

## Clinical Outcomes after Surgical Treatment of Giant Zenker Diverticulum. Analysis of a 10-Year-Experience in a High Level Center

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### Abstract

There is a wide variety of therapeutic options for treatment of Zenker's Diverticulum (ZD), ranging from flexible and rigid endoscopic to open surgical resection. Optimal management remains controversial. We present a 54-year-old man who developed progressive dysphagia and weight loss. CT scan and esophagogram revealed large ZD (Grade IV) size of 9,5 x 6,7 cm. Mechanical diverticulectomy and myotomy of cricopharyngeal muscle were performed by cervicotomy. About this case we started a retrospective and descriptive study of all patients with large ZD treated in our center since 2005 to 2015. Demographics variables (sex, age, pre-operative ASA, main symptom, clinical image, surgical treatment) were analyzed. Primary outcome was clinical success and secondary variables were long term outcomes such as complications, dysphonia, esophageal stenosis and radiological or subclinical recurrence. Clavien-Dindo classification was used to describe major or minor perioperative complications. Among the long-term outcomes of recurrence, there was a low radiological recurrence, without clinical repercussion. Postoperative transient dysphonia was also detected. Clavien-Dindo classification for minor and major complications was used. Clinical improvement success (relief symptoms) was achieved in all patients, with no severe morbidity, low recurrence and absence of mortality.

**Keywords:** Zenker; Diverticulum; Recurrence; Dysphonia; Complication; Endoscopic; Diverticulectomy

### Introduction

Zenker's Diverticulum (ZD) is an infrequent pathology (0,01 - 0,11%). Main symptom is dysphagia and it is often due to high pressure during swallowing as a result of cricopharyngeal muscle spasm [1].

There is a wide variety of therapeutic options, the optimal management is far from being standardized in current clinical practice. Traditional approach follows a standardized surgical technique, such as diverticulectomy with cricopharyngeal myotomy. This is an acceptable treatment with a high clinical success rate, low morbidity and recurrence [2].

Advances of endoscopy, stapling techniques and carbon dioxide laser technologies have opened new options to the therapeutic armament [1,3].

Based on a case of large ZD, we performed a retrospective and descriptive study of clinical outcomes after surgical resection of Zenker Diverticulum Type IV in our center during the last 10 years.

## Materials and Methods

### Clinical case

A 54-year-old man who developed progressive dysphagia and weight loss. CT scan and Esophagogram showed a giant Zenker Diverticulum (Grade IV) size of 9,5 x 6,7 x 6,5 cm (Figure 1 and 2). Mechanical diverticulectomy and myotomy of cricopharyngeal muscle were performed by cervicotomy (Figure 3). In the postoperative period he presented hoarseness and dysphonia. After a laryngoscopy, transitory hemilaryngeal paralysis was detected. No other complications were notified and our patient was discharged on the 5<sup>th</sup> postoperative day. He received rehabilitation and physical therapy for the hemilaryngeal palsy, who was successfully.

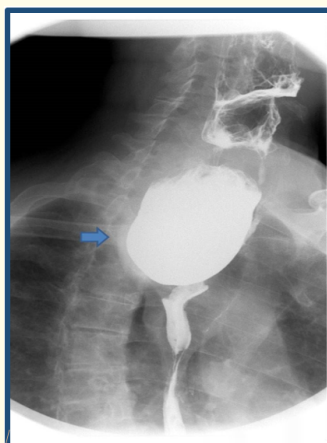


Figure 1: Esophagogram showing large Zenker's Diverticulum.

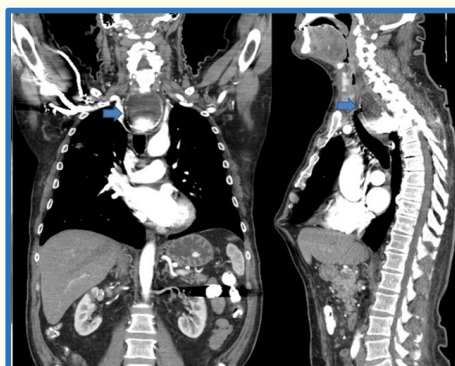


Figure 2: Cervical CT scan showing large Zenker's Diverticulum.

