

Intraoperative diagnosis of a Zenker diverticulum during a total thyroidectomy: a case report

S. Naoum¹, D. Vasdeki², T. Papavramidis³

¹251 General Hospital of Hellenic Air Force, Athens, Greece, ²Second Department of Internal Medicine, General Hospital of Trikala, Greece, ³First Propedeutic Surgical Department, AHEPA General Hospital, Thessaloniki, Greece

ABSTRACT

Zenker's diverticulum (ZD) is a rare condition with a reported prevalence of 0.01–0.11% in the general population and it can escape diagnosis, pretending other pathological conditions such as thyroid nodules. The presentation to general surgeons may be atypical and may pose diagnostic difficulty, so a definitive diagnosis is likely to be established during surgery for other diseases of the cervical region. We report a case of a woman with right lobe nodule in the thyroid gland and during operation a ZD was found, which was presented with symptoms that are common between the two different medical conditions. We discuss specific aspects of ZD and the correlation with the thyroid gland diseases to elucidate the pathologic entity.



Keywords: Zenker's diverticulum, thyroid nodule, intraoperative diagnosis, total thyroidectomy



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INTRODUCTION

Thyroid nodules (TN) are solid or fluid-filled lumps that form within the thyroid. Because of the anatomic relationship of the thyroid gland to the trachea, larynx, superior and inferior laryngeal nerves and esophagus, abnormal growth may cause a variety of compressive syndromes such as *TOMOΣ 24^{ος} - ΤΕΥΧΟΣ 4 - 2019*

pain, shortness of breath or difficulty in swallowing. ZD develops by a pathologic process that involves herniation of the esophageal mucosa posteriorly between the cricopharyngeus muscle and the inferior pharyngeal constrictor muscles. The retention of food elements and secretions within the lesion's pouch frequently leads to dysphagia,

halitosis, regurgitation of undigested food hours after eating, sensation of food sticking in the throat, aspiration and borborygmi in the neck. Symptoms may last from months to years. The most common life-threatening complication in patients with a ZD is aspiration. Other complications include massive bleeding from the mucosa or from fistulization into a major vessel, esophageal obstruction, and fistulization into the trachea. [1-3] The comorbidity of TN and ZD can pose diagnostic and management challenges, since it is quite rare in clinical practice and accumulation of these rare cases are important.

In this paper, we describe a case of a woman with normal-nontoxic goiter while this patient had also developed an esophageal ZD in her esophagus which was surgically removed later.

CASE REPORT

A 75-year-old woman with Greek origin was referred to our clinic in an outpatient setting due to a voluminous goiter of the thyroid right lobe. The main symptoms were progressive oropharyngeal dysphagia (to both solids and liquids), neck tightness, airway obstruction chronic aspiration, sensation of a lump in the throat and hoarseness. As a result, the patient had experienced a 15kg weight loss.

At presentation, physical examination only showed signs of malnutrition and the laboratory blood tests were unremarkable in contrast with hormonal tests. PTH was 11,6 pmol/l (normal value: 10-65 pg/mL), TSH

was 2,45 microIU/ml (0,4-4,0 microIU/ml), FT4 was 12 pmol/l (10,2-21,8 pmol/l) and FT3 was 3,7 pmol/l (3,4-6,5 pmol/l). The patient also mentioned difficulty in breathing. The findings from physical examination were normal. Additionally, her personal medical history included hypothyroidism, hypoparathyroidism, GERD, dyslipidemia, osteoporosis, degenerative spondylitis-chronic back pain, spondylolisthesis (L4-L5) and Alzheimer's disease.

Two months before patient's admission to hospital, an isonitrilioscintigraphy was conducted. During the procedure, there were injected intravenously 20 mCi Tc99m-SESTAMIBI and then a visualization of the cervix was followed after 10 minutes and after 3 hours of the introduction of the radiopharmaceutical substance. The study was completed with a thyroid scintigraphy after the 6mCi Tc99m introduction with the form of pertechnetate sodium (Figure 1).

