



# Advances in Laparoscopy

Research Article

Open Access

## Laparoscopic Treatment of Incisional Lumbar Hernia: Long Term Results Comparing Polypropylene Xptfe Mesh Repair

Marcos Tobias-Machado\*

Department of Urology, ABC Medical School, São Paulo, Brazil

### Summary

**Introduction:** Lumbar hernia after lumbotomy is rare especially nowadays due to routinely application of minimally invasive treatments for kidney and adrenal diseases. We present our results with laparoscopic mesh repair analyzing objective parameters and patient satisfaction in at least 1 year of follow-up.

**Material and methods:** Between 1998 and 2016 we prospectively evaluate 25 patients with previous history of lumbotomy and lumbar incisional hernia were submitted to transperitoneal laparoscopic repair with mesh fixed with titanium hernia articulated stapler through 3 ports technique. Ten received a Polypropylene (PP-Marlex®) mesh and 15 patients received a Polytetrafluoroethylene (PTFE, Gore-Tex®) mesh. Patients were followed up on days 7, 30, 90, 180 and finally 1 year when was performed the final analysis by CT scan and application of satisfaction questionnaire about the procedure.

**Results:** Mean operative time was 130 min for Marlex® and 80 min for Gore-Tex® ( $p = 0.03$ ). There were no intraoperative complications. Blood loss was less than 100 ml in all cases. Mean hospital stay was 30 h for Marlex® and 24 h for Gore-Tex®. Mean time for normal activities was 4 weeks for both meshes. There were two minor postoperative complications. Only 2 patients with associated muscular atonia were partially satisfied with aesthetic results and all of others (92%) were satisfied. Clinical examination and CT scan shows that all defects were repaired with no recurrences.

**Conclusion:** Laparoscopic approach with mesh repair is a minimally invasive, safe and effective long term treatment for lumbar hernia. Operative time to Gore-Tex® mesh was shorter, with similar final results when compared to Marlex®.

### Introduction

Lumbar hernia is probably the most uncommon abdominal hernia type, with approximately 300 cases reported in the literature [1,2]. It occurs anywhere between the 12<sup>th</sup> rib and the iliac crest, and it can be congenital or acquired. Congenital hernias appear during infancy as the origin of a defect in the musculoskeletal system of the lumbar region, and are associated with other malformations. Acquired lumbar hernias are usually primary (or spontaneous) and secondary, which depend on the existence of a causal factor, such as surgery, infection or trauma [1]. The spontaneous hernias are located preferentially on the superior lumbar triangle (Grynfeltt-Lesshaft triangle) or inferior lumbar triangle (Petit triangle).

Lumbar incision for open renal surgery (lumbotomy) gives great kidney access, but comes with high postoperative complications rates including muscular weakness, chronic incisional pain and lumbar hernia. The prevalence of lumbar hernias after lumbotomy is approximately 20 to 30% [2,3].

Traditionally, open lumbar hernia repair on these situations have to be performed with larger incisions increasing patient's morbidity. Laparoscopic techniques, which were developed and refined with ventral herniorraphies [4-6], were applied successfully for the lumbar hernias repair [7-9], and became an emerging attractive treatment for these uncommon situations.

Five years ago we reported our personal experience in laparoscopic lumbar hernia repair, in which we used polypropylene (Marlex) mesh in all cases [10]. After 2006 we have started to utilize Gore-Tex mesh. The need for abdominal wall reinforcement by synthetic materials

**\*Corresponding author:** Marcos Tobias-Machado, Department of Urology, ABC Medical School, São Paulo, Brazil, E-mail: [tobias-machado@uol.com.br](mailto:tobias-machado@uol.com.br)

**Received:** July 15, 2017; **Accepted:** September 26, 2017;  
**Published online:** September 28, 2017

**Citation:** Tobias-Machado M (2017) Laparoscopic Treatment of Incisional Lumbar Hernia: Long Term Results Comparing Polypropylene Xptfe Mesh Repair. Adv Laparoscopy 1(1):40-43

implantation during abdominal incisional hernia repair is well established in the literature [11-13], but the choice of prosthetic material may influence the rate of wound complications and long term results [14].

The aim of this paper is to evaluate the initial impact of two diferents mesh type in the laparoscopic treatment of incisional lumbar hernia, regarding intraoperative data and patient's outcomes.

