

Chronic Testicular Pain: an overview

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Chronic testicular pain (CTP) is defined as an intermittent or constant, unilateral or bilateral pain of three or more months duration that is significantly bothersome to the patient and other causes such as an infection, testicular mass, varicocele, hydrocele, abscess or referred pain have been ruled out (1,2). It may occur accompanied by pain with sexual intercourse, physical activities and/or ejaculation (3).

CTP is the cause of about 2.5% to 5% of all urology consultations (4). One of the most common causes of this pathology is the history of previous vasectomy surgery and this entity is known as "post-vasectomy pain syndrome, PVPS" (5). The approximate incidence of PVPS is estimated at around 1-15 out of every 100 vasectomized (6–8). Other recognized causes of CTP are inguinal hernia surgery (9), abdominal surgery (10), diabetic neuropathy (11) and imipramine used as an antidepressant treatment (7). In patients with hyperuricemia, intracanalicular deposition of uric acid crystals with consequent disruption of the nerve endings has been suggested as the cause of this condition (12). Some patients relate the onset of their chronic testicular pain to some kind of injury. This could be explained by the phenomenon of neural plasticity. In neural plasticity, injury can cause changes at all levels of the nervous system, so pain messages are amplified.

Chronic testicular pain can be considered as part of chronic pelvic pain syndrome and the etiology and pathophysiological mechanism is not fully understood. The importance of the

sympathetic nervous system and the role of a possible alteration of the adrenergic receptors of the vas deferens are discussed (7). In PVPS, a mechanical obstruction of the ejaculating ducts with congestion of the epididymis, a nervous entrapment, formation of granulomas or formation of perineural fibrous tissue are postulated as possible causes (13). Other authors affirm that the pain may be caused by the disruption of the neurovascular bundle, in particular, those that move along the vas deferens and contain sympathetic nerves derived from the pelvic plexus and the afferent nociceptive nerves. The alteration of these nerves can lead to dyssynergia of the vassal contractions or to scarring with the consequent neural compression that gives rise to pain (14).

For a proper diagnostic approach, a good anamnesis is necessary, recording the date the pain onset, concomitant diseases, previous surgeries and possible triggers, as well as the type of pain, location, intensity, irradiation and triggering or other aggravating factors.

Although there are potential causes of CTP, such as epididymis congestion, infection or varicocele, most of these can be ruled out with a complete medical history, physical examination and urinalysis. When these analysis are normal, the diagnosis is less clear and the neurogenic causes of pain must be considered (15). If there is no suspicion of infection, treatment with empirical antibiotic therapy is not indicated (16).

Scrotal ultrasonography is usually part of the patient's evaluation with scrotal pain. However, in the absence of significant clinical findings on physical examination and in the presence of a negative urinalysis, the real benefit of scrotal ultrasound is to reassure the patient concerned about cancer (17).

Currently, the treatment of CTP is largely empirical because of the absence of standardized protocols (2) and it occupies a considerable part of most urologists' time. Chronic testicular pain typically presents a poor response to usual analgesic drugs and as a first line of treatment, low doses of anxiolytics or tricyclic antidepressants (amitriptyline, dapoxetine and nortriptyline) can be used with good rates of pain reduction (18). Neuromodulating drugs such as gabapentin that provide significant pain reduction in up to 80% of patients may also be used (19) (*Figure 1*).

