Original Article

Caustic Oesophageal Stricture Treated By Instrumental Dilatation: A Review of 6 Years of Practice at the Pediatric University Hospital Charles de Gaulle of Ouagadougou

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Abstract

Background: Oesophageal stricture is one of the most important and redoubtable complications following caustic ingestions in children. Instrumental dilatation is usually considered the first line of treatment. **Aims and Objectives:** This study aims to evaluate the outcomes of caustic stenosis treatment when using Lerut dilatators. **Materials and Methods:** This is a descriptive retrospective study from May 2014 to April 2020. All children under 15 years hospitalised in our department for caustic oesophageal stricture and had a gastrostomy and oesophageal dilatation with insertion of an endless wire were included. **Results:** A total of 83 patients were included. The sex ratio was 2.2. The mean age was 4 years. The mean time from caustic ingestion to presentation was 90 days. Oesophageal stricture was mostly caused by caustic soda ($n = 41$) and potash ($n = 15$). We performed in total 469 dilatations and had only three oesophageal perforations. After a mean follow-up of 17 months, we had 60.2% good results ($n = 50$) and 7.2% ($n = 6$) failures. The mortality rate was 13.2% ($n = 11$). **Conclusion:** The results of the dilations by Lerut dilatators give encouraging results in our department. It is easy to perform and its complications remain rare. Mortality could be reduced by adequate nutritional support.

Keywords: Caustic oesophageal stricture, dilatation, Lerut dilatators, management, paediatric

Introduction

Oesophageal stricture is one of the most redoubtable complications following ingestion of caustic substances. In developing countries, the caustic oesophageal stricture is frequently underreported.[1] Oesophageal stricture management is not consensual, given the wide array of existing dilators and other therapeutic methods.[2] Yet, instrumental dilatation is unanimously recognised as the first line of treatment.[3-6] Surgery is usually indicated when dilatation is not successful.[7]

In our context of limited resources, oesophageal stricture management is challenging, and the mortality rate is high. In this manuscript, we aimed to report 6 years of caustic oesophageal stricture management using Lerut candles.

Materials and Methods

We conducted a retrospective study from May 2014 to April 2020. All patients aged 15 years and below hospitalised for caustic oesophageal stricture and had a feeding gastrostomy with insertion of an endless wire were included. Dilatation was performed with Lerut dilatators [Figure 1].[8,9] These are a set of dilatators of increasing calibre hollowed out at their ends with an orifice allowing the passage of the endless wire.[9] A feeding gastrostomy with endless wire insertion by the technique of Canty preceded dilatation in all patients. These dilatations were performed under general anaesthesia with orotracheal intubation.

Patients who had a normal oral diet 6 months after the end of dilatations were considered cured. Those who had a normal oral diet after three consecutive dilatations were

Received: 22-06-2021 **Revised:** 10-02-2022 **Accepted:** 27-06-2022 **Available Online:** 04-01-2023

Access this article online

Quick Response Code:

Website: www.afrjpaedsurg.org

DOI: 10.4103/ajps.ajps_101_21

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How to cite this article: Modeste OS, Thiombiano K, Damba JJ, Ouedraogo A, Doulkom PN, Ouedraogo I, *et al*. Caustic oesophageal stricture treated by instrumental dilatation: A review of 6 years of practice at the pediatric university hospital charles de gaulle of ouagadougou. Afr J Paediatr Surg 2023;20:116-9.

closely monitored. Outcomes were considered good for patients cured and those under surveillance. Outcomes were considered fair when dilatation was still necessary after 15 sessions. Failure was defined as a nonsignificant increase of oesophageal calibre after five consecutive dilatations or the occurrence of iatrogenic oesophageal perforation during dilatation. Data were recorded on statistical software (MS Excel®, Microsoft Corporation, Redmond, WA, United States, Epi-Info) with a double-checking of the data before data analysis. The source of data was patient folders and operating report folders.

