Letters to the Editor

1. Ultrasound-Guided Anterior Abdominal Cutaneous Nerve Block for the Management of Bilateral Abdominal Cutaneous Nerve Entrapment Syndrome (ACNES)

To the Editor:

We would like to report our experience with a patient suffering from bilateral postoperative anterior abdominal cutaneous nerve entrapment syndrome (ACNES) who was successfully treated by ultrasound-guided blockade of the abdominal cutaneous nerves. ACNES is an often misdiagnosed clinical entity, leading to chronic postoperative pain after operations of the abdominal wall, such as total hysterectomy, Caesarean section, and hernia repair surgery. It is caused by entrapment of the lower intercostal nerves at the lateral border of the rectus abdominis muscle (1) as they exit through the rectus channel and become subcutaneous (2,3). In a large retrospective study on postoperative pain after Pfannenstiel incisions that included 866 women (4), chronic pain was observed on 26% of patients, while in a study by Nikolajsen et al (5), pain was still present in 12.3% of women after Caesarean section. The syndrome is characterized by abdominal pain, both spontaneous and on palpation of the relevant side, in addition to a positive Carnett sign. Carnett sign is elicited as the examiner localizes the spot of maximal tenderness with the index finger over the abdominal wall, and the patient is then asked to raise his/her head and torso with the arms crossed over the chest, with the examiner's finger unmoved. Increased or equal pain during this maneuver suggests localization of pain to be at the abdominal wall and not to be of visceral origin (1-3). Other causes of persisting postoperative pain should always be excluded, such as musculotendinous causes, hernia, cheloid formation, abdominal wall atrophy and bulging, gynecologic pathology, and entrapment of ilioinguinal or iliohypogastric nerves (4-7). Therapy includes acetaminophen, nonsteroidal anti-inflammatory drugs, anticonvulsants, opioids, and performing nerve blocks that also serve as a diagnostic test (3). There is only one report of 9 cases of patients with ACNES, who were treated by ultrasound-guided abdominal cutaneous nerve infiltration (2). The approach that we used was slightly different than the one described by Kanakarajan et al (2).

A 37-year old woman (209 pounds, 65 inches) was referred to the Pain Unit of our department, due to bilateral lower abdominal pain. The patient had an elective myomectomy performed via a wide Pfannenstiel incision 2.5 months earlier and suffered from intractable pain located at both ends of the incision scar and radiating to the back. The patient could point out the site of pain with one finger at both sides and described it as paroxysmic and throbbing, increasing when she tried to lift up from the supine position. Clinical examination revealed numbness along the incision area, with mild allodynia and hyperalgesia. The patient rated her pain as 8/10 on the Numeric Rating Scale (NRS) during most of the day, while the neuropathic element of pain was significant (18/24 points on the S-LANSS neuropathic pain scale). Her pain led to a great decrease in everyday activities, social isolation, sleep disorders, and significant alteration of her overall quality of life (assessed via the Brief Pain Inventory [BPI]).

After a thorough surgical re-evaluation and postoperative MRI scans, all visceral causes of pain were excluded, and ACNES syndrome was suspected and confirmed by performing a Carnett test, which was positive bilaterally. An ultrasound-guided block of the anterior cutaneous T11 and T12 nerves with local anaesthetic was then decided upon.

The patient was placed supine and asked to point out the sites of maximal tenderness of the abdominal wall. A linear 5–10 mHz probe of the Vivid 1 (GE Healthcare, Waukesha, WI) was used. The rectus muscle was identified, as well as its lateral end forming the linea semilunaris. The exact position of the cutaneous nerve could not be identified, and a local anesthetic solution (lidocaine 1% 10 mL) was injected via a Tuo-

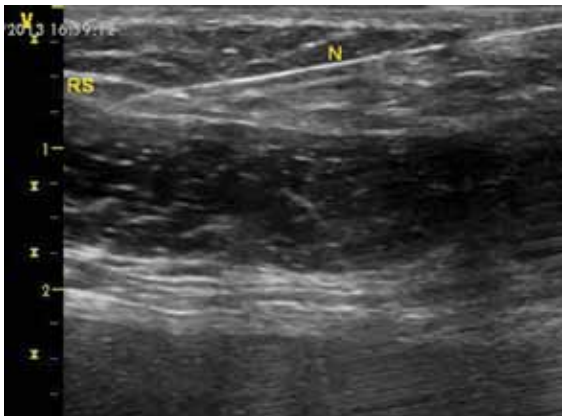

Fig. 1. *Ultrasonographic view of needle course and spread of injectate along the rectus sheath.*

hy 18G needle under aseptic conditions to the area of maximal tenderness, along the rectus abdominis muscle, underneath the rectus sheath (Fig. 1). Complete pain relief occurred about 30 minutes after injection, and the blockade was repeated at the other side, leading to similar results.