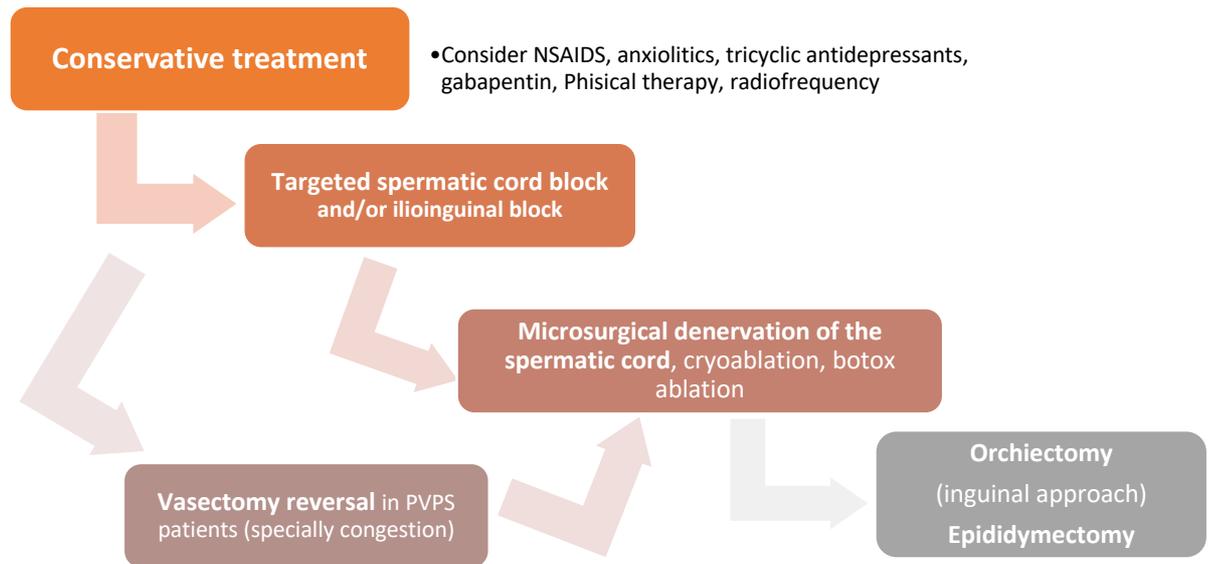


Figure 1: Chronic testicular pain management proposed algorithm

NSAIDS: non-steroidal anti-inflammatory drugs

Other conservative strategies include pelvic floor physical therapy, acupuncture, transcutaneous electrical nerve stimulation (TENS) (20,21), or neuromodulation (2). Cohen *et al.* (22) and Misra *et al.* (23) reported their results using pulsed radiofrequency of the scrotal nerves that appears to be a safe minimally invasive outpatient procedure and recommended further randomized, placebo-controlled studies to assess the procedure efficacy.

A specific block of the spermatic cord and/or ilioinguinal nerve with local anesthesia with or without steroids has also been suggested, as an intermediate maneuver between conservative and surgical treatment, in order to alter the route of afferent pain (5). This can be used as a diagnostic procedure, as it confirms a neural source of pain (16,24). The effects of these blocks are usually short-lived, and the pain usually returns. However, these blocks provide a significant predictive value in response to surgical treatments. A positive response is considered an independent predictor of response to microsurgical denervation of the spermatic cord (MDSC) (25).

The ilioinguinal nerve comes from the first lumbar branch and the 12th thoracic branch and is responsible for the innervation of the cremaster muscle and the sensitivity of the scrotal content and the base of the scrotum skin (*Figure 2*). A group of sympathetic fibres follow the path of

the spermatic cord and collect the scrotal content sensitivity. The ilioscrotal nerve enters the scrotum through the anterolateral border of the spermatic cord and it is accessible to the pharmacological anaesthetic block. When performing an ilioscrotal nerve block, there is no anaesthesia of the scrotal skin (26, 27).

