



Inguinodynia - Myth or Truth

KEYWORDS

Axonotmesis , funiculodynia, Inguinodynia, neuropraxia, neurotmesis, orchalgia.

* Dr Ramalingam

Professor, Department of General Surgery, Kamineni Institute of Medical Sciences, Narketpally, Nalgonda District, Telangana state, India-508 254. * corresponding author

Jayanth L

Post graduate, Department of General surgery, Kamineni Institute of Medical Sciences, Narketpally, Nalgonda, Telangana State, India.

Karthik T

Post graduate, Department of General surgery, Kamineni Institute of Medical Sciences, Narketpally, Nalgonda, Telangana State, India.

ABSTRACT

Inguinodynia is a recognized complication after laparoscopy or open inguinal hernia surgery that may interfere with patients daily activities apart from livelihood, though recurrence rate is reduced significantly after usage of mesh and tension free repairs.

Introduction

Inguinodynia or chronic groin pain is one of the recognized complications of the commonly performed inguinal hernia surgery. Recurrence rate of inguinal hernia repair is reduced by use of mesh and tension free technique but, chronic post operative pain which is of concern to the hernia surgeon needs proper understanding the etiology, anatomy, diagnosis and treatment.

There is a perception among some surgeons in developing countries that there is no postoperative pain. This may not be true because of various reasons like no post-operative follow up, the perception that the pain is inevitable after surgery, non occurrence of pain in severe form and not knowing that there is an entity like inguinodynia.

Only when severe pain affects the quality of life, the patient consults the clinician.¹ On the contrary in developed countries patients are more concerned with mild pain and may exaggerate because of availability of compensation. Pain is a subjective sensation which cannot be proved scientifically.

Incidence of inguinodynia may vary from surgeon to surgeon depending on the procedure, expertise, duration, knowledge of anatomy, prophylactic steps taken, apart from the psyche of the patient.^{2,4} As the treatment is not simple and cure not satisfactory, prevention may be a better option.

Definition

Chronic postoperative groin pain has been defined as pain lasting for more than 30 days and interfering with the patients activities in daily life or work activities [IASP-International Association for the Study of Pain].⁵

The type of pain in inguinodynia is broadly divided as Nociceptive, Neuropathic and Visceral. According to various studies, incidence of inguinodynia was reported to be 6 to 9 %, 0 to 53%,⁶ 9 to 27.7% respectively. The incidence was found to be higher among those who have undergone open procedure (33%), as compared to laparoscopic procedure (20%). Inguinodynia due to mesh may be due to bulky mesh, idiosyncrasy, technical fault and allergy etc. To reduce this, mesh is not advocated for patients with her-

nia below 40 years without pain, those with recurrent hernia with mesh, and those with history of allergy. Also mesh is not advocated for those with history of *Staphylococcus aureas* infection and those subjects with Nyctus type 1, 2 repair (getting surgery done by an expert in Shouldice repair). Surgeon must tailor the procedure to the individual patient and not patient to the procedure. A template or blanket technique for repair of every patient with a hernia is to be condemned.⁷

Etiology

Somatic pain is due to damage to pubic tubercle and funiculodynia (spermatic cord - S 2,3,4).^{7,8} it may also be due to previous ligament/mesh injury, reaction of prosthetic material/mesh or new ligament, muscle injury caused by surgeon.

Neuropathic cause can be partial or complete transaction like neuropraxia, neurotomesis, axonotmesis, stretching, contusion, crushing, electrical damage, caught in the suture in open operation, tacks in laproscopic surgery, inflammation with granuloma (meshoma), fibrotic reaction and mesh encasement.⁹

Visceral pain may be due to venous congestion or encasement of cord.

During laproscopic repair ilioinguinal nerve is at risk as it is lateral to the internal ring, genitofemoral nerve is at risk as it is medial to the internal ring and iliohypogastric nerve may be damaged by tacks or staples along its entire length during mesh fixation.¹⁰⁻¹³ This can be avoided by using glue for mesh fixation.

Clinical features

Patient may present with paraesthesia, burning sensation, hypoesthesia, neuralgic pain, pricking sensation, pain radiation to hemiscrotum (orchalgia), upper leg, upper back with trigger points and episodic nature aggravated by walking, tenderness in pubic tubercle and funiculodynia (ejaculative pain because of vas engulfment).¹⁴

Diagnosis

Diagnosis of pain due to individual nerve damage like ilioinguinal nerve, iliohypogastric nerve, genitofemoral nerve

is difficult because of overlapping of these 3 nerves with peripheral communication between their twigs and common roots of origin.¹⁵ Nerve blocks, neurectomies, CT and MRI, MR neurography (measuring water content of nerves), electromyography, did not give any concrete conclusion.¹⁶ Variety of causes may complicate the diagnosis of inguinodynia which include patients reporting pain for compensation,¹⁷ phantom limb pain (pain pathway is already established), removal of mesh plug and doing verniorrhaphy (for mesh plug eroding into iliac and femoral veins), pyramidalis syndrome, urological and gynaecological causes of pain.