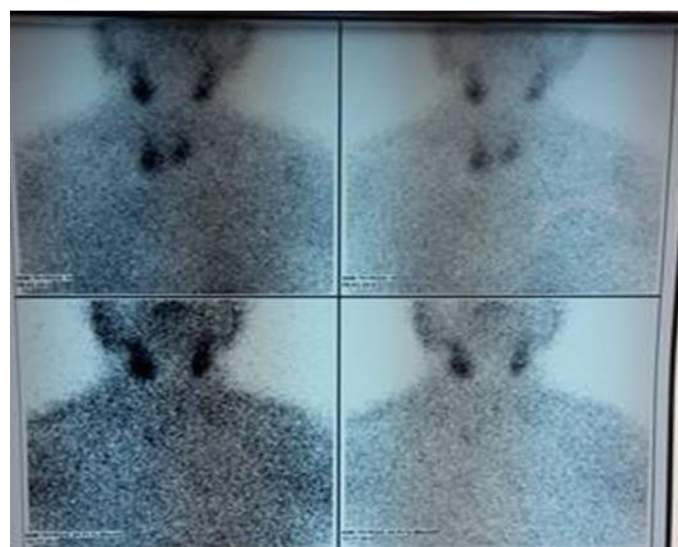


Figure 1. MIBI of thyroid gland

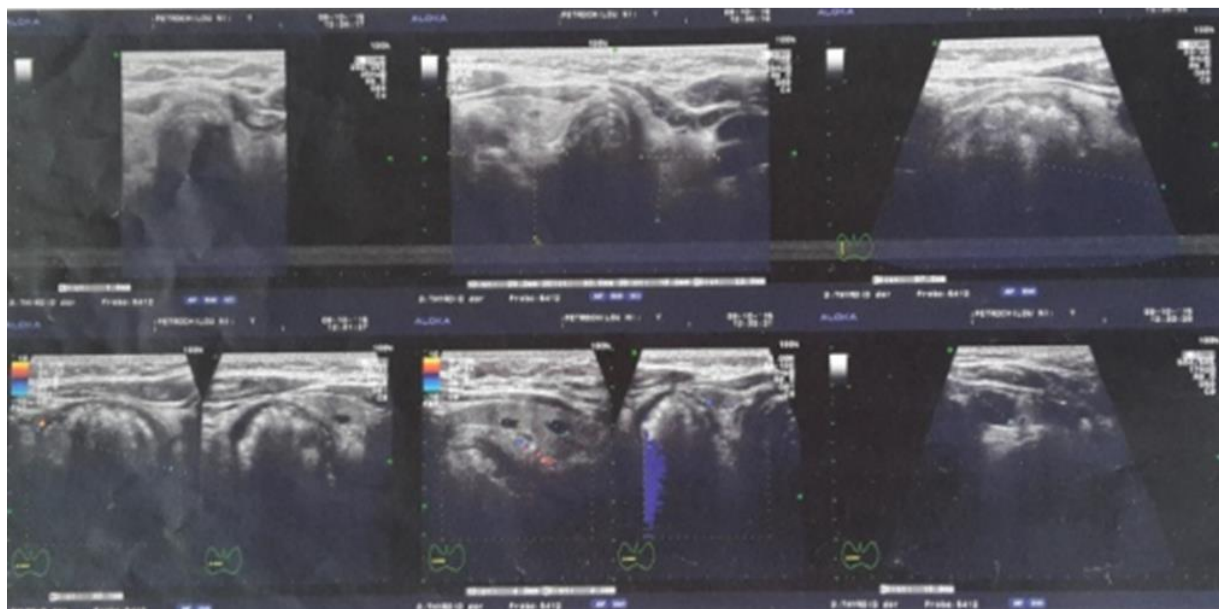


Figure 2. Thyroid Ultrasound

During the first phase of the procedure, the thyroid gland showed slightly an increased size, with multinodular heterogeneous composition as well as there was a "hot" nodule in the lower pole of the right lobe. After 3 hours, the isotope was released from the thyroid parenchyma, and these findings were also confirmed by the scintigraphy with sodium pertechnetate which was conducted next. The final results were: findings inconsistent with the presence of parathyroid adenoma with the isonitrile scintigraphy and findings consistent with the presence of a small degree multinodular goiter and a "hot" nodule in the lower pole of the right lobe.

At the same time period, a thyroid ultrasound was conducted (Figure 2). The thyroid gland was depicted with increased dimensions and normal vascularization. Specifically, the dimensions of the right lobe were $25.2 \times 30.6 \times 57.2$ mm and of the left

lobe were $16.2 \times 22.6 \times 56.7$ mm, while the density of the isthmus was 1.90 mm. The gland's parenchyma echogenicity was mixed, with a sizeable presence of nodules in both lobes. In particular, the right lobe nodule was found with the presence of calcifications, low-echo halo and some mild indications of peripheral vascularization with 30mm diameter. A morphologically similar sizeable nodule was depicted in the left lobe with a diameter of 30.8 mm. Finally, there were depicted a few scattered colloid cysts, 6.3 mm maximum diameter.

