

Inguinodynia after Laparoscopic Inguinal Hernia Repair

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Abstract

Objectives: The objective of this literature review is to see if changing the site of the mesh from outside to inside has any effect on the occurrence of posthernia repair pain. And also to review different author's opinion about causes occurrence and management of post-mesh inguinal pain.

Materials and methods: Literature review conducted using Google search engine, Google books, HighWire press, using keywords like postinguinal hernia pain, complications of hernia surgery, laparoscopic mesh repair.

Results: Chronic pain after surgery has been recently a neglected topic. The extent of the problem first came to light in a survey of patients attending pain clinics in Scotland and the north of England. This survey showed that about 20% of patients attending chronic pain clinics implicated surgery as one of the causes of their chronic pain, and in about half of these; it was the sole cause.¹ Inguinal hernia repair is a common surgical procedure performed worldwide with an annual procedural rate of 2,800 per million people in the United States alone. In England and Wales, 70,322 primary inguinal herniorrhaphies were performed in National Health Service Hospitals between 1998 and 1999. Inguinal herniorrhaphy is often performed as a daycase procedure with minimum postoperative morbidity. After inguinal hernia repair, patients can return to work early and enjoy a good quality of life. Since modern surgical thinking concerning inguinal hernia repair was established by Bassini in 1884, various modifications have been developed to improve outcome. Despite the fact that recent meta-analyses have suggested that laparoscopic surgery is associated with less postoperative pain and more rapid return to normal activity, open mesh repair is still recommended by the National Institute for Clinical Excellence.

Keywords: Inguinodynia, Laparoscopic, Inguinal hernia, Complication of Inguinal hernia.

CAUSES

There are many causes for the persistent, postoperative hernia area pain including, but certainly not limited to:

- Nerve damage (directly at the time of surgery)
- Nerve entrapment in scar tissue, mesh or sutures
- Postoperative benign nerve tumors
- Scar tissue itself or tissue damage
- Misplaced mesh
- Contracted, scarified and hardened mesh plugs
- Infection usually noted early postoperatively
- Recurrent hernia.

Constriction or narrowing of the internal inguinal ring around the spermatic cord.

Periostitis of pubic bone due to the presence of permanent suture material inadvertently placed into this layer resulting in chronic inflammation and pain.

Pain from unrelated causes associated with neither the prior inguinal hernia nor its operative repair (i.e. nonhernia musculoskeletal, intra-abdominal, intrapelvic, neurologic, genitourinary, infectious or vascular origin etc.).

Pain after placement of mesh in the parietal compartment of proportional space presents special problem, the main trunk of genitofemoral nerve, the preperitoneal segment of

its genital branch and its femoral branch located in the parietal compartment without protection from direct contact to the mesh.²

Laparoscopy is no better than open surgery at reducing recurrence or chronic pain according to a meta-analysis by British researchers. With laparoscopy, however, patients do have less postoperative pain and return to work more quickly, and although operating times are longer, patients have fewer superficial wound infections. Operating time was significantly longer for laparoscopy (weighted mean difference: 0.68 min), but return-to-work time was shorter (weighted mean difference: 0.82 days).³

Laparoscopic inguinal hernia repair, which requires the use of mesh, became popular because of a claimed reduction of postoperative pain and early return to normal activity. Liem et al described fewer recurrences and more rapid recovery compared to conventional anterior repair. The EU Hernia Trialists Collaboration included 34 (quasi-) randomized trials in a systematic review. It was confirmed that laparoscopic repair of inguinal hernias results in less recurrences when compared with open non-mesh repair. No difference was found between laparoscopic repair and open mesh repair with regard to recurrences.

