

Effectiveness of Endoscopic Balloon Dilatation in Corrosive Esophageal Stricture

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Abstract

Introduction: Esophageal strictures are a problem frequently encountered by clinicians. Corrosive injuries to the esophagus and stomach is one of the common conditions encountered in developing countries like India. It may result in major morbidity and mortality particularly in the younger age group.

Material and Method: The material of study consists of 30 patients of corrosive esophageal stricture undergone endoscopic balloon dilatation. Patients of >12 year age group were taken in this study. Patients undergone endoscopic balloon dilatation for corrosive oesophageal stricture of various lengths and at different sites.

Observation : All patients have normal dietary intake including solid food at the time of discharge. All patients under study were followed after 1week, 3 weeks and 6 weeks interval. In our study out of 30 patients 24 patients (80%) had satisfactory oral diet and 6 patients (20%) developed recurrence of symptoms after 6 weeks of follow up.

Conclusion : Endoscopic balloon dilatation found to be safe, effective and promising treatment for corrosive esophageal structure.

Key words: Endoscopic balloon dilatation, Corrosive esophageal stricture, Dysphagia

INTRODUCTION

Esophageal strictures are a problem frequently encountered by clinicians. Strictures can be subdivided into those with malignant causes and those that are benign. Esophageal strictures, either congenital or acquired, result from injuries to the esophageal wall with subsequent thickening of its layers and eventual development of fibrosis.^[1] Patients have high morbidity with severe consequences, such as weight loss, malnutrition, food impaction, and pulmonary aspiration. Corrosive injuries to the esophagus and stomach are one of the common conditions encountered in developing countries like India.^[2] It may result in major morbidity and mortality, particularly in the younger age group.

The most commonly abused substance among acids is hydrochloric acid. Alkali ingestion is more common in the western developed countries. In India, acid ingestion is the cause of corrosive esophageal strictures in about 75% of patients.^[3] Accidental ingestion is more common in children and drunken adults, due to careless storing of chemicals. Ingestion with suicidal intent is more common in India due to the easy availability of the caustic agents which are commonly used for cleaning purposes.

Acids usually cause coagulative necrosis with limited tissue penetration and superficial scar formation. Strong alkalis produce liquefaction necrosis with deep ulcerations, and a subsequent risk to develop esophageal stricture and/or perforation. On swallowing, acids cause severe oropharyngeal pain, and therefore, they are usually ingested in smaller volumes than alkaline substances, resulting in a lower incidence of stricture formation and/or esophageal perforation. Corrosive injuries with varying degrees of severity can occur along the entire length of the esophagus, particularly in the middle and distal parts, and also at the sites of physiological narrowing. Severe acute injuries are usually lethal and

Access this article online



www.surgeryijss.com

Month of Submission : 01-2019
Month of Peer Review: 02-2019
Month of Acceptance : 03-2019
Month of Publishing : 04-2019

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are most often due to tracheal necrosis, perforation of the esophagus and stomach, and the consequential development of mediastinitis and peritonitis.^[4]

The treatment of esophageal strictures aims to alleviate dysphagia and to prevent recurrent esophageal narrowing. The current treatments include surgery, endoscopic dilatation, and use of removable self-expanding intraluminal stents; the latter two are conservative and have significantly reduced indications for surgery. Esophagectomy with gastric or intestinal interposition for transit reconstruction has high morbidity and uncertain results in the long run, and is, therefore, reserved for cases that are unresponsive to endoscopic treatment.^[5]

MATERIALS AND METHODS

The material of study consists of 30 patients of corrosive esophageal stricture undergone endoscopic balloon dilatation in New Civil Hospital, Surat, during the period of April 2017–August 2018.

Inclusion Criteria

- Patients of >12 years age group were taken in this study.
- Strictures at any location along the esophagus and of any size were included in this study.
- Patients were previously undergone endoscopic balloon dilation for corrosive esophageal strictures were also included in this study.

Exclusion Criteria

The following criteria were excluded from the study:

- Patient of <12 years of age group.
- Malignant esophageal stricture.
- Benign stricture other than corrosive esophageal stricture.

Patient Preparation

Preparation is as for esophageal dilatation. Clinical data including history of the mode of ingestion, type of substance ingested, and amount of substance ingested. Symptoms included difficulty in swallowing, cough with expectoration, difficulty in breathing, abdominal pain, abdominal distension, vomiting, and fever were collected. History of alcohol intake including amount, frequency, and associated comorbid illness such as diabetes mellitus, hypertension, and bronchial asthma and tuberculosis was also noted. All basic investigations including complete blood count, serum electrolytes, blood sugar, renal function tests, liver function tests and prothrombin time, and chest X-ray were noted. In some patients, barium swallow study was done. Data of the previous dilatation done if any, recorded.

