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Clinical Spectrum of Oesophageal Strictures in Paediatric Population in North India: A tertiary care experience

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ABSTRACT

Background: Oesophageal strictures in children can result from a range of congenital, acquired, or iatrogenic causes. Understanding the causes, clinical presentation, and management outcomes in a specific geographic region like the Kashmir Valley is essential for developing region-specific strategies.

Objectives: To assess the spectrum, causes, clinical presentation, and management outcomes of oesophageal strictures in paediatric patients in the Kashmir Valley.

Methods: This observational study was conducted at a tertiary care centre in Kashmir and included paediatric patients (0–18 years) diagnosed with oesophageal strictures over three year period from December 2020 to December 2023. Data on demographics, clinical features, imaging, endoscopic findings, aetiology, treatment modalities, and outcomes were collected and analysed.

Results: A total of 30 paediatric patients were included, mean age at presentation was 6.2±3 years with male predominance (63.3%).The most common cause of oesophageal stricture was corrosive ingestion (56.7%), followed by post-surgical/anastomotic strictures (16.7%), peptic strictures due to gastro-oesophageal reflux (13.3%) and congenital anomalies (13.3%). Dysphagia and weight loss were the predominant presenting symptoms. All patients were diagnosed by endoscopy (EGD) Management included endoscopic dilatation (28/30) while surgical interventions were required in (6/30) mostly in refractory strictures. Most patients responded well to endoscopic management 24/30(80%) with 6/30(20 %) requiring surgical correction. Complications occurred in 2 patients including post dilatation perforation and post SEMS placement intolerance .

Conclusion: Corrosive ingestion remains the leading cause of oesophageal strictures in children in the Kashmir Valley, highlighting the need for community education and prevention strategies. Early diagnosis and multidisciplinary management can lead to favourable outcomes.

Keywords: *Post corrosive stricture, oesophageal stenosis, CRE, Peptic strictures.*

1. INTRODUCTION

Oesophageal strictures in children are a significant cause of morbidity, often leading to feeding difficulties, malnutrition, and impaired quality of life. The aetiology of these strictures is diverse and includes congenital anomalies, caustic ingestion, gastro-Oesophageal reflux disease (GERD), infections, and post-surgical complications (1). Among these, caustic ingestion remains one of the most common causes in developing countries due to the widespread availability of household cleaning agents and inadequate preventive measures (1,2). In paediatric populations, the clinical presentation of oesophageal strictures can vary from subtle symptoms like feeding aversion to overt signs such as progressive dysphagia, regurgitation, vomiting, and failure to thrive (13). Timely diagnosis and appropriate intervention are crucial in preventing long-term complications, including growth retardation and respiratory issues secondary to aspiration (14). The management of oesophageal strictures depends on the cause and severity. Treatment options include endoscopic balloon or bougie dilatation, intra-lesional steroid injections, stenting, and, in refractory cases, surgical intervention (16). However, outcomes can vary significantly based on

access to healthcare, expertise, and socioeconomic factors. There is limited published data from the Kashmir Valley on the spectrum and management of paediatric oesophageal strictures. Understanding the local aetiology and outcomes is essential for developing targeted prevention and treatment strategies. This study aims to analyse the spectrum, clinical features, etiological factors, and outcomes of oesophageal strictures in the paediatric population of Kashmir Valley.

AIMS AND OBJECTIVES:

Aim:

To evaluate the spectrum, aetiology, clinical presentation and management outcomes of oesophageal strictures in the paediatric population of the Kashmir Valley.

Objectives:

1. To identify the common causes of Oesophageal strictures in children.
2. To describe the clinical features and diagnostic findings associated with paediatric oesophageal strictures.
3. To assess the treatment modalities used, including endoscopic and surgical interventions.
4. To evaluate treatment outcomes and complications in affected children.
5. To provide region-specific data that can inform prevention and management strategies.

2. METHODS

Study Design:

This was a hospital-based, observational prospective study conducted in the Department of Gastroenterology at GMC Srinagar in Jammu and Kashmir, India.

Study Duration:

The study was conducted over a period of 3 years, from Dec.2020 to Dec. 2023

Study Population:

Children aged 0–18 years presenting with clinical, radiological diagnosis or Endoscopic of oesophageal stricture were included in the study.

