

Laparoscopic Transabdominal Preperitoneal (TAPP) Hernia Repair: Experience with the GORE BIO-A Hernia Plug

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Introduction

Open inguinal hernia repair traditionally is associated with low recurrence rates with up to 43%¹ incidence of chronic pain, with an average incidence of about 11%¹ which may be under reported in outcome data. Similarly, laparoscopic inguinal hernia repairs also have low recurrence and complication rates, with the advantage of shorter recovery time with up to 22% of patients who may have chronic pain². Open repairs using the absorbable GORE BIO-A Hernia Plug have been associated with a lower incidence of pain³.

Our initial experience with the absorbable plug originated in the repair of a contaminated operative field due to femoral hernia incarceration with concomitant appendicitis. Repair with a synthetic bioabsorbable plug was successful and well tolerated with two-year follow up. We adopted this approach for unilateral inguinal hernia repair based on this experience. The GORE BIO-A Hernia Plug is indicated for reinforcement of soft tissue repairs. In repairs requiring high strength, an overlay patch is strongly recommended.

The purpose of this study was to evaluate the GORE BIO-A Hernia Plug in laparoscopic transabdominal preperitoneal (TAPP) procedures for freedom from recurrence while minimizing the risk of complications associated with permanent synthetic mesh. Primary endpoints were recurrence, incidence of chronic pain, and other surgical complications.



Intraabdominal polypropylene plug inserted from a previous open approach. Using the GORE BIO-A Hernia Plug can help reduce complications associated with permanent plugs including pain^{4,5}, migration⁵ and erosion⁵.

Methods

A prospective, non-randomized single center evaluation of patients of at least 18 years of age were treated for unilateral or bilateral inguinal, primary or recurrent hernias without prior mesh repair.

All procedures were completed by a single surgeon after informed consent. Data include the defect location and size, operative time, and length of stay.

Approximately 12-24 months after surgery, patients completed the McGill Pain Questionnaire (MPQ) and underwent physical examination or telephone interview by the primary surgeon.

Operative Technique



Reduce the hernia sac, and visualize the defect (in this case a small indirect hernia). In later repairs, a pre-peritoneal space was created after hernia reduction.



Soak the plug in MARCAINE®, and tie the legs together with VICRYL Suture to facilitate passage through the 12 mm trocar.



Deploy the plug into the defect and fixate with a few titanium staples. In later repairs, the peritoneum was closed over the plug. This image depicts a femoral hernia repair.

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Operative Findings

Inguinal Hernia	26
Direct	10
Indirect	10
Pantaloon	2
Femoral	1
Spigelian	1
Recurrent	2
Mean Operative Time (min) (n = 25)	32
Range (20, 75)	
Mean Defect Size (cm ²) (n=26)	8.9
Range (4,21)	

Patient Recovery

Length of Hospital Stay (n=25)	
Released same day	18 (72%)
Average (days) Range (1, 5)	1.6 (28%)

Patient Demographics

Gender (n=25)	
Male	21 (84%)
Female	4 (16%)
Mean Age (years) Range (19, 89) (n=25)	54.1
Mean BMI Range (22, 30) (n=25)	26.1

Complications

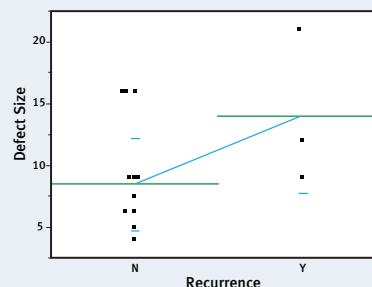
Post operative	
Trocar site hematoma (n=25) (evacuated)	1 (4.2%)
Urinary retention (n=25)	1 (4.2%)
Follow up	
Recurrence (n=24)	3 (13%)
Mean time to recurrence (mos)	8.5
Range (5, 35)	
Pain (n=24)	0 (0%)

Results

24 patients (96%) were followed an average of 17 months (1, 35). One patient had bilateral defects included in the study. Four patients had bilateral defects not included in the study because they were repaired in combination with a synthetic mesh overlay. Complications included 3 recurrences, 1 hematoma, and 1 urinary retention. Average defect size was 8.9 cm². Average OR time was 32 minutes with 72% of patients going home the same day. No pain was reported by patients who did not have a recurrence.

Conclusion

Interim results suggest using the GORE BIO-A Hernia Plug in Laparoscopic Transabdominal Preperitoneal repair is reasonable with no chronic pain and low recurrence rates in selected patients (small indirect defects). Long-term follow up is necessary to determine the durability of the repair.



Oneway Analysis of Defect Size By Recurrence

A larger defect size (>9cm²) was associated with recurrence (p = 0.0385) in a single sided test with a 95% confidence interval.

The green lines denote the mean defect size for non-recurrent and recurrent repairs.

Discussion

Early recurrences led to refinement in patient selection to those with small (<9cm²) primary indirect defects. There were no recurrences in this subset of cases, and patient satisfaction was high.

One advantage of using an absorbable plug is the ability to apply it to a contaminated field, as in the index case prompting further study. The absorption behavior of the GORE BIO-A Hernia Plug is similar to polyglycolic acid/trimethylene carbonate (MAXON®) suture with absorption over a period of approximately six months. The material functions as a lattice that allows for predominantly type 1 collagen deposition which has been documented in animal⁶ and human^{7,8} experience.

One concern regarding laparoscopic preperitoneal (TEP) procedures is the inability to reproduce results in part due to the technical demands of the procedure. Use of the GORE BIO-A Hernia Plug in transabdominal preperitoneal (TAPP) procedures is straightforward. Long-term follow up will be necessary to determine the durability of the repair but short term follow up is encouraging in properly selected patients.



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