Neuroanatomy of nerves

The ilioinguinal nerve is located over the spermatic cord covered and protected from the mesh by the investing fascia of internal oblique muscle. The protective fascia should not be damaged by removing the nerve from its natural bed. Dissecting the ilioinguinal nerve from the cord and placing it below the inguinal ligament, which was a teaching of the prior era, destroys the protective fascia of nerve and risks perineural scarring and direct contact of the nerve with the mesh.(Fig.1)



Fig.1: Arrow mark shows ilioinguinal nerve

Genital branch of genitofemoral nerve is located under the cord, covered and protected from direct contact with the mesh by the deep cremasteric fascia. Although small and difficult to see its location can be determined by the easily visible "blue line" of the external spermatic vein that is always adjacent to the nerve. To ensure the safety of the nerve, it must be kept with the cord while cord is separated from the inguinal floor under direct vision. Grasping the cord with the thumb and index finger and pulling it off the floor, is always a bad habit from the past and damages deep cremasteric fascia, which can lead to perineural scarring and direct contact with genital nerve with the implanted mesh (Fig.2).



Fig 2 : Arrow shows genital branch of genitofemoral nerve

The iliohypogastric nerve is located between external and internal oblique layers covered and protected from the mesh by the investing fascia of the internal oblique muscle. The key step to expose the iliohypogastric nerve is opening the anastomatic cleavage between the internal and external oblique layers high enough to expose the internal oblique aponeurosis. This step that takes only a few seconds, easily and automatically exposes the iliohypogastric nerve. The iliohypogastric nerve is easily visible over the internal oblique aponeurosis. Lower down the nerve has hidden segment that runs inferiorly and laterally within the internal oblique muscle. This segment of the iliohypogastric nerve is the most vulnerable neural structure of the inguinal area because it is not visible within operative field. Passing through the internal oblique muscle or conjoint tendon for its fixation to the inguinal ligament, flat mesh or plug has the potential risk of injuring the intramuscular segment of the nerve with the needle or entrapping it by the suture (Fig.3).



Fig. 3: Arrow mark shows iliohypogastric nerve Management

Nonsurgical treatment

It includes life style modification, use of analgesics, physical and psychological therapies and nerve blocks which have limited role in the management of inguinodynia.

Surgical treatment

When conservative management fails or inguinodynia recurs, then surgical treatment is indicated. Triple neurectomy and ligation of the nerve endings implanting into muscle is the universally accepted gold standard procedure.^{18,19}

Various studies showing neurectomy by open, laparoscopic or a combination of both open and laparoscopic approach:

According to Starling et al, out of 57 patients 32 patients underwent IIN neurectomy & 25 patients underwent GFN neurectomy. Neuralgia persists in 12.5%(4) patients who underwent IIN neurectomy & 28%(7) patients who underwent GFN neurectomy.

Heise et al had done individual neurectomies (IIN, IHN, GFN) in 20 patients. Out of which 40% (8) patients had persistent neuralgia & 2 patients developed complications, one for hematoma & another for testicular atrophy.⁵

Out of 30 patients with Inguinodynia Deysine et al (2002-USA) had done IIN neurectomy without excision of mesh in 22 patients. Remaining 8 patients were conservatively treated. Recurrent neuralgia persisted in 22 patients (100%) who underwent IIN neurectomies.²¹

Among 33 patients with Inguinodynia, Kim et al (2005-

USA) had done IIN & IHN neurectomy in 16 patients. 10% patients had recurrent neuralgia & 90% have successful neurectomy.²²

Amid et al (2004) has done triple neurectomies in 225 cases along with implantation of proximal nerve ending into internal oblique. Success rate was 100% with only 15% patients having transient neuralgia.¹²

Conclusion:

Among various studies by different authors Triple neurectomy & implantation of proximal nerve ending into internal oblique done by Amidet et al appears to be goldstandard & most satisfying procedure with 100% success rate 15% have transient neuralgia. Prophylactic neurectomy is inferior to alternate careful identification and protection of nerves. At any time if a nerve is in the way of the repair or suspected to be injured its resection is universally recommended.