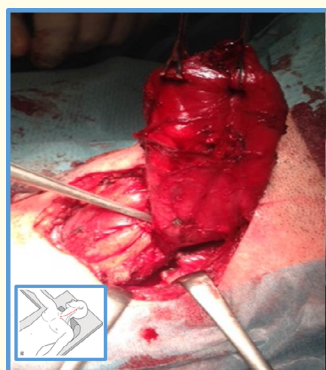


Figure 3: Cervicotomy during surgery of large ZD.

Three and six months follow-up radiology study was satisfactory (Figure 4), no clinical or radiological recurrence was detected.



Figure 4: Postoperative esophagogram 3 - 6 months, follow-up control.

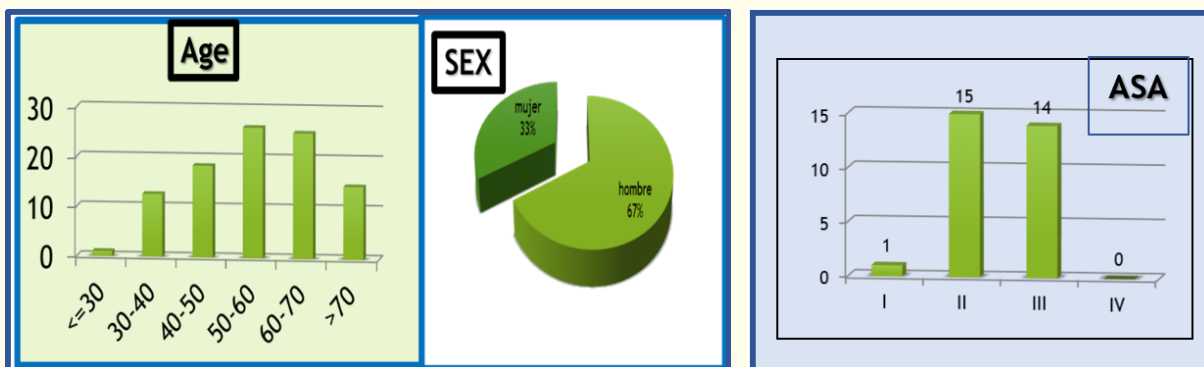
**Study**

Based on Brombart Classification, a Zenker Diverticulum Grade IV, which is considered when the diverticulum compresses and displaces the esophagus. We performed a retrospective and descriptive study of patients with Zenker Diverticulum grade IV which were operated from 2005 to 2015, in a high-level center.

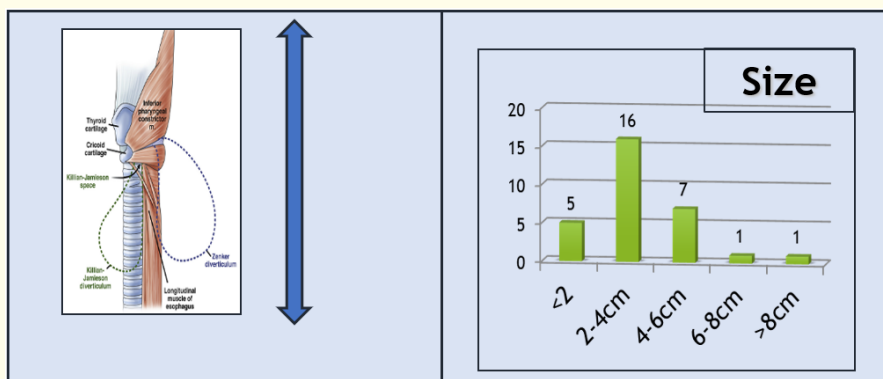
We analyzed demographics variables (sex, age), preoperative ASA, main symptom, clinical image and surgical treatment. Primary outcome was clinical success (relief of symptom). And secondary long-term outcomes were complications, such us dysphonia, stenosis and radiological or subclinical recurrence. Clavien-Dindo classification was used to describe perioperative complications.