Upon patient's admission to hospital, a cervix MRI-scan (Figure 3) was performed before and after the infusion of paramagnetic substance. There were not observed any pathologically enlarged cervical lymph nodes, while the display of the laryngeal structures and throat was normal. There was a display of a clearly circumscribed solid lesion of the right lobe of the thyroid,

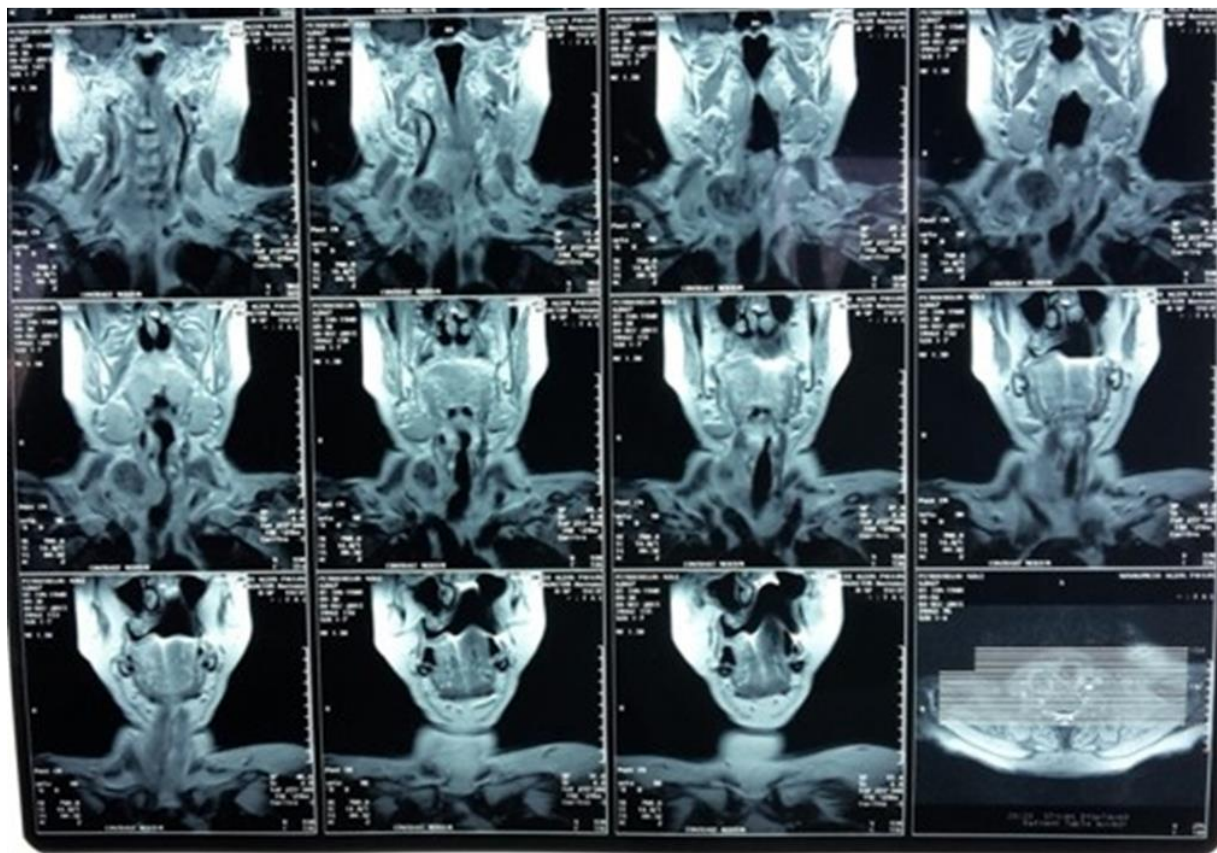


Figure 3. Cervix MRI-scan

measuring $4,1 \times 2,8 \times 4$ cm, which was located behind the trachea and it pressed the larynx and the trachea (adenoma or some thyroid structure).

