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Clinical case

A 91-year-old woman with esophageal obstruction by Zenker's diverticulum

Mujer de 91 años con obstrucción esofágica por divertículo de Zenker

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ABSTRACT. Zenker's diverticulum is located at the dorsal area of the pharyngoesophageal junction, between the muscles inferior constrictor muscle of the pharynx and the cricopharyngeal. Symptoms include dysphagia, regurgitation, halitosis, postprandial vomitus and cough, dysphonia, odynophagia, sialorrhea, heartburn, cervical pain, and loss of weight. Complications are bronchial aspiration, pneumonia, perforation, esophageal obstruction. The management options are conservative or surgical, either invasive or endoscopic. Interventions are restricted for symptomatic cases or complications. Herein is reported the case of an elder woman with symptomatic Zenker's diverticulum and bone metastases of breast cancer in T1 and T2 vertebral bodies. She successfully underwent the diverticulotomy by an endoscopic approach under conscious sedation.

Keywords: Endoscopy, esophageal disease, Zenker's diverticulum.

RESUMEN. El divertículo de Zenker se encuentra en la zona dorsal de la unión faringoesofágica, entre el músculo constrictor inferior de la faringe y el cricofaríngeo. Los síntomas incluyen disfagia, regurgitación, halitosis, vómitos y tos postprandial, disfonía, odinofagia, sialorrea, ardor de estómago, dolor cervical y pérdida de peso. Las complicaciones son aspiración bronquial, neumonía, perforación y obstrucción esofágica. Las opciones de tratamiento son conservadoras o quirúrgicas, invasivas o endoscópicas. Las intervenciones son limitadas para casos sintomáticos o complicaciones. Aquí se describe el caso de una mujer mayor con divertículo de Zenker sintomático y con metástasis óseas de cáncer de mama en los cuerpos vertebrales T1 y T2. Fue sometida con éxito a la diverticulotomía por un abordaje endoscópico y sedación consciente.

Palabras clave: Endoscopia, enfermedad esofágica, divertículo de Zenker.

INTRODUCTION

Esophageal diverticula are classified according to their specific location, which is predominantly at three sites: immediately above the upper esophageal sphincter (Zenker's diverticulum), near the midpoint of the esophagus (traction diverticulum) and just above the lower esophageal sphincter (epiphrenic diverticulum).[1,2]

Zenker's diverticulum (ZD), also called cricopharyngeal, pharyngoesophageal, or hypopharyngeal diverticulum, is a pouch containing only the mucosa and submucosa layers (false diverticulum) at the pharyngoesophageal junction.[1-12] This pulsion diverticulum occurs dorsally in the pharyngoesophageal wall, between the inferior constrictor muscle of the pharynx and the cricopharyngeal muscle, an area of relative weakness known as the Killian triangle or Killian dehiscence.[1-12] The annual incidence .of symptomatic ZD in the United Kingdom was estimated at two cases per 100,000 population, mainly in males, from middle age to the 9th decade of life.[1,2,7-11] This condition was described by the first time by Ludlow in 1767, and in 1877 Zenker reported the association of this diverticulum with the upper esophageal sphincter dysfunction.[1,2,4,6,7,10] ZD has been more frequently found in Northern Europe, North America and Australia in comparison with Southern Europe, Japan or Indonesia.[1,7,10]

Currently, the therapeutic options vary between conservative and surgical treatment, which may be either classic or endoscopic.[1,3-12] The intervention should be reserved for symptomatic patients with or without complications and the modality to be established will be defined with base on the variables previously mentioned.[1,3-12]

The aim of this report is to emphasize possible diagnostic challenges involving the Zenker's diverticulum, and to highlight the option of intervention by endoscopic approach under conscious sedation to improve the quality of life of frail elderly people. Case reports may enhance the suspicion index about less common clinical conditions.