Inclusion Criteria:

- Paediatric patients (0–18 years) diagnosed with oesophageal stricture based on clinical, radiological or endoscopic
- Patients who underwent treatment and were followed up for at least 6months.

Exclusion Criteria:

- Patients with oesophageal malignancy.
- Children with incomplete medical records or lost to follow-up.
- Functional oesophageal disorders (e.g., achalasia) without anatomical stricture.

Data Collection:

Data was collected from Gastroenterology ward and included:

- Demographic details (age, gender, residence)
- Clinical presentation (dysphagia, regurgitation, weight loss, respiratory symptoms)
- Aetiology (e.g., corrosive ingestion, congenital anomalies, post-surgical, peptic)
- Diagnostic investigations (barium swallow, upper GI endoscopy, biopsy if performed)
- Treatment modalities (dilatation, stenting, surgery)
- Outcome and follow-up data

Ethical Consideration:

The study was approved by the Institutional Ethics Committee. Informed consent was obtained from the parents or guardians of all patients enrolled in the study.

Statistical Analysis:

Data was entered and analysed using SPSS version Descriptive statistics were used to summarize demographic and clinical

data. Categorical variables were expressed as frequencies and percentages; continuous variables were presented as mean ± standard deviation.

3. RESULTS

A total of 30 paediatric patients with oesophageal strictures were included in the study. The mean age of presentation was 6.2 ± 3.1 years, with 19 (63.3%) males and 11(36.7%) females.

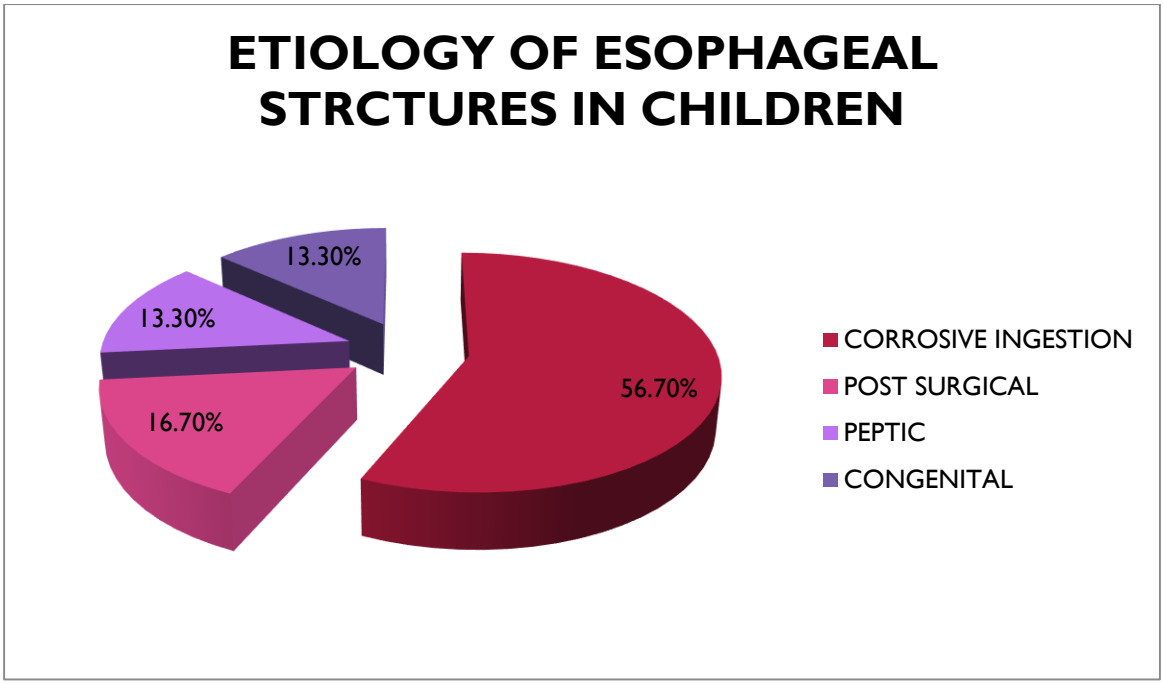
1. Aetiology of oesophageal Strictures

The most common cause was corrosive ingestion (56.7%), followed by post-surgical (anastomotic) strictures (16.7%), congenital oesophageal stenosis (13.3%), and peptic strictures due to GERD (13.3%). Table 1

Table 1: Aetiology of oesophageal Strictures in Children

ETIOLOGY	NUMBER OF PATIENTS(N=30)	PERCENTAGE (%)
CORROSIVE	17	56.7
POST SURGICAL	5	16.7
PEPTIC	4	13.3
CONGENITAL ESOPHAGEAL STENOSIS	4	13.3

Figure 1: Aetiology of oesophageal Strictures in Children (Pie Chart)



4. CLINICAL PRESENTATION

Table 2: Clinical Features at Presentation

SYMPTOM	NUMBER OF PATIENTS	PERCENTAGE
DYSPHAGIA	30	100
REGURGITATION	21	70

WEIGHT LOSS	13	43.33
COUGH/ASPIRATION	10	33.33
FAILURE TO THRIVE	9	30

5. DIAGNOSTIC MODALITIES USED

Barium swallow was performed in 21 patients.

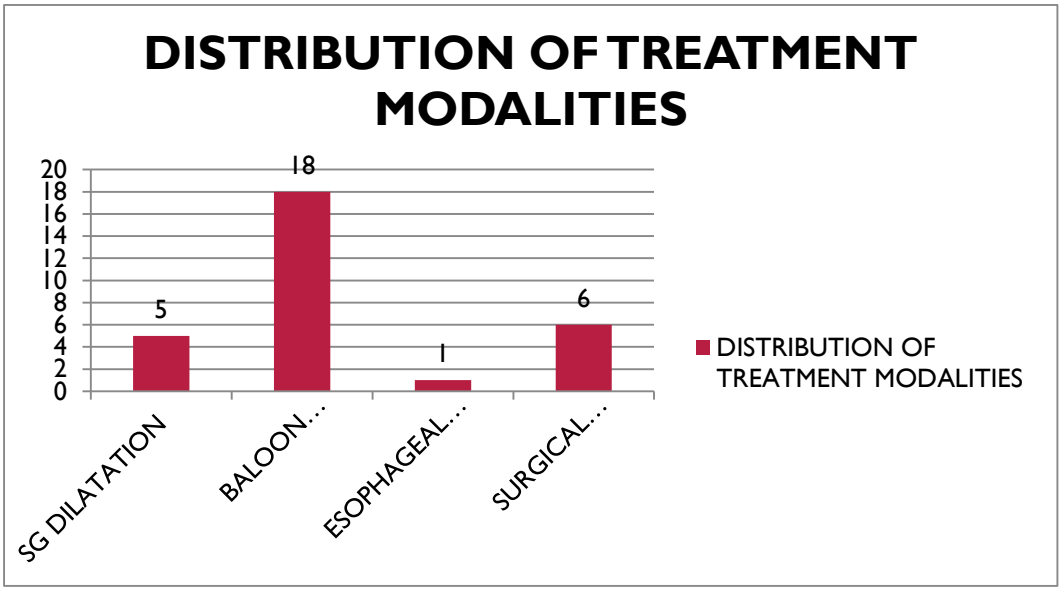
Upper GI endoscopy was done in all patients.

6. TREATMENT MODALITIES

Table 3: Treatment Modalities Used

Serial number	**TREATMENT**	**NUMBER OF PATIENTS**	PERCENTAGE (%)
1	SG DILATATION	5	16.6
2	BALOON DILTATION	18	60
3	ESOPHAGEAL STENTING	1	3.33
4	SURGICAL INTERVENTION	6	20

Figure 2: Distribution of Treatment Modalities (Bar Graph)



7. OUTCOMES AND FOLLOW-UP

Symptomatic improvement was seen in 24 (80%) patients.