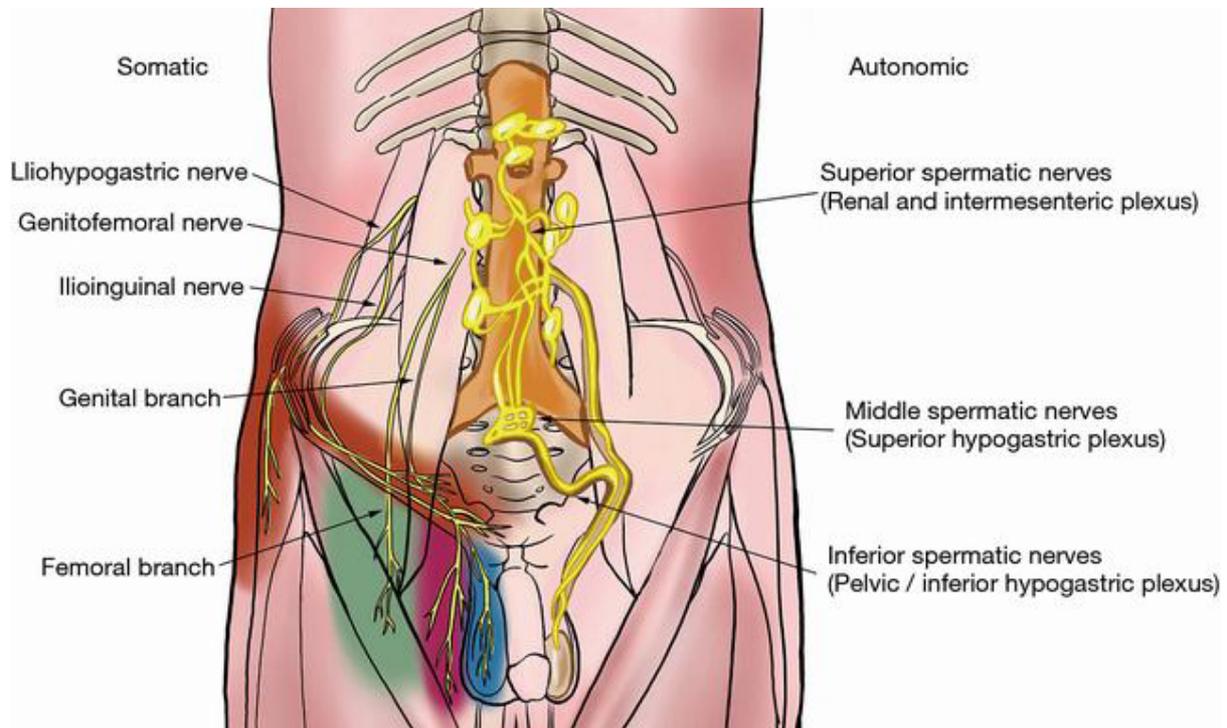


Figure 2: Somatic and autonomic nerves supplying the scrotal contents. Source <http://tau.amegroups.com/article/view/14984/15154>. © 2017 by Dhairya Patel, based on Reynolds LW, Sills SM. Orchialgia. In: Waldman SD. editor. Pain Management, Philadelphia: Elsevier, 2011.

The spermatic cord block is performed starting with palpation of the pubic tubercle and inserting the 22-gauge needle one centimetre from the tubercle and following the caudal and vertical direction towards the anterior face of the pubic bone. On its way, contacts the bone after it has passed through the spermatic cord. The liquid is injected along the withdrawal route to the skin after aspiration to avoid intravascular injection of local anesthesia (*Figure 3*).

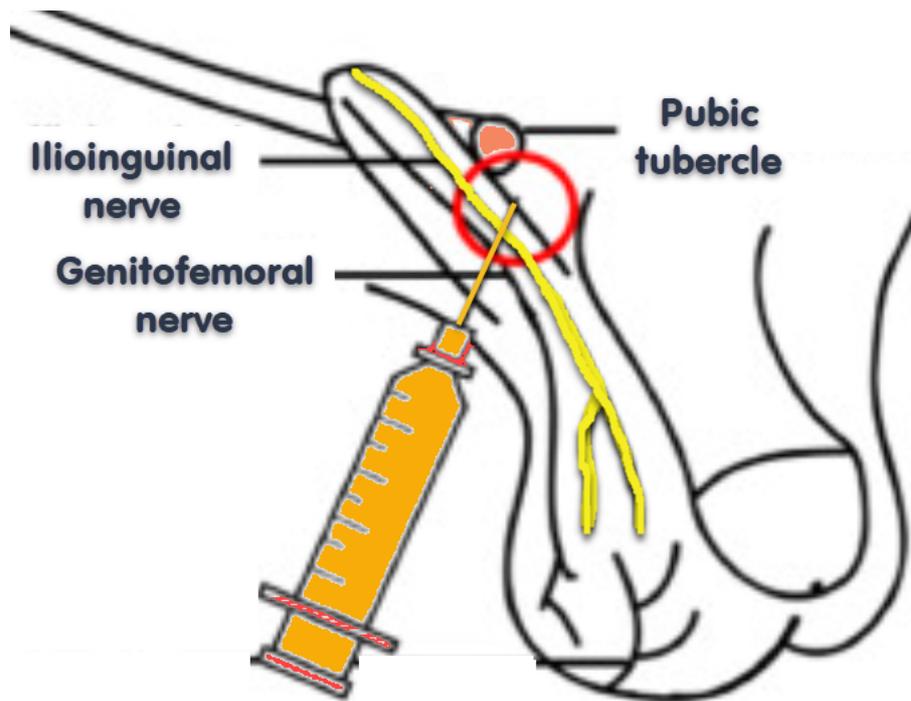


Figure 3: Spermatic cord block

Tan *et al.* use blockades with bupivacaine 0.75% when there is a failure of medical treatment, offering a series of 4-5 cycles repeated every 2 weeks if a symptomatic relief is produced. Surgical therapy is recommended when conservative treatment fails (28).

