



Trauma

Surgical management of corrosive-induced gastric injury in children: 10 years' experience ^{☆,☆☆,★}



Khaled M. El-Asmar ^{*}, Ayman M. Allam

Pediatric Surgery Department, Ain Shams University, Cairo, Egypt

ARTICLE INFO

Article history:

Received 14 February 2017

Received in revised form 4 May 2017

Accepted 16 May 2017

Key words:

Caustic ingestion

Acidic corrosive

Pyloric stricture

Gastric outlet obstruction

Pyloroplasty

Gastrectomy

ABSTRACT

Aim: The purpose of this study was to report surgical management and outcome of corrosive-induced gastric injuries in children at our institute over the last decade.

Patients & method: Medical records of patients admitted for corrosive-induced gastric injury at the Pediatric Surgery Department of Ain Shams University between January 2007 and January 2017 were retrospectively reviewed.

Results: Twenty six cases (17 boys and 9 girls) were enrolled. Mean age was 3.61 ± 1.29 . Ingested agent was acid in all the patients. Main presenting symptom was gastric outlet obstruction in 22 cases. The interval between corrosive ingestion and presentation ranged from one to 135 days (mean = 43.9 ± 34). Surgical procedure included total gastrectomy (n = 2), partial gastrectomy (n = 2), augmentation gastroplasty (n = 1), Billroth I (n = 2), antrectomy (n = 2), antroplasty (n = 3), gastrojejunostomy (n = 2), Heineke–Mikulicz pyloroplasty (n = 9), Finney pyloroplasty (n = 5), and feeding jejunostomy (n = 4). Anastomotic stricture requiring a second operation developed in one patient. There were three mortalities related to the associated esophageal strictures. The mean follow-up period is 3.5 years. All patients are free of symptoms and gained adequate weight.

Conclusion: Surgery is the mainstay of management for corrosive-induced gastric injuries with good long-term results. Surgical procedure should be tailored according to the patient's general condition and extent of gastric injury.

Level of evidence: This is a case series with no comparison group (level IV).

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Accidental ingestion of corrosive substance in children is still a commonly encountered problem in developing countries with short- and long-term sequelae [1–3]. The extent and degree of injury depends mainly on type, concentrations, and amount of the ingested substance [4]. In contrast to alkali, acid corrosives cause coagulative necrosis that affects mainly the gastric mucosa that is aided by the rapid clearance of acids from the esophagus to the stomach [5]. Gastric injury usually occurs in the antrum and pylorus as acids follow the lesser curvature of the stomach to reach the antrum where it pools there because of

the induced reflex pylorospasm [5,6]. Gastric outlet obstruction (GOO) is the most common form of gastric injury after corrosive ingestion in pediatric patients [1,7,8]. The incidence of GOO varies in different series from 5% to 10% [1,9–11].

Surgical intervention is the mainstay of management for chronic corrosive-induced gastric injuries [10]. There are many surgical procedures described in the literature to relieve GOO, the most common of which are gastric resection [12], gastrojejunostomy [1,9] and pyloroplasty [2,5]. This retrospective study reports the surgical management and outcome of corrosive-induced gastric injuries in children at our institute over the last decade.

1. Patients and methods

Patients who presented with corrosive-induced gastric injury at Pediatric Surgery Department, Ain Shams University, between January 2007 and January 2017, were retrospectively analyzed. Medical records were reviewed for age, gender, type of ingested substance, time of presentation, presenting symptom, radiological findings, extent of gastric

[☆] Conflict of Interest: None

^{☆☆} No financial disclosures

[★] Authors Contribution: Both authors contributed equally in the design of the work, collection and analysis of data, drafting and revising of the manuscript, and approving the final version for publishing.

^{*} Corresponding author at: 14 mostafa sadek el-rafeay, Heliopolis, Cairo, Egypt, 11361. Tel.: +20 1001222624; fax: +20 4830833.

E-mail address: khaled.elasmar@med.asu.edu.eg (K.M. El-Asmar).

Table 1
summary of patients' demographic data, extent of injury, surgical management, and outcome.

