

Current Trends In The Diagnosis and Management of Post-Hernioplasty Chronic Groin Pain



Medical Science

KEYWORDS :

Dr. BHAUMIK CHUDASAMA

Resident doctor, Surgery Department, New Civil hospital, B.J. Medical College .

Dr. HITENDRA DESAI

Assistant Professor, Surgery Department, New civil hospital, B.J. Medical College.

ABSTRACT

Inguinodynia is one of the recognised complications of the commonly performed Lichtenstein mesh inguinal hernia repair. This has major impact on quality of life in a significant proportion of patients. Correct diagnosis of this problem is relatively difficult. A thorough history and clinical examination are essential. There are various diagnostic tools and treatment options available.

INTRODUCTION

Mesh inguinal hernia repair is one of the most common operations performed worldwide. The main purpose of this review is to look at the available evidence on diagnostic modalities for this chronic problem and to discuss the varied treatment options practised worldwide.

AETIOLOGY OF CHRONIC GROIN PAIN

The exact aetiology of this complex pain is unknown, although various theories have been proposed. Chronic groin pain has been classified empirically as neuropathic or non-neuropathic in origin. Neuropathic pain is considered to be due to damage to the inguinal nerves and usually develops in the sensory distribution of the injured nerve. Non-neuropathic pain is caused by either mesh-related fibrosis or post-operative fibrosis. The nerves involved are the Ilioinguinal nerve (IIN), the Iliohypogastric nerve (IHN), the genital branch of the Genito-Femoral nerve (GFN) and, rarely, the Lateral Femoral Cutaneous nerve (LFC). These nerves can be damaged either by partial or complete transection, stretching, contusion, crushing, electrical damage or by being caught in the suture used in open repair or the tacks used in laparoscopic repair. Secondary nerve damage can also occur as a result of adjacent inflammatory processes, such as granuloma, or because of excess fibrotic reaction or mesh encasement.

A combination of neuropathic, non-neuropathic, visceral and somatic pain is common, making clinical or radiological differentiation of the cause extremely difficult.

COMPLEX SYMPTOMS OF CHRONIC GROIN PAIN

The complex symptoms of post-herniorrhaphy chronic pain vary depending on the involvement of the nerve or nerves, amount of mesh-related fibrosis and damage to spermatic cord structures. The neuropathic symptoms include pain (neuralgia), burning sensation (paraesthesia), reduced sensation (hypoaesthesia) and increased sensation (hyperaesthesia). The pain may radiate to the hemi-scrotum, upper leg or back.

Neuropathic pain is usually characterised by the presence of a trigger point, its episodic nature and by being aggravated by walking or sitting. It is variously described as a stabbing, burning, shooting or pricking sensation. In contrast, non-neuropathic pain is a constant dull-ache over the entire groin area with no specific trigger point and is usually aggravated by strenuous exercise. Patients commonly describe it as a gnawing, tender, pulling or pounding sensation. A range of symptoms are related to sexual dysfunction due to vas engulment and inflammatory reaction caused by the mesh. Patients describe ejaculatory pain in the region of superficial ring or testicular or labial pain due to GFN irritation. Other com-

plaints included diminished quality of life, mood swings and depression.

DIAGNOSIS OF CHRONIC GROIN PAIN

The diagnosis of chronic groin pain begins with a comprehensive patient history and good knowledge of the anatomy of inguinal nerves. The history should include the commonly encountered risk factors for chronic groin pain which include age below median, female gender, postoperative complications, recurrent hernia repair, open repair techniques, history of preoperative pain and an interval of less than 3 years from surgery.

Due to the infrequent presentation of chronic groin pain, there is no clear consensus on the diagnosis of this iatrogenic problem. Neuropathic pain is usually distributed along the sensory innervations of the affected nerve(s) and can be reproduced by tapping the skin medial to the antero-superior iliac spine or over an area of local tenderness (Tinel's test). The clinical differentiation of ilioinguinal, iliohypogastric and genitofemoral neuralgia is difficult, frequently resulting in misdiagnosis and inappropriate treatment. This is because of the overlapping sensory innervations of these three nerves, peripheral communication between their nerve twigs and, most importantly, their common roots of origin. Along with these anatomical factors, fibrosis caused by the procedure and the mesh causes a degree of non-neuropathic pain in most cases, thereby making it difficult to delineate the neuropathic cause clinically.