## Material and Methods

From January 2002 to March 2016, we reviewed the prospective collected data of 25 patients with incisional lumbar hernias who had undergone previous lumbotomy. Patient's initial evaluation was obtained by physical examination, including hernia ring's margins delimitation which were confirmed and documented through computerized tomography. None of these patients had any absolute laparoscopic surgery contraindication and all of them were included on these study. Parameters analyzed were age, gender, Body Mass Index (BMI), cause of previous lumbar incision, surgical time, blood loss, analgesic requirements, complications, conversion rate, hospital stay and recovery time until returning to normal activities, and functional and aesthetic features. Included patients were followed up by our outpatient service on days 7, 30, 90, 180 and finally 1 year when a patient satisfaction subjective questionnaire was applied and a CT scan were performed in all patients. The first 10 patients underwent laparoscopic lumbar hernia repair utilizing Marlex mesh and the last 15 patients underwent surgery with Gore-Tex mesh. Our surgical technique was already published [10] and we utilized 3-port transperitoneal approach in all cases. The main difference utilizing Marlex or Gore-Tex mesh is due to the fact that the Gore-Tex does not need to be covered by peritoneum. During the hernia dissection, the peritoneum, close to the wall defect, does not need to be dissected extensively to cover the mesh when the Gore-Tex mesh was used. The other surgical steps were identical until the mesh fixation. This is the last step utilizing Gore-Tex mesh and for the Marlex mesh, the released peritoneum has to be fixed covering it.

Statistical comparison between the two groups was done by t test and Fisher exact test. The level of confidence was 0.05.

## Results

Demographics are summarized on **Table 1**. Mean age was 52 years (40-65), with BMI from 20-25 (11 cases) and 26-30 (14 cases). The wall defects ranged in size from 6 × 8 cm to 10 × 15 cm (mean 8 × 12 cm). Fourteen patients were female and 11 male, with 14 cases occurring on the left side and 11 cases on the right. About the surgeries that caused the previous lumbar incision, there were 12 cases of nephrectomy for kidney donation, 7 cases of nephrectomy due to renal tumor, 4 case of nephrectomy due to hydronephrosis and 2 cases of pyelolithotomy.

All procedures were successfully completed by laparoscopic access. During laparoscopic inspection it was possible to distinctively access the size of the hernia ring and anatomical structures involved in the wall defect in all patients. Both Marlex and Gore-Tex mesh were easily inserted into the cavity and fixed by titanium clamps to the ring margins through the 12 - mm port. Surgical time ranged from 80 to 180 minutes (mean 130) and from 60 to 110 minutes (mean 80) for Marlex group and Gore-Tex group respectively ( $p = 0.03$ ). There were no intraoperative complications and mean overall blood loss was 70 ml for both groups ( $p = 0.75$ ). Analgesia was obtained using only dipyrone on the first postoperative day in 14 cases, 8 from the Marlex group and 6 from the Gore-Tex Group ( $p = 0.20$ ). All other receive dipyrone and or non hormonal anti-inflammatory for 3 days. Hospital stay was similar in both Groups (30 h for the Marlex Group

**Table 1:** Demographic characteristics of the patients.

	Marlex*	Gore-Tex*	Total
Mean age (yr)	50 (40-59)	56 (52-65)	52 (40-65)
Gender (female/male)	6/4	8/7	14/11
Mean wall defect size (cm)	8 × 12	9 × 11	8 × 12
BMI (kg/m <sup>2</sup> )			
20 to 25	5	6	11
26 to 30	5	9	14
Surgical side (left/right)	5/5	9/6	14/11

\* $p$  value > 0.05 for all comparative demographics parameters.

**Table 2:** Operative and functional results-Marlex vs. Gore-Tex.

	Marlex group	Gore-Tex group	$p$
Mean surgical time (min)	130 (80-180)	80 (60-110)	0.03
Intraoperative complications	0	0	*
Mean blood loss (ml)	80	60	*
Major postoperative analgesia	0	0	*
Mean hospital stay (h)	30	24	*
Mean time to return to normal activities (weeks)	4 (2-8)	4 (2-6)	*
Postoperative complications	2	1	*
Hernia recurrence 1 year after	0	0	*

\* $p$  value > 0.05 (not significant).

and 24 hs for the Gore-Tex Group ( $p = 0.31$ ). Mean time to return to normal activities was 4 weeks after surgery in both groups ( $p = 1.0$ ) (Table 2).