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CASE REPORT

A 91-year-old white woman diagnosed with left breast cancer, submitted to a mastectomy three years ago and using aromasin (25 mg daily), was admitted in August 2018 for investigation of loss of appetite, asthenia, nausea, postprandial regurgitation and dysphagia for solids and liquids, without previous fever or weight loss. Her physical examination showed BMI: 23.4 kg/m^2; temperature: 38.4 ^{o}C; blood pressure: 180 x 90 mmHg; heart rate: 130 beats/minute; respiratory rate: 20 breaths/minute; and sequels of total left mastectomy; cyanosis, visceromegaly, and lymphadenopathy were not present. Her Eastern Cooperative Oncology Group (ECOG) performance status was grade 4 (completely disabled, not carrying on any self-care, and confined to bed or chair). Routine laboratory determinations and controls during admission are showed in *Table 1*.

The preliminary clinical concern was about the possibility of esophageal compression due to lymph node metastases of breast cancer. This hypothesis was ruled out by the images of computed tomography (CT) with contrast showing a large diverticulum as a paravertebral expansive lesion on the right side at the cervicothoracic level. As some osteolytic and osteoblastic lesions due to breast cancer implants were detected at the bodies of T1 and T2, the suspicion of nerve root compression was later discarded by cervical nuclear magnetic resonance (MRI). Other concern was about a pouch carcinoma, but the upper gastrointestinal endoscopy (UGE) ruled out this complication, and showed the large saccular change at 12 cm from the upper dental arch, with discrete atrophy of the esophageal mucosa *(Figure 1)*. During the UGE, a nasoenteric tube was placed in order to maintain a feeding pathway for the patient. With evidence of diverticulum and suspected bone metastasis, imaging exams were done for staging of neoplasm, including CT with contrast of the abdomen and pelvis that revealed a hypovascular lesion suggestive of liver metastasis. For more adequate diagnostic complementation of the esophageal diverticulum, an esophagography with barium was performed and confirmed the presence of a conspicuous ZD *(Figure 2)*.

With the established diagnosis of ZD, she underwent an Endoscopic Zenker Diverticulotomy Overtube Assisted procedure utilizing: Fujinon videogastroscope 530ZW; Erbe VIO 200D-electrosurgical unit-endocut mode-effect 2/interval 2/power 40 w; needle knife-Microknife (Boston Scientific); nitinol guidewire (Boston Scientific); resolution clips (Boston Scientific); and soft Zenker Overtube (Cook). The intervention was performed in the Endoscopic Unit, under conscious sedation with midazolam, considered the best option for this frail elderly patient. Illustrative images including the incision of the septum between the diverticulum and esophagus, and myotomy of the septal wall followed by complete myotomy are showed in the *Figure 3*.

She was transferred to the ICU for postoperative follow-up during three days, without intercurrences. The oral test diet started one week later, without removal of the nasoenteric tube, and this was well accepted. She was then referred to breast radiation therapy and oncology

Table 1: Laboratory determinations of a 91-year-old woman with Zenker's diverticulum.

Parameters (normal range)	D2	D6	D9	D13	D32
Hemoglobin (11.7-15.7 g/dL)	14.9	14.0	15.3	16.0	13.7
Hematocrit (35-47%)	44.8	42.6	46.2	47.0	38.7
Leukocytes (4,000-10,000/mm^3)	**11,990**	9,690	**12,010**	**19,670**	8,089
Platelets (140-450 x 10^3/mm^3)	189	195	184	144	201
C-Reactive protein (0.5-0.9 mg/dL)	**3.1**	**4.9**	**–**	**1.7**	**7.7**
Aspartate transaminase (< 32 IU/dL)	24.7	22.5	**60.5**	24.2	21.1
Alanine transaminase (< 33 IU/dL)	19.3	16.7	**73.6**	**42.0**	22.8
Alkaline phosphatase (35-105 IU/L)	95.8	89.7	109.6	110.3	102.8
γ-glutamyl transpeptidase (5-36 IU/L)	18	21	**56**	**37**	29
Urea (16.6-48.5 mg/dL)	46.9	**71.5**	**93.5**	**113.4**	38.0
Creatinine (0.5-0.9 mg/dL)	0.87	0.62	0.57	0.57	0.43
Sodium (136-145 mmol/L)	139	**148**	145	**147**	138
Potassium (3.5-5.1 mmol/L)	4.5	3.9	3.8	3.8	4.1
Magnesium (1.6-2.6 mg/dL)	–	2.3	2.2	2.3	–

D1: August 4, 2018. Abnormal data are in bold.

