

POST-OPERATIVE INGUINODYNIA FROM HERNIA SURGERY

Inguinodynia as a hernia post-operative chronic pain syndrome may occur due to an assortment of causes including mesh shrinkage, inflammation, scarification, as well as surgical technique.

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As an expert in hernia surgery and a referral center for difficult hernia patients, one of the most challenging problems that I have encountered with increasing frequency is post-operative inguinodynia from hernia surgery. This term refers to persistent groin pain after hernia repair. A host of possible causes for the pain have been implicated. Men are primarily affected by this syndrome but women have also been known to be plagued by inguinodynia. In this article, I will present an overview of this problem and attempt to give insight on this difficult and costly syndrome which has become increasingly prevalent in the workers' compensation arena, as well as in the private sector.

Background

This relatively newly-recognized syndrome has become a modern day plague on the claims examiner, the treating surgeon, and the patient. Diagnosis, etiology, treatment, and generally interacting with these patients are challenging for all those involved. An integral part of this problem is knowing if the patient is a reliable historian, psychologically sound, and whether the patient is merely posturing for secondary gain. Personally, I have seen inguinodynia appear months or years after hernia surgery, and only after the injured worker retained legal representation—usually due to an unrelated issue such as back pain. Interestingly, the most current surgical literature reveals that over 90% of inguinodynia occurs in workers' compensation patients. Of those 10% remaining patients with inguinodynia, only a fraction of them is without

litigious intent. This has prompted some authors to believe that inguinodynia is synonymous with the patient posturing for secondary gain and using symptom amplification (see Table 1). This situation has been in question until recently.

Neuropathy of Inguinodynia

Inguinodynia can occur in the immediate post-op period or can occur months after hernia surgery. The most difficult scenario presents when the patient experiences a window of three to six months after surgery without complaints then returns complaining of pain on the operated side. Then there are those patients with obvious pathology who present with unrelenting pain without reduction in intensity of the pain from the date of surgery. 15 to 30% of hernia patients will develop a post-op neuropathy or a nerve irritation symptom complex. Symptoms of neuropathy are usually described as burning with irradiation to the upper inner thigh, lower abdomen, testicle, scrotum, base of the penis, or labium. A list of potential causes of inguinodynia is presented in Table 2.

Originally, the supposed culprit causing the neuropathy was believed to be the mesh per se. This gave the senior surgeons probable cause to condemn the use of mesh and continue the archaic Bassini, McVay, or other non-mesh repairs. Subsequent research, however, showed that the mesh did not cause the neuropathy but, instead, was traced to the surgeon's surgical technique. With the use of mesh, more detailed anatomic dissection and attention to sensory nerve anatomy was required. Surgeons were

actually incorporating the sensory nerve with the suture used to affix the mesh, thus causing the neuropathy. With exquisite attention to avoiding the sensory nerves, the incidence of neuropathy plummeted. Recognition of the precise anatomy of the ilioinguinal, iliohypogastric, genito-femoral, and lateral femoral cutaneous nerves is paramount.

Symptoms emanating from the neuropathy generally resolve spontaneously in

TABLE 1. Non-medical Reasons for Asserting Inguinodynia

1. Posturing for secondary gain
2. Legal representation
3. Loss of job
4. Loss of sexual prowess in the male
5. Loss of financial security or income

TABLE 2. Potential Causes of Inguinodynia

1. Breach of surgical technique
 - a. Poor mesh placement
 - b. Nerve entrapment
 - c. Osteitis pubis
 - d. Loss of domain
 - e. Compromise of spermatic cord
 - f. Inappropriate tack placement laparoscopically or suture placement with open technique
2. Neuropathy secondary to exaggerated scarification response
3. Plug repair with secondary concrete-like mass and possible neuropathy from resultant scarification
4. Idiosyncratic response to mesh implantation
5. Post-op infection or fistulization/sinus formation
6. Infected mesh-toxic shock syndrome
7. Gynecological causes
8. Inflammatory or irritable bowel disorder
9. Other causes to be determined

a few months only if the neuropathy is from inflammation. Oral anti-inflammatories, ice, or heat are helpful at times. More severely affected patients require injections with local anesthetics and corticosteroids to reduce or eradicate the neuropathy symptoms. A series of three injections, spaced one week apart, may be necessary to control the symptoms of burning or searing pain. A minority of neuropathy patients are a failure on medical therapy and therefore require surgical re-intervention. Re-operation may be necessary if there is a true mechanical restrictive component whereby the nerve(s) are irreversibly involved and treatment with alcohol ablation and radiofrequency ablation have been attempted and failed. Some pain treatment anesthesiologists have gone so far as to use an implantable dorsal column stimulator in attempts to control the pain.