We had 3 postoperative complications. One case repaired with Marlex mesh presented a cutaneous infectious complication that needed hospitalization for intravenous antibiotics, external drainage and conservative treatment. Another complication in Marlex group was a chronic lumbar pain that lasted until the 3<sup>rd</sup> postoperative month. This particular case we interpreted as neuropathic pain, required treatment with major analgesics, tricyclic anti-depressants and corticoids for symptom improvement. Probably, a staple used for fixating the mesh was applied to some nervous bundle at the posterior abdominal wall. A seroma was observed in one patient repaired with Gore-Tex with spontaneous resolution after 60 days.

We did not observe hernia recurrence in any patients on the follow-up. The control tomography performed 1 year after the surgery revealed good mesh positioning in all patients. The aesthetic and functional defect appearance reported by the patients was perfect in 23 cases when compared with the preoperative appearance. The overall success satisfaction rate was 92%. Only 2 patients (one of each group) who presented muscular atonia at the incision's anterior portion before surgery was partly satisfied with the aesthetic result.

## Discussion

Lumbar hernia is a rare condition, and can be associated with lumbar incision for renal surgery. In our country, classical lumbotomy is still largely used, and therefore lumbar hernias tend to be a problem regarding the risk of complications (25% risk of incarceration and 8% chance of strangulation) [7].

The complexity of repairing lumbar hernias arise in part from the difficulty of sewing onto the bony portions of the hernia boundaries and the general weakness of the surrounding tissues typical of these defects [4]. Over the years, several techniques have been described for surgical repair of posterolateral hernias, such as simple closure, imbrications of the fascia transversalis, plastic reconstruction with muscle flaps, or currently with a prothesis. All these techniques require a large incision to properly expose the debilitated area, extensive dissection of the musculoaponeurotic and bone layers, and multiple sutures to repair the defect [4]. With the laparoscopic approach the defect can be repaired at the deepest layer of the posterior abdominal wall. Moreno-Egea, et al., Arca, et al., Heniford, et al. and Bickel, et al. recommended the laparoscopic technique as the method of choice for lumbar hernia repair for reasons of simplicity, safety and quick recovery [4,7,8,15].

In 1857, Theodore Billroth remarked: "If we could artificially produce tissue of the density and toughness of fascia and tendon, the secret of the radical cure of the hernia would be discovered". From the initial use of silver mesh in the early 90s to more recent synthetic materials, the tension free repair with mesh finally offered reduced recurrence rates of 10 to 24% [16]. Unfortunately, wound complications such as infections, enterocutaneous fistulas, and chronic subcutaneous abscesses were significant using this approach [17]. Therefore, there is still a need for the search of an ideal type of prothesis. Since considering that polypropylene mesh is cheaper and followed by good results PTFE can be done without dissection of an adherent and thin peritoneum with significant gain of time.

We did not find on the literature publications regarding the best type of mesh for the laparoscopic lumbar hernia repair. However, there are several data about the correction of ventral hernia with different types of meshes. Eid, et al. used Polytetrafluoroethylene (PTFE, Gore-Tex®) mesh in 97% of the 79 patients with ventral hernia, with no evidence of complications, and 58.2% of the patients were discharged with less than 24 hours. The authors recommended the technique as standard care [16].

Numerous reports have been made about complications resulting from placement of mesh in contact with the viscera. Many of these described erosion or fistula formation occurred with the use of polypropylene mesh (Marlex®) in trauma cases in which extensive contamination was present, the mesh was in contact with the viscera by necessity, and no tissue cover the mesh externally. However, fistula formation after implantation of various biomaterials in the abdominal wall has also been observed in several non trauma cases [18].

Koehler, et al. showed no or minimal adhesions with the use of Dual Mesh (PTFE) in a study of 65 reoperations (for various indications) in patients who had previously undergone laparoscopic ventral incisional hernia repair. The authors observed no adhesions to titanium tacks developed, a finding indicating that even in patients with a possible tendency to adhesions, Dual Mesh serves to limit such formation. Therefore, this suggests that this type of mesh is effective in minimizing and often eliminating visceral adhesion formation after this repair [13].

In the present study, we observed a significant shorter surgical time with the use of Gore-Tex to correct laparoscopic lumbar hernia. The longer time with the Marlex mesh is probably due to the necessity of covering this type of mesh, although there were not previously descriptions in the literature for lumbar hernias. In some patients with cardiovascular and pulmonary comorbid-

ities a reduced surgical time can be advantageous to reduce postoperative clinical complication.