Results

We identified 119 patients hospitalised for caustic oesophageal stricture during the study period. Among these patients, only 83 (69.7%) were eligible for instrumental dilatation. The mean age was 4 years ± 2.6. Seventy-one (71.08%) patients were aged less than or equal to 5 years old. Males were predominant in our cohort (68.7% vs. 31.33%). The sex ratio was 2.2. Patients came from rural areas (56.63%) and urban areas (43.37%).

Dysphagia (86.75%) was the main reason for admission to our clinic, followed by caustic ingestion (13.25%). The mean time from ingestion to the consultation was 90 days but ranged from 3 to 730 days. Alkaline (72.29%) and acid (14.46%) were the most common chemical substances ingested. Among them, 49.39% had ingested caustic soda, whereas 18.07% ingested potash. One patient had ingested an oxidant. The nature of chemicals ingested was imprecise in 12% of patients. Table 1 presents the type of corrosive substances ingested in our study.

Upper gastrointestinal endoscopy was performed in 19 patients due to the high cost of these exams. Stricture location at the gastroduodenal oesophageal transit was thoracic (36.84%), cervical (23.32%), abdominal (26.32%) and thoracoabdominal (10.52%). The stricture was considered tight in 57.89% of patients. A gastrostomy using the Fondant technique was performed in all patients within 7 days of admission to the emergency department.

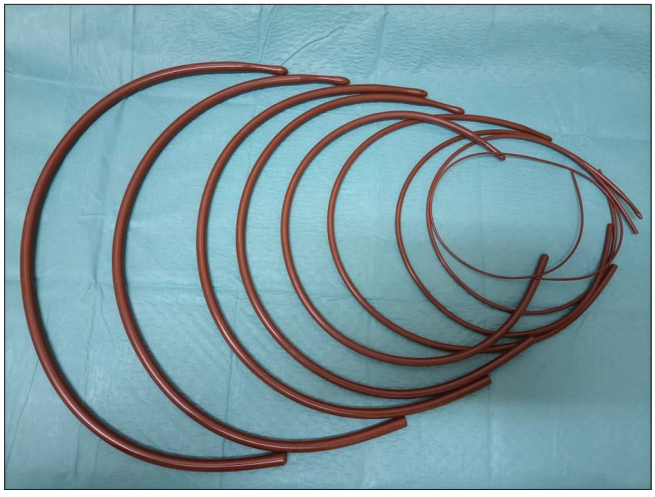


Figure 1: Tony Lerut dilatators

In total, 469 dilatations were performed during the study period (78 dilatations per year). Table 2 presents the number of patients according to the number of dilatations. Each patient received an average of 5.58 dilatations.

Complications following dilatations were oesophageal perforations (three patients) and unplanned removal of the endless guide wire (four patients).

Forty-four patients were declared cured after a mean follows of 516.3 days. Six patients remain under surveillance. Outcomes

Table 1: Number of patients according to chemical substances ingested

Chemical substances ingested	*n* (%)
Caustic soda	41 (49.39)
Potash	15 (18.07)
Unknown	10 (12.05)
Sulphuric acid	9 (10.84)
Hair relaxer	3 (3.61)
Insecticide	2 (2.41)
Sodium hypochlorite	1 (1.21)
Bicarbonate	1 (1.21)
Bleach	1 (1.21)
Total	83 (100.00)

Table 2: Distribution according to the number of dilatations

Number of dilatations	*n* (%)
1-5	54 (65.06)
5-10	17 (20.48)
10-15	7 (8.43)
15-20	1 (1.21)
20-25	3 (3.61)
≥26	1 (1.21)
Total	83 (100.00)

Table 3: Outcomes according to the number of dilatations received

Number of dilatations	*n*
Good results	
1-6	39
6-12	9
12-18	2
Total	50
Fair results	
19	1
22	1
24	1
26	1
Total	4

were good in 60.2% (50/83) patients, after approximately six dilatations sessions per patient.

Fair results were observed in four patients. Table 3 presents outcomes according to the number of dilatations received.