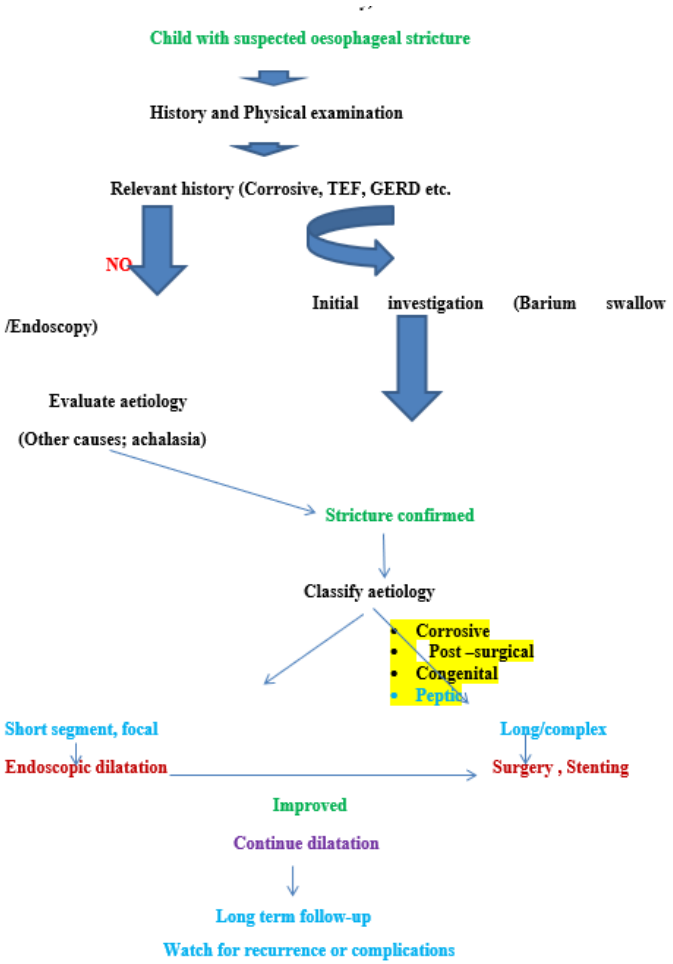
Recurrent strictures occurred in 6(20%) patients, most commonly in the corrosive group. Complications: Perforation occurred in 1 case during dilatation (managed conservatively). No mortality reported.

S.NO	**Complications**	**Number**
1	RECURRENT STRICTURES	6
2	PERFORATION	1
3	STENT INTOLERANCE/REMOVAL	1

8. DISCUSSION

Oesophageal strictures in the paediatric population pose a significant healthcare burden, particularly in resource-limited regions such as the Kashmir Valley. In our study, corrosive ingestion emerged as the most common aetiology (56.7%), which aligns with findings from other developing countries (1–3). The high incidence is largely attributed to the easy accessibility of household cleaning agents and lack of awareness regarding safe storage practices (4,5).Post-surgical strictures, mainly following repair of trachea-oesophageal fistula (TEF), constituted the second most common cause in our cohort (16.7%). These are often due to ischemia at the anastomotic site or stricture formation due to tension during primary repair (6,7). Congenital oesophageal stenosis, though rare, accounted for 13.3% of cases in our study. These cases typically presented earlier and required precise diagnosis to differentiate from other aetiologies (8,9). Peptic strictures, related to chronic gastro-oesophageal reflux, were also noted. These are less common in children but can occur in association with neurological impairment or delayed gastric emptying (10). Diagnosis often relies on endoscopy with biopsy to exclude eosinophilic esophagitis and malignancy, though the latter is rare in children (11,12).Dysphagia was universal in our cohort, consistent with previous studies (13). Other symptoms such as regurgitation, weight loss, and respiratory issues were also common and highlight the impact of oesophageal strictures on growth and development (14,15). This reinforces the importance of early diagnosis and intervention.Endoscopic dilatation was the most common treatment modality (70%), with a good response in the majority. Both bougie and balloon dilators were used, with the latter being preferred for focal and tight strictures (16). Surgical interventions were reserved for refractory or complex cases, such as long-segment strictures or those with failed endoscopic management, consistent with current literature (17,18).Complications were minimal, with 1 case of Oesophageal perforation managed conservatively and Post SEMS placement intolerance ,managed by removal and later by surgical treatment. This supports the safety and efficacy of endoscopic management when performed by experienced hands (19). Recurrent strictures were more common in the corrosive group, reflecting the severe and often circumferential damage caused by caustic agents (20).This study highlights the need for community-based preventive measures, especially in rural areas, to reduce the incidence of corrosive ingestion. Public health policies must focus on education, packaging regulations, and emergency response training for caregivers.

Proposed algorithm for management of paediatric oesophageal strictures (Derived from our study)



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