Real-time Sonography of Killian-Jamieson Diverticulum and Its Differentiation From Thyroid Nodules

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Killian-Jamieson and Zenker diverticula are both rare pharyngoesophageal diverticula. Both are outpouching of the mucosal and submucosal layers of the esophageal wall, which protrude through a muscular gap at the level of the pharyngoesophageal esophagus. When these diverticula are large enough, they can be in proximity to the thyroid gland and may mimic a thyroid nodule.1,2 Thyroid nodules, although shown well by high-resolution sonography, cannot be finally diagnosed by imaging modalities; therefore, most of them are further investigated with fine-needle aspiration (FNA).

To our knowledge, 7 previous case reports of Zenker diverticulum diagnosed by sonography are reported in the literature.3–6 There is no report regarding the sonographic diagnosis of Killian-Jamieson diverticulum. Both can be mistaken for a thyroid nodule. Our purpose is to focus radiologists’ attention on the possibility of a pseudo thyroid lesion originating in the esophagus and to describe the sonographic findings and advantages of real-time sonography in examining the thyroid to reach the correct diagnosis and avoid unnecessary invasive and possible dangerous procedures.

Case Report

A 58-year-old woman came to our department for FNA of a thyroid nodule containing microcalcification. The lesion was discovered during a previous sonographic investigation performed in another institution and was suggestive of papillary carcinoma. Laboratory study results were normal.

Another sonographic examination was performed before the FNA using a real-time linear array 7.5- to 12-MHz transducer (HDI 5000 SonoCT; Philips Medical Systems, Bothell, WA) with the patient in the supine position and the neck hyperextended. The sonographic examination showed a hypoechoic lesion containing some bright foci, which appeared to be in the posterior left lobe of the thyroid (Figure 1). However, a closer inspection revealed that the lesion was located adjacent to but sepa-
rate from the thyroid (short arrows). Furthermore, the hyperechoic foci (long arrows) within the lesion were somewhat brighter than expected for calcifications, consistent with air bubbles. When examined in the sagittal plane (Figure 2), the wall of the lesion appeared to be contiguous with the esophageal wall (arrowheads). It had a multilayer appearance (long thin arrows) implying a gut signature and therefore revealing the lesion’s true nature as an esophageal diverticulum. To further confirm our diagnosis, we asked the patient to swallow saliva while we performed real-time imaging (Figure 3). This maneuver revealed motion of the hyperechoic particles in a linear fashion from the esophagus into the suspected diverticulum (arrowheads), confirming the diagnosis of air bubbles. The FNA was canceled, and a fluoroscopic examination was performed shortly thereafter, confirming the sonographic diagnosis of a diverticulum (Figure 4, A and B). Because this diverticulum projected anteriorly, it was diagnosed as a Killian-Jamieson diverticulum.

**Discussion**

Zenker and Killian-Jamieson diverticula are pharyngoesophageal diverticula that occur at sites of anatomic weakness in the cervical esophagus near the cricopharyngeus muscle just below its insertion on the posterior lamina of the cricoid cartilage. Zenker diverticulum originates on the posterior wall of the pharyngoesophageal segment in a midline area of weakness just above the cricopharyngeus, whereas Killian-Jamieson diverticulum originates on the anterolateral wall just below the cricopharyngeus. Their prevalence ranges from 0.01% to 0.11% of the US population. Zenker diverticulum is found in about 2% of patients with dysphagia undergoing fluoroscopy. It was found by Rubesin and Levine that Zenker diverticulum is nearly 4 times as common as Killian-Jamieson diverticulum.
The differential diagnosis is made radiographically by a barium study in a lateral projection, which shows the sac of the Zenker diverticulum lying posterior to the cervical esophagus, in contrast to the Killian-Jamieson diverticulum, which overlaps the anterior wall of the cervical esophagus. When these diverticula are large enough, they can be in proximity to the thyroid gland and may mimic a thyroid nodule. In addition, they may compress the esophagus and cause symptoms of dysphagia or discomfort, which may sometimes be the cause for the sonographic examination.

Sonographic findings of pharyngoesophageal diverticula may mimic those of a thyroid nodule. Both may appear as an oval to round lesion with or without a hypoechoic surrounding wall. A diverticulum, depending on the transducer alignment, may appear inside the thyroid and may contain little air bubbles or other particles. These must be differentiated from punctate calcifications found in thyroid nodules such as papillary carcinoma.

To avoid needle puncture of an esophageal diverticulum, it is very important to perform a meticulous examination to characterize the lesion correctly as an extrathyroidal lesion. With high-resolution sonographic equipment and real-time scanning, it is usually possible to determine the multilayered wall of the diverticulum and its contiguity with the esophagus. Attention should be paid to the intensity of the hyperechoic foci within the lesion. The echogenicity of air bubbles in a diverticulum is higher than that of the classic fine calcifications seen in thyroid nodules. The real-time nature of the sonographic examination may increase the confidence of diagnosis if the patient is asked to swallow during the examination. A thyroid nodule moves with the thyroid. In a case of a pseudo lesion such as a diverticulum, it moves separately from the thyroid.

With water swallowing, linear echogenic material (air), anechoic material (water), or both can be seen moving into and out of the lesion, confirming the diagnosis of a diverticulum. A barium study performed with the patient in frontal (A) and lateral (B) positions shows the left-sided diverticulum in A (white arrow) and its overlapping of the anterior wall of the collapsed cervical esophagus (black arrow) in B, consistent with a Killian-Jamieson diverticulum.
um study should be performed to confirm the diagnosis and to show the precise size of the diverticulum and the anatomic information required for surgical planning.

In conclusion, we present a case of a pharyngoesophageal Killian-Jamieson diverticulum misdiagnosed initially as a thyroid mass to increase radiologists' attention to this rare diagnosis. The real-time sonographic examination is simple, which enables a clear diagnosis and avoids redundant and dangerous invasive procedures.

References


