Original Article

Interventional Rehabilitation Approach in Anterior Cutaneous Nerve Entrapment Syndrome Post Nephrectomy-A Case Report

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Abstract

Introduction: Chronic refractory abdominal pain may be caused by anterior cutaneous nerve entrapment syndrome (ACNES) may require surgery in up to 70% of patients to provide long-term pain relief. Entrapment of sensory branches of nerve roots (T7–T12) can occur due to raised intra or extra abdominal pressure; long operative abdominal scars. There are no known factors that predict outcome after an anterior neurectomy. However conservative interventional management is a safe and effective remedy for ACNES.

Objective: To evaluate the effect of ultrasound guided hydro-dissection of anterior cutaneous nerve entrapment in refractory pain.

Case description: A 62-year-old man who had undergone a robotic laparoscopic partial nephrectomy presented with pain in the left periumbilical region for more than 8 months duration, with no relief from medications and transcutaneous electrical nerve stimulation. He was diagnosed with ACNES.

Intervention: An ultrasound-guided hydro-dissection of the abdominal anterior cutaneous nerves (T9, T10, and T11) was performed. Baseline measurements of the pain and quality of life were considered before and after the procedure. Outcome measures demonstrated improved quality of life, patient's satisfaction score and complete pain relief after follow up at 2 weeks, 3 months, 6 months, and 1 year.

Conclusion: An ultrasound guided hydro-dissection procedure is a safe, easy to perform, and effective intervention for ACNES.

Keywords: ACNES, Hydro-dissection, anterior cutaneous nerve, robotic surgery, nerve entrapment

HIGHLIGHTS:

- Diagnosis of ACNES should be considered in cases of abdominal pain post abdominal surgeries and as such be referred to pain practitioners for further management.
- Other professional help should be sought if you are unable to diagnose your patient rather than labelling with psychiatric issues.
- Hydro dissection of the abdominal anterior cutaneous intercostal nerves might offer a permanent or rather a long term relief of the patient painful experiences.

BACKGROUND:

Anterior cutaneous nerve entrapment syndrome (ACNES) is a commonly missed and under reported diagnosis while such entrapment syndromes are quite common post abdominal surgeries(Smelt et al., 2020). Chronic abdominal pain is associated with a reduced health-related quality of life (QoL). Chronic abdominal pain could be explained by the anterior cutaneous nerve entrapment syndrome (ACNES) one such case was referred to us by a surgeon and various physicians (Pierik et al., 2017). A properly administered local injection of an anaesthetic agent completely relieves the pain of ACNES. Technique is critical for both diagnosis and treatment(Applegate, 2002). So we aim to evaluate the effect of ultrasound guided hydro-dissection of anterior cutaneous nerve entrapment in refractory pain.

CASE DESCRIPTION:

A 62-year-old male, experienced pain on the left periumbilical region since the last 8 months. It started a month after the robotic laparoscopic partial nephrectomy was converted to left open partial nephrectomy for non-functioning left kidney.

The pain aggravated upon sitting for 1 min and subsided when lying down or using an abdominal binder. The patient underwent several consultations, including the operating surgeon, but to no avail. Instead, the patient was frequently offered reassurance and psychiatric counselling. The operating surgeon referred the patient to us, the Physical Medicine and Rehabilitation (PMR) Department, AIIMS, Jodhpur for further management. Thereafter, he visited PMR department with previous investigation reports like blood work up and CT abdomen reports diagnosed as a case of ACNES after a thorough clinical examination. Then, gabapentin for neuropathic pain was started along with transcutaneous electrical nerve stimulation (TENS). Initially, there was good pain relief, but over time, the pain gradually increased in intensity (NRS-7/10). Owing to the distressing pain, the patient lost his job which further escalated his agony.

PHYSICAL EXAMINATION

It revealed an aged male with relatively toned muscles and otherwise healthy with no apparent signs of distress. The examination did not reveal any bruising, swelling, or deformities, however, a long diagonal operative scar was observed over the abdomen (See Figure 1). The spinal range of motion (ROM) was within normal limits. Power in the upper and lower abdominal muscles were 5/5. It was bilaterally equal with tenderness on soft tissue palpation along T9, T10, and T11 abdominal anterior cutaneous intercostal nerve distributions. Hyperaesthesia and allodynia regions were also confined to T9, T10, and T11 abdominal anterior cutaneous intercostal nerve distributions. The Carnett test was positive and the neurological and general examinations were unremarkable. We decided to proceed with an ultrasound guided hydrodissection of the abdominal anterior cutaneous nerves (T9, T10, and T11).

INTERVENTION

After explaining the procedure to the patient and obtaining a written informed consent, he was positioned supine with the upper extremity exposed and the relevant area in the abdomen was painted and draped. The rectus abdominis and lateral abdominal muscles were visualized under ultrasound guidance, and the abdominal anterior cutaneous nerves (T9, T10, and T11) were observed. Skin infiltration was performed using 1% lignocaine. Thereafter, a 25 gauge 1.5 inch needle was inserted into the plane to reach just above and around the nerve and perform hydrodissection of T9, T10, and T11 thoracic intercostal nerves (Figure 2) using 40 mg triamcinolone, 4 ml of 0.25% bupivacaine, and 5 ml of normal saline. An additional 10 ml of normal saline was used to spread the mixture in the nerve entrapment site in the rectus abdominis muscle. The peritoneum was at a safe distance of 2 cm from the muscle.

