Food Impaction Due to Nutcracker Esophagus

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Abstract: Nutcracker esophagus is an esophageal motility disorder characterized by the presence of hypertensive contraction waves. These waves can have very high amplitudes, but they maintain a peristaltic pattern and therefore, bolus passage is minimally affected. Esophageal food impactions are rare in nutcracker esophagus. Our patient was a previously asymptomatic man who presented with an esophageal meat impaction due to nutcracker esophagus in which high-resolution manometry played a key role in the diagnosis. Although a rare etiology, nutcracker esophagus can result in esophageal food impaction. High-resolution manometry plays a critical role in the diagnosis of specific motility disorders, even in the setting of minimal symptoms.

Key Indexing Terms: Esophageal food impaction; Nutcracker esophagus; High-resolution manometry. **[Am J Med Sci 2013;346(1):76–79.]**

CASE REPORT

Nutcracker esophagus is an esophageal motility disorder characterized by the presence of hypertensive contraction waves.[1–3] These waves can have very high amplitudes, but they maintain a peristaltic pattern and therefore, bolus passage is minimally affected. Esophageal food impactions are rare in nutcracker esophagus. We describe a patient who presented with an esophageal food impaction due to nutcracker esophagus in which high-resolution manometry (HRM) played a key role in the diagnosis.

A 66-year-old male presented with acute onset of chest pain and dysphagia 3 hours after ingesting a large piece of beef. His pain was located in the mid chest and was described as sharp, constant and radiating to the back. It was not associated with diaphoresis, palpitations and was not exacerbated by movement. He noted difficulty swallowing solids and liquids, including his own saliva, with a sensation of "food getting stuck" in his chest. He denied any previous episodes of food impaction, dysphagia or heartburn. He had never undergone an upper endoscopy or a barium swallow. The patient's medical history included diabetes mellitus, hypertension, dyslipidemia and coronary artery disease. Medications included glipizide, metformin, lisinopril, carvedilol, simvastatin and clopidogrel. There was no history of smoking, alcohol or illegal drug use. He denied any allergies.

On arrival, the patient was alert and in mild distress due to chest discomfort and pooling of saliva in his mouth. Blood pressure was 171/88 mm Hg sitting; heart rate was 63 beats per minute. Heart and lung examinations were normal. Examination of the abdomen revealed no abnormalities. Initial laboratory test results were normal except for white blood cells 11,950, with a normal eosinophil count. Serum chemistries including liver enzymes and coagulation tests were normal. An electrocardiogram and 3 sets of cardiac enzymes ruled out cardiac causes of chest pain. A chest radiograph revealed no signs of free air or any cardiopulmonary disease. However, a computed tomography of the chest without contrast identified foreign material distending the distal esophagus, consistent with intraluminal undigested food (Figure 1).

The patient was admitted to the hospital for supportive care and further treatment. An esophagogastroduodenoscopy was scheduled after the initial evaluation. Before endoscopic evaluation, the patient felt he may have passed the ingested food, although some chest discomfort remained. Endoscopy revealed mildly hemorrhagic mucosa in the mid esophagus with a mildly dilated and tortuous distal lumen. No concentric rings or esophageal furrows were seen. Given the setting of acute trauma of the esophageal mucosa, biopsies were deferred. The stomach and duodenum appeared normal (Figure 2). A single-contrast esophagram performed after endoscopy revealed tertiary contractions of the esophagus (Figure 3). Subsequent HRM (Manoscan; Given Imaging, Yoqneam, Israel) performed the next day revealed adequate peristaltic sequences after all wet swallows with normal contraction amplitudes at 7 and 11 cm above the lower esophageal sphincter (LES). Lower esophageal sphincter pressure was within the normal range and LES relaxed appropriately. At 3 cm above the LES, however, the mean wave amplitude was elevated at 186 mm Hg, with many contractions in the range of 209 to 304 mm Hg (Figure 4). The mean distal contractile integral (DCI) was 3909 mm Hg/cm/seconds, with 20% of contractions over 5000 mm Hg/cm/seconds (maximum 6667). These findings were consistent with a segmental nutcracker esophagus.

The patient was discharged remaining asymptomatic and tolerating a regular diet. He returned 4 weeks later for follow-up and endoscopy that revealed a normal-appearing esophagus. Biopsies from the distal, mid and proximal esophagus were taken and revealed no evidence of eosinophilic esophagitis. He remained asymptomatic, and no further treatment was required.