**Results**

30 patients were analyzed, 67% were men. The mean age was 60 years old and ASA II risk the most frequent pre-operative assessment (96.7%), as it shows in graph 1. Dysphagia was the main symptom (96%), followed by regurgitation in 50% of cases. Diagnosis was made by Esophagogram in all of them and CT scan was used in 23% of patients. Average size of diverticulum was 3,9 cm, ranging from 3 to 9,5 cm (Graph 2).



Graph 1: Distribution of demographics (mean age of 60 years, male sex 64%, ASA Assessment II Grade the most frequent, remarkable features).



Graph 2: Mean size of 35 mm.

The most performed surgical technique was diverticulectomy and myotomy of the cricopharyngeal muscle with mechanical (76%) and hand-sew (23%) suture. Mechanical stapler was made with T.A System (66%) and linear Endo GIA stapler (10%) as shows in table 1.

|                  | Surgical Technique |            | Type of Suture |    |       |
|------------------|--------------------|------------|----------------|----|-------|
|                  | Frequency          | Percentage | Mechanical TA  |    |       |
| Myotomy          | 30                 | 100%       | Mechanical TA  | 20 | 66.6  |
|                  |                    |            | Mechanical GIA | 3  | 10    |
| Diverticulectomy | 30                 | 100%       | Manual         | 7  | 23.3  |
|                  |                    |            | Total          | 30 | 100.0 |

Table 1: Type of surgery.

There was a radiological fistula in 4 patients with no clinical repercussion. Temporary dysphonia was reported in 4 cases and esophagus stenosis in other 2 patients. Based on Clavien-Dindo classification, minor and major complications are described in table 2. All patients included in this study showed clinical improvement, low morbidity and we found no mortality.

| GRAVEDAD (Clavien-Dindo) |       |           |
|--------------------------|-------|-----------|
|                          |       | Frequency |
| Grade                    | 0     | 13        |
|                          | I     | 9         |
|                          | II    | 3         |
|                          | IIIa  | 3         |
|                          | IIIb  | 2         |
|                          | IVb   | 0         |
|                          | V     | 0         |
|                          | Total | N: 30     |

Table 2: Clavien-Dindo classification, the majority of patients has no or minor complication in perioperative period.

### Discussion

Because of the low incidence, heterogeneity and lack of more prospective studies and the diversity of surgical techniques (open surgery, rigid and flexible perioral endoscopic); the gold standard for treatment remains to be controversial [2,4].

Diverticulectomy and myotomy of the cricopharyngeal muscle by cervicotomy has a high success rate and low recurrence (clinical or radiological persistence), however it is associated with a higher risk of recurrent nerve injury than endoscopic management [2,4,5].

Especially, for cases of Giant ZD, like ours, there is no other option than open surgery due to lower recurrence rate and higher satisfactory outcome; probably the endoscopic techniques represent a better option in small diverticula or “borderline size” cases (< 35 - 40 mm) in centers with experience and proper training with the transoral access.

Endoscopic approach represents an excellent option for selected patients, in multidisciplinary surgical teams, and in experienced surgeons. The flexible endoscopy and intraluminal technique for the treatment of Zenkers Diverticulum appears in the field of minimally invasive surgery with a similar efficiency and lower morbidity rates [5]. The highest rate of recurrence is the unfavorable point, more than 35% comparing with the open surgery [4,5,7].

In our country, Noguera, *et al.* [6], carried out a prospective study with over a median follow-up of 2 years, those patients were treated with flexible peroral endoscopy and tissue sealing. No clinical or radiological recurrence was detected and no major complications were notified.

Multiple retrospective studies agree with our results and show a clinical satisfaction after surgery around 90%. Probably due to the large size of de diverticulum in grade IV [7,8]. It’s remarkable that, in our study, the few cases that presented recurrence were found as a radiological finding during follow-up. Being the only 4 patients subclinical recurrences.

## Conclusion

In the presence of large and symptomatic ZD, open diverticulectomy and myotomy of the cricopharyngeal muscle by cervicotomy is still a good option of treatment given the greater clinical success and less symptomatic persistence or recurrence rate.

Current trends seem to support the development of endoscopic techniques that could be used in selected cases. Nowadays, literature still recommends open surgery as a procedure of choice in most of large ZD cases.

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