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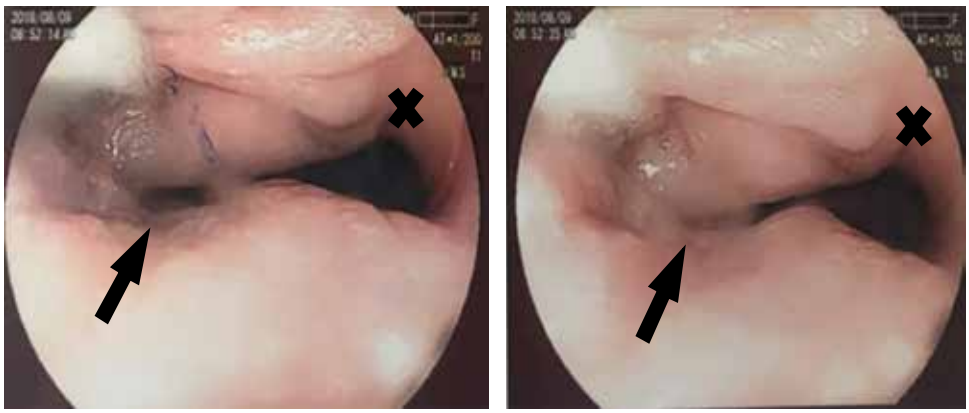

Figure 1:

Upper gastrointestinal endoscopy study showing the esophageal lumen **(X)**, and the opening of the Zenker's diverticulum (**arrow**).