DISCUSSION

Nutcracker esophagus is one of the differential diagnoses of the non-achalasia spastic motility disorders of the esophagus along with diffuse esophageal spasm, isolated hypertensive lower esophageal sphincter and ineffective esophageal motility.[1] Classically, it has been defined as the presence of peristaltic contractions with a mean amplitude >180 mm Hg in the distal segment of the smooth muscle portion of the esophagus.[1–3] Nevertheless, evidence that nutcracker esophagus can occur in the mid and even upper esophagus has been published.[4,5] This has led to the terms "diffuse" and "segmental" nutcracker esophagus.[4,5] Other

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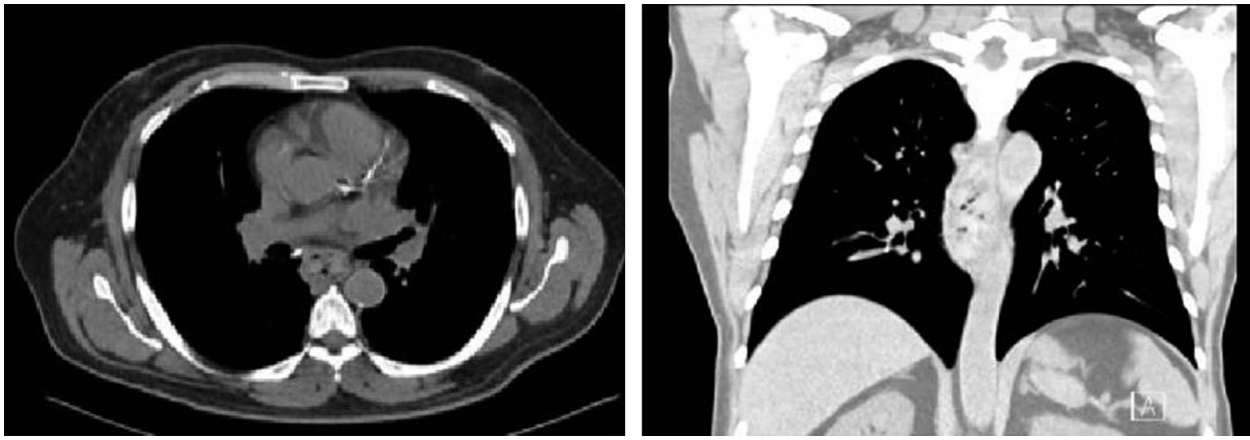

FIGURE 1. Computed tomography (CT) chest (2 views). CT of the chest shows an 8.6-cm segment distended and filled with food debris from below the carina to 4 cm above the gastroesophageal junction.

characteristics of nutcracker esophagus include the presence of bi-peaked and triple-peaked waves as well as some prolonged duration contractions.[6]

In motility laboratories in specialized tertiary referral centers, the prevalence of nutcracker esophagus generally ranges between 9% and 12%.[7] However, the exact incidence and prevalence of nutcracker esophagus and other spastic disorders is not known due to confusion generated from the lack of standardized application of the above criteria. Some authors have even suggested that the definition of nutcracker esophagus be revised to further stratify patients based on the degree of contractile abnormalities.[8] Recently, HRM has helped clinicians in the diagnosis and reclassification of these disorders.[7,9] Distal esophageal contraction vigor has been characterized using the newly developed measure of the DCI.[9] A mean DCI greater than 5000 mm Hg/cm/seconds is considered elevated according to the Chicago classification. Our patient met conventional manometric criteria for nutcracker esophagus as well as HRM criteria (Chicago classification) on 2 of 10 contractions. The manometric tracing was the classic pattern with intact peristalsis. Retrosternal pain is the most common complaint in patients with nutcracker esophagus, but variable amounts of dysphagia can also occur. Symptoms vary widely in terms of their intensity, frequency, precipitating factors and location.[10] The lack of correlation of symptoms and/or physical findings with a specific motility disorder makes

FIGURE 2. Endoscopic photo. Segmental abnormality of the mid esophagus characterized by mild dilation and hemorrhagic appearance consistent with recent food impaction.

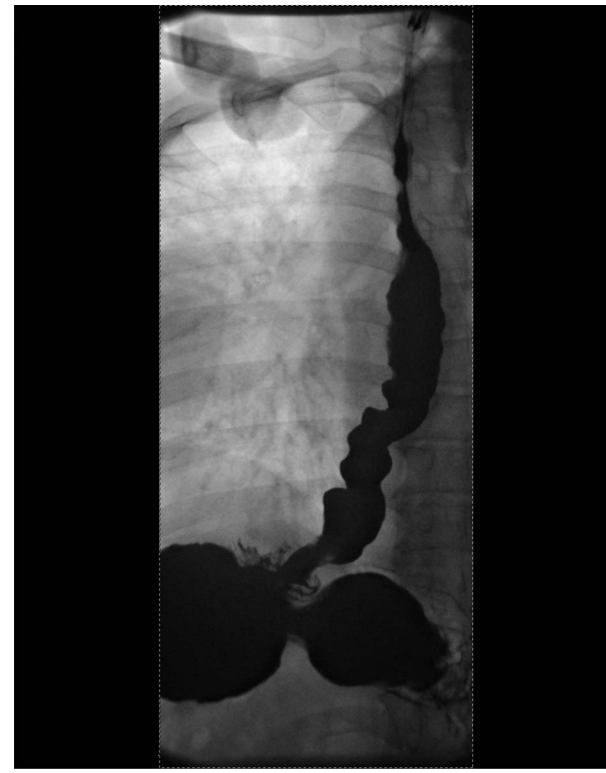

FIGURE 3. Barium esophagram. Barium swallow shows tertiary contractions.

