

## Esophageal Strictures in Children

Ahmad Bazrafshan<sup>1</sup> (MD); Farhad Heydarian<sup>2\*</sup>(MD); Mahboubeh Sadeghi<sup>3</sup> (MD); Shaghayegh Rahmani<sup>2</sup> (MD)

<sup>1</sup> Dr. Sheikh hospital, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran.

<sup>2</sup> Patient Safety Research Center, Imam Reza Hospital, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran.

<sup>3</sup> Ghaem Hospital, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran.

ARTICLE INFO	ABSTRACT
<p><b>Article type:</b> Original Article</p> <hr/> <p><b>Article history:</b> Received: 24- May-2014 Accepted: 17- June -2014</p> <hr/> <p><b>Keywords:</b> Children Dilatation Esophageal atresia Stricture</p>	<p><b>Introduction:</b> To evaluate main aspects of esophageal strictures in children.</p> <p><b>Materials and Methods:</b> This cross-sectional study was performed on 43 cases of esophageal stenosis ranging from 1 month to 10 years of age who were admitted in Ghaem and Dr. Sheikh Hospitals from 1995 to 2003 in Mashhad, Iran.</p> <p><b>Results:</b> Most cases were male (56%). The most common cause of esophageal stricture was anastomotic stricture after esophageal atresia surgery (34.9%) followed by strictures due to gastroesophageal reflux (25.6%), chemical burns (11.6%), and congenital a (11.6%). Proximal esophagus was the most common site of stricture (48.8%). Dilatation and operation had been chosen as the treatment of choice for most of our cases (42%). The majority of our patients recovered after receiving the proper treatment (60.5%).</p> <p><b>Conclusion:</b> Anastomotic stricture after surgical repair of esophageal atresia comprised the most common cause of esophageal stricture. Proximal esophagus was the most common site of stricture. Most of the patients recovered with dilatation, surgery, or a combination of the two.</p>

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### Introduction

There are numerous etiologies for esophageal stricture in childhood, most of which are benign. This condition may most commonly result from caustic burns of esophagus following ingestion of acids or alkali (1-4), as a complication of gastroesophageal reflux, and iatrogenic insults after surgical repair of esophageal atresia. Also, esophageal atresia may rarely arise as a congenital condition in which a portion of the esophagus is stenotic (5,6). Treatment options investigated in our study included dilatation with a balloon or bougie and in some cases, surgical intervention (4,7,8). Due to the importance of esophageal stricture in children, this study was conducted to assess the causes, lesions location, available therapeutic options, and the final outcome of the patients.

### Materials and Methods

In this cross-sectional study, 43 patients ranging from one month to 10 years of age were included.

This investigation was performed in an eight year interval from 1995 to 2003 at Dr. Sheikh and Ghaem Hospitals in Mashhad, Iran.

Data were gathered on patients' sex, age, esophageal

stricture etiologies, and location of stricture (including distal, proximal, and total). The available treatment options included dilatation, surgery, and a combination of both. The patients' final outcomes were considered as well. Data were analyzed by SPSS using Chi-square and the Kruskal-Wallis tests. P-Value ≤ 0.05 was considered significant.

### Results

The mean age of cases was 25.8±29.7 months. 24 cases (56%) were male and 19 cases (44%) were female. Table 1 summarizes the respective frequencies of each etiology.

**Table 1: Causes of esophageal stricture.**

Cause	Number	Percent
esophageal atresia	15	34.9
Gastroesophageal reflux	11	25.6
Chemical burn	5	11.6
Congenital	5	11.6
Achalasia	4	9.3
Foreign body	2	4.7
Pseudostricture	1	2.3
Total	43	100

It was realized that the proximal esophagus was the most common site of stricture (48.9%). The lesion was located in distal esophagus in 39.5% of the cases. The remaining 11% of the cases suffered from total esophageal strictures.

Most of the patients were treated by a combination of dilatation and surgery (42%). 28% of the patients

underwent dilatation and the remaining 30% were selected for surgery.

The majority of the cases (60.5%) recovered, 9% died and 30.2% did not return for follow up. Table 2 demonstrates the sites of lesions and treatment options of esophageal stricture.

**Table 2: Site and therapies in esophageal strictures**

Site –treatment Causes	Site of stricture			Treatment		
	Distal No-%	Proximal No- %	Total No %	Dilatation No- %	Dilatation surgery No-%	Surgery No-%
Iatrogenic (Esophageal Atresia Surgery)	0-0	15-100	0-0	9-60	3-20	3-20
Gastro-esophageal reflux	10-90.9	1-9.1	0-0	1-9.1	6-54.5	4-36.4
Chemical burn	0-0	0-0	5-100	0-0	4-80	1-20
Congenital	3-60	2-40	0-0	1-20	2-40	2-40
Achalasia	4-100	0-0	0-0	0-0	2-50	2-50
Foreign body	0-0	2-100	0-0	1-50	1-50	0-0
Pseudostricture	0-0	1-100	0-0	0-0	0-0	1-100

It was revealed that types of treatment did not make any significant difference in the patients' final outcomes (P: 0.78) (Table 3).

**Table 3: Type of treatment and outcome**

Type of treatment	Recovered No -%	Non-recovered No-%
Dilatation	7-58.3	5-41.7
Surgery	9-69.2	4-30.8
Dilatation and surgery	10-55.6	8-44.4

No significant relationship between stricture etiology and the patient's final outcome were found (P: 0.82) (Table 4).