If pain persisted after IIN block, L1-L2 plexus block was carried out and, if this relieved pain, GFN neurectomy was then performed. If pain was partially relieved by both blocks, groin exploration of both nerves was then carried out.

However, if a mesh is present, the sensitivity of the test is poor due to lack of spread of anaesthetic agent because of mesh-related fibrosis. Though peripheral nerve blocks or paravertebral blocks have been tried, they lack the ability to differentiate the involved nerve and are only helpful temporarily as a means of relieving pain.

CT or MRI scans are helpful in identifying non-neuropathic causes of chronic groin pain by identifying mesh-related pathologies, recurrent hernias and occasionally neuromas.

TREATMENT OPTIONS FOR CHRONIC GROIN PAIN

The treatment of chronic groin pain can be a difficult ordeal for both the patient and the clinician. Pain related to neuropraxia (intact axon and myelin sheath), is usually temporary and may resolve itself in around 6 mo post-herniorrhaphy. As time progresses, chronic groin pain disappears without treat-

ment in 30% of the patients, remains mild in 45% and in 25% of them it persists as severe pain affecting their everyday life.

NON-SURGICAL TREATMENT

Lifestyle modification

Chronic groin pain has been shown to be aggravated by walking, stooping or hyper-extension of the hip and relieved by recumbent position and flexion of the hip and thigh. Hence, some clinicians have advised lifestyle changes, advocating sedentary lifestyle or sedentary occupations to negate the neuropathic pain caused by movement. This leads to poor quality of life and loss of productivity. It is not now recommended because of the availability of better medical and surgical modalities.

Analgesics

Many clinicians use pharmacologic agents to manage chronic groin pain. These include non-steroidal anti-inflammatory drugs (NSAIDs), opioids, muscle relaxants, antiepileptics and antidepressants. However, these drugs may not prove helpful in relieving all types of chronic groin pain. The anti-depressants and antiepileptics are helpful in neuropathic pain whereas opioids or NSAIDs are usually minimally effective or ineffective for neuropathies. In most studies, NSAIDs were used as the first line analgesic treatment. The efficacy of these treatment regimens has not been proven and majority of patients suffer recurrence with worse pain due to development of resistance to analgesics.

Physical and psychological therapies

Physical therapies including massage, physiotherapy and acupuncture have been tried. These physical techniques may reduce pain temporarily but few, if any, can prevent the recurrence of pain.

Nerve blocks

Nerve blocks reversibly interfere with neuronal transmission, leading to temporary pain relief. This can, therefore, be both diagnostic and therapeutic. The ideal nerve block would specifically anaesthetise the nerve proximal to the injury but this is technically challenging. Various chemical agents used for blockade are shorter- or longer- acting local anaesthetics, steroids and glycerol as well as neurolytic solutions such as alcohol or phenol. Commonly, these agents prevent neuronal transmission through nerve fibres either by blocking membrane ion channels or by denaturation of axon proteins. They can also be used with non-pharmacologic techniques like cryoanalgesia and transcutaneous electrical nerve stimulation, depending upon the response to the anaesthetic agents. All these therapeutic modalities have their own risks, therefore a positive diagnostic block should guide the further use of therapeutic blocks.

Previously, blind injection of local anaesthetics was practiced, based on knowledge of the anatomy of the nerves. Recently Ultrasound guided blocks have been shown to be highly accurate and selective for blockade of either the IIN or the IHN, thereby increasing success rates.

Alcohol or phenol injection has been tried for reducing chronic inflammation caused by mesh or post-operative fibrosis. Neuro-destructive procedures, such as cryo-ablation which destroy the nerve fibres by coagulation at very low temperatures (-40°C), have been shown to give some temporary pain relief. Following cryo treatment pain recurred due to axonal regeneration. Radiofrequency pulses, working by thermo-coagulating nerves at very high temperatures, have been shown to cause temporary pain relief in ilioinguinal neuralgia. Again, definite evidence for their effectiveness is lacking.

SURGICAL TREATMENT

The surgical treatment of chronic groin pain was first described by Stulz et al in 1982. They performed IIN neurectomy on 5 patients with chronic groin pain following inguinal hernia repair, achieving a 100% success rate.