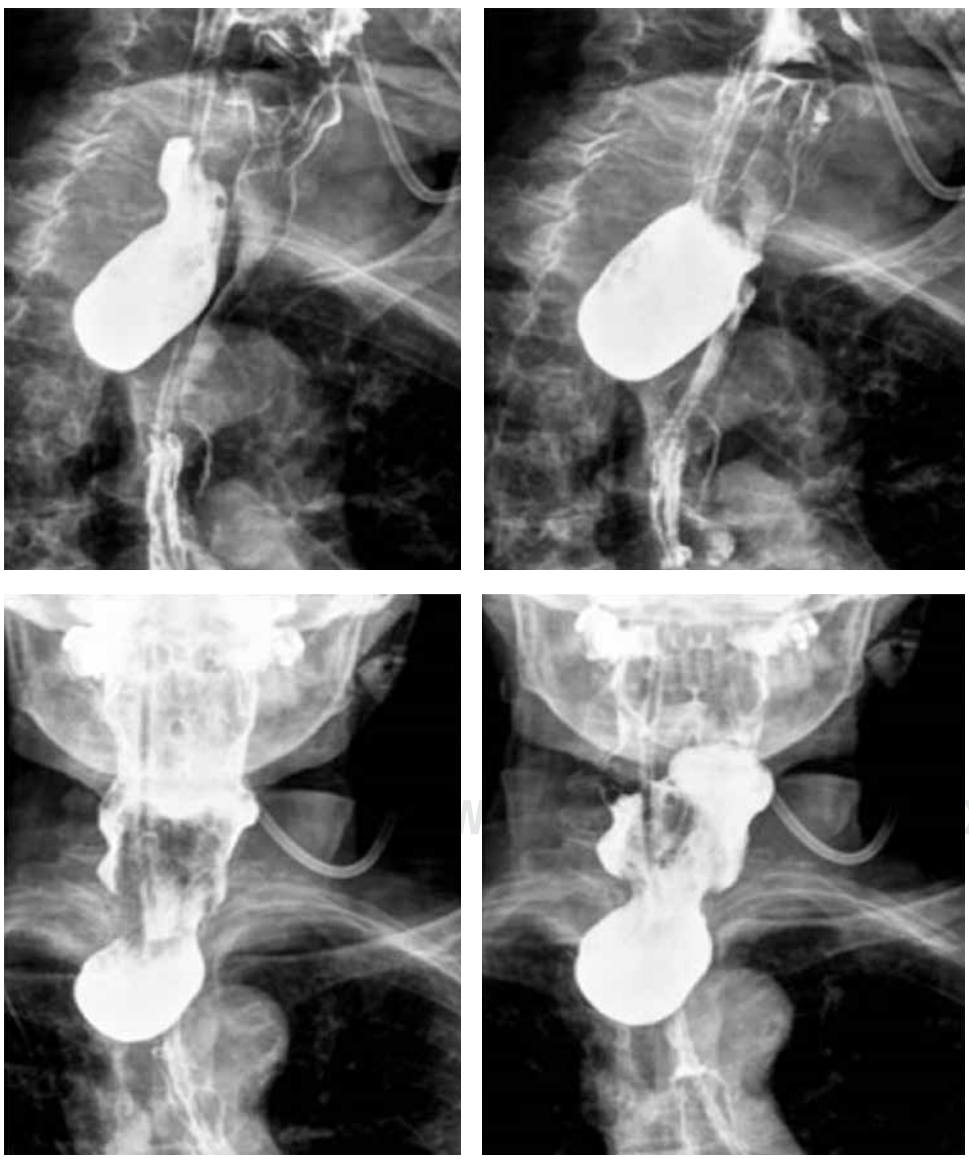

Figure 2:

Esophagography with barium contrast revealing the Zenker's diverticulum in different phases of filling.

care in good general status and with oral diet resumption. Two days after the beginning of cervical radiotherapy she had dysphagia and regurgitation, and an endoscopic gastrostomy was necessary to maintain her nutrition until the end of radiotherapy course. Before the hospital discharge she had physiotherapy sessions for rehabilitation of the oral feeding, and gradually evolved to become free of symptoms. Despite of the metastatic breast cancer, she kept better quality of life than that before admission and surgery. Her ECOG performance is grade 2 (ambulatory and able of self-care but unable to do work activities; up and about more than 50% of waking hours). The surgical approach in fact resulted advantageous for this elderly woman with ZD.

DISCUSSION

If ZD increases enough to contain food or liquid, symptoms of dysphagia due to extrinsic compression of esophageal lumen may occur.[6-11] Other common complaints include regurgitation, halitosis, weight loss, postprandial vomitus, dysphonia, neck mass, postprandial cough, odynophagia, sialorrhea, heartburn and neck pain.[1-6,8-12] Complications of ZD include perforation of the diverticulum, esophageal obstruction by external compression, and recurrent bronchial aspiration followed by pneumonia.[1-6,8-11] This aspiration pneumonia is frequently due to anaerobic or mixed flora and may incidentally herald the diagnostic hypothesis of an anatomical esophageal disorder; worthy of note, the bronchial aspiration may occur without regurgitation symptoms.[11] Although rare (0.3% to 7%), the presence of carcinoma in ZD must be discarded.[1,4-6,8,9]

Barium esophagography establishes the diagnosis of ZD and is another useful tool for clinical investigation of ZD, in special if combined with continuous dynamic fluoroscopy during swallowing.[1,2,4-6,9-11] UGE with biopsy is indicated in some patients for additional investigation of possible comorbidities and the exclusion of malignancy; however, there is a risk of perforation.[3,6,9-11] Esophageal manometry is not mandatory, but it could contribute to clarify the pathogenesis of this kind of diverticulum.[1,5,7,9-11]

The basis of symptomatic ZD management is surgical, and minimally invasive methods as endoscopic myomectomy and diverticulotomy are often utilized.[1-6,8-12] The technique used in our patient was endoscopic section of cricopharyngeal muscle and division of the common wall between the diverticulum and esophagus *(Figure 3 C-D)*. Advantages of endoscopic option in comparison with the

