



Carbon Dioxide Laser Endoscopic Surgery for Zenker Diverticulum; A First Reported Case in Malaysia

Syauqi MS^{1,2*}, Ridwan AM^{1,2}, Izani MS^{1,3} and AbdulRazak A¹

¹Department of Otorhinolaryngology Head and Neck Surgery, Melaka General Hospital, Ministry of Health, Malaysia

²Department of Otorhinolaryngology Head and Neck Surgery, University of Malaya, Kuala Lumpur, Malaysia

³Department of Otorhinolaryngology Head and Neck Surgery, University Sains Malaysia, Kubang Kerian, Malaysia

*Corresponding Author: Syauqi MS, Department of Otorhinolaryngology Head and Neck Surgery, University of Malaya, Kuala Lumpur, Malaysia.

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Abstract

Zenker diverticulum (ZD) is an extremely rare disease of upper oesophagus especially in Malaysia. Common presentation is dysphagia, amid almost normal examination and endoscopic findings. Barium study is the gold standard investigation to diagnose it. Our aim is to report an extremely rare case of ZD and to proclaim to be the 1st centre which manage it with CO₂ laser in Malaysia. We reported a case of a 68-year-male, presented to a tertiary medical centre then diagnosed as ZD, treated surgically via endoscopic transoral laser, a minimally invasive method with less complications as compared to conventional open surgical approach and had yielded tremendous outcome post-operatively.

Keywords: Zenker Diverticulum; Dysphagia; Endoscopic Laser Surgery

Introduction

ZD can be anatomically described as an out-pouching of both mucosa and submucosal layer originated between the posterior part of the oblique muscle of inferior constrictor muscle and horizontal muscle fibres of cricopharyngeal muscle [1-4]. It is considered as a false type or pseudo diverticula, as it is devoid of the muscularis layer [3]. Clinically, the symptoms depend on the size the diverticulum [4]. The classical symptom is dysphagia to both solid and liquid [1-4]. Other related symptoms are, regurgitation, chronic cough, choking and in severe cases, patient may be presented with additional symptoms of oesophageal obstruction,

cachexia and aspirations [4]. Barium study is the gold standard in diagnosing this disease [5]. Other modalities include esophagogastroduodenoscopy, ultrasound, though are not warranted in all cases, but they are beneficial to rule out other differentials and possible coexisting diseases [6]. The sole definitive treatment for this is surgery [1-7]. Medical treatments are mainly supportive which include proton pump inhibitor and sodium alginate suspension for symptomatic relief [8].

Case Report

68-year-old gentleman with premorbid hypertension and bronchial asthma presented with chronic dysphagia and foreign body

throat sensation for 2 years especially when taking solid food. He is able to tolerate fluids better than solid with episodes of choking during swallowing. Oral cavity, throat, neck examination and flexible scope was otherwise normal. We proceeded with barium study with later the result pointed the diagnosis of ZD (Figure 1).



Figure 1: Shows the barium swallow films of the patients with central hypoechoic defect/ pouch at the level of cricopharynx.

He underwent endoscopic CO₂-laser diverticulotomy under general anesthesia. Intraoperatively, a posterior outpouching diverticula sac over the C6-C7 level of cervical oesophagus was noted. The neck of this diverticulum was ablated until the fundus resulting a widened space diverticulum that formed a single cavity with the oesophagus. Nasogastric tube was inserted post operatively (Figure 2 and 3).

Post-operatively patient was well and comfortable with no complications noted. Nasogastric tube was taken off and he was able to swallow without aspiration. He was discharged home day 2 postoperatively. During subsequent clinic visit the patient has fully recovered and has no more dysphagia nor choking during meal.

