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Commentary Open Access

Abnormal Radiotracer Uptake in the Retro-Cardiac Area on SPECT Myocardial Perfusion Imaging

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Commentary

An 88-year-old male with history of endovascular repair for abdominal aortic aneurysm presented to the hospital with abdominal pain and found to have leakage from the site of repair. He was scheduled to undergo repair of the endoleakage. He had history of hypertension, hyperlipidemia and remote history of smoking and no history of coronary artery disease. His cardiac exam and baseline electrocardiogram were normal. Given his uncertain exercise capacity, he was referred for pharmacological stress perfusion imaging as a prelude to the vascular surgery.

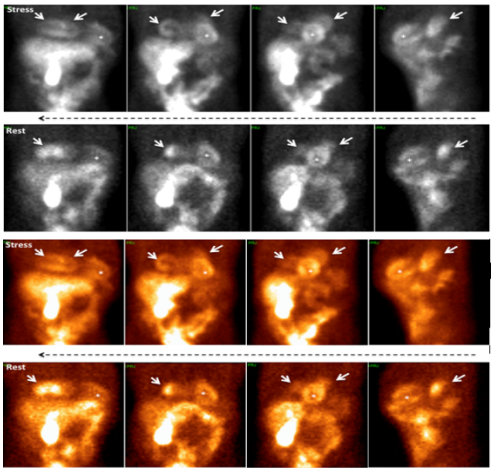

Figure 1: (a gray scale, b thermal scale). Representative still frames from the raw rotating stress and rest images showing a very large mass in the entire retro-cardiac region (arrows), extending beyond the right cardiac border. This mass is larger than the size of the heart (indicated by *). The appearance of this mass is highly suspicious of herniation of the entire stomach into the retro-cardiac space.

He underwent rest perfusion imaging using 10.5 mCi of 99mTc-sestamibi, followed by pharmacological stress using 0.4 mg of regadenoson. Following regadenoson, his heart rate increased from 64 to 85/min and blood pressure from 118/94 to 140/80 mm of Hg. He did not develop any chest pain. No significant ST-segment changes or arrhythmia were observed. He underwent gated SPECT imaging with CT attenuation correction using Brightview SPECT-CT gamma camera (Philips, Briarcliff Manor, NY). A low dose flat panel, slow CT was carried out for the purpose of attenuation correction (5 mAmp current with 80 Volt). The raw rotating images show a very large abnormal, well circumscribed mass in the entire retro-cardiac area, extending beyond the right cardiac border (Videos 1a and 1b and Figures 1a and 1b). Stress and rest perfusion images were normal (Figure 2). Gated SPECT images showed normal left ventricular wall with left ventricular ejection fraction of 72%.

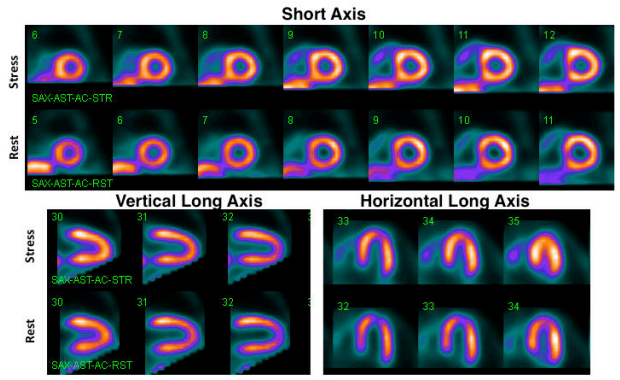

Figure 2: Representative short axis, vertical and horizontal short axis slices on stress and rest images, showing normal myocardial perfusion.