Severe chronic pain following hernia repair is usually due to ischemia or neuropathy. Ischemia induced in musculofascial tissues by a repair done under tension is the most common cause of undue postoperative pain. In this situation, the sutures slowly cut through the tissues relieving the pain but setting the stage for recurrence. The other major cause of ischemia-induced pain is tight closure of either the deep or superficial inguinal ring during repair. Most often, ischemia in the ring is partly due to edema following operative dissection, and resorption of edema postoperatively leads to gradual resolution of pain; rarely does testicular atrophy supervene.

Neuropathy is widely recognized as a cause of chronic postoperative pain. It can be induced by nerve trauma during dissection, neuroma formation after partial or complete transection, entrapment by sutures or by postoperative adhesions. The implantation of mesh, which induces scar formation through increased inflammation, also has been suggested as a cause of neuropathic pain.²

DISCUSSION

More than a decade ago, it was true that chronic disabling pain was rare after hernia repair. It is also true that the reported incidence of this problem has been increasing in recent years,³ although the reasons for this change are not entirely settled. It is important to know the true incidence of chronic, disabling pain after hernia repair, so that patients can make an informed choice of whether or not to undergo repair and can receive an acceptable informed consent. Generally, problems with an incidence of less than 1% are thought not to need specific mention in discussing with patients the potential complications of an operation.

The report from the Danish Hernia Data Base group⁴ suggests that in current practice the incidence of chronic pain, a year after groin hernia repair, may be approximately 29%. This number is unexpectedly high, and certainly will gain the attention of all surgeons who repair hernias. It is important to know if the incidence is truly so high, and if so, to learn what causes the pain. If the incidence truly exceeds one percent then pain will need to be specifically mentioned in preoperative discussions with patients.

The Danish report is based on two questionnaires mailed 1 year postoperatively to 1,443 patients having hernia repair during 2 months period in 1998. More than 80% of patients responded to each questionnaire. The first time around, patients were asked whether they had pain or not; 29% said they had pain and 11% indicated that their pain was disabling to some degree. The second questionnaire was sent to those reporting pain asking about specific pain characteristics;

58% of those experiencing pain indicated that their pain impaired specific activities. There was no correlation of postoperative pain with the type of hernia or the method used for repair.

These data need to be interpreted in terms of limitations of the study methodology. Self-reporting, especially of the severity of such a subjective matter as pain, is confounded by variable perceptions of pain between patients, varying definitions of impairment, and similar limitations. In essence, the severity data from this study are not completely reliable. And there was no evaluation by a physician, preferably a blinded one, of the patient's complaints. I am not trying to denigrate the study, for it reports important data and raises important questions. But it does not provide final answers.

This study suggests that something in the currently employed methods of groin hernia repair is associated with an increase in postoperative pain, and it provides a hypothesis for future investigations. These provocative results should stimulate additional effort and prospective clinical trials by the Danish Data Base group and others to elucidate the exact causes in current surgical practices of postoperative groin pain. Could it be that the major change in the technique of hernia repair that has evolved over the most recent two decades—the widespread use of implanted prosthetic mesh, whether needed or not—is a cause?⁵

The overall incidence of chronic pain after herniorrhaphy was 12% (18% in patients having open surgery [range 0-75.5%] and 6% in patients treated laparoscopically [range 1-16%]). The follow-up and method of pain assessment, along with the study design and definition of chronic pain varies to such a degree that these numbers should be interpreted cautiously. No final conclusion should be made regarding the exact incidence of chronic groin pain in relation to the type of surgery.

Single center trials of less than 300 patients generally reported lower rates of chronic pain compared with larger studies except for one study. None of the studies that used an objective pain measurement, for instance a VAS for pain assessment, found an incidence below 5%. A study of 400 patients found an incidence of moderate or severe pain of 2% after laparoscopy compared with 10% after open surgery, but the follow-up rate was only 61%. A comparative study between total extraperitoneal (TEP) and open mesh herniorrhaphy using a retrospective questionnaire in 560 patients showed that after a mean follow-up period of 21 months, 22.5% of laparoscopic patients had pain/discomfort compared with 38.3% of those treated by open mesh repair.⁶

