Manometric Features of the Laparoscopic Hill repair vs. the Nissen Fundoplication for Gastroesophageal Reflux Disease

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INTRODUCTION

Multiple surgical methods exist to restore the antireflux mechanism of the lower esophageal sphincter (LES).

Techniques can be grouped into 3 categories:
- fundoplication
- reconstruction of the angle of His
- esophago-gastropexy and reconstruction of the valve mechanism.

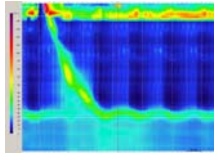
Each technique is thought to restore function to the LES with a different mechanism. In a randomized controlled trial comparing the Hill repair with the Nissen fundoplication, we hypothesized there would be manometric differences between the 2 procedures that could explain their respective mechanisms of reflux prevention.

METHODS

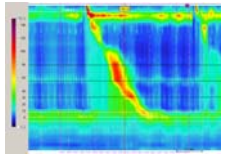
123 patients with GERD (Hill = 52, Nissen = 71) were randomized under an IRB protocol to receive either a laparoscopic Nissen or Hill procedure. To avoid institutional procedure bias, all procedures were done under the guidance of a Nissen (LS) or Hill (RA) expert. Standard preoperative and post operative testing were performed.

For this study, high resolution manometry (Manoscan, Sierra Scientific Instruments, Mountain View, California) performed after surgery was available for 31 patients. After an overnight fast, the catheter was placed transnasally and after a period of acclimatization, 10 – 5 mL of water aliquots were given to the patient in the supine position and the bed elevated approximately 30 degrees.

The data were analyzed using the ManoView software and interpreted by blinded observers (BL and CD) marking the following results: proximal and distal LES borders, maximum and nadir LES pressure, respiratory inversion point, esophageal body peristalsis, residual LES pressure, and distal contraction amplitude.



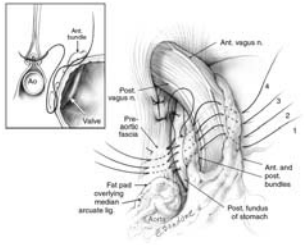
Hill Repair



Nissen

OPERATIVE TECHNIQUES

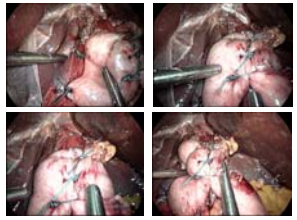
THE HILL REPAIR



Technique
- Full mobilization of esophagus
- Restore 2-3 cm of intra-abdominal length
- Posterior crural closure (0 Ethibond)
- 4 bundle sutures with posterior fixation of collar sling musculature to preaortic fascia
- 43 Fr Bougie
- Intraoperative manometry

Expected Mechanism of Repair
- Restores LES length and pressure
- Accentuates valve

NISSEN FUNDOPLICATION

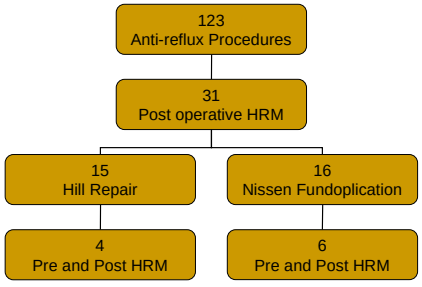


Technique
- Full mobilization of esophagus
- Restore 2-3 cm of intra-abdominal length
- Division of short gastric vessels
- Posterior crural closure (0 Ethibond)
- Greater curve to greater curve Nissen
- Posterior anchoring sutures (2)
- Internal esophageal-fundal sutures (2)
- Fundal-fundal sutures (3)
- 56 Fr Bougie

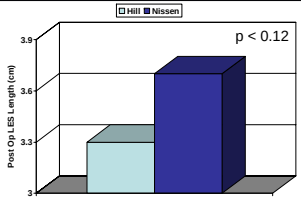
Expected Mechanism of Repair
- Restores LES length and pressure
- Impairs inappropriate LES relaxation

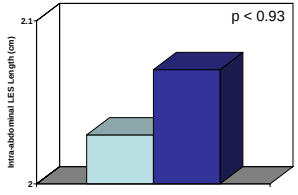
RESULTS

Demographics

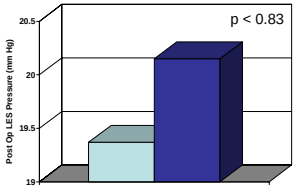


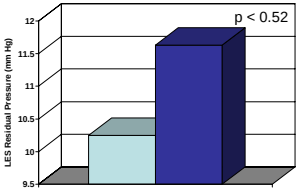
Structural Characteristics

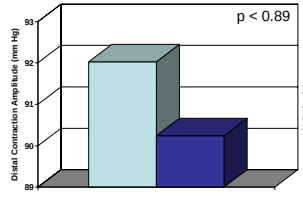


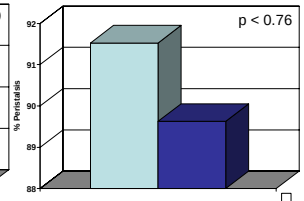


Functional Characteristics

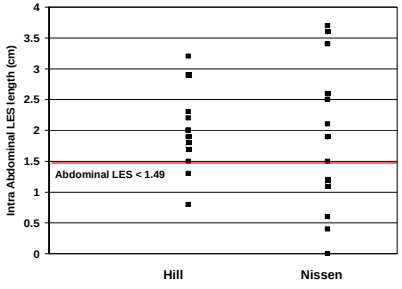




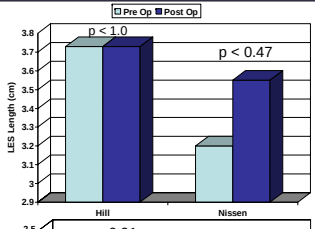


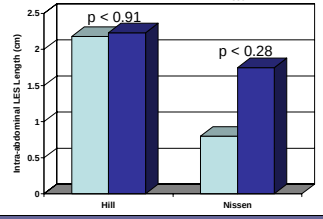


Shortened Intra-Abdominal Length



Pre and Post Op HRM (n=10)





CONCLUSIONS

The manometric characteristics of the Hill repair and the Nissen Fundoplication are equivalent.

Both repairs restore overall and intra-abdominal LES length. Functionally, both repairs also generate equivalent LES pressures, residual LES pressures, distal contraction amplitudes and peristalsis. There was a non-significant trend to restoring more LES length with the Nissen but the Hill may be better at restoring intra-abdominal length.

These findings correspond to the differences in surgical technique and may indicate a role for the Hill in patients with shortened esophagus.