

CASE REPORT Section Editor - Brian D. Hoit, M.D.

Extrinsic Esophageal Compression by Cervical Osteophytes in Diffuse Idiopathic Skeletal Hyperostosis: A Contraindication to Transesophageal Echocardiography?

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Contraindications to transesophageal echocardiography (TEE) include various esophageal pathologies, but compression of the esophagus by vertebral osteophytes is not listed in the current American Society of Echocardiography guidelines. We report a case of diffuse idiopathic skeletal hyperostosis (DISH) in an 81-year-old man who had incidentally been found to have extrinsic esophageal compression by cervical osteophytes prior to a proposed TEE. The incidence of esophageal perforation in patients with DISH and vertebral osteophytes is not well documented. We believe these patients are at increased risk of esophageal perforation during TEE, and thus, TEE may be relatively contraindicated in patients with DISH. (Echocardiography 2016;33:314–316)

Key words: transesophageal echocardiography, diffuse idiopathic skeletal hyperostosis, cervical osteophytes, esophagus, compression

Case Report:

An 81-year-old man with methicillin-resistant *Staphylococcus aureus* (MRSA) bacteremia was referred for a transesophageal echocardiography (TEE) to assess for endocarditis. The patient—who had a history of coronary artery disease, hypertension, hyperlipidemia, gastroesophageal reflux disease, and spinal stenosis—had been admitted with a subarachnoid hemorrhage (SAH) following a mechanical fall. Serial brain imaging showed resolution of the SAH, but the patient developed intermittent fevers, progressive anemia, and elevated inflammatory markers, and was found to have MRSA bacteremia. Antibiotic treatment was initiated, and a transthoracic echocardiogram showed aortic valve thickening, but no conclusive evidence of valvular or nonvalvular endocarditis.

Prior to the TEE, the patient reported an occasional choking sensation while eating in the supine position, but he denied any swallowing difficulties when eating upright. Four years ear-

lier, a fiber-optic esophagogastroduodenoscopy revealed a “tortuous esophagus” as well as patchy candidiasis in the lower two-thirds of the esophagus. Based on this history, the TEE was postponed pending single-contrast barium swallow to delineate the esophageal anatomy. It revealed a C-shaped curvature and narrowing of the mid-cervical esophagus secondary to extrinsic compression from an uncertain etiology (Fig. 1).

Subsequent noncontrast computed tomography (CT) of the neck revealed prominent flowing ventral osteophytes of all cervical vertebrae as well as the visualized upper thoracic vertebrae (Fig. 2). These findings were consistent with a new diagnosis of diffuse idiopathic skeletal hyperostosis (DISH). The cervical osteophytes at the C4–C5 vertebral levels were noted to be the most prominent, causing indentation and ventral displacement of the posterior hypopharyngeal wall and region of the upper esophageal sphincter that correlated with the esophagogram findings. The TEE was cancelled because of concern for potential intra-procedural esophageal injury and perforation. The patient was subsequently discharged on a 6-week course of antibiotic therapy.

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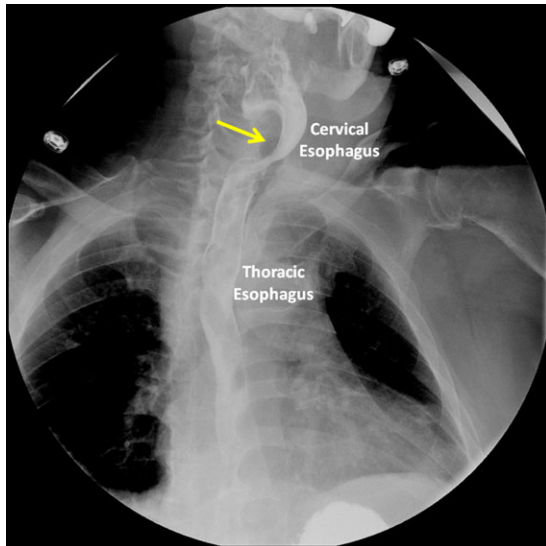


Figure 1. Barium esophagogram demonstrates C-shaped curvature and narrowing of mid-cervical esophagus (arrow) with tapering into thoracic esophagus due to extrinsic compression.

Discussion:

Transesophageal echocardiography is an essential tool for the diagnosis and management of many cardiac processes including evaluation of infective endocarditis. While the safety of TEE is widely established, it does carry inherent risks. The most commonly reported complications of TEE (such as lip injury and hoarseness) do not usually require significant medical intervention.¹ Thankfully, life-threatening complications are rare, with the incidence of esophageal perforation reported to be 0.01–0.09%.² The mechanism of esophageal injury during a TEE

examination is thought to be a combination of thermal energy from the probe tip and direct trauma and pressure during probe insertion, manipulation, and removal.³

To minimize the risk of esophageal injury, the Task Force on Perioperative Transesophageal Echocardiography in 1996 recommended avoiding TEE examinations in patients with extensive esophageal or gastric pathology.⁴ In the current 2013 American Society of Echocardiography (ASE) guidelines, absolute and relative contraindications to TEE were clarified to include esophageal stricture, tumor, scleroderma, perforation, laceration, varices, diverticulum, Barrett's esophagus, esophagectomy, and esophagogastrectomy. Extrinsic compression of the esophagus by vertebral osteophytes, for example, is not explicitly cited as a contraindication or risk factor for esophageal injury during TEE.