Surgical Re-Intervention

The newest surgical studies and research support surgical intervention with removal of the three main sensory nerves of the groin. These nerves are the ilioinguinal, iliohypogastric, and genito-femoral nerves. Removing only one nerve and/or attempting a neurolysis (freeing the nerve from scar) has been fraught with failure to eradicate the painful symptoms. This treatment is incomplete and requires further expensive interventional treatment.

As a result, the optimum treatment regimen would be to perform a triple neurectomy and neuroplasties or implantation of the nerve ends into pristine muscle tissue or "virgin soft tissue." Implantation is done to prevent neuroma formation. Prior alternative nerve transposition did not yield optimum results because the transposed nerve was irreversibly damaged and more scar would form. This was a set-up for prolongation of the neuropathy symptoms and eventual triple neurectomy.

In my personal experience, surgical triple neurectomy has afforded 70% of the patients good to excellent pain relief; 20% of the patients experience no benefit nor significant change in their symptoms despite apparent successful technical re-intervention; and 10% may experience a worsening of the neuropathy symptoms. Of those 10% who reportedly were worse after the neurectomy, all were workers' compensation patients. In fact, of those

patients actually requiring triple neurectomy, 95% have been workers' compensation patients. Most, if not all, were represented by attorneys and all had other simultaneous aspects of their claims, most commonly "back pain."

The surgeon who has agreed to re-operate these neuropathy patients must be very familiar with this procedure technically, and the patient must be specifically informed of the possibility that surgical re-intervention may be a failure and not relieve the neuropathy symptoms. No guarantees of specific results should be made, inferred, nor promised. Only the facts should be presented. To further compound this scenario, the more chronic the pain syndrome and the longer the delay to treat actively with surgical re-intervention, the less likelihood of success. Pain lasting over three months is considered chronic and, as with any chronic pain syndrome, pain pathways become firmly established in the brain. Despite successful removal of the causative problems (i.e., scar around the nerves or exaggerated scar from mesh), the patient continues to perceive pain due to the cerebral pathways. By this time, all these individuals involved in the case are exasperated by the continuing pain complaints. This scenario is not dissimilar to phantom limb pain.

An important post-op sequel from the triple neurectomy is hypesthesia of the lower abdomen, thigh, scrotal sac, base of the penis, or labium. This can be very annoying at times but may also gradually improve with time. At no time are sensory pathways of reproductive/sexual sensation involved. The patient should be reassured that the nerves responsible for sexual function originate in the spine at levels S2 to S4. It is anatomically impossible to have erectile and or ejaculatory failure as a result of removing the ilioinguinal, iliohypogastric and genito-femoral nerves. Plaintiff attorneys may try to convince a jury to the contrary. This issue must also be delicately, yet directly, discussed pre-operatively.

Osteitis Pubis

Another technical problem causing inguinodynia is osteitis pubis. This occurs when a suture or surgical tack is placed too deeply into the periostum of the os pubis and, more specifically, the pubic tubercle. Inflammatory reaction results causing the patient to complain of pulling, aching, or throbbing in the pubic area. These

symptoms are exacerbated by twisting, bending, squatting, reaching overhead and stretching. Injections with local anesthetics and a corticosteroid (e.g., triamcinolon) maybe helpful. Usually this treatment is insufficient to alleviate the pain. Partial temporary improvement is usually followed by a complete recurrence of the symptoms. The diagnosis is made by direct manual pressure on the os pubis recreating the pain sensation. At times it is imperative to ask the patient to do provocative movements such as squatting and twisting at the waist to cause the pain sensation at the pubic tubercle. Ultimately, the definitive treatment to eradicate the pain on a permanent basis is to surgically remove the offending suture or tack. Confirmation of the diagnosis requires injection of local anesthesia into the exact area of point tenderness. An immediate disappearance of pain confirms the diagnosis.