At the time, we are writing this article, nine patients were having ongoing dilatations.

Dilatations failed in six patients. Three of them had oesophageal perforations. The oesophagus calibre did not increase after five dilatations in the other three cases. Among those who were declared cured, three had a recurrence. In total, (13,25%) occurred, mostly due to malnutrition.

Discussion

Caustic oesophageal stricture occurred mostly around 4 years old.[10,11] Although it could occur at any age, it is well established that caustic oesophageal stricture occurred between 3 to 5 years old. In fact, young age represents a risk factor for many reasons such as lack of the child's attention, lack of parental surveillance, or need for the kid to explore his environment.[12,13]

Another risk factor for caustic ingestion is the male gender. Several studies have reported male predominance, as a result of male curiosity and turbulence.[5,9-11,14] This could explain why males are more exposed to domestic accidents than females.[2]

The mean time for consultation was 90.06 days. Agbara *et al*.[10] in Ivory Coast and Togo[5] in Mali found, respectively, 138.62 days and 180 days. Boume[12] and Tadmori *et al*.[14] found 21 days. While our finding looks shorter than those reported by Agbara and Togo, late presentation is still a major concern in caustic ingestion management in our context. Many factors could contribute to this situation such as auto-medication attempts initiated by parents or delayed access to adequate care.[9,11]

Caustic soda and potash are two chemicals frequently reported as responsible for caustic oesophageal strictures in West Africa.[5,6,10,12] In fact, caustic soda is one of the components used for the manufacture of soaps in many households. Similarly, potash is regularly used for meal preparation. This last is stored in kitchens in liquid and concentrated form. It is this concentrate that is accidentally drunk by children. Those two chemicals can be bought at the market and they are not well labelled. Therefore, young children could easily confuse those chemicals with milk or sugar,[5] and accidentally ingest them.

Average number of dilatation per patient is 5.58 dilatations. Fifty-four had less than or equal to five sessions of dilatations. Yena[8] in Mali, who also used Lerut candles, found similar results. The number of instrumental dilatations for each patient is difficult to plan. It depends on the type of caustic ingested, stricture length, or dilatator used.

Oesophageal perforations are seldom during dilatation. However, they are dramatic when they occurred and worsen the prognosis.[15-17] Instrumental dilatation regardless of the type of candles used, is the main cause of oesophageal perforations in children.[15,18,19] Oesophageal perforation mortality rate is around 50%.[15,19] Oesophageal perforation management must be as early as possible and usually combine medical treatment and surgery. Perforation is earlier recognised by systematically performing a chest X-ray after each session of dilatation.[9,18] Its occurrence means that dilatation has failed, and consequently should be discontinued, as many authors reported.[12,19-21]

After a mean follow-up of 17 months, (1 year and 5.11 months), we noted 60.24% of good results (n = 50) and 7.23% (n = 6) were considered as failures. In the literature, the success rate using Lerut dilatators varies between 84.78% and 92.6%.[5,8] It is a simple procedure with a proven high rate of good results. However, good results depend on the medical team's experience and equipment, and there is no clear evidence that one type of dilatator could be more effective than others. Recurrences after dilatations are unpredictable. Therefore, long-term follow-up is required as there might be persistent retractile fibrosis in the site of the oesophageal stricture. Even when a patient is declared cured, regular visits with medical examination and endoscopy are required during the follow-up.[22,23]

In this study, 13,25% of the patients died. The mortality rate observed in other west African countries varies betwen 7% and 21%.[5,8,10] This mortality was mainly due to malnutrition. Discuss results of the study with emphasis on aims and objectives.

Conclusion

Caustic oesophageal stricture is a serious complication following chemical substance ingestion. It is often considered a domestic accident in children. Instrumental dilatation still represents the first line of treatment. Lerut candles are actually a simple and accessible method of treatment in our context of countries with limited resources.

Acknowledgement

We would like to thank Dr. Damba J.J and Dr. Noutchie A.C. for proofreading and good translation of this article.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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