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Functional outcomes and nutritional status after surgery for corrosive gastric strictures: a 12-year clinical study

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Abstract

Corrosive ingestion often results in severe damage to the distal stomach, specifically the antral region, while sometimes potentially sparing the esophagus. This study evaluates the long-term surgical outcomes, nutritional status, and quality of life (QoL) in 73 patients diagnosed with isolated corrosive antral strictures. All subjects underwent Antrectomy + Billroth I reconstruction. The findings demonstrate that this surgical approach achieves high rates of functional success, with a 100% weight maintenance rate and minimal long-term symptomatic complications.

Keywords: Corrosive burns, Stomach, Gastric outlet obstruction, Nutritional status, Quality of life, Caustic ingestion, Antrectomy and Billroth 1 reconstruction, Follow-up studies

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INTRODUCTION

Corrosive ingestion is a prevalent and devastating public health issue in developing countries like India, causing severe and extensive damage to the upper gastrointestinal tract. This injury often results in profound morbidity, including difficulty swallowing, inanition, and severe malnutrition[4]. The affected population predominantly consists of **young adults in their most productive years**, making the resulting social and economic repercussions substantial. While accidental or suicidal ingestion can cause higher grades of tissue injury in the proximal esophagus, concentrated acids frequently **"lick the esophagus and bite the pyloric antrum"**.[1] This specific pattern of isolated gastric involvement is attributed to **pylorospasm and the prolonged contact time** of the corrosive substance in the dependent portion of the stomach.

When these injuries lead to the formation of dense, extensive, and **non-dilatable strictures**, they often obliterate the gastric lumen, making them unresponsive to conservative management like endoscopic dilatation. In such cases, **definitive surgical intervention**—specifically antrectomy or partial gastrectomy reconstructed via a Billroth I procedure—is required to restore alimentary continuity and prevent long-term complications.

Despite the established technical success of these procedures, **existing literature often fails to address the long-term quality of life (QoL) and functional capacity** of survivors. Traditional surgical success is frequently measured by objective clinical data, which may not align with a patient's perceived well-being or their ability to maintain a normal diet.

Understanding the physical, psychological, and social consequences is crucial, as many of these patients have **extended life expectancies** following their recovery.

The emergence of late complications or subtle functional deficits can cause an initially "good" surgical outcome to deteriorate over time. Therefore, assessing **patient-reported outcomes**, such as those captured by the EORTC QLQ-OG 25 (or its adaptations), is essential for optimizing post-surgical care protocols. This study investigates the **long-term functional outcomes and nutritional status** for patients specifically undergoing surgery for isolated corrosive antral strictures at a high-volume tertiary care center over a **12-year period**. By focusing on this specific cohort, we aim to quantify the incidence of functional success and provide insights into the lasting efficacy of surgical management in restoring **alimentary autonomy**.

MATERIALS AND METHODS

Study design and Setting

This was a **single-center, ambispective, cross-sectional study** conducted at a tertiary care centre in India. Our institute is a tertiary care university hospital and serves as a major referral center for complex gastrointestinal procedures, including the surgical management of corrosive injuries. The study was conducted over an 18-month period (2024–2025) following approval from the **Institutional Ethics Committee (IEC)**.

Patient selection and Inclusion criteria

The study cohort comprised **73 patients** diagnosed with isolated corrosive antral strictures, representing **40.6%** of a larger 180-patient corrosive injury study treated between **2012 and 2023**.

Inclusion criteria required patients to have a history of corrosive ingestion managed surgically at the institution during the study period.

Exclusion criteria were strictly applied to ensure data integrity:

- Patients who underwent gastric surgeries for **non-corrosive etiologies** (e.g., malignancy or benign disorders unrelated to caustic injury).
- Patients whose short-term outcomes precluded long-term assessment, including **immediate post-operative mortality** or those lost to follow-up where records or contact information were unavailable.

Surgical intervention

The standardized surgical procedure for this specific subgroup was **Antrectomy + Billroth I reconstruction**. Clinical protocols dictated a meticulous preoperative optimization phase, with a mandatory waiting interval of approximately **four months** from the time of ingestion to definitive surgery to ensure maturation of fibrosis, stabilization of the extent of injury, nutritional optimization, assessment of concomitant esophageal injury, technical ease and safety.

Data collection techniques

Data were gathered using a two-pronged approach:

- **Retrospective collection:** Clinical and surgical data from the index admission were gathered via the Surgical Gastroenterology department audit data and medical records. This included patient demographics (age, gender), injury details (corrosive type, **Zargar's endoscopic severity grading**), and peri-operative details (hospital stay, immediate complications).
- **Prospective QoL assessment:** Long-term follow-up was conducted at least one year post-surgery. Patients were contacted and assessed during follow-up visits in the **Surgical Gastroenterology Outpatient Department (OPD)**.