In our study, all patients having esophageal stricture subjected for endoscopic balloon dilation done under general anesthesia. Patient should fast for 6 h before the procedure. Anticoagulant medication should be discontinued. Routine antibiotics were given during induction of anesthesia and single post-operative dose given if there is no complication. During the informed consent process, patients should be informed about the complication like perforation and the possible need for surgery should it occur.

Procedure

After proper position of patient, endoscope introduced through mouth and reaches up to stricture. Guidewire with soft tip was introduced and positioned at stricture and hydrostatic balloon catheter was then passed over the guidewire, placed across the stricture and slowly inflated using distilled water. To study effectiveness of endoscopic balloon dilatation in corrosive esophageal stricture. Pressure within the balloon was kept around 5 cm of water. The size of the initial balloon catheter was chosen based on the estimated esophageal caliber of stricture segment and the esophagus distal to the stricture. Inflations were repeated 3 times per session.

After completing procedure look for complication such as bleeding and perforation. Patient shifted to recovery room and observed for post-operative complication. Liquid diet should be started after 12 h and after 24 h allow for soft diet.

OBSERVATION AND DISCUSSION

Observation

The present study was undertaken on 30 patients admitted in New Civil Hospital, Surat, from May 2016 to August 2018.

Patients undergone endoscopic balloon dilation for corrosive esophageal stricture of various lengths and at different sites. In four patients, endoscopic dilation was followed by submucosal injection of long-acting steroid triamcinolone. Impact on stricture recurrence was given a special consideration.

In the present study, patients of >12 years age were divided randomly. The youngest patient was 18 years of age and the oldest patient was of 70 years old. 56% of the patients fall into age group of 21–30 years. Of 30 patients, 18 were male and 12 were female. Of 30 patients, mode of ingestion was suicidal in 26 patients while it was accidental in four patients. In this study, of 30 cases, 22 patients having dysphagia for saliva, 28 having liquid, and all having dysphagia for solid. In our study of 30 patients, upper esophagus is the most common site of stricture in

each group followed by mid and lower esophagus. Patients with multiple esophageal strictures included in this study. Bleeding was present in seven patients. Of 30 cases, barium study was done in five patients and triamcinolone coadministration was done in four patients.

Of 30 patients, complete stricture was seen in 23 patients, incomplete in seven patients, soft in three patients, and fibrosis in 27 patients. In our study, after 6 weeks of endoscopic balloon dilatation, of 30 patients, 24 patients having satisfactory (as per patient's feedback) oral diet and six patients having recurrence of symptoms such as dysphagia for solid and liquid and odynophagia. In the early follow-up, 80% of the patients have satisfactory oral diet. In our study, in most of the patients have satisfactory oral diet after 6 weeks of follow-up. Of 30 patients, six patients having early recurrence and patients undergone colonic transposition surgery in long-term follow-up.

Discussion

Consumption of corrosive substance is one of the common modes of poisoning in developing countries. It is the common cause of benign stricture of the upper gastrointestinal tract. Acid ingestion is more common than alkali ingestion in India as concentrated acids are much cheaper than alkaline-like toilet cleaner.

Results of our study were compared with Chiu *et al.* BMC Gastroenterology, published their experience with effectiveness of endoscopic balloon dilatation – 43 patients in 2013.

Effectiveness of endoscopic balloon dilatation in corrosive esophageal stricture (117 patients) in H. Y. S., Department of Radiology, Asan Medical Centre, University of Ulsan College of Medicine, 388–1, Poongnap–2dong, Songpa–gu, Seoul 138–736, Republic of Korea.

Among these 30 patients, there were 13 males and 17 females with average age of 31 years ranging from 18 to 70 years [Table 1]. Most of the patients were young female in the 2nd or 3rd decades. Majority of patients ingested acid with suicidal intention (86.6%). Emotional behavior disorder can be performed effectively and safely from 4 to 6 weeks after corrosive injury and is the treatment of choice for most of these injuries. Duration between corrosive ingestion and the development of stricture varied from 1 month to 2 months.

All patients present with dysphagia for solid food and 93% of patients present with dysphagia for liquid before endoscopic balloon dilatation. All patients had post-corrosive ingestion weight loss (100%). Among 30 patients, 4 patients (13.3%) had oral ulcer and foul-smelling oral discharge and 5 patients (16.6%) had cough.

Among 30 patients, seven patients had done barium swallow before endoscopic balloon dilatation.

In our study, of 30 patients, 22 patients (73.3%) had upper esophageal stricture, 6 patients (20%) had mid esophageal stricture, and 2 patients (6.7%) had lower esophageal stricture. Among 30 patients, 23 patients (76.7%) had complete stricture and 7 patients (23.3%) had incomplete stricture. Among 30 patients, 3 patients (10%) have soft stricture and 27 W patients (90%) having fibrosis stricture. Among 30 patients, triamcinolone had been administrated in four patients.