DISCUSSION

ZD is the most frequent type of diverticulum but is a rare condition with a reported prevalence of 0.01–0.11% in the general population [4]. It is presented mainly in men and is usually diagnosed between the seventh and eighth decades of life and rarely before the age of 40 years [5]. It affects the rear wall of the esophagus at the Killian's triangle area, which is defined downwardly

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from the crico-pharyngeal muscle and upwardly from the lower throat clamp. Due to the incoordination of the upper esophageal sphincter and the pharyngeal contraction during swallowing, consequently, high intraluminal pressures develops [6].

The main symptom is dysphagia and as a result, the undigested and odorous foods can lead to aspiration pneumonia (severe complication of diverticulum). The halitosis is typical. Although epidemiological data are scarce, it is estimated that dysphagia is a symptom ranging in rates from 16% to 22% in people over 50 years [7-8]. Nevertheless, among symptomatic ZD patients, 80–90% complain of dysphagia. Typical symptoms include: dysphagia, regurgitation, chronic cough and weight loss [9]. At a percentage of



Figure 4. Intraoperative photo of Zenker's Diverticulum

30% gastroesophageal reflux disease coexists or occurs. The duration of symptoms at presentation may vary from weeks to several years. According to a study published in 2015 [10], Zenker diverticulum may mimic the clinical symptoms of a nodule in the thyroid gland. Apart from a feeling of pressure and foreign body in the throat, most of the patients were asymptomatic, without dysphagia, difficulty in swallowing or regurgitation [10]. However, the distinction between those conditions can be accomplished with an ultrasound test.

A Barium Meal/Swallow may show the size and the location of the diverticulum. The manometry will document the incoordination between pharyngeal and crico-pharyngeal muscle or hypertonic upper esophageal sphincter. Endoscopic control should be handled carefully in order to avoid potential rupture of the diverticulum. The differential diagnosis includes the scar

stenosis of the lumen, the achalasia and esophageal cancer.

As far as the thyroid nodules are concerned, it is common knowledge that their size can be used as a prognostic marker for the risk of malignancy. Those nodules of a size between 3 - 5,9 cm are at increased risk by 26% compared to those of a size <3 cm in the largest diameter. However, nodules ≥ 6 cm carry less risk for malignancy 16% [11]. The size of our patient's nodule, as mentioned above, belongs to the category 3-5,9cm, which means that the patient is in increased risk of malignancy and thus the nodule needs to be surgically removed, a decision that is enhanced especially when ultrasonographic features that indicate the presence of malignancy are present.

During the procedure of a total thyroidectomy, it was found an unexpected structure on the left side of the esophagus (Figure 4). Esophagoscopy was performed in

which a presence pharyngo-esophageal diverticulum was found, with undigested food therein. The surgical excision of multinodular goiter was completed, while the diverticulum was treated later. Flexible esophagoscopy is essential before surgical management to assess the nature of the mucosa of the ZD and to exclude the presence of SCC or carcinoma in situ. Care must be taken with esophagoscopy to avoid perforating the ZD [12]. In our case, the flexible esophagoscopy was performed during the surgery in order to make the proper diagnosis.

In the general trend versus less invasive approaches, new techniques and devices have been implemented and transoral endoscopic treatment (with stapler, CO₂-laser or harmonic scalpel) and flexible endoscopy have gained in popularity over open surgery (cricopharyngeal myotomy with or without resection) with a concurrent decrease in mortality and morbidity [13-15]. Endoscopic diverticulectomy is a better first-line treatment than open diverticulectomy for ZD [16].

On the one hand, the most popular open surgical approach for ZD represents diverticulectomy plus cricopharyngeal myotomy and can effectively resolve symptoms in 90-95% of patients [17-18]. In a recent literature review, an overall morbidity of 10.5% and a mortality of 0.6% were observed [19]. Open surgical treatment has the highest complication rate because it is the most invasive of the three methods, considering the fact that ZD is a disease of the elderly and the possibility of life-threatening complications [19].

On the other hand, the endoscopic approach can be accomplished by a rigid or a flexible endoscope. Rigid endoscopic approach is well established, particularly in Europe. Its advantages include a short hospital stay, particularly after stapler esophago-diverticulostomy, as well as low rates of complications and recurrences. It is as effective as open surgery but is generally not indicated in small diverticula (< 3 cm). Flexible endoscopy shares the same principles as rigid endoscopy: the septum between the diverticulum and the oesophagus contains the cricopharyngeal muscle, while by dividing the septum and creating a common cavity a myotomy is automatically added [20]. High-risk elderly patients are expected to benefit the most from flexible endoscopic diverticulotomy [21]. Most authors recommend reserving it for a subset of selected patients, especially highly morbid patients and older individuals who are poor surgical candidates with head and neck anatomy that make rigid endoscopic access difficult [22]. Our patient was in high risk and endoscopic technique with flexible endoscope would be the superior treatment for diverticulum.

