



## Case Report

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# Esophageal Hiatal Hernia: A Possible Scintigraphic Feature

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**ABSTRACT**

An 81-year-old woman with symptoms of upper Gastrointestinal (GI) obstruction but with no supporting evidence for obstruction in previous endoscopies was studied with a solid-liquid gastric emptying scintigraphic examination. There was evidence of accumulation of the tracer in a part of the stomach in the thorax before filling the stomach. The paraesophageal hiatal hernia was suspected. The diagnosis was not confirmed by other modalities and the patient passed away after upper GI bleeding a month later.

**Introduction**

**A** paraesophageal hernia is a surgical emergency when symptomatic [1]. The diagnosis is based on the pH-metry and radiologic examinations, including CT scan. The endoscopy is the main stem either for the diagnosis or treatment but the retroflexed view is necessary for the diagnosis [2]. The barium swallow has its drawbacks for the diagnosis of paraesophageal hernia and there are only two scintigraphic cases reported to date [3, 4].

**Case Presentation**

The patient was an 81-years-old woman referred to the department of nuclear medicine for scintigraphic evaluation of gastric emptying. She was admitted to our teaching university hospital for her 6-month lasting on-and-off vomiting attacks immediately after food intake as well as early satiety resulting in appetite loss and weight loss of 9 kg during 6 months. She also had sustained abdominal pain and constipation. She was diagnosed with Alzheimer's disease. She had a history of appendectomy and two times surgery for an umbili-

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cal hernia. Her exam revealed no abdominal tenderness with normal bowel sounds; in the general examination, the conjunctiva was pale. Complete blood count showed normal indices with a hemoglobin concentration of 12 mg/dl. Electrolytes and creatine kinase-MB levels were within normal limits.

She had multiple upper Gastrointestinal (GI) endoscopic examinations with the following overall findings: reflux esophagitis, chronic atrophic gastritis, erythematous duodenitis, and no evidence of mechanical obstruction. Gastric biopsy indicated extensive intestinal metaplasia. Abdominal ultrasonography determined normal viscera except for microlithiasis of a gallbladder. Color Doppler sonography found no significant obstructions of mesenteric and celiac vessels. She had a normal barium swallow study with a remark of slow intestinal barium passage without obstruction. We performed gastric emptying scintigraphy 10 minutes after upright intake of two scrambled eggs labeled with 0.5 mCi 99mTechnetium phytate and bread (100 g) with 200 ml of water. She had significant difficulty in eating the test meal and vomited a part of the ingested meal; thus, we added 200 µCi 99 mTechnetium DTPA to the patient's drinking water. Imaging was performed every 15 minutes up to 120 minutes. The esophagus was found with mild retention of the tracer.

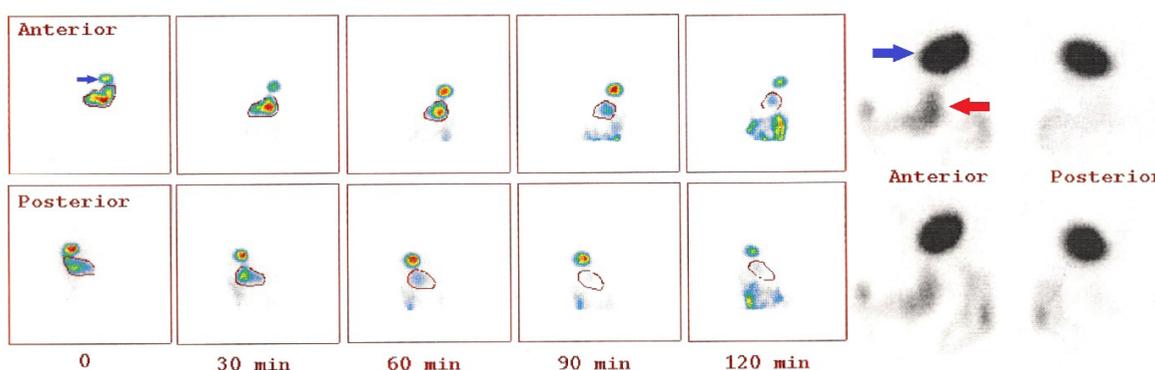
There was significant retention of the tracer above the level of the entrance of the esophagus into the stomach in a reservoir-like part of the stomach, which retained the tracer for 30 to 40 minutes. During the first 30 minutes of the study, no tracer was determined in the stomach below the expected esophagogastric junction (Figure 1). Then, the tracer was excreted from the men-

tioned reservoir-like part to the remaining stomach with normal clearance afterward. The findings were reported as an obstruction at the gastric fundus level probably secondary to a paraesophageal hernia. Repeated upper GI endoscopy excluded again mechanical obstruction or evidence of a paraesophageal hernia. Meanwhile, the patient experienced improvement with chlordiazepoxide, citalopram, omeprazole, and domperidone and was discharged from the hospital. One month later, she was admitted for GI bleeding and passed away with the presentation of shock and hemoglobin of 8 in her last complete blood count.