References

- Poobalan AS, Bruce J, King PM, Chambers WA, Krukowski ZH, Smith WC. Chronic pain and quality of life following open inguinal hernia repair. *Br J Surg.* 2001;88:1122-1126.
- Bay-Nielsen M, Perkins FM, Kehlet H. Pain and functional impairment 1 year after inguinal herniorrhaphy: a nationwide questionnaire study. *Ann Surg.* 2001;233:1-7.
- Staal E, Nienhuijs SW, Keemers-Gels ME, Rosman C, Strobbe LJ. The impact of pain on daily activities following open mesh inguinal hernia repair. *Hernia.* 2008;12:153-157.
- Kalliomiäki ML, Sandblom G, Gunnarsson U, Gordh T. Persistent pain after groin hernia surgery: a qualitative analysis of pain and its consequences for quality of life. *Acta Anaesthesiol Scand.* 2009;53:236-246.
- Heise CP, Starling JR. Mesh inguinalgia: a new clinical syndrome after inguinal herniorrhaphy? *J Am Coll Surg.* 1998; 187(5):514-518.
- Poobalan AS, Bruce J, King PM, Chambers WA, Krukowski ZH, Smith WC. Chronic pain and quality of life following open inguinal hernia repair. *Br J Surg.* 2001;88:1122-1126.
- Delikoukos S, Fafoulakis F, Christodoulidis G, Theodoropoulos T, Hatzitheofilou C. Re-operation due to severe late-onset persisting groin pain following anterior inguinal hernia repair with mesh. *Hernia.* 2008;12:593-595.
- Loos MJ, Roumen RM, Scheltinga MR. Classifying post-herniorrhaphy pain syndromes following elective inguinal hernia repair. *World J Surg.* 2007;31:1760-75.
- Cunningham J, Temple WJ, Mitchell P, Nixon JA, Preshaw RM, Hagen NA. Cooperative hernia study. Pain in the postrepair patient. *Ann Surg.* 1996;224:598-602.
- O'Dwyer PJ, Alani A, McConnachie A. Groin hernia repair: postherniorrhaphy pain. *World J Surg.* 2005;29:1062-1065.
- Davis CJ, Arregui ME. Laparoscopic repair for groin hernias. *Surg Clin North Am.* 2003;1141-1161.
- Amid PK. Commentary on: Pokorny H, Klingler A, Schmid T, Fortelny R, Hollinsky C, Kawji R, Steiner E, Pernthaler H, Függer R, Scheyer M (2008) Recurrence and complications after laparoscopic versus open inguinal hernia repair: results of prospective randomized multicenter trial. *Hernia.* 2008;12:441.
- Broin EO, Horner C, Mealy K, Kerin MJ, Gillen P, O'Brien M, Tanner WA. Meralgia paraesthetica following laparoscopic inguinal hernia repair. An anatomical analysis. *Surg Endosc.* 1995;9:76-78.
- Vuilleumier H, Hübner M, Demartines N. Neuropathy after herniorrhaphy: indication for surgical treatment and outcome. *World J Surg.* 2009;33:841-845.
- Rab M, Ebmer And J, Dellon AL. Anatomic variability of the ilioinguinal and genitofemoral nerve: implications for the treatment of groin pain. *Plast Reconstr Surg.* 2001;108:1618-1623.
- Filler A. Magnetic resonance neurography and diffusion tensor imaging: origins, history, and clinical impact of the first 50,000 cases with an assessment of efficacy and utility in a prospective 5000-patient study group. *Neurosurgery.* 2009;65:A29-A43.
- Alfieri S, Amid PK, Campanelli G, et al. International guidelines for prevention and management of post-operative chronic pain following inguinal hernia surgery. *Hernia.* 2011;15(3):239-249.
- Amid PK. Causes, prevention, and surgical treatment of postherniorrhaphy neuropathic inguinodynia: triple neurectomy with proximal end implantation. *Hernia.* 2004;8:343-349.
- Zacast AC, Magill ST, Anderson VC, Burchiel KJ. Long-term outcome following ilioinguinal neurectomy for chronic pain. *J Neurosurg.* 2010;112:784-789.
- Loos MJ, Verhagen T, Scheltinga MR, Roumen RM. A randomised controlled trial of injection therapy versus neurectomy for post-herniorrhaphy inguinal neuralgia: rationale and study design. *Hernia.* 2010;14:593-597.
- Deysine M, Deysine GR, Reed WP. Groin pain in the absence of hernia: a new syndrome. *Hernia.* 2002;6:64-67.
- Kim DH, Murovic JA, Tiel RL, Kline DG. Surgical management of 33 ilioinguinal and iliohypogastric neuralgias at Louisiana State University Health Science Center. *Neurosurgery.* 2005;56:1013