Functional and Nutritional assessment tools

The primary instrument for assessing patient-reported outcomes was a **modified and adapted version of the EORTC QLQ-OG 25 questionnaire**. Although originally designed for esophagogastric cancer, it was chosen for its heavy emphasis on functionality and the ability to eat. To ensure accuracy and minimize misinterpretation, the questionnaire was administered individually by a researcher in the patient's preferred language. Evaluation specifically focused on:

- **Nutritional Status:** Quantified by long-term **weight maintenance** and the ability to resume a normal diet.
- **Symptomatic Profile:** Prevalence of discrete symptoms such as **dysphagia** (using an adapted grading scale), **symptomatic reflux** (heartburn, bile regurgitation), and **persistent coughing**.
- **Psychosocial Well-being:** Self-reported indices including "illness thoughts" and feelings of being "physically less attractive".

Statistical analysis

Data were analyzed using descriptive statistics, reporting continuous variables as **means and medians** (e.g., mean age of 30.7 years) and categorical variables as frequencies and percentages. Inferential analysis used the chi-square test or Fisher's exact test to compare long-term outcomes and quality of life indices. A P-value of <0.05 was set as the threshold for statistical significance. All data were recorded uniformly using a standard study proforma dedicated to each patient.

RESULTS

Patient Demographics and Injury Characteristics

The study cohort consisted of 73 patients diagnosed with isolated corrosive antral strictures, representing 40.6% of the total patients managed for corrosive injuries during the 12-year study period. The mean age of this subgroup was 30.7 years (median 27.5 years), with an age range extending from 4.0 to 76.0 years. Demographically, there was a female predominance within this specific group, comprising 46 females (63%) and 27 males (37%).

The severity of the initial corrosive injury, classified by Zargar's endoscopic grading, showed that the majority of patients presented with high-grade tissue damage, specifically Grade 3 injuries, followed by Grade 2. The follow-up period for these 73 patients ranged from 2 to 13 years, with a mean duration of 8.9 years and a median of 10.0 years, allowing for robust long-term functional assessment.

Table 1: Demographic and Clinical profile of patients

Age (years)	Gender	Zargar's endoscopic grading	Follow-up Duration (Mean)
10-20 n=14 21-30 n=28 31-40 n=11 41-80 n=20	Male n=27 Female n=46	G2 n=36 G3 n=37	8.9 years

Surgical safety and Early postoperative course

All 73 patients underwent **Antrectomy + Billroth I reconstruction** after a mandatory preoperative optimization period. The immediate postoperative complication rate for this surgical subgroup was **9.6%** (7 out of 73 patients).

All complications were minor and were managed conservatively during the index admission:

- **Fever:** Occurred in 3 patients (4.1%).
- **Surgical Site Infection (SSI):** Recorded in 4 patients (5.5%).
- **Transient vomiting:** Reported in 1 patient (1.4%) who also presented with SSI.

The average hospital stay was **11 days**, though many patients were discharged earlier (as low as 7–9 days) depending on the resolution of minor complications.

Nutritional and functional outcomes

The long-term nutritional rehabilitation for this cohort was remarkably successful. An exceptional **100% of the 73 patients** reported successful **weight maintenance** and nutritional stability during their final follow-up, indicating a full restoration of alimentary autonomy.

Functional outcomes related to feeding were assessed using an adapted EORTC QLQ-OG 25 questionnaire:

- **Swallowing efficacy:** Only **3 patients (4.1%)** reported difficulties with solid foods (Grade 2 dysphagia), while the remaining 95.9% reported excellent swallowing function.
- **Eating behavior:** These same 3 patients (4.1%) reported **taking a long time to complete meals**.
- **Alimentary satisfaction:** None of the 73 patients reported problems with liquidized or soft foods, drinking liquids, or choking while swallowing.

Symptomatic profile and Psychosocial well-being

The incidence of procedure-related symptoms remained notably low in the long term. **Symptomatic reflux**, including heartburn and acid or bile regurgitation, was **completely absent (0%)** among patients who underwent Antrectomy + Billroth I reconstruction. **Persistent coughing** was reported by only **one patient (1.4%)**. No patient had reported any difficulty in talking postoperatively.

Psychosocial assessments revealed minimal long-term distress:

- **Self-image:** Only **2 patients (2.7%)** reported feeling "physically less attractive" due to their disease or surgical scars.
- **Mental status: None of the patients (0%)** reported persistent "illness thoughts".

Furthermore, none of the 73 patients in this group required further surgical intervention or endoscopic dilatation following their primary reconstruction.

DISCUSSION

Surgical efficacy and injury patterns

The management of corrosive antral strictures presents a unique surgical challenge that differs significantly from esophageal involvement. Our study demonstrates that **Antrectomy followed by Billroth I reconstruction** provides excellent long-term functional results and alimentary satisfaction. The classic clinical observation that concentrated acids often **"lick the esophagus and bite the pyloric antrum"** is clearly validated in our cohort[1]. This pattern occurs because pylorospasm, triggered by the corrosive agent, traps the substance in the dependent portion of the stomach, leading to

localized full-thickness burns and subsequent dense, non-dilatable strictures in the antrum. When these injuries result in complete luminal obliteration, definitive surgery is the only path to restoring nutritional autonomy.

Safety profile and Post-operative complications

A central finding of this 12-year study is the high safety profile associated with this surgical approach. The immediate post-operative complication rate for the antrectomy group was notably low at **9.6%**. Crucially, **all complications were minor**—consisting of fever, surgical site infections, and transient vomiting—and were successfully managed conservatively during the index admission. This stands in contrast to more extensive gastrointestinal reconstructions, where the surgical burden is higher due to greater anatomical complexity. The preservation of the proximal stomach and the anatomical simplicity of the Billroth I reconstruction likely contribute to this reduced risk, allowing for an average hospital stay of 11 days with no major technical failures.

Nutritional rehabilitation and Functional superiority

The primary goal of surgical reconstruction in corrosive injuries is the restoration of oral feeding and long-term nutritional stability. Our data shows a remarkable **100% weight maintenance rate** among the patients in the antral stricture group. This success rate indicates a complete restoration of alimentary autonomy, enabling patients to resume regular diets and productive professional lives.

Furthermore, the **functional superiority** of this procedure is underscored by the **complete absence of symptomatic reflux (0%)**. While major reconstructions can be plagued by persistent long-term challenges like heartburn or regurgitation, the preservation of the stomach's reservoir function effectively prevents these issues. Similarly, the incidence of **post-operative coughing was minimal at 1.4%**. This approach maintains a higher physiological quality of life by avoiding the anatomical complexities that lead to recurrent aspiration.

Clinical optimization and timing

The favorable outcomes observed are largely attributed to the institutional protocol of **meticulous preoperative optimization**. We have found that waiting for an adequate interval—**approximately four months** from the initial ingestion to definitive surgery—is critical for antral strictures. This period allows localized inflammation to subside and the stricture to mature, ensuring that the surgery is performed on stable, non-friable tissue, which minimizes the risk of anastomotic failure. This multidisciplinary approach, combining nutritional support with precisely timed intervention, is essential for high-volume centers managing these complex cases.

Psychosocial and Long-term well-being

Despite the severe nature of their initial injuries, the psychosocial burden on this specific patient group remained relatively low. Only **2.7% reported feeling "physically less attractive,"** and notably, **none (0%) reported persistent "illness thoughts"**. This suggests that the successful restoration of eating function and the avoidance of major surgical complications significantly mitigate the long-term psychological trauma associated with corrosive ingestion.

CONCLUSION

For patients with isolated corrosive antral strictures, **Antrectomy + Billroth I reconstruction** is a highly effective procedure. It offers a safe surgical profile with minimal complications and yields superior long-term results in terms of nutritional status and physiological functionality. By adhering to standardized protocols for timing and perioperative care, high-volume centers can ensure that these patients—many of whom are young adults—achieve near-normal quality of life and full reintegration into society.

REFERENCES

1. Gumaste VV, Dave PB. Ingestion of corrosive substances by adults. Am J Gastroenterol. 1992;87:1–5
2. Cattan P, Munoz-Bongrand N, Berney T, et al. Extensive abdominal surgery after caustic ingestion. Ann Surg. 2000;231:519 –523.
3. Javed, A. (2012). Surgical management and outcomes of severe gastrointestinal injuries due to corrosive ingestion. *World Journal of Gastrointestinal Surgery*, *4*(5), 121.
4. Kalayarasan, R., Ananthakrishnan, N., & Kate, V. (2019). Corrosive Ingestion. Indian Journal of Critical Care Medicine, 23(S4), 0–0.
5. Faron M, Corte H, Poghosyan T, et al.: Quality of life after caustic ingestion. Ann Surg. 2021, 274:e529-34. 10.1097/SLA.0000000000003774