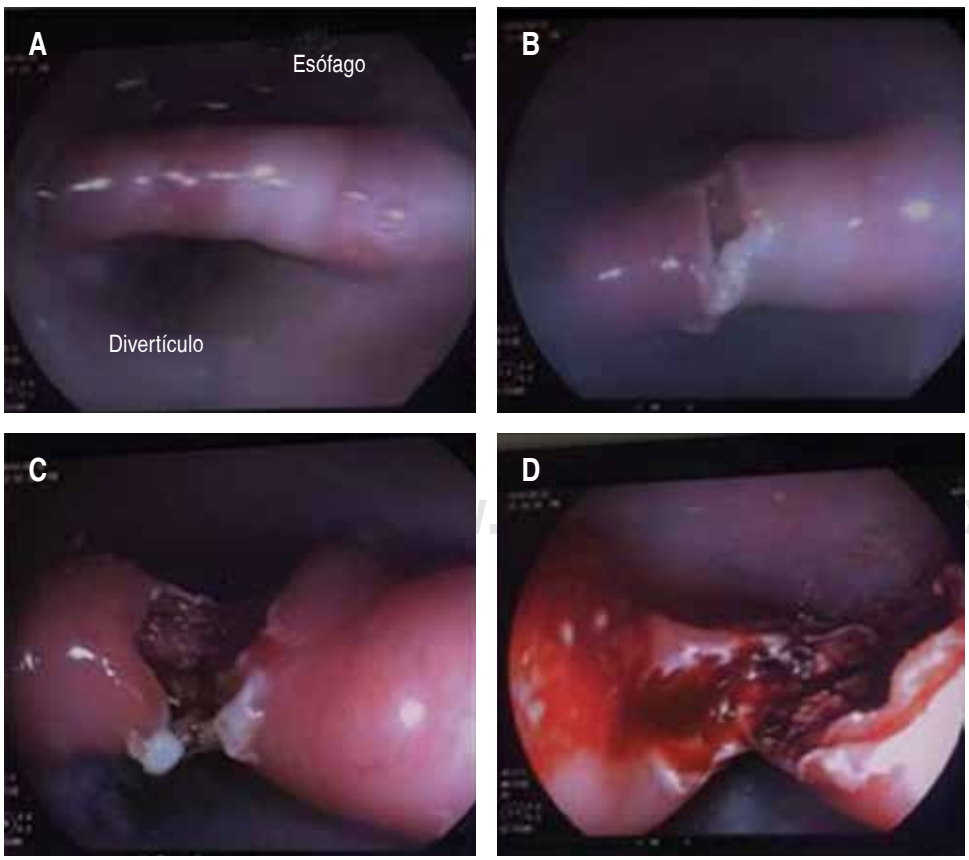

Figure 3:

Endoscopic views of the surgical procedure. **A)** The septum between the diverticulum and esophagus; **B)** Initial step of the cricopharyngeal myotomy; **C)** Following phase of the myotomy; and **D)** Complete myotomy.

open surgery include shorter duration and lower costs, rapid recovery from anesthesia or sedation, better outcomes, and fewer postoperative complications as fistulas and surgical infections.[1,5,6,10-12] However, difficulties related to exposure and the recurrences may enhance failures.[8,12]

Asymptomatic patients are not submitted to treatment, and endoscopic surgery is the first option to treat symptomatic ZD.[1,2,4-6,8-11] Endoscopy allows adequate exposure of the septum and free wall of the esophagus; however, in Latin America, there are 4 to 50% of recurrences after cricopharyngeal myotomy by flexible endoscopy.[9] The estimated mortality rate with this modality of management is from 0.2 to 2%.[9,10] Endoscopic techniques seem safe, but more studies with longer follow-up are needed.[7] Recurrent symptoms may develop if the myotomy has been inadequate or if there is a recurrence of cut edges of the muscle, most likely in patients with large diverticulum.[1] Moreover, hypopharyngeal motor abnormalities sometimes persist after this modality treatment because myotomy may impair the propulsive activity of the hypopharynx.[1] Some authors consider that experienced physicians for the endoscopic treatment of ZD would be those who have performed at least 25 to 50 diverticulotomies per year.[1] Nevertheless, some authors consider that there is insufficient evidence to demonstrate the greater effectiveness of endoscopic approach if compared with open surgery.[3,6,8,12] Thence, the choice of treatment depends on availability and experience of the service.[1]

CONCLUSION

ZD has origin from a variety of phenomena that predispose to herniation within the Killian triangle, and may evolve asymptomatic or with symptoms, which are the main indication for intervention, usually performed by open or endoscopic intervention. There is no consensus on significant advantages of an endoscopic approach over other. Elderly patients often have comorbidities and will benefit of less invasive management.

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