However, several factors must be considered when deciding whether to use an open surgical or transoral approach. Clear endoscopic exposure of the diverticulum may be limited in a patient with short neck, decreased hyomental distance, inability to adequately open the mouth, large osteophytes, obesity and redundant mucosa. In some cases of elderly, medically unfit patients with minimal symptoms, no surgical treatment except careful observation may be indicated [23]. Furthermore, the

complications of transoral endoscopic treatment include cervical or mediastinal emphysema, esophageal tear or perforation, dental injury, bleeding, mediastinitis, leaks, respiratory infections, stenosis, recurrent nerve injury, neck abscess, sore throat and gingival laceration.

In summary, the treatment of ZD has evolved thanks to a better appraisal of the pathophysiology of the disease and the implementation of new techniques in the field of minimally invasive surgery and interventional flexible endoscopy. Small-

medium (up to 5 cm) sized diverticula are best treated endoscopically, with ZD up to 3 cm best amenable by flexible endoscopy, while very large diverticula may still benefit from open surgical excision, especially in younger patients, good surgical candidates. In case of treatment failure or symptomatic recurrence, repeated procedures can easily and successfully be achieved through flexible or rigid endoscopy [24-25]. Further investigation and prospective clinical studies are eagerly awaited to define treatment guidelines for ZD.

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Διεγχειρητική διάγνωση ενός εκκολπώματος Zenker σε ολική θυρεοειδεκτομή: Μια ενδιαφέρουσα περίπτωση

Σ. Ναούμ¹, Δ. Βασδέκη², Θ. Παπαβραμίδης³

¹ 251 Γενικό Νοσοκομείο Αεροπορίας, Αθήνα, ² Β' Παθολογική Κλινική, Γενικό Νοσοκομείο Τρικάλων, ³ Α' Προπαιδευτική Χειρουργική Κλινική Π.Γ.Ν Θεσσαλονίκης «ΑΧΕΠΑ», Ελλάδα

ΠΕΡΙΛΗΨΗ

Το εκκόλπωμα Zenker είναι μια σπάνια πάθηση με αναφερόμενο επιπολασμό 0,01-0,11% στο γενικό πληθυσμό και μπορεί να ξεφύγει από τη διάγνωση υποδηλώνοντας οποιοδήποτε άλλες παθολογικές καταστάσεις όπως οι θυρεοειδικοί όζοι. Η παρουσίασή του στους γενικούς χειρουργούς μπορεί να είναι άτυπη και να προκαλέσει διαγνωστική δυσκολία, οπότε η οριστική διάγνωση τίθεται κατά τη διάρκεια της χειρουργικής επέμβασης για όλες τις παθήσεις της τραχηλικής χώρας. Στο παρόν άρθρο αναφέρουμε και παρουσιάζουμε μια περίπτωση ενός ατόμου με έναν όζο στον δεξιό λοβό του θυρεοειδή αδένα και κατά τη διάρκεια της επέμβασης βρέθηκε και ένα εκκόλπωμα Zenker, το οποίο παρουσιάστηκε με συμπτώματα κοινά και στις δύο ιατρικές παθήσεις. Τέλος, συζητάμε τις συγκεκριμένες πτυχές του εκκολπώματος Zenker και την αλληλεπίδραση-συσχέτιση του με τις παθήσεις του θυρεοειδούς αδένα ώστε να διασαφηνίσουμε την εν λόγω παθολογική οντότητα.



Λέξεις ευρετηρίου: εκκόλπωμα Zenker, θυρεοειδικός όζος, την διεγχειρητική διάγνωση, ολική θυρεοειδεκτομή



Παραπομπή

Σ. Ναούμ, Δ. Βασδέκη, Θ. Παπαβραμίδης. Διεγχειρητική διάγνωση ενός εκκολπώματος Zenker σε ολική θυρεοειδεκτομή: Μια ενδιαφέρουσα περίπτωση. *Επιστημονικά Χρονικά* 2019; 24(4): 608-617