The results in both mesh types were similar, with a great satisfaction rate among the patients, and with only minor complications. It is remarkable to say that the costs of the Gore-Tex mesh are higher. PTFE mesh has a 4-8 folds costs over Marlex. Specially in Brazilian public health system hospitals PTFE mesh is not routinely available.

Recently we are investigating the application of laparoendoscopic transumbilical repair for lumbar hernia. Our initial impression is that due to the limitation movement of laparoscopic instruments, lesser dissection maneuver and utilizing PTFE mesh became easier to perform the repair (personal communication).

As long term success rate is similar, the choice of mesh for each case depends on the surgeon expectation for operative time and availability of surgical mesh.

## Conclusions

Laparoscopic approach with mesh repair is a minimally invasive, safe and effective long term treatment for lumbar hernia. Operative time to Gore-Tex® mesh was shorter, with similar final results when compared to Marlex®. Laparoscopic surgery must be considered a technique option of choice for this uncommon condition.

## References

1. Moreno-Egea A, Baena EG, Calle MC, et al. (2007) Controversies in the current management of lumbar hernias. *Arch Surg* 142: 82-88.
2. Hafner C, Wylie JJr, Brush BE (1963) Petit's lumbar hernia: Repair with Marlex mesh. *Arch Surg* 86: 180-186.
3. Soto Delgado M, Garcia Urena MA, Velasco Garcia M, et al. (2002) Lumbar eventration as complication of the lumbotomy in the flank: Review of our series. *Actas Urol Esp* 26: 345-350.
4. Arca MJ, Heniford BT, Pokorny R, et al. (1998) Laparoscopic repair of lumbar hernias. *J Am Coll Surg* 187: 147-152.
5. Saiz AA, Willis IH, Paul DK, et al. (1996) Laparoscopic ventral hernia repair: A community hospital experience. *Am Surg* 62: 336-338.
6. Chin AK, Dion YM (1995) The spiral tacker: A new technique for stabilizing prosthetic mesh in laparoscopic hernia repair. *Surg Rounds* 461-467.
7. Heniford BT, Iannitti DA, Gagner M (1997) Laparoscopic inferior and superior lumbar hernia repair. *Arch Surg* 132: 1141-1144.
8. Bickel A, Haj M, Eitan A (1997) Laparoscopic management of lumbar hernia. *Surg Endosc* 11: 1129-1130.
9. Burick AJ, Parascandola SA (1996) Laparoscopic repair of a traumatic lumbar hernia: A case report. *J Laparoendosc Surg* 6: 259-262.
10. Tobias-Machado M, Rincon FJ, Lasmar MT, et al. (2005) Laparoscopic surgery for treatment of incisional lumbar hernia. *Int Braz J Urol* 31: 309-314.
11. Hesselink VJ, Luijendijk RW, de Wilt JH, et al. (1993) An evaluation of risk factors in incisional hernia recurrence. *Surg Gynecol Obstet* 176: 228-234.
12. Luijendijk RW, Hop WC, van den Tol MP, et al. (2000) A comparison of suture repair with mesh repair for incisional hernia. *N Engl J Med* 343: 392-398.
13. Koehler RH, Begos D, Berger D, et al. (2003) Minimal Adhesions to ePTFE Mesh After Laparoscopic Ventral Incisional Hernia Repair: Reoperative Findings in 65 Cases. *JSLS* 7: 335-340.
14. Toy FK, Bailey RW, Carey S, et al. (1998) Prospective, multicenter study of laparoscopic ventral hernioplasty: Preliminary results. *Surg Endosc* 12: 955-959.
15. Moreno-Egea A, Torralba-Martinez JA, Morales G, et al. (2005) Open vs. laparoscopic repair of secondary lumbar hernias: A prospective nonrandomized study. *Surg Endosc* 19: 184-187.
16. Eid GM, Prince JM, Mattar SG, et al. (2003) Medium-term follow-up confirms the safety and durability of laparoscopic ventral hernia repair with PTFE. *Surgery* 134: 599-603.
17. Leber GE, Garb JL, Alexander AI, et al. (1998) Long-term complications associated with prosthetic repair of incisional hernias. *Arch Surg* 133: 378-382.
18. Karakousis CP, Volpe C, Tanski J, et al. (1995) Use of a mesh for musculoaponeurotic defects of the abdominal wall in cancer surgery and the risk of bowel fistulas. *J Am Coll Surg* 181: 11-16.