The duration of this first diagnostic block was 1.5 days. It was then repeated, after reoccurrence of pain, using 20 mg of triamcinolone at each side, in addition to 10 mL of ropivacaine solution 0.2%. The patient had 4 consecutive blocks (2 with triamcinolone), approximately every 7–10 days. The pain relief after each block was longer than the previous one, and after 2 months of therapy, the patient has significant pain relief, with mean NRS of 2/10, S-LANSS 13/24, and significant improvement in most BPI parameters. The patient was also offered a trial of drugs for neuropathic pain (gabapentin and duloxetine) but due to side effects she refused to continue with systemic therapy.

The role of injections with local anesthetic for diagnostic and therapeutic purposes in ACNES is still unclear. Boelens et al (3), who studied 139 patients with ACNES, report that a single shot diagnostic injection of 10 mL of lidocaine 1% led to immediate pain reduction in 83% of patients, while 1–2 subsequent injections of local anesthetic combined with methylprednisolone led to persistent reduction of pain in 33%. However, in this report injections were performed blindly. Ultrasound offers a safer version of the technique, avoiding the risk of entering deeper structures. In Kanakarajan et al's study (2), 7 of 9 patients (all diagnosed with ACNES) responded. The nerve was visible 0.5–1.0 cm medial to the linea semilunaris as a "hyperechoic dot," and was blocked with 2–3 mL of local anesthetic. In our patient, visualization of the nerve's exit point from the rectus abdominis fibrous ring was not possible, maybe because the patient was overweight or because the anatomy was altered due to surgery. However, injecting a larger dose of local anesthetic led to sufficient blockade of the nerves at both sides. This technique may be a safe alternative in cases where the actual nerve cannot be visualized.

Ultrasound-guided techniques definitely have a place in ACNES syndrome, in order to block the entrapped anterior cutaneous abdominal nerves of the lower abdominal wall. However, further research is required to identify the best ultrasound-guided approach that achieves the best clinical outcome.

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References

1. Applegate WV. Abdominal cutaneous nerve entrapment syndrome (ACNES): A commonly overlooked cause of abdominal pain. *Perman J* 2002; 6:20-27.
2. Kanakarajan S, High K, Naaraja R. Chronic abdominal wall pain and ultrasound-guided abdominal cutaneous nerve infiltration: A case series. *Pain Med* 2011; 12:382-386.
3. Boelens OB, Scheltinga MR, Houterman S, Roumen RM. Management of anterior cutaneous nerve entrapment syndrome in a cohort of 139 patients. *Ann Surg* 2011; 254:1054-1057.
4. Loos MJ, Scheltinga MR, Mulders LG, Roumen RM. The Pfannestiel incision as a source of chronic pain. *Obstet Gynecol* 2008; 111:839-845.
5. Nikolajsen L, Sorensen HC, Jensen TS, Kehlet H. Chronic pain following Caesarean section. *Acta Anaesthesiol Scand* 2004; 48:111-116.
6. Ducie I, Moxley M, Al-Atar A. Algorithm for treatment of postoperative incisional groin pain after Cesarean delivery or hysterectomy. *Obstet Gynecol* 2006; 108:27-31.
7. Luijendijk RW, Jeekel J, Storm RK, Schutte PJ, Hop WC, Drogendijk AC, Huikeshoven FJ. The low transverse Pfannenstiel incision and the prevalence of incisional hernia and nerve entrapment. *Ann Surg* 1997; 225:365-369.

2. Paresthesia Coverage for Comparing the Inhibition of Somatosensory Evoked Potentials by Spinal Cord Stimulation and Transcutaneous Electrical Nerve Stimulation

To the Editor:

I read with great interest the article by Wolter et al (1) and appreciated the attempt to answer some important questions on the possible role played by the inhibition of somatosensory evoked potentials (SEPs) by spinal cord stimulation (SCS) used for chronic pain. Although I share with the authors most of their interpretations and opinions, it seems to me that the protocol used to answer the question about the comparison between SCS and transcutaneous electrical nerve stimulation (TENS), was not completely adequate because the 2 stimulations were not applied with the same characteristics. In fact, when applying SCS and TENS, they did not search the complete coverage of paresthesia in the tibial nerve territory, the nerve used for SEPs recordings. Since the coverage of the induced paresthesia is an important prerequisite for SCