CLINICAL CASE

ESOPHAGEAL CAUSTIC STENOSIS – DIFFICULTIES OF THERAPEUTIC MANAGEMENT**A. Crețu^{1,2}, Rodica Bîrlă^{1,3}, P. Hoară^{1,3}, A. Abdulah^{1,3}, Mădălina Mitrea^{1,3}, S. Constantinoiu^{1,3}**¹“Carol Davila” University of Medicine and Pharmacy, Bucharest, Romania²Romanian Student Society of Surgery³“Sf. Maria” Clinical Hospital, Bucharest, Romania

Corresponding author: Rodica Bîrlă

Phone no: 0040212223550

Email: birlarodica@yahoo.com

Abstract

Esophageal stenosis is one of the most common sequels of caustic injury. After the ingestion, in the acute phase, the life support is sometimes critical, and the treatment varies from observation to esophagectomy. During the first 6 months, endoscopic dilation can be necessary in order to maintain the patency of the esophageal lumen. Usually, endoscopic dilation is the treatment of choice for caustic stenosis of the esophagus. Sometimes this procedure is not possible or too risky and then reconstruction surgery is needed, but no earlier than 6 months. We present the case of a 57 years old male who was referred to our clinic for the treatment of a mid-esophageal caustic stenosis, after the accidental ingestion of a concentrated alkaline substance 6 months before. After an initial successful endoscopic dilation, in the second attempt, due to the asymmetric position of the stenosis and the high risk of perforation, we decided to perform an esophageal by-pass. We chose to use the left colon for interposition, with the left branch of middle colic artery as the feeding source and the sigmoid trunk as the second arcade. The surgical procedure went uneventful, with restoration of normal oral feeding.

Keywords: *esophageal caustic stenosis, colon interposition***Introduction**

Esophageal stricture is one of the most common sequels of caustic injury. Up to 90% of patients with severe acute injuries are likely to develop esophageal stricture [1].

Esophageal radiologic studies have an important role in the diagnosis of post caustic stenosis, showing the exact location, the length of the stenosis and, eventually, a fistulous track. It is better to begin with an iodine swallow, in order to see if there is any leak and to make things easier for the endoscopist.

Upper digestive endoscopy represents the gold standard in diagnosis and treatment of

patients with esophageal pathology, including post caustic lesions. For a better comfort, in patients with esophageal stenosis, it should be done with general anesthesia and should offer the possibilities for treatment. The first option is endoscopic dilation, using Savary bougies or TTS balloon. The rate of major complications (hemorrhage, perforation) is small. In order to low down even more the risk of perforation, the most fearful complication of dilation, one should use the “rule of 3” – no more than 3 successive dimensions of bougies in a single session [2]. The success of the treatment is achieved when the esophageal lumen reaches 15 mm [3].

Temporary use of esophageal stents is considered a therapeutic option, but the method still has its drawbacks [4]. Plastic stents have a high risk of migration, metallic stents can migrate and need to be removed under general anesthesia and biodegradable stents are still new, and have a high cost. The dysphagia improved 40% after using metallic stents, 30% after biodegradable ones and only 10% when using plastic stents, according to some authors [5].

Surgical treatment is the last resort, sometimes in emergency, when perforation occurs, or after failure of endoscopic management, being the most invasive and with the highest risk of major complications. It is rarely needed, most stenoses being amenable by endoscopic treatment. The surgical treatment can be performed after at least 6 months from ingestion of the caustic substance, when all the tissue modifications are over. The dilemma the surgeon has to face before doing an esophageal reconstruction is whether to resect the stenotic esophagus or to leave it inside. So, basically, the question is whether to perform an esophagectomy or just an esophageal bypass. In favor of the esophagectomy is the risk of esophageal cancer after ingestion of a corrosive substance, which is 1000 times higher than that of the normal population. On the other hand, it has been proven that, by eliminating the esophagus from the digestive pathway, it no longer has contact with food antigens, which significantly decreases the risk of cancer, to the point where it is lower than the mortality associated with the esophagectomy procedure [6].

Case presentation

We present the case of a 57-year-old male, who accidentally ingested a corrosive substance (sodium hydroxide 70%) in November 2018, who continued p.o. feeding one month, being diagnosed in another medical facility with esophageal stenosis, for which a gastrostomy was placed, in January 2019. He was admitted to our clinic in April 2019 for further investigations and establishing the therapeutic approach. He presented with normal clinical and biological parameters.

The contrast radiography of the upper gastrointestinal tract showed an esophageal stenosis situated in the thoracic esophagus (the

middle 1/3), with a length of 7-8 cm, which allowed the filiform passage of the contrast substance, with dilation and stasis above the stenosis, a stomach with hypersecretion, normal gastric folds and curvatures, normal evacuation and a diverticulum on DIII (Figure 1).

Figure 1 – Barium swallow showing esophageal stenosis

Superior digestive endoscopy was then performed and it allowed the visualization of a slightly eccentric stenosis, with a diameter of approximately 3-4 mm, situated at 28 cm from the dental arcade (Figure 2). A guide wire was introduced and then dilations were performed, using Savary bougies with diameters of 7 and 8 mm, respectively, without any incidents. However, it was impossible to advance the endoscope past the stenosis. The patient was then discharged, with improved dysphagia, until the next dilation session.

Figure 2 – Endoscopic appearance of the stenosis.

The patient was readmitted after 3 weeks for reevaluation and a new dilations session. The lab results were normal, except for a slightly elevated C reactive protein (42,66 mg/L). The barium X-ray examination did not reveal any fistulous tract, but a persistence of the lumen dilation above the stenosis could be observed. During the endoscopy, the stenosis was located at 30 cm from the dental arcade, with a diameter of 4-5 mm. The passage of the guide wire was impossible and there seemed to be purulent liquid coming out of the stenosis. Hence, considering that the maneuver was too dangerous, given the location and the appearance of the stenosis, the investigation was stopped and the patient was temporarily discharged and proposed for surgical treatment of the stenosis. We have decided to perform an esophageal bypass using anisoperistaltic left colic graft interposition via a retrosternal approach.

Figure 3 – The colon graft

The procedure started with a median xiphoid-umbilical incision. The first step was the gastrostomy removal. Then, the epiploic disinsertion of the left colon was performed and the gastro-colic ligament was sectioned. The vascular pedicles of the transverse and descending colon were identified (the left branch of the middle colic artery, the left colic artery and the sigmoid arteries) and then clamped, except for the left branch of the middle colic artery, which was left as the only vascular supply of the graft. There were no changes in the color of the colic graft or the pulse of the marginal artery of the colon. After measuring the colic graft so that it could have a proper length to reach the cervical esophagus, the trunk of the sigmoid arteries (right at its origin from the superior rectal artery) and the left colic artery were sectioned and ligated. The transverse colon and the sigmoid were sectioned, a colonic graft of about 50 cm was obtained [fig.3] and an end-to-end colo-colic anastomosis was performed and the proximal end of the graft was anastomosed to the anterior wall of the stomach, close to the small curvature.

The second part of the procedure started with the oblique left cervical incision, on the edge of the SCM muscle. After the middle thyroid vein was sectioned and ligated, the approach of the cervical esophagus was possible between the left thyroid lobe, laterally, and the vascular bundle, medially. Bearing in mind that the recurrent laryngeal nerve had to be avoided, the cervical esophagus was then isolated, sectioned and the distal end was closed in a pouch. A retrosternal passage was prepared by performing blunt dissection and the anisoperistaltic colic graft was then ascended at the upper thoracic aperture, where the end-to-side eso-colic anastomosis was performed with interrupted 4.0 sutures [fig.4]. A feeding jejunostomy was also placed.

Figure 4 – The retrosternal path

Postoperative course was uneventful, with oral feeding starting the 7th day, after radiologic control of the anastomosis and discharge in the postoperative day 10.

Discussions

Some authors noted that the peak development of strictures commonly starts in the 8th week post-ingestion, although it has been reported to occur as early as 3 weeks [6], [7]. In our case the patient had total dysphagia 4 weeks after the ingestion of caustic agent which determined the presentation to the doctor and the setting up of a gastrostomy for nutrition.

Most authors think that the primary non-surgical treatment of caustic esophageal stricture is endoscopic dilatation and we agree with this opinion. This can be achieved with bougies or balloon dilators. For tight and fibrotic strictures, bougies dilators are often more reliable than balloon dilators [1].

For either technique, the goal is to achieve relief of symptoms (particularly dysphagia) and maintain efficient luminal diameter of up to 15 mm [3].

Other authors noted that this intervention was safe and effective in improving dysphagia, achieving clinically significant dilatation, reducing dilatation frequency, maintaining luminal patency of ≥ 14 mm [8]. The method is usually helpful in such patients; many of them tolerate it quite well and remain symptom free [9].

80-90% of the patients with caustic esophageal stenosis can be successfully treated with endoscopic dilations, with up to 30-40% having dysphagia recurrence after 1 year. In our case this method was not efficient due to the eccentric appearance of the esophageal stenosis which made the introduction of the guide wire risky.

The local injection of Triamcinolon or Mitomycin C was associated with a longer interval between dilations. Using balloon dilators, a lower dilatation force should be used initially to avoid perforation [10]. This may need to be repeated and advanced slowly to achieve effective and safe dilatation.

The interval between dilatations varies from 1-3 weeks among different studies [11] but usually an interval of 3-4 weeks is recommended, opinion that we agree upon.

When dilatation therapy is ineffective, stricture may cause permanent dysphagia, which sometimes leaves the patient unable to swallow his or her saliva. In those cases, surgery is inevitable as was our case [12], [13].

The literature revealed that only a few adult patients have undergone a surgical operation for caustic esophageal burn [14], [15], [16].

Therefore, the best surgical management of severe corrosive esophageal stricture is still being debated.

Surgical options include partial or total esophagectomy with gastric pull up or, preferably colonic interposition [7]. Some authors, including us, prefer not to do the esophagectomy, in order to lower the morbidity and mortality of the surgery, taking into consideration that the esophagus is no longer in contact with food, so the risk of malignant transformation is reduced.

Gastric pull-up in general, is quicker and requires only one anastomosis. However, the long-term functional outcome may decrease with development of complications such as recurrence of stricture, bothersome reflux, and subsequent metaplasia over the anastomotic site [17].

Colon interposition is a more complex procedure requiring 3 anastomoses, albeit with a more stable long-term functional outcome. It is often associated with a lower incidence of stricture formation than gastric pull-up hence its preferential use in the setting of a relatively spared and healthy stomach [11].

With good blood supply and improved somatic growth, the colon is long enough for esophageal replacement, and it causes fewer late complications of esophagitis and stricture because of the resistance to acid. So, colon could offer potential advantages over other organs [18], [19], and it is believed to be an ideal organ for the replacement.

We used colon for esophageal bypass in 63 cases, and the result was satisfactory. Our experience supports the idea that colon interposition is the best option for reconstruction of esophagus in caustic injury strictures [20].

Choice of colon segment as a graft is also a key point for reconstruction of esophagus. The

left colon has been considered by many surgeons to be a preferable conduit for several reasons. But left colon interposition could be done only in an antiperistaltic fashion, which may cause inflammation of the anastomosis, and affect the healing process.

So, it is suggested that the reversed peristalsis might cause more complications of anastomosis than isoperistalsis. The choice of a colon segment for substitution in our study was also influenced by the blood vessels supply seen during operation, the color of the intestine, and pulsation of marginal arteries after clamping all the vessels except for the supplying artery of the graft. The mortality and morbidity in the literature, after colonic interposition, was very high [21].

Colonic transposition changes the gastrointestinal anatomy more than gastric pull-up. Some authors reported a series of 336 patients with colonic transposition and early postoperative complications included anastomotic leakage, colonic necrosis, and hemo-pneumothorax. They reported an early postoperative complication rate of 26.49%. Furthermore, the authors declared that cervical anastomotic stricture, peptic colonic ulceration, bowel obstruction, and thoracic outlet compression were the late postoperative complications with an overall rate of 14% [22].

In another study, including 82 patients who underwent colonic transposition, six deaths were reported due to graft necrosis in two cases, aspiration pneumonia in other two, one case of bacterial peritonitis due to abdominal anastomotic leakage, and one disseminated intravascular coagulopathy [23].

Conclusion

Endoscopic dilation is the first line of treatment for esophageal benign stenosis, including post caustic, but when they are not possible or are too risky, esophageal by-pass becomes necessary. A colon interposition is one of the most frequently used methods of alimentary tract reconstruction for the treatment of esophageal caustic stenosis.

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