The workup for the self-reported history of dysphagia and "tortuous esophagus" in this patient led to a new diagnosis of DISH and the discovery of extrinsic hypopharyngeal and esophageal compression by vertebral osteophytes. DISH is a noninflammatory condition characterized by calcification and ossification of ligaments along the sides of contiguous vertebrae of the spine. The exact mechanism of DISH is unclear, but it affects roughly 10% of the elderly population with a male predominance and because it is more prevalent in obese and diabetic patients, it is thought to be largely driven by metabolic factors.⁵

Although often found incidentally on radiographic imaging, DISH typically presents with stiffness and pain in the back and neck. Less commonly, dysphagia is the presenting complaint, with compression of the esophagus by vertebral

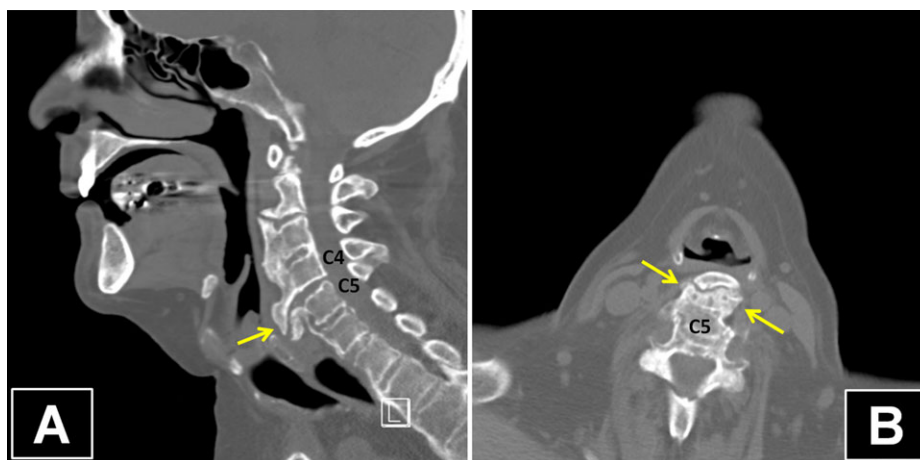


Figure 2. Noncontrast computed tomography of neck. **A.** Sagittal view showing diffuse idiopathic skeletal hyperostosis involving all cervical levels and visualized upper thoracic levels of the spine with the most prominent ventral osteophytes at the C4-C5 level (arrow). **B.** Axial view showing ventral osteophytes anterior to the body of the C5 vertebra (arrow).

osteophytes reported in 14–16% of cases.⁶ Interestingly, the onset of dysphagia in DISH may also be acute.⁷ It is thought that while esophageal compression by slow-growing vertebral osteophytes may be well-tolerated, an event such as aspiration, regurgitation, choking, or trauma, which can induce soft tissue swelling in a structurally abnormal esophagus, may precipitate acute dysphagia.

We hypothesize that the introduction and manipulation of a TEE probe to our patient would have placed him at increased risk of esophageal injury, including perforation. While the rates of TEE-related esophageal perforation reported in literature have been low, the risk of esophageal perforation in our patient was probably significantly higher.

A review of the literature reveals only one report detailing an esophageal perforation due to a thoracic vertebral osteophyte after a seemingly routine TEE.⁸ During surgical repair, the thoracic osteophyte was directly visualized through the esophageal perforation, implicating the osteophyte in the genesis of the injury. The authors proposed that direct pressure and friction of the TEE probe against sharp vertebral osteophytes led to perforation through the posterior wall of the esophagus. In our patient, the cervical location of the osteophytes likely conferred additional risk. In fact, the cervical esophagus is the most common site of esophageal perforation, a phenomenon believed to be caused by the weaker crossing fibers of the pharyngeal constrictor muscle and the cricopharyngeus muscle.⁹

We recommend that prominent cervical and thoracic vertebral osteophytes should be added to the list of relative contraindications to TEE. Given the known association between DISH and vertebral osteophytes, particular caution should be taken in elderly patients with known diagnosis of DISH or in obese or diabetic patients with a

history of back or neck pain and stiffness, even when there is no history of dysphagia. In such patients, additional imaging with CT may be warranted to characterize anatomy prior to TEE. At the very least, very careful TEE probe manipulation and close monitoring for evidence of perforation should be employed in patients with vertebral osteophytes who undergo transesophageal examination.

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