Mesh Plug

Most expert hernia surgeons use mesh to reinforce the operative repair. The mesh per se has been implicated as a possible source of inguinodynia. Although there are no documented cases of true rejection of mesh, some patients develop an exaggerated fibrosis or scar response to the presence of the mesh. The mesh as the source of the post-operative pain is a diagnosis that is difficult to prove. However, the mesh "plug" has been implicated as a source of pain more often than the onlay patch. Very eloquent studies have demonstrated the fact that the mesh plug forms a concrete-like mass exacerbating the scarification reaction. The mesh shrinks excessively, scars and retracts away from the host tissue. This fuels the exaggerated scarification response and subsequent sensory nerve involvement. At times, the triple neurectomy is done in addition to removal of the mesh "plug." I have personally witnessed mesh plugs which have eroded into the iliac and femoral veins. In this case, mesh removal and venorrhaphy were necessary to appropriately treat the patient. Note that subsequent deep venous thrombophlebitis is not uncommon after venorrhaphy.

Mesh Onlay Patch

I have developed a theory that mesh onlay patches do not cause pain, but rather the operative procedure in affixing the mesh is the culprit. In my experience of having

re-operated outside referral cases, I found that the iliohypogastric nerve was inadvertently incorporated into the suture line placed in the conjoined area. This was the true reason for the pain. A little known fact is that the iliohypogastric nerve has an intra-muscular portion that may be inadvertently sutured at the time of the repair.

I have had the opportunity to re-operate outside cases of hernia repairs where I discovered suture material incorporating or encircling the ilioinguinal, iliohypogastric, and genito-femoral nerves. In these cases removal of the mesh is not imperative but a triple neurectomy, however, is required. Neurolysis and nerve transposition, advocated by some authors in the past, has proven to be uniformly unsuccessful in alleviating the pain. The neurectomy must be done to alleviate the patient's pain.

Mesh Removal

Removal of the mesh is a formidable task for the operating surgeon, even in the most experienced hands. At times, despite the mesh removal, the patient continues to complain of pain. I firmly believe that a neurectomy must be done in this instance to assure optimum success and afford the patient lasting symptomatic relief.

After the physical removal of the mesh, another iatrogenic hernia is created that must be repaired using an alternative technique. The other option is to repair the iatrogenic hernia at a separate operative setting at a later date. This can lead to a "no win" situation for the surgeon and the patient. Financially, this scenario becomes prohibitively expensive. Rather than going through a period of temporary partial disability, the patient may develop permanent disability. As a result, repair of the iatrogenic hernia is best done at the same time as the original mesh removal.

Referred Pain to the Groin

On occasion, groin pain does not originate in the groin per se. Low back injuries, degenerative changes in the spine, a herniated lumbar disc, and other low back-related disorders can cause referred pain to the groin. The pain usually follows a dermatome distribution. A detailed history aimed at possible back causes for groin pain may uncover the origin of the pain in the spine and surrounding supporting structures.

Other Causes of Groin Pain

Groin pain may also be evoked by the following:

- "the pyramidalis syndrome" that usually presents in younger, healthy, athletic males;
- urological disorders including disease of the prostate, testicles, epididymis, kidney, bladder, and ureter;
- kidney stones, ureterolithiasis, and side effects of drugs used for erectile dysfunction;
- pelvic or gynecological causes in the female;
- inflammatory bowel disease, colonic disorders and, most notably, irritable bowel syndrome.

Conclusion

Mesh shrinkage has been reported as a cause of inguinodynia (polypropylene mesh shrinkage of 46% has been measured and published). It has also been demonstrated that post-operative inflammation can be caused by the prosthetic material. As an alternative, polyester meshes may result in better tissue integration and less fibrosis. Reabsorbable fixation devices, bioglues, and soft material may be other ways to reduce inguinodynia. In addition, attention to surgical details intra-operatively will decrease the risk of post-operative chronic pain syndromes.

The frustration and cost of diagnosis and treatment of inguinodynia can be overwhelming, especially in the situation whereby the patient has been seen by a myriad of healthcare professionals. Despite a "million dollar work-up" the patient may still complain of the same pain as they had from the inception. The reason why this phenomenon occurs mostly in the workers' compensation patient population is yet to be determined. Those physicians treating hernias must inform and reassure patients that pain after hernia surgery may persist in different forms and occur at different times up to one year after surgery. Continued reassurance of the patient, along with kindness and the expression of concern, sometimes are the best treatment modalities.

Research is actively under way at several reputable institutions, both here and abroad, to better understand and treat inguinodynia. As an expert in the field, I have had extensive experience with these patients and their treating physicians. I

welcome any inquiries, comments, and insight from anyone involved in the care and treatment of inguinodynia patients. This article merely touches on some of the more common causes of inguinodynia. An all-inclusive cataloguing of etiologies of inguinodynia has yet to be published. ■

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