### Discussion

A hiatal hernia is a common disorder [5, 6] characterized by a protrusion of any abdominal structure other than the esophagus into the thoracic cavity through a widening of the hiatus of the diaphragm. Attempts have been made during the last century to classify a hiatal hernia into subtypes [7]. According to the current anatomic classification, include hiatal hernias is classified into four types (I – IV) [8]. Type II hernias are pure Paraesophageal Hernias (PEH); the gastroesophageal junction remains in its normal anatomic position but a portion of the fundus herniates through the diaphragmatic hiatus adjacent to the esophagus. Type III hernias represent both the gastroesophageal junction and the fundus herniating through the hiatus (the most frequent type in 90% of all cases) [9]. The fundus lies above the gastroesophageal junction. We suspect that our patient had a type II or III hernia.

Regarding imaging modalities, which may assist in the diagnosis of a hiatal hernia, plain chest radiographs may



**Figure 1.** Anterior and posterior projections and close up of the gastric emptying study of the patient with symptoms of upper Gastrointestinal (GI) obstruction

Accumulation of the tracer within the reservoir-like part (blue arrow) above and separated from the stomach (red arrow) is evident up to 90-min delayed images.

identify soft tissue opacity with or without an air-fluid level within the chest. A retrocardiac air-fluid level on chest radiograph is pathognomonic for a paraesophageal hiatal hernia [10]. CT scan [11] may be useful in an urgent situation for patients with suspected complications from a volvulized paraesophageal hernia. The hernia site and any herniated organs within the chest cavity are clearly visualized in most cases. Multi-slice CT with sagittal, coronal, and 3D reformatted images may increase the sensitivity of CT for the detection of a hiatal hernia [12].

Esophagogastroduodenoscopy (EGD) allows visual assessment of the mucosa of the esophagus, stomach, and duodenum. The presence of erosive esophagitis or Barrett's esophagus can be determined. Further, the size and type of a hernia can be assessed. Esophageal manometry can demonstrate the level of the diaphragmatic crura, the respiratory inversion point, and the location of the lower esophageal sphincter. In patients with a paraesophageal hiatal hernia, placement of the manometry catheter across the lower esophageal sphincter and below the diaphragm can be difficult [13]. Also, pH testing has limited relevance in the diagnosis of a hiatal hernia and using pH monitoring. Ott et al. found that 94% of patients with reflux esophagitis had a hiatal hernia in a population with a 51% prevalence of the disease [14].

Nuclear medicine studies can also demonstrate hiatal hernias but are not routinely used for diagnosis [3]; for example, the use of radionuclide gastric emptying scintigraphy has been reported to demonstrate hiatal hernia [4]. In the mentioned study, most radiotracers lodged and hung intrathoracically, and a small amount of radiotracer was noted in the stomach subdiaphragmatically. Delayed or discordant gastric emptying in gastroesophageal reflux in patients with a hiatal hernia has previously been documented [15]. In another case report study, a patient with type III hiatal hernia underwent a radionuclide gastric-emptying study that showed accumulation of the radiotracer in the herniated stomach and esophagus in the thorax and accelerated gastric emptying. It was concluded that a scintigraphic gastric-emptying study may be an option for the noninvasive demonstration of gastroesophageal accumulation of tracer in patients with a hiatal hernia [3]. We think that the scintigraphic findings of the presented patient are in line with what we may expect from the hiatal hernia; however, we had no proof for the clam.

## Conclusion

We detected the accumulation of the tracer in a possibly herniated part of the stomach in the thorax above

the junction of the gastroesophageal junction in a patient with abdominal pain, retractable postprandial vomiting, and early satiety. The hiatal hernia was not confirmed in three prior and a consecutive upper GI endoscopy. However, the patient had reflux, esophagitis, gastritis, and duodenitis and passed away a month later secondary to upper GI bleeding. To the best of our knowledge, this is one of the very few scintigraphic images of paraesophageal hernia [3, 4].

## Ethical Considerations

### Compliance with ethical guidelines

All procedures involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and the Helsinki declaration.

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