**Table4: Relationship between etiologies of the strictures and patients' final outcome**

Cause of stricture/Out come	Recovery No-%	Non-recovered No-%
Atresia	9-60	6-40
GER	6-54.5	5-45.5
Chemical burn	2-40	3-60
congenital	4-80	1-20
Achalasia	3-75	1-25
Foreign body	1-50	1-50
Pseudo stricture	1-100	0-0

## Discussion

It was realized that in most of the cases, esophageal stricture was a complication of esophageal atresia surgery.

Also, it was revealed that most of the cases were affected in the proximal esophagus.

Most patients were treated by a combination of dilatation and surgery; however, there was not any significant differences in final outcomes between the different types of intervention. Most of the patients recovered after receiving the appropriate treatment.

In a study (4) conducted on 38 children between one

month to 10 years of age from 1998 to 2006 in Jordan, the mean age was 3.2 years. Among acquired esophageal stricture, corrosive induced damages was the most common (47.3%). Complications of esophageal atresia surgery (23.6%), surgical repair of hiatal hernia (10.5 %) and GERD (7.8%) were among other causes of stricture.

It was found that each patient underwent  $20.1 \pm 17.3$  dilatation procedures on average. Also, patients who suffered from stricture caused by corrosives injuries required more frequent dilatation than others (i.e.  $34.2 \pm 16.6$  vs.  $10.4 \pm 8.2$  dilatations).

Dilatations were successful in the majority of cases (84.2%). In another study (9), it was revealed that 35 out of 287 esophageal strictures were a consequence of corrosives ingestion. Jones (5) reported three cases of congenital esophageal stenoses. In one of these cases, the presenting complaint was severe failure to thrive without any symptoms of vomiting or dysphagia.

This patient had a good response to esophageal dilatation. The second case presented with dysphagia and vomiting and only tolerated liquids. Further evaluations revealed a narrowing in gastroesophageal junction with a proximal dilatation in barium meal study. This patient was diagnosed with achalasia later on and was treated successfully with dilatation procedure. The third case presented with esophageal stenosis in association with esophageal atresia and TEF in VACTERL syndrome. The main presenting symptom was dysphagia. Barium meal study revealed no stricture in the anastomosis region, but a stricture was apparent in the distal esophagus. Dilatation was performed, and she was treated successfully.

In another study (9) carried out on 17 patients between three months to nine years of age (mean age: 7.6 months) from 1995 to 2005 in Egypt, most of the cases were male, and the most common presenting symptoms included vomiting (64.7%), failure to thrive(47%), and dysphagia (41.2%). Most of

the cases (11 patients), were successfully treated with dilatation. The others (six cases) needed surgical intervention. Most of the lesions were located in distal esophagus. In one other similar study (10), 20 cases of esophageal stricture between 17 days to 12 years of age from 1994 to 1998 in China were studied. The patients were divided into two groups. Group one consisted of those with congenital esophageal atresia (10 cases), and Group two was comprised of the cases with acquired esophageal stenosis.

All the group one cases were successfully treated with dilatation procedure whereas in the second group, only seven out of 10 patients were successfully treated by dilatation and the remaining three (all of which were corrosive-induced injuries) did not respond to esophageal dilatation. There were some differences in

the results of our study in comparison to others'. This may be due to the differences in ethical considerations, geographic features, and life habits.

### Conclusion

In our study, stricture after surgical repair of esophageal atresia was the most common cause of esophageal strictures. Most of the lesions were located in proximal esophagus. The majority of the patients recovered with dilatation, surgery, or a combination of both.

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### References

- 1- Stringer MD. Oesophageal substitution: Editorial comment. *Pediatric surgery international*. 1996 Apr; 11(4):213.
- 2- Broor SL, Lahoti D, Bose PP, Ramesh GN, Raju GS, Kumar A. Benign esophageal strictures in children and adolescents: etiology, clinical profile, and results of endoscopic dilation. *Gastrointestinal endoscopy*. 1996 May; 43(5):474-7.
- 3- Broto J, Asensio M, Jorro CS, Marhuenda C, Vernet JM, Acosta D, et al. Conservative treatment of caustic esophageal injuries in children: 20 years of experience. *Pediatric surgery international*. 1999 Jul; 15(5-6):323-5.
- 4- Saleem MM. Acquired oesophageal strictures in children: emphasis on the use of string-guided dilatations. *Singapore medical journal*. 2009 Jan; 50(1):82-6.
- 5- Jones DW, Kunisaki SM, Teitelbaum DH, Spigland NA, Coran AG. Congenital esophageal stenosis: the differential diagnosis and management. *Pediatric surgery international*. 2010 May; 26(5):547-51.
- 6- Takamizawa S, Tsugawa C, Mouri N, Satoh S, Kanegawa K, Nishijima E, et al. Congenital esophageal stenosis: Therapeutic strategy based on etiology. *Journal of pediatric surgery*. 2002 Feb; 37(2):197-201.
- 7- Numanoglu A, Millar AJ, Brown RA, Rode H. Gastroesophageal reflux strictures in children, management and outcome. *Pediatric surgery international*. 2005 Aug; 21(8):631-4.
- 8- Jayakrishnan VK, Wilkinson AG. Treatment of oesophageal strictures in children: a comparison of fluoroscopically guided balloon dilatation with surgical bouginage. *Pediatric radiology*. 2001 Feb; 31(2):98-101.
- 9- Lan LC, Wong KK, Lin SC, Sprigg A, Clarke S, Johnson PR, et al. Endoscopic balloon dilatation of esophageal strictures in infants and children: 17 years' experience and a literature review. *Journal of pediatric surgery*. 2003 Dec; 38(12):1712-5.
- 10- Elhalaby EA, Elbarbary MM, Hashish AA, Kaddah SN, Hamza AF, Waheeb SM, et al. Congenital esophageal stenosis: to dilate or to resect. *Annals of Pediatric Surgery*. 2006;2(1):2-9.