

Normal MR Appearance of Laparoscopic Nissen Fundoplication

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Purpose: Laparoscopic Nissen fundoplication is a common surgical procedure for the treatment of gastroesophageal reflux disease. The procedure is intended to restore the antireflux barrier at the GE junction by "wrapping" the proximal gastric fundus around the GE junction and tightening the esophageal hiatus. In less than 5% of patients symptoms appear postoperatively which may be the result of structural failure of the fundoplication. Structural abnormalities include disruption of the wrap with or without recurrent hiatal hernia; herniation of the intact wrap into the chest; and malposition of the wrap. All imaging techniques currently used to evaluate complications have limitations. The purpose of this study was to determine the feasibility of using MR to evaluate fundoplications and to determine the normal postoperative appearance of Nissen fundoplication at MR

Methods and Materials: Seven subjects (5 males, 2 females, ages 26-75 yrs) who had undergone laparoscopic Nissen fundoplication 1 months to 5 years previously were examined with MR. All patients were asymptomatic and had complete resolution of symptoms related to reflux disease following surgery. Patients were kept NPO for three hours prior to the exam and were given 8 oz of water orally while in the supine position just before scanning. Patients were evaluated on a GE 1.5T MR scanner using a torso phased array coil with the following sequences: SSFSE (Single Shot Fast Spin Echo), ungated 2D Fiesta (Fast Imaging Employing Steady-state Acquisition) and 3D Fiesta, which were acquired in the axial, sagittal and coronal planes.

Images were reviewed to determine (1) location of the wrap (intrathoracic vs intraabdominal) (2) absence of stomach/hernia above the wrap and (3) appearance of the fundoplication.

Results: None of the seven patients had evidence of hiatal hernia or stomach above the wrap. One patient had a supradiaphragmatic location of the wrap. The wrap had a similar appearance in all seven patients (Figure 1 and 2)

Conclusion: An intact Nissen fundoplication has a typical appearance on MR. The centrally located esophagus incompletely surrounded by the two-layers of gastric fundus resembles a "hot dog in a bun". Demonstration of this finding along with an infradiaphragmatic location of the wrap and absence of stomach or hiatal hernia above the wrap is consistent with a positive surgical outcome. Our findings show that MR can be performed in a rapid fashion and provides exquisite anatomic information regarding the location and integrity of the wrap. Further studies assessing the accuracy in diagnosing complications seems warranted.



Figure 1. Axial view demonstrates esophagus (arrowhead) partially surrounded by fundoplication (arrow)



Figure 2. Coronal view demonstrates wrap located below diaphragm (arrowhead) and no hiatal hernia or stomach seen above wrap (arrow)