On SPECT imaging, retro-cardiac radiotracer activity is relatively uncommon. Retro-cardiac tracer activity can result from the herniation of stomach or bowel loops through the esophageal hiatus in the diaphragm, malignancy of the lower part of the esophagus, or very rarely due to the presence of ectopic structures such as thymoma or enlarged lymph nodes [1,2]. In our patient, the scintigraphic appearance is highly suggestive of a very large hiatal hernia with the entire stomach herniated into the retro-cardiac space [3,4]. The superimposed SPECT-CT images were helpful in further delineation of the herniated stomach (Figure 3). Figure 4 shows the chest X-ray in the PA view showing a rounded shadow extending in the right retro-cardiac region consistent with a large hiatal hernia. Chest CT confirmed the herniation of the entire stomach into the retro-cardiac space with suspicion of organo-axial volvulus of the herniated stomach (Figure 5). The raw rotating images detected a very large hiatal hernia, the extent and severity of which correlated very closely with the CT images of the thorax. Organo-axial volvulus of the stomach in a hiatal hernia sac can give the appearance of inverted stomach in the thoracic cavity. . The patient underwent repair of the endovascular leak with

uneventful recovery. He declined repair of his hiatal hernia in view of lack of any symptoms.

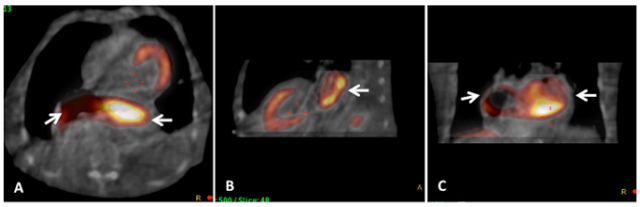

Figure 3: Superimposed SPECT and CT images in the transaxial (A), sagittal (B) and coronal (C) sections, showing a large retro-cardiac mass with radiotracer uptake, extending above the superior extent of the heart (arrows).

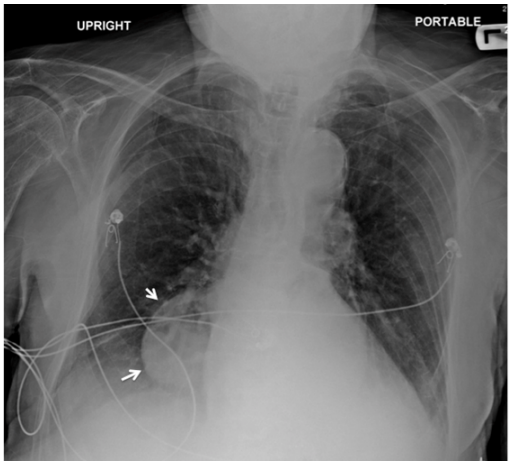

Figure 4: Portable chest X-ray in AP view showing a large rounded mass projecting beyond the right cardiac border due to a large hiatal hernia.

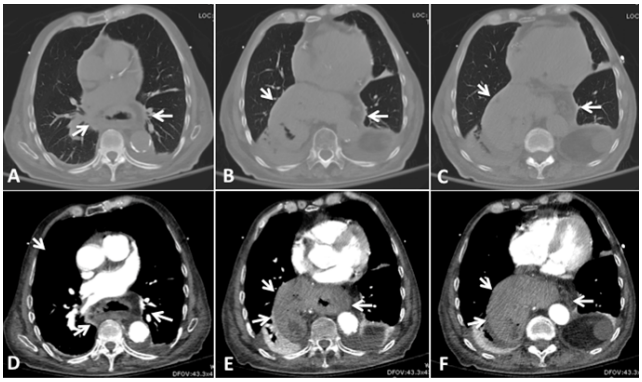

Figure 5: Representative transaxial slices of the thoracic CT at superior, mid and lower level of the mediastinum (images A-C without contrast and D-F following iv contrast injection). These images show herniation of the entire stomach into the retro-cardiac space. The radiological appearance is consistent with organo-axial volvulus of the stomach

Systematic review of raw projection images can occasionally lead to identification of incidental extra cardiac findings, which might not be recognized by other imaging modalities.

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