Patient no	Gender	Age (years)	Time of presentation	Gastric lesion ± Esophageal involvement	Surgical procedure	Post-operative complication
1	M	5	2 weeks	Total gastric scarring Long stricture	Total gastrectomy + esophagojejunal anastomosis + feeding jejunostomy Endoscopic dilatation complicated by iatrogenic perforation → Esophagectomy + jejunal pullup	–
2	M	4	8 weeks	Pyloric stricture	Heineke–Mikulicz pyloroplasty	–
3	M	5	3 weeks	Total gastric scarring Long stricture	Total gastrectomy + esophageal anastomosis with jejunal pouch + Reux en y jejunostomy Successful endoscopic dilatation	–
4	F	3.5	1 day	Stomach perforation & extensive gastric necrosis involving antrum and pylorus Long stricture	Partial gastrectomy + gastroduodenal anastomosis + gastrostomy → postoperative leakage → closure of duodenal stump + redo gastrostomy + feeding jejunostomy 3 months later → gastrojejunostomy + closure of feeding jejunostomy Failed endoscopic dilatation → colon bypass	–
5	M	3 3/12	5 weeks	Antral and pyloric scarring Short stricture	Finney pyloroplasty + feeding gastrostomy Successful endoscopic dilatation	–
6	M	1	3 weeks	Antral scarring Long stricture	Feeding jejunostomy	Died from aspiration pneumonia
7	M	6	3 weeks	Antral and pyloric scarring + Gastrocolic fistula long stricture	Repair of the fistula + Finney pyloroplasty + ryle feeding	Died from aspiration pneumonia
8	M	1 8/12	6 weeks	Perforated stomach with necrotic posterior wall long stricture	Partial gastrectomy → Augmentation gastroplasty by jejunal loop (4 months later) Colon bypass after failure of endoscopic dilatation	–Died after colon bypass because of pulmonary complications
9	M	4	3 months	Antral scarring Short stricture	Antroplasty Endoscopic dilatation complicated by iatrogenic perforation → colon bypass	–
10	M	3	4 months	Pyloric stricture	Heineke–Mikulicz Pyloroplasty	–
11	F	2.5	4.5 months	Antral and pyloric scarring Short Stricture	Bilioroth I Successful endoscopic dilatation	–
12	F	5	1 week	Pyloric stricture Long undilatable stricture	Feeding jejunostomy complicated by postoperative intussusception → open reduction 6 months later → Colon bypass + Heineke–Mikulicz pyloroplasty + closure of jejunostomy + fashioning of feeding gastrostomy tube (removed 3 months later) 1 year later → gastrojejunostomy	Recurrent GOO 1 year postoperatively
13	F	3.5	4 months	Antral scarring Short stricture	Antrectomy Successful endoscopic dilatation	–
14	M	4.5	2.5 months	Pyloric stricture	Heineke–Mikulicz pyloroplasty	–
15	M	3	1 month	Pyloric stricture	Finney pyloroplasty	Dumping syndrome
16	M	2	1.5 months	Pyloric stricture	Finney pyloroplasty	–
17	F	2.5	7 weeks	Pyloric stricture	Finney pyloroplasty	Dumping syndrome
18	F	1.5	5 weeks	Pyloric stricture	Heineke–Mikulicz pyloroplasty	–
19	M	3	1 month	Pyloric stricture	Heineke–Mikulicz pyloroplasty	–
20	M	4	25 days	Antral scarring	Antrectomy	–
21	F	2	6 weeks	Antral scarring Long stricture	Antroplasty Endoscopic dilatation complicated by iatrogenic perforation → colon bypass	–
22	M	4	3 weeks	Antral and pyloric scarring	Bilioroth I	–
23	F	1.5	36 days	Antral scarring	Antroplasty	–
24	F	2	40 days	Pyloric stenosis	Heineke–Mikulicz pyloroplasty	–
25	M	2 9/12	2 months	Pyloric stenosis	Heineke–Mikulicz pyloroplasty	–
26	M	2	40 days	Pyloric stenosis	Heineke–Mikulicz pyloroplasty	–

injury, associated esophageal stricture, surgical management, post-operative complications, and outcome.

2. Results

During the last ten-year period, a total of 524 children were admitted to our hospital with a history of accidental corrosive ingestion, out of which 26 cases (5%) developed a corrosive-induced gastric injury.

Seventeen boys and nine girls were treated and their ages ranged from 1 to 6 years with a mean of 3.61 ± 1.29 years. All gastric injuries were induced by accidental ingestion of acidic agent in the form of sulphuric acid or hydrochloric acid. The demographic data, esophageal and gastric pathological injuries, time of presentation, surgical interventions, and outcome are summarized in Table 1.

The main presenting symptom in 22 patients was GOO in the form of persistent non-bilious vomiting with marked loss of weight. Two

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