For patients with CTP who do not respond to conservative treatment, different surgical procedures have been described (29). Epididymectomy has a very variable success rate from 10% to 80% (6, 30), and it is recommended when there is refractory pain to conservative maneuvers, localized at that level, especially in those with structural abnormalities such as cysts observed on examination or ultrasound.

Recanalization by vasovasostomy or epididimovasostomy has also been described for the treatment of PVPS, also with variable results and improvement rates around 60-80% of cases (3, 15, 31, 32). As for the resection of granulomas, these appear with a very disparate frequency between 5-70% and occurs as a natural effect and not as a complication in vasectomy techniques. In case it produces chronic pain located at the site of the granuloma refractory to the previous measures or if the skin fistulizes (an uncommon fact) its resection is justified (28).

Finally, microdenervation of the spermatic cord (MDSC) is a well-studied option and

remains a valuable approach with high success rates and should be considered for CTP that is refractory to medical therapy. This treatment appears to show the highest success rate for patients who experience temporary relief from a spermatic cord block, and can significantly improve patients' quality of life and ability to return to daily activities (16, 28). *Figure 4*.

New minimally invasive procedures such as laparoscopic or robotic testicular denervation, have been emerging to support in the management of chronic refractory pain with a significant reduction in pain presenting low morbidity and mortality (6, 28, 33).

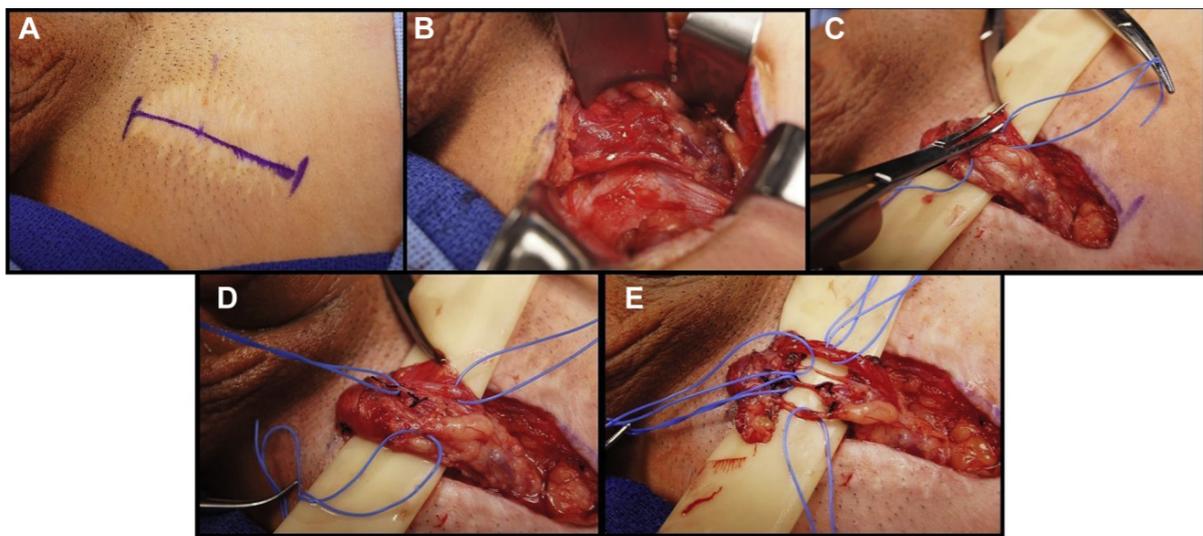


Figure 4: Micro-denervation of the spermatic cord. A: marking of the inguinal site. B: dissection to expose the spermatic cord. C: spermatic cord with the cord fascia opened. D: arteries secured by a blue vessel loop. E: after completion of dissection, only the cremasteric artery, testicular artery, deferential artery, and lymphatics remain (top to bottom). **Source:** Tan, W. P., & Levine, L. A. (2018). Micro-Denervation of the Spermatic Cord for Post-Vasectomy Pain Management. *Sexual Medicine Reviews*, 6(2), 328–334. doi:10.1016/j.sxmr.2017.06.002

In conclusion, chronic testicular pain is a debilitating and difficult to treat condition and remains a challenge for urologists. A thorough understanding of this pathology and its different causes, and a multidisciplinary team approach to its treatment, are necessary for the patient to benefit from the different available options.

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