


Surgical Outcome of Pediatric Corrosive Induced Antropyloric Strictures

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Abstract

Introduction: Corrosive induced upper gastrointestinal tract injuries in pediatric patients, are not easy to treat. Interestingly only few reports are available in English literature highlighting the management and surgical outcome of corrosive induced antropyloric strictures. The aim of this study was to determine the presenting features, management and outcome of patients treated at our institute with corrosive induced antropyloric strictures.

Materials and Methods: This retrospective descriptive study was conducted at Paediatric Surgery Department of Children Hospital & Institute of Child Health, Lahore. Medical records of patients admitted for corrosive-induced gastric out let obstruction from January 2013 to December 2018 were included. The demographic, preoperative assessment, investigations, surgical procedure and follow up details were noted on a predesigned proforma. Results were analyzed by descriptive statistics using SPSS version 20. The quantitative variables were presented as mean \pm SD. Qualitative variables were presented as frequency and percentages.

Results: A total of 62 patients were included in this study. The mean age at presentation was 4.9 ± 3.9 years. Of these 67.7% were male and the mean weight of children at the time of surgery was 12.6 ± 5.0 kilo grams. Bathroom cleaner was ingested by 77.4%. Vomiting was seen in 100% cases while abdominal pain and weight loss was seen in 38.7 %, and 80.6% respectively. We preformed Heinke-mikulicz pyloroplasty in 59(95.2%) patients, Billroth II in 1(1.6%) and gastrojejunostomy in 2(3.2) cases. Postoperatively 40 children remained well during early post- op period while leak and respiratory issue were seen in 11.9% and 13.6% patients respectively. The mean hospital stay was 27.9 ± 11.5 days. Two

Keywords

- Outcome
- Corrosive
- Antropyloric strictures
- Pediatric

patients died after surgery and the rest were discharged. Mean follow up is 15.2 ± 70 months. Of 60 discharged children 37 (62.7%) had no issue while 4 (6.8%) had leakage from previous jejunostomy site leak other 19 patients were lost to follow up.

Conclusion: We conclude that surgical treatment for Antropyloric strictures due to corrosive injuries is an acceptable option with minimal complications. However, we emphasize on the preventive measure, child-proof containers and legislations to be taken by authorities and social welfare societies.

Introduction

Corrosive injuries of the gastrointestinal tract is a challenging problem of pediatric age in developing countries especially in Pakistan. In contrast, developed countries had worked a lot for prevention by introducing a good deal of legislations regarding this matter. So the incidence is decreasing significantly in developed countries.¹ Corrosive related injuries in the pediatric age are not uncommon in Asian countries, although exact data is not available.² Ingestion in pediatric age group is mainly accidental. However, there is evidence of ingestion by suicidal intent in adolescents.³

The ingested corrosive agents can result in esophageal and gastric burns, which may lead to severe strictures in a significant number of patients. Main corrosives substances are acid and alkali. Alkalis usually adhere to esophageal mucosa and cause mainly esophageal injuries. Acids on the other hand are moved rapidly to the stomach and remain in contact with the gastric mucosa for a long (due to corrosive-induced pylorospasm) and their mechanism of damage is coagulative necrosis. This necrosis may lead to gastric perforation or in the majority of cases result in strictures of antropyloric region.^{3, 4}

Isolated antropyloric strictures due to corrosive ingestion are uncommon.⁵ According to the literature only 3.8 % of the cases of corrosive intake suffer from isolated antropyloric stricture.⁶ Easy availability of corrosive agents in our part of the world, results in a high morbidity and mortality of corrosive ingestion in children.^{4, 7} Interestingly only few recent reports are available in English literature highlighting the management and surgical outcome of corrosive induced antropyloric strictures in pediatric patients. The aim of our study was to determine the presenting features, management and outcome of patients treated at our institute with corrosive induced antropyloric strictures.

Materials and Methods

This retrospective descriptive study was carried out at Paediatric Surgery Department of Children Hospital & The Institute of Child Health, Lahore. In this study, we reviewed medical charts of patients treated for corrosive-induced antropyloric strictures from January 2013 to December 2018. Out of 62, available 38 patients were called for follow up and assessed for late complications and outcome. Data was summarized on a self-structured proforma. The demographic details of all the patients including gender and age at presentation were noted. Intent

and Type of ingested substance was also recorded. Preoperative assessment, investigations carried out at our department along with finding at exploration and surgical procedures were documented. Results were analyzed by descriptive statistics using SPSS version 20. The quantitative variables (age, weight, hospital stay and follow-up) were presented as mean \pm SD. Qualitative variables were presented as frequency and percentages.

Results

A total of 62 patients were included in this study. The mean age at presentation was 4.9 ± 3.3 years. Of these 42 (67.7%) were male and 20 (32.3%) were female. The mean weight at time of surgery was 12.6 ± 5.0 kilograms. Bathroom cleaner was ingested by 42 (77.4%) while 12 cases (19.4%) ingested bleach and 2 (3.2%) had battery acid ingestion; all parents reported that the victims took corrosive agents accidentally **Table 1**.

Table 1: Mean Age, time between ingestion, onset of symptoms and surgery

N = 62	Mean \pm SD
Age (in years)	4.9 ± 3.34
Time between ingestion and onset of symptoms (in hours)	1.8 ± 1
Time between ingestion and surgery (in days)	124 ± 98.86
Weight at time of surgery (in kilograms)	12.6 ± 5.0

Vomiting was seen in 100% of cases while abdominal pain, dysphagia and weight loss was seen in 38.7 %, 8.1% and 80.6% respectively. Feeding jejunostomy tube was placed in 35 (56.5%) patients as initial procedure. Endoscopy was performed in 61 patients. Upper GI contrast study showed complete obstruction in 52 (83.9%) and partial obstruction 10 (16.1%) patients. Mean

hemoglobin level was 11.1 ± 1.5 while rest of the labs were within normal limits. We used Heineke-Mikulicz pyloroplasty in 59 (95.2%) patients, Billroth II in 1 (1.6%) and gastrojejunostomy in 2 (3.2%) cases (Table No.1) Postoperatively 40 children remained well during early period while leak and respiratory issue were seen in 11.9% and 13.6% patients respectively, details are shown in

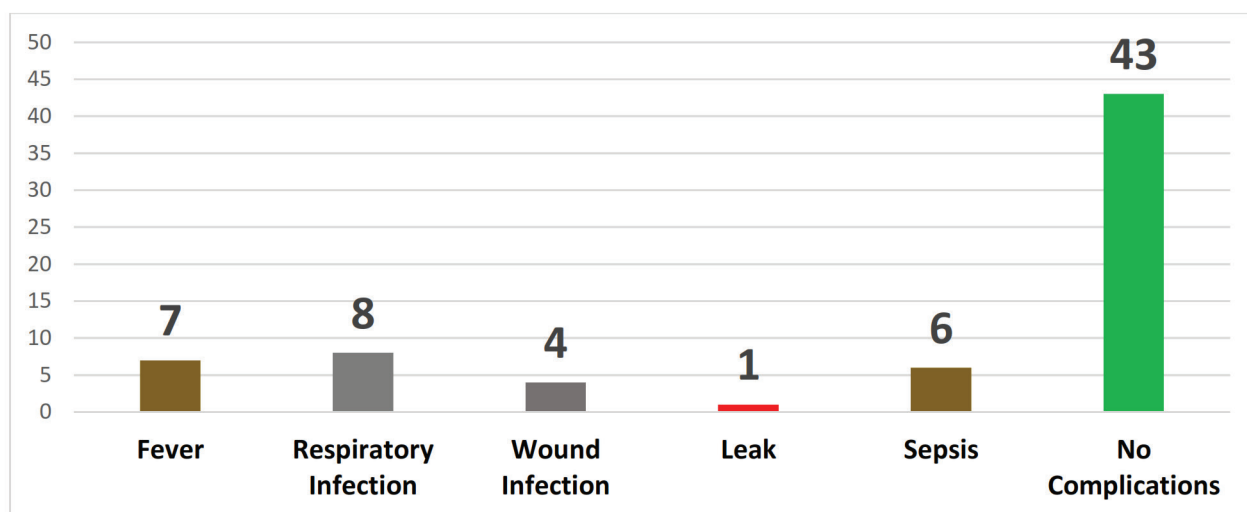


Figure 1: Postoperative course

Figure 1.

The mean hospital stay was 27.9 ± 11.5 days. Two patients died after surgery. Of 60 discharged children 37 (62.7%) had no issue while 4 (6.8%) had leakage from previous jejunostomy site and the other 19 patients were lost to follow up. Mean follow up of our patients was 15.2 ± 70 months.

Discussion

This series of 62 cases is the largest series of pediatric patients with gastric outlet obstruction (GOO) following corrosive intake reported in the literature. We found the mean age of patients as 4.9 ± 3.3 years. Among children, the mean age of presentation varies in previous large series reported in the literature.^{8,9} However, the age range starts usually at 1 year of age.⁶ The difference in mean age of presentation in these series is because of difference of maximum age of hospital admission which ranges from 12-18 years as per protocols of the hospital. In our series the age range was 4.9

± 3.3 years. Two thirds of patients in this study were male as has been shown in previous studies. In a large series of 26 cases, 65.3% of patients were also male.⁸ In another series among pediatric age group, equal distribution among genders was found.⁹ In another series of GOO following corrosive injury among adults, male to female ratio was 1.7:1.5

Corrosive ingestion is a global issue and is prevalent everywhere in the world. In the USA, around 15000 cases are reported annually,¹⁰ while in England, 40,000 cases are reported annually.¹¹ The most common agent accidentally ingested was washroom cleaner, followed by bleach and battery acid. In our part of world, the most common agent reported is bleach or washroom cleaner.⁷ It is because of poor legislation and protocols to control these events. Although many ideas have been proposed to prevent these accidents,¹² but unfortunately in Pakistan, we don't see such legislation and frequency of these events are not decreasing. Also other important agents taken

accidentally in Pakistan are the pharmaceutical agents, kerosene oil and Organophosphates, although these agents don't lead to GOO.¹³

For diagnosis of GOO, investigations may include endoscopy, contrast studies and ultrasound. As per departmental protocols, we perform upper Gastrointestinal (UGI) endoscopy in all patients with suspected GOO. The surgical treatment of GOO included Heineke-Mikulicz pyloroplasty, Billroth II and gastrojejunostomy. The most common performed procedure was Heineke-Mikulicz pyloroplasty in our series, though we do not have any reason for preference of this procedure, but as per departmental protocol these procedures were done. Similarly, a previous series of GOO needing surgical correction have opted varied procedures other than the one cited above including total gastrectomy, partial gastrectomy, augmentation gastropasty, Billroth I, antrectomy, antroplasty and Finney pyloroplasty.⁸ Also minimal invasive procedures, particularly laparoscopic diamond antroduodenostomy approach is gaining popularity.¹⁴ Endoscopic dilatation of the stricture

is also reported, and some series have reported good outcomes following dilatations.¹⁵

Conclusion

We conclude that surgical treatment for GOO due to corrosive injuries is an acceptable option with minimal complications. However, we emphasize on the preventive measure, child-proof containers and legislations to be taken by authorities and social welfare societies.

Ethical Consideration

This study was approved by Institutional Review Board (IRB)/ Ethical Committee of The Children's Hospital & the Institute of Child Health, Lahore.

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Conflict of interests

There is no conflict of interests.

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