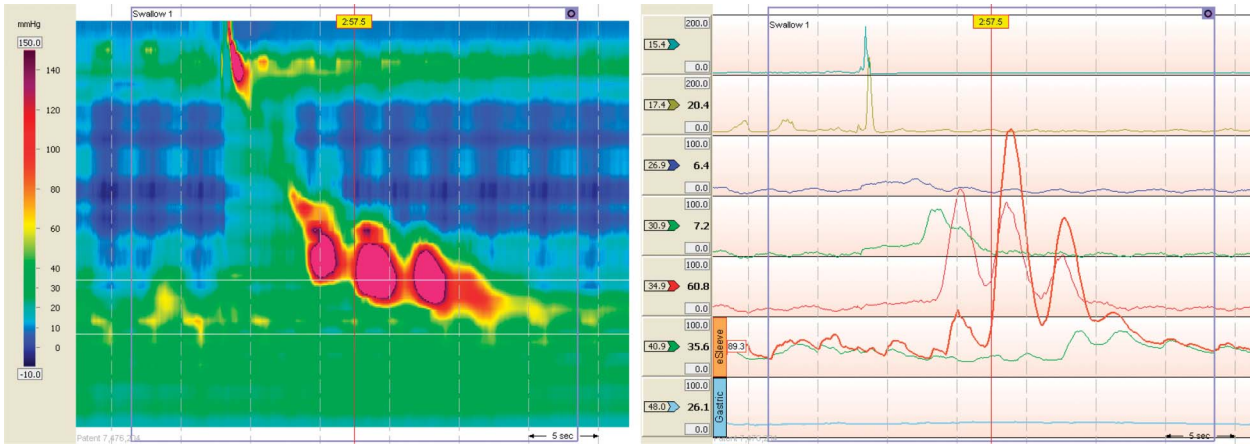

FIGURE 4. High-resolution manometry image shows hypertensive peristaltic contractions after wet swallows in the distal esophagus. The amplitude of the wave at 3 cm above the lower esophageal sphincter shown here is 304 mm Hg, and the mean wave amplitude was 186 mm Hg.

manometry a *sine qua non* for their accurate classification and diagnosis.

Patients with nutcracker esophagus rarely present with esophageal food impaction perhaps because although esophageal contractions are intense, they are still peristaltic. Esophageal food impaction is usually secondary to structural abnormalities of the esophagus such as esophageal stricture, Schatzki's ring, eosinophilic esophagitis, previous esophageal surgery, gastroesophageal reflux disease stricturing, large hiatal hernias, large diverticulum and neoplasms.[11,12] We performed a literature search looking for esophageal food impaction as a manifestation of nutcracker esophagus and identified only 4 cases.[13–15] The main characteristics of these 4 cases are summarized in Table 1. Interestingly, our case resembles the others, in that all are middle-aged or older men without a history of a "motility" disorder. Ours is the first case using HRM to make the diagnosis.

Our patient was an elderly man with no prior episodes of dysphagia or chest pain who presented with an esophageal food impaction that was confirmed on computed tomography scan. When an esophagogastroduodenoscopy failed to reveal any mechanical or microscopic abnormalities, a motility disorder was suspected. A barium swallow revealed the presence of nonspecific tertiary waves. This led to the performance of a HRM even though the patient was essentially asymptomatic before the impaction event. The information provided by this study allowed us to separate this entity from diffuse esophageal spasm, achalasia and presbyesophagus. However, it is possible that the manometric finding of nutcracker esophagus may be a "marker" of other motility abnormalities, such as esophageal spasm occurring sporadically. Transition from nutcracker esophagus to esophageal spasm has rarely been described.[16] We finally diagnosed the patient with a segmental nutcracker esophagus. Esophageal biopsies ruled out eosinophilic esophagitis, which has been associated with a variety of motility disorders, including nutcracker esophagus.[17,18]

This case highlights 2 important points. First, although rare, nutcracker esophagus can manifest itself with esophageal food impaction. Second, HRM plays a critical role in the diagnosis of specific esophageal motility disorders and should be considered even in the setting of minimal symptoms. Clinicians should be aware of these important take home messages to diagnose and adequately treat their patients in their practices.

TABLE 1. Cases of esophageal food impaction associated with nutcracker esophagus

Author	Age	Gender	Prior motility disorder	Manometry findings	Type of manometry
DiPalma et al[14]	65	Male	Yes	245 mm Hg segmental nonperistaltic waves 2 cm above LES[a]	Conventional
Breumelhof et al[15]	66	Male	No	151–225 mm Hg peristaltic waves 5 cm above LES	Conventional
Chae et al[13]	55	Male	No	230–301 mm Hg short segmental peristaltic waves 2 cm above LES	Conventional
Chae et al[13]	63	Male	No	172–285 mm Hg diffuse peristaltic waves in mid to lower esophagus	Conventional
Mendoza Ladd et al (current study)	66	Male	No	Mean wave amplitude 186 mm Hg 3 cm above LES	High resolution

[a] Manometry findings from 1 year before esophageal food impaction. Manometry done 1 month after esophageal food impaction showed normal findings.

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