OBJECTIVE
To assess the outcomes of patients who underwent laparoscopic repair of large hiatal hernias.

METHODS
Retrospective chart review, clinic visit data and a follow up symptomatic questionnaire via phone. All the procedures were performed by the same surgical and anesthesiology team. The postoperative care was provided by a trained team of thoracic nurses.

RESULTS
From 09/16/2009 to 09/06/2015, there were 215 laparoscopic hernia repairs. We excluded redo procedures (n=35) and type I hernias < 4cm (n=49) giving a study population of 131 patients. There were 56 type I hiatal hernias ≥ 4 cm: size 5 (4.5-2.5) cm, 4 type II E: 6 (5.8) cm, 37 type II B and 54 type IV as seen in Figure 1; 26 of whom had the entire stomach in the chest, as seen in Figure 2. Values are presented as median and interquartile range (IQR). There were 102 females and 29 males with median age of 63 (56-74) years. The median duration of operation was 138 (119-172) min. There were 28 Nissen, 102 Toupet and 1 Dor Fundoplication.

Esophageal mediastinal mobilization from the aorta, spine and pleura, as seen in Figure 3, was performed as indicated in all patients and tension free intra-abdominal esophageal length was obtained in all, without the need for Colls gastropexy. Vixilor absorbable mesh for cural closure reinforce- ment was used in 10x/13 (84.8%) patients. A laparoscopic view of 2 cm tension free intra-abdominal esophageal length with cural closure and a Toupet fundoplication is shown in Figure 4.

The peri-operative complications included atrial fibrillation in 5, gastric distension or tears requiring nasogastric tube in 3, re-intubation in 3, hypertension in 5, induced thrombocytopenia resulting in stroke in 1 and temporary dialysis in 1 patient. In the first 10 cases there was 1 conversion as the result of esophageal perforation during bougie insertion which was treated with laparotomy and primary repair. Esophageal leak occurred in 2/131 (1.5%) with type IV hiatal hernia that underwent Toupet fundoplication which were treated with drainage and esophageal stent. Both leaks resolved and each developed stricture requiring esophageal dilation and stent placement. There was no perforation in the last 70 repairs. The median length of stay was 2 (1-3) days. There was no 30-day mortality.

In-person clinical follow up was obtained in 121/131 (92%) patients. At a median of 3.5 (0.5-7.3) months, 116/121 (96%) were free of heartburn, 110/121 (91%) were free of regurgitation and 101/121 (83%) were free of dysphagia. The median weight loss was 7 (6-12) lbs. A follow up symptomatic questionnaire via phone was obtained in 99/131 (76%) patients. At 24 (9-38) months, 85/99 (68%) were free of preoperative symptoms. 91/99 (92%) were satisfied with the operation, 92/99 (93%) were free of heartburn, 88/99 (89%) were free of regurgitation; 87/99 (88%) were free of dysphagia and 73/99 (74%) were off PPI. Excessive gas was reported in 26/99 (26%), gas bloating in 19/99 (19%) and diarrhea in 15/99 (15%). The median weight change was 0 (-18 to 12) lbs.

There was 1 rate death in a patient with aspiration pneumonia who died from head trauma in a rehabilitation facility 63 days after repair of type II hiatal hernia. Reoperation for symptomatic recurrent hiatal hernia was performed in 8/131 (6%) patients. 2 in the early perioperative period and 6 at median of 25 (8-31) months.

CONCLUSIONS
Laparoscopic repair of large hiatal hernia is a safe approach with excellent patient satisfaction and low morbidity. Tension free intra-abdominal esophageal length can be achieved laparoscopically without Colls gastropexy. Reoperation for symptomatic recurrence is rare.