Principles of surgical treatment

Removal of the foreign body (mesh) alone has not been shown to relieve chronic groin pain. It is thought that it is due to chronic inflammation around the nerves from the mesh-induced reaction and the consequent degenerative nerve damage. Traditionally, surgical treatment of chronic groin pain includes groin exploration, mesh removal and neurectomy. Open chemical neurolysis has been tried, but does not resolve the problem of neuromas and secondary scarification. Freeing the nerve alone (physical neurolysis) has been tried but with high failure rates. Similarly simple division of the nerves without resection is not recommended. The entire length of the nerves should be excised, in order to involve all the neural connections between the nerves. Neurectomy with or without mesh excision is usually the preferred surgical treatment but there are no current consensus on which surgical approach should be chosen and which nerve should be excised. They concluded that concurrent neurectomy affords better results than mesh removal alone. Recently radio-frequency ablation of inguinal nerves have used with the aim for ablating the painful impulses transmitted by injured nerves.

The IIN can be identified lateral to the internal ring and then traced towards the external ring and resected as distally as possible. The IHN can be identified by the separation of the external oblique aponeurosis from the underlying internal oblique muscle as proximally as possible. With the IHN, dissection should include the intramuscular section, in order to look for nerve entrapped by sutures, mesh plugs or tacks. The GFN is usually identified through a retro-peritoneal (flank) approach. In a very rare case of LFC nerve involvement, decompression was performed by releasing the inguinal ligament on the anterior superior iliac spine and the lateral fibres of internal oblique aponeurosis.

Resected tissue from neurectomy should be sent for histology to confirm the removal of the involved nerve. Most importantly, there should be an informed decision about post-neurectomy numbness in the area of corresponding nerve innervation.

Criteria for surgical treatment

Surgical treatment is required if refractory pain persists after treatment with oral analgesics and/or local nerve(s) blockades. Nerve block must have resulted in a complete or substantial decrease in pain before neurectomy can be recommended. There are no defined limits on how often nerve blocks can be carried out and the practice has varied among surgeons worldwide. Failure or recurrence of pain following at least two attempted nerve blocks is the criterion for choosing surgery followed in most units worldwide.

Currently there is no consensus on the type of assessment tool for patients needing neurectomy and, as a result, there is no definitive protocol available for selecting patients for surgical exploration.

Timing of surgical intervention

Differences in the assessment of chronic groin pain, and variations in diagnostic practice and in the length of trial period with nerve blocks, have meant that the timing of surgical intervention has been widely varied. The timing of surgical intervention should ideally be at least 6 mo after herniorrhaphy to give adequate time for any neuropraxia to settle and time to try medical management.

Which nerve should be excised?

There was no clear explanation in most studies of why only one or two nerve were resected, rather than all three. Neurectomy should ideally resect the entire length of the nerve as far proximally as possible, to leave a smoothly cut end. There is still no consensus on whether only the affected or the entrapped nerve should be removed, or whether three nerves should be removed on the basis that remaining nerve branches may still transfer pain stimuli. Resection of the three nerves, IIN, IHN and GFN, has been shown to permanently relieve chronic groin pain at the expense of inguinal numbness.

Ilioinguinalneurectomy alone has also been shown to be an effective treatment for relieving chronic groin pain in several studies.

Dealing with neurectomized nerve ends

The transected nerve can be ligated, cauterised or buried within the muscle fibres. Majority of surgeons usually tie the nerve end with absorbable suture and tuck it under the internal oblique muscle.

Mesh excision

Currently there are no long-term results available from large studies on the safety of surgical mesh removal with or without neurectomy.

Pubic periosteal reaction or osteitis

If there is pubic periosteal reaction or osteitis, then possible causative agents such as suture materials, staples or rolled up meshes should be removed. Steroid injection can be useful when used intra-operatively or post-operatively if pain persists.

CONCLUSION

Chronic groin pain is not uncommon. It is particularly common in patients with pre-operative pain due to hernia and in patients who are of younger age. Diagnosing chronic groin pain is difficult and needs a high level of patient co-operation. Pain severity is subjective and will remain difficult to evaluate until better scoring systems are developed. In most studies pain is measured subjectively prior to initiation of medical or surgical treatment.

The role of surgery in patients with chronic groin pain is controversial and due to various surgical methodologies adopted by surgeons worldwide, data are highly confusing and difficult to interpret. Moreover, the current treatment regimens for chronic groin pain have limited success and their long-term benefits and quality of life effects are still uncertain. A randomised clinical trial comparing nerve blocks vs surgical neurectomy is currently being undertaken to obtain a definitive answer to this difficult problem.

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