There are reports about mesh repair of inguinal hernia and its effect on testicular vasculature, and hence effect on testicular size and on sexual function as fibrotic healing causes hardening and shrinking of the mesh that is in direct contact with spermatic cord. A report describes a beneficial effect on sexual function that improved postoperatively while another describes postoperative chronic inguinal pain with subsequent sexual dysfunction. Inguinal hernioplasty with mesh repair is associated with improvement in both quality of life and sexual function. Improvement of sexual function is attributed to improvement of quality of life. Also, inguinal hernia may be associated with increased vascular resistance that is reversed after surgery with increase of testicular perfusion.⁷

Various systems exist for prosthesis fixation in hernia repair. These techniques vary in terms of postoperative complications and pain. This study compares prosthesis fixation techniques employed in laparoscopic transabdominal preperitoneal (TAPP) hernioplasty using a visual analog scale (VAS) to quantify postoperative pain. We found differences in postoperative pain among different laparoscopic TAPP prosthesis fixation methods. The use of the biocompatible fibrin sealant 'Tissucol' seems to significantly reduce postoperative pain, complications, and resumption to work times compared with other systems.⁸

Recent literature on laparoscopic inguinal hernia repair (LIHR) has shown that laparoscopic hernioplasty is associated with reduced postoperative pain and wound infection, and an earlier return to normal daily activities.⁹ Inguinal hernia repair can result in significant complications. Among these is postherniorrhaphy neuralgia, a potentially disabling condition. It is important to determine whether the patient had groin pain prior to hernia repair and whether the preoperative pain was the same in character as the postoperative pain. In addition, it is appropriate to determine how long after hernia repair the patient's inguinodynia began and whether the patient can differentiate postoperative surgical pain from the pain of inguinodynia or not. Patients should be informed of the remote possibility of central and differentiated pain.

In order not to raise a red flag, we avoid such terms as "nerve entrapment" for compression of the nerve(s) caused by "perineural fibrosis," a naturally occurring condition after inguinal hernia repair. Similarly, it is important not to use the term "mesh inguinodynia," which implies chronic pain caused by the mesh itself. In a published series of 234 patients with postherniorrhaphy neuralgia in which the term "mesh inguinodynia" was used, seven i.e. only one-third of the patients had previous mesh repair; the remainder had

undergone repair with no mesh. This confusion in terms suggested that the term "mesh inguinodynia" was not supported by the data presented.

The recommended surgical treatment for chronic neuropathic pain after herniorrhaphy has been a two-stage operation that includes ilioinguinal and iliohypogastric neurectomies through an inguinal approach and genital nerve neurectomy through a flank approach. Equally effective is a one-stage procedure involving the resection of all 3 nerves from an anterior approach. Simultaneous resection of the ilioinguinal, iliohypogastric, and genital nerves is performed with implantation of their proximal ends and without mobilization of the spermatic cord.

Although inguinodynia is a potentially disabling condition, it remains an underrated complication of inguinal hernia repair. Surgeons are able to pay more attention to addressing pain because of the reduced recurrence rate caused by advances in hernia surgery.

The pain complex syndrome of postherniorrhaphy neuropathic inguinodynia includes pain (neuralgia), burning sensation (paresthesia), hypoesthesia, and hyperesthesia, with radiation of the pain to the skin of the corresponding hemiscrotum, labium majus, and Scarp's triangle. Symptoms are frequently triggered or aggravated by walking, stooping, or hyperextension of the hip, and can be decreased by recumbency and flexion of the thigh. These aspects of the pain syndrome suggest that traction of the involved nerve plays a major role in the postherniorrhaphy pain syndrome, an issue that must be addressed in the surgical treatment of neuropathic inguinodynia.

The neuropathic pain complex can also be reproduced by tapping the skin, medial to the anterosuperior spine of the iliac bone or over an area of localized tenderness (Tinel's test). It is extremely difficult, if not impossible, to pinpoint the involved nerve for several reasons. First, peripheral communication between the ilioinguinal, iliohypogastric, and genital branch of the genital femoral nerve is very common and results in an overlap of their sensory innervation. Second, the innervation fields of the 3 nerves overlap. Third, at the spinal level both ilioinguinal and iliohypogastric nerves derive from the 12th thoracic and first lumbar nerve, and both the genital and ilioinguinal nerves receive communication from the first lumbar nerve. Fourth, more than one involved nerve can cause postherniorrhaphy pain syndrome.

TREATMENT

Peripheral nerve block or differential paravertebral root block, although helpful for differentiating neuropathic from nonneuropathic pain, is often inconclusive in the differential

diagnosis of the involved nerve. Magnetic resonance neurography was helpful in few cases of this series pain related to neuropraxia, which may last for upto 6 months postoperatively and is usually self-limiting and does not require surgical intervention. Surgery is required, however, for per neural fibrosis; nerve entrapment by suture, staple, or prosthetic device; and neuroma formation as a result of axonotmesis, neurotmesis, or complete nerve transection.

Central and peripheral communication, and frequent multiple nerve involvement can make it extremely difficult, if not impossible, to discern which nerve is involved. Therefore, surgical treatment of post herniorrhaphy neuralgia should not be limited to a grossly involved nerve, but should address all 3 nerves. Furthermore, the triggering or aggravation of the neuropathic pain complex by walking or hyperextension of the hip and its alleviation by recumbency and flexion of the thigh suggests that traction of the involved nerve due to its adherence to the aponeurotic tissue of the groin plays a major role in postherniorrhaphy pain syndrome.

The surgical treatment of postherniorrhaphy neuralgia should include the insertion of the proximal cut ends under the internal oblique muscle fibers to avoid recurrent neuralgia triggered by adherence of the cut ends of the resected nerves to the aponeurotic elements of the groin. Surgical treatment for periosteal reaction or osteitis pubis consists of removing suture materials, staples, bulky suture knots, and bulk-forming or wadded mesh material from the inguinal region. Injection of 80 mg of methylprednisolone acetate under direct vision during the operative procedure may also be helpful.

Surgical treatment of neuropathic pain consists of resection of the involved nerves. Neurolysis is not recommended because it does not address neuromas or inevitable secondary scarification. Similarly, simple division of the nerves without complete resection is not recommended.

The recommended procedure is neurectomy. In this procedure, as suggested by Starling et al, the entire length of the nerves should be resected as proximally and distally as possible to include the involved segment and account for the numerous neural communications that inevitably exist among the 3 nerves. The transected nerve ends should be ligated to prevent neuroma formation. Any staple, suture, or prosthetic material along the course of the nerve should be included with the resected portion of the nerve. Complete removal of mesh is not necessary. We found, as other

investigators had, that previous mesh repair did not predispose patients to neuropathic pain.

In addition, we suggest the following measures:

Resecting the genital nerve from the same anterior approach to avoid a second-stage operation through the flank and the possibility of an associated lumbar incisional hernia.

Implanting the ligated proximal ends of the ilioinguinal and iliohypogastric nerves within the fibers of the internal oblique muscle, and allowing proximal cut ends of the genital nerve to retract into the internal ring. This step prevents the cut ends of the nerves from adhering (via scarification) to the inguinal ligament and/or external oblique aponeurosis, which subjects the nerve to traction on walking or moving the hip joint and once again sets the stage for postoperative neuralgia.

Resecting and submitting any tissue fibers resembling a nerve as well as grossly evident nerve trunks for histologic verification to ensure that the resected specimens are neural tissues. With exploration and experience, intraoperative frozen section may not be necessary, although it can be helpful.

CONCLUSION

Still there is no enough data to support superiority of laparoscopic mesh repair over conventional open mesh repair regarding postinguinal hernia surgery pain. But it is superior regarding wound infection and early return to work.

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