OUTCOME AND FOLLOW UP

After intervention, the rehabilitation protocol consisted of abdominal muscle and core muscle strengthening and operative scar mobilization and desensitization. The patient reported to have near total pain relief after a fortnightly follow up over phone and also his QoL had improved Table 1. He was then followed over telephone at 6 months and after 1 year Table 2.

DISCUSSION:

ACNES represents a common problem among patients with chronic abdominal pain, however, it still lacks awareness and proper redressal. Thus far, ACNES is grossly misdiagnosed and under recognized by medical practitioners. It requires widespread awareness for a proper diagnosis, thereby alleviating patient agony(Okamoto, 2020). It is the most common form of abdominal neuralgia. It is stated that "The cutaneous branches of the thoraco-abdominal nerves from T7 to T12 supply somatic sensation to the abdominal wall. At the lateral edge of the rectus abdominis muscle, these cutaneous nerves travel through a fibrous ring called the rectus channel. The fibrous ring provides a smooth surface for the nerve bundle to travel from the inner to the outer part of the abdominal wall. Ischaemia or irritation of these nerves can lead to pain. Applegate describes three key mechanisms.(Applegate, 2002) First, increased intra-abdominal pressure can herniate the neurovascular bundle through the rectus sheath causing the bundle to bunch up against the fibrous ring. Second, stretching the neurovascular bundle through the rectus sheath can cause the nerves to swell and compress blood supply causing relative neural ischaemia. Third, the nerves can be affected by the scar tissue". are various risk factors for ACNES (Lindsetmo et al., 2009). These include abdomen operations, scars following surgeries, pregnant status, and obesity. Classically, patient with ACNES presents with long standing abdominal pain which is constant in location and sharp or burning type. Aggravating factors usually include all those activities such as lifting in which the abdominal wall becomes taut. Carnett's test is typically employed for such patients, and it differentiates somatic pain from the abdominal pain. This test reproduces the typical symptoms of ACNES. The abdomen is made tense by asking the patient to lift both the legs and the patient pin points towards his/her maximum tender spot. Pressing that same spot reproduces the pain, thereby worsening the pain and the Carnett's sign will be positive. One study suggested that medications likes NSAIDs, weak-opioids, anti-epileptic, and antidepressants are ineffective in the management of ACNES owing to the mechanical nature of pain (Chrona et al., 2017). Therefore, treatment in the form of guided nerve blocks is extremely effective in alleviating pain related to the ACNES. Another study used the corticosteroid injection at the tender point in rectus abdominis.(Applegate, 2002). The accuracy further improved via the use of ultrasound and reduces complications. Chemical neurolysis and surgical anterior neurectomy was reserved for intractable pain and failed conservative measures. Another study reported significant pain relief upon performing chemical neurolysis with aqueous 6% phenol in 44 patients with ACNES (Mcgrady & Chb, 1988).The surgical option includes anterior neurectomy wherein entrapped nerves are removed surgically. A study also reported longer pain relief with anterior neurectomy in 94/139 patients with a diagnosis of ACNES(Boelens et al., 2011).ACNES can be timely managed with infiltration of a local anaesthetic on a strong

suspicion of a cutaneous nerve entrapment. Undiagnosed abdominal pain as a presentation in emergency department can be ACNES(Chrona et al., 2017)(Assen et al., 2015). Lack of awareness and rarity make ACNES, a late presentable case with usually chronic abdominal pain like features involving untreated pain and an anguished patient. This case is a dual reminder that focuses on clinical history with a differential diagnosis of ACNES and must be considered in patients with abdominal pain.

CONTRIBUTORS:

SK framed the case, in addition to collecting the data for this study. NG was the primary interventionist described in this case and who proposed the idea of this case report. MS, SJP and SBB analysed and interpreted the data. Sk was the prime case interpreter. SK,MY and MS performed the proof-reading of the case. SK, R and, S followed up with the case.

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Conflicts of interests

Nil

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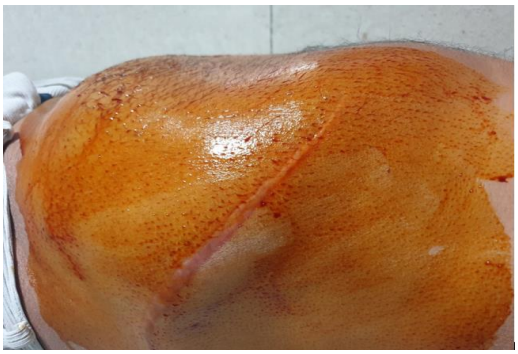

Figure 1: Long oblique operative scar on abdomen

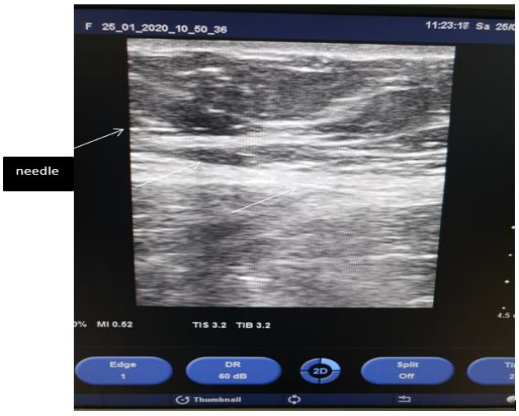

Figure 2: Needle insertion into plane of transversus abdominus to hydrodissect the nerves (T9, T10, and T11)