All patients have normal dietary intake including solid food at the time of discharge. All patients under study were followed after 1 week, 3 weeks, and 6 weeks interval. In our study, of 30 patients, 24 patients (80%) had satisfactory oral diet and 6 patients (20%) developed recurrence of symptoms after 6 weeks of follow-up. In our study, complication like bleeding observed in seven patients, but not a single esophageal perforation observed [Table 2]. In long-term follow-up, 6 patients (20%) were undergone colonic transposition surgery.

Endoscopic balloon dilatation is effective way for relief of symptoms and improves quality of life in those particular patients who are not fit for surgery or refuse to surgery. In patients with esophageal stricture, esophagectomy followed by reconstruction operation can be performed, but such invasive procedure is grueling for both the patients and their surgeons. They should only be considered in severe complications when endoscopic

Table 1: Comparison of clinical parameters

History	Our study (n=30)	Chiu <i>et al.</i> BMC Gastroenterology (n=36)
Age, mean (years)	31	47
Male/female	13/17	15/21
Acid/alkali	30/0	33/3

n: Total number of patients

Table 2: Comparisons of the outcomes of endoscopic balloon dilatation in patients with corrosive esophageal strictures

Outcome	Our study (n=30)	Chiu <i>et al.</i> BMC Gastroenterology (n=36)
Achieving symptomatic relief, number	24	23
Major complication number		
Bleeding	7	3
Perforation	0	5

n: Total number of patients

balloon dilatation fails or when patients are unable to tolerate endoscopic balloon dilatation procedures.

CONCLUSION

- Corrosive poisoning is one of the most common causes of benign esophageal stricture, difficult to treat and has high morbidity and mortality.
- Female gender has preponderance over males and the 3rd decade of life is the most common age group.
- Among various causes, suicidal ingestion found to be the most common and acid substance ingestion was present in all cases.
- Dysphagia was presenting symptom in all patients, very few patients had cough, oral ulcers, and odynophagia.
- Barium swallow study is not must in all patients. However, patients primarily seen elsewhere had barium study done, most of them had feeding jejunostomy to fulfill nutritional requirement.
- Upper esophagus was the most common site of stricture with almost complete luminal obstruction. Most strictures were dense and fibrous.
- Balloon length and size were decided by local finding in endoscopy, in most patient, bigger size balloon (>10 mm) was used.
- In our study, we did not encounter any perforation as a complication, very few ($n = 7$) has temporary bleeding.
- Although the length of the study was relatively less, in 6-week duration follow-up, most patients had satisfactorily diet ($n = 24$) after balloon dilatation, in sequential follow-up symptoms, recurrence was present in some patients requiring subsequent multiple dilatation with satisfactory results. Six patients had not much improvement after dilatation and diet was not satisfactory with early recurrences, were subjected to surgical option of colonic transposition.

Guide wire with soft tip was introduced and positioned at stricture and hydrostatic balloon catheter was then passed over the guide wire, placed across the stricture and slowly inflated using distilled water which was held for 2 minutes. Multiple dilatations required in most of the patient, single dilatation is never sufficient.

In refractory cases, where the result of dilatation is not promising in terms of resuming satisfactory diet, or patients who had initial good results but later on not responding well to dilation alone, such patients are benefitted by surgical treatment of colonic transposition.

Endoscopic balloon dilatation found to be safe, effective, and promising treatment of most of such patient. However, long-term result and further data analysis are required to establish its efficacy.

REFERENCES

1. Clossen M, Tytgat GN, Lightdale CJ. Gastroenterological Endoscopy. 2nd ed. New York: Thieme Publishing Group; 2010. p. 323, 496.
2. Lahoti D, Broor SL. Corrosive injury to upper gastrointestinal tract. Indian J Gastroenterol 1993;12:135-41.
3. Ramasamy K, Gumaste VV. Ingestion of corrosive in adults. J Clin Gastroenterol 2003;37:119-24.
4. Schubert D, Kuhn R, Lippert H, Pross M. Endoscopic treatment of benign gastrointestinal anastomotic strictures using argon plasma coagulation in combination with diathermy. Surg Endosc 2003;17:1579-82.
5. Fischer JE, Bland KI. Mastery of Surgery. 5th ed. Baltimore, MD: Lippincott Williams and Wilkins; 2006. p. 57, 664.

How to cite this article: Shah J, Chaudhari K, Kachhadiya N. Effectiveness of Endoscopic Balloon Dilatation in Corrosive Esophageal Stricture. IJSS Journal of Surgery 2019;5(2):7-10.

Source of Support: Nil, **Conflict of Interest:** None declared.