routinely. Javed et al at AIIMS, India have performed transhiatal resection of the native esophagus in 59(95.2%) patients [10]. In another study in 1989 Dr. Chattopadhyay had opined that the only feasible treatment for long segment corrosive stricture of esophagus would be replacement with suitable conduits without wasting much time for dilatation [11].

Important early complications of colon transposition operation are necrosis of a part or whole of the intestinal graft, pulmonary complications like pneumothorax, collapse, consolidation of portions of lung, anastomotic dehiscence at the esophago-colonic anastomosis leading to salivary fistula at neck, anastomotic stricture at cervical esophagus, injury to the recurrent laryngeal nerve leading to hoarseness of voice etc. Of these the most serious is of course graft necrosis. several factors are implicated for this. They are incorrect assessment of the vascularity of the graft at surgery, undue tension on the vascular pedicle while mobilizing and placing the graft, torsion of the vascular pedicle, constriction of the graft at diaphragmatic hiatus or at neck etc [12]. The management of choice is repeated operation – removal of the necrotic graft, mediastinal and peritoneal drainage, formation of a salivary fistula in the cervical esophagus, management of the opening in the stomach or jejunum after removing the graft and formation of a decompressing fistula [13,14]. The common late complications are anastomotic stricture at neck, reflux from the colon conduit, herniation of the colon into any of the pleural spaces, diverticula in the region of cervical anastomosis, benign or malignant tumors in the intestinal conduit etc.

Heinrich Fürst, Wolfgang Hugo Hartl et al had reported that the in hospital mortality after colon transposition surgery was around 7% [15]. Various studies have demonstrated that the anastomotic leak rate may vary from 2% to 7% [16,17,18]. In our series of patients the rate of anastomotic leak was noted to be around 13.33% which seems a bit higher. The incidence of anastomotic stricture was also around 13.33% (4 out of 30), which is at par with other studies reporting similar complications [19,20]. 3 patients were managed with repeated dilatation of the anastomosis, but one patient required reexploration – manubriectomy and reconstruction of the anastomosis. Various studies have reported varying mortality trend among the patients with corrosive injury to upper g.i.tract [21,22]. The overall mortality in our study was 6 out of 112 patients (5.36%). The causes of mortality were iatrogenic perforation, pulmonary complication and sepsis.

V. Conclusion

Corrosive ingestion for suicidal purpose is common in Indian society. Easy availability of the corrosive agent - commonly muriatic acid is one major reason behind this. Accidental ingestion is seen among children. The treatment has to be individualized in every case. The patient may have to undergo repeated operative procedures over prolonged period of time. Lack of definite guidelines and various types of complications and morbidities make treatment of these patients extremely challenging. To obtain optimum results the treating medical team has to have experience, expertise and patience. The patient should receive psychological counseling from time to time. The end results in dedicated centers are usually good, most of the patients can lead relatively symptom-free good quality of life.

References

[1]. Murray CJL, Lopez AD. The global burden of disease: a comprehensive assessment of mortality and disability from diseases, injuries and risk factors in 1990 and projected to 2020. Global Burden of Disease and Injury Series. Volume.1.Cambridge MA. Havard School of Public Health, 1996.

[2]. Satar S, Topal M, Kozaci N. Ingestion of caustic substances by adults. Am J Ther. 2004;11:258–261.[PubMed]

[3]. Lakshmi CP, Vijayahari R, Kate V, Ananthakrishnan N. A hospital-based epidemiological study of corrosive alimentary injuries with particular reference to the Indian experience. Natl Med J India. 2013;26:31–36. [PubMed]

[4]. Jin Hyoung Kim, Ho-Young Song, Hyo-Cheol Kim et al. Corrosive esophageal strictures: long term effectiveness of balloon dilatation in 117 patients. J Vasc Interv Radiol 2008; 19:736 –741

[5]. Tom R Demeester. Operative techniques in cardiac and thoracic surgery. Vol 2, No.1 (February), 1997, pp 73 - 86

[6]. D K Gupta M Srinivas S Dave A Lall. An Epidemiological Survey on Corrosive Esophageal Strictures in Children. J Indian Assoc Pediatric Surgery Vol 8 (April-June 2003)

[7]. Qureshi S[1], Ghazanfar S, Leghari A, Tariq F et al. Benign esophageal strictures: Behaviour, pattern and response to dilatation. J Pak Med Assoc. 2010 Aug; 60(8):656-60.

[8]. S A Riley, S E A Attwood, Guidelines on the use of oesophageal dilatation in clinical practice Gut 2004; 53(Suppl I):i1–i6

[9]. Agarwal S, Sadiq S, Ashok Kumar et al . Surgical management of corrosive strictures of stomach. Indian Journal of gastroenterology 2004; 23: 178-180

[10]. Javed, Amit MS, MC h; Pal, Sujoy MS, MC h; Dash, Nihar Ranjan MS; Sahni, Peush MS, PhD; Chattopadhyay, Tushar Kanti MS. Outcome Following Surgical Management of Corrosive Strictures of the Esophagus. Annals of Surgery: July 2011 Volume 254 Issue 1 p 62–66

[11]. Chattopadhyay, Tushar Kanti MS. The management of extensive corrosive esophageal stricture: do not dilate and procastrinate. Japanese Journal of Surgery, Vol. 19. No. 2 pp 171-176, 1989

[12]. Strutyńska-Karpińska M. Causes of blood perfusion disturbances in pedunculated intestinal grafts employed in reconstructive procedures of the esophagus. Pol Przeg Chir 1993, 65:1185-1190.

[13]. Knezević JD, Radovanović NS, Simić AP, Kotarac MM, Skrobić OM, Konstantinović ND, Pesko PH. Colon interposition in the treatment of esophageal caustic strictures: 40 years of experience. Dis Esophagus 2007, 20: 530-534.

[14]. Yasuda T, Shiozaki H. Esophageal reconstruction with colon tissue. Surg Today 2011, 41: 745-753.

[15]. Heinrich Fürst, MD, Wolfgang Hugo Hartl, MD et al. Colon Interposition for Esophageal Replacement - An Alternative Technique Based on the Use of the Right Colon. Ann Surg. 2000 Feb; 231(2): 173–178.

[16]. Xia J, Peng Y, Huang J. Cheng BC, Wang ZW. Prevention and treatment of anastomotic leakage and intestinal ischemia after esophageal replacement with colon. Chinese J Gastrointest Surg 2009, 12: 17-19.

[17]. Strutyńska-Karpińska M. Early postoperative complications in reconstructive operations of the esophagus. Pol Przeg Chir 1997, 69: 677-685.
[18]. Strutyńska-Karpińska M. Frequency of cervical anastomotic leaks after various types of oesophagoplasty – a retrospective study. Adv Clin Exp Med 2002, 11: 473-479.
[19]. De Jong AL, Macdonald R, Ein S, Forte V, Turner A. Corrosive esophagitis in children: a 30-year review. Int J Pediatr Otolaryngol 2001, 57: 203-211.
[20]. Wu MH, Tseng YT, Lin MY et al. Esophageal reconstruction for hypopharyngoesophageal strictures after corrosive injury. Eur J Cardiothorac Surg 2001, 19: 400-405.
[21]. Cheng BC, Xia J, Liu XP et al Observation on the long-term complications after esophageal replacement with colon. Zhonghua Wai Ke Za Zhi 2007, 45: 118-120.
[22]. De Delva PE, Morse CR, Austen WG Jr, Gaissert HA, Lanuti M, Wain JC, Wright CD, Mathisen DJ. Surgical management of failed colon interposition. Eur J Cardiothorac Surg. 2008, 34: 432-437.