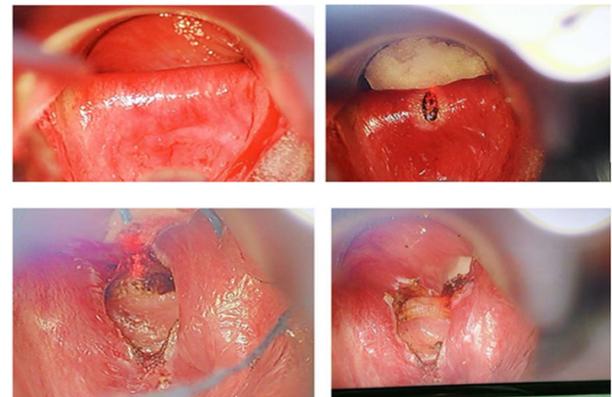


Figure 2: Shows series of intraoperative pictures of the ZD, with laser surgery aimed at the neck of the diverticula forming a widened single cavity with the oesophagus.



Figure 3: Shows the post-operative ablated ZD with CO₂ laser.

Discussion and Conclusion

ZD is also known as hypopharyngeal diverticulum or pharyngeal pouch that develop in the upper oesophagus causing dysphagia and regurgitation of food [1]. It is commonly seen in elderly between the 6th and 8th decade of life with prevalence less than 1% and incidence 2 per 100,000 annually [1,2]. Male to female ratio is about 1.5:1 [1]. It is an acquired lesion with the aetiology still not fully understood [2,3].

ZD was first described by Friedrich von Zenker back in 1877 but was first resected surgically by Wheeler in 1886 [7]. Since then, various surgical techniques have evolved, beginning with open approaches such as diverticulectomy, diverticuloplexy, diverticular inversion, cricopharyngeal myotomy to newer minimally invasive endoscopic approaches [4,7,8]. Endoscopic laser treatment in managing ZD was first introduced by Van Overbeek in 1981 [4]. The proposed pathophysiology has been suggested due to the increased intraluminal pressure during swallowing against inadequate relaxation of cricopharyngeus muscle with incomplete opening of upper esophageal sphincter resulting protrusion of the mucosa [1]. This sac-like expulsion occurs dorsally at the pharyngoesophageal junction through the Killian's dehiscence [1].

The fundamental principal of open surgical approach is the excision of the pouch followed by cricopharyngeal myotomy [4,8]. In contrast, endoscopic approach aims to widen the diverticula opening into the oesophagus by a complete myotomy and full length mucosal incision of the tissue bridge between the diverticular pouch and oesophagus using either carbon dioxide laser, stapling device, electrocautery or harmonic scalpel [4,8]. The relative advantages of endoscopic over open approach can be demonstrated in the following table [1-8] (Table 1). Nevertheless, there are few limitations of endoscopic that might require conversion to external approach which include high BMI patient, short neck, and decreased hyoidmental distance [4].

We had used Lumenis carbon dioxide laser with 'super-pulse delivery in repeated mode' to ablate the neck of diverticulum until the fundus, thus forming a widened common single cavity with the oesophagus. From our experience, the advantages of carbon dioxide laser technique above all include better visualization of the diverticular bridge, less thermal injury, less pain and complication and better post-operative care [4,7]. Plzak., *et al.* has demonstrated high success rate of 97% with this technique and merely 3% of recurrence and morbidity [4].

Ethical Declaration

This article and the process of the production including informed consent are according to local ethical guideline and Declaration of Helsinki.

Competing Interest Declaration

None. Our interest of this article is fully academic.

	Open or External	Endoscopic
Complications number	Higher	Lower
Hospital Fees	Higher	Lower
Cervical Scar	Present	Absent
Conversion to open approach	-	Present
Neck Extension	None	None
Recurrence	Few	Uncertain
Anatomic Limitations(Rigid neck,trismus)	None	Present
Small Diverticulum	Not Applicable	Applicable
Large Diverticulum	Applicable	Not applicable
Reoperation	Difficult, higher risk	Easy, safe
Special Technique	None	Present
Dental Injury	None	Present
Recurrent Laryngeal Nerve Injury	Higher risk	Lower risk

Table 1: The relative advantages of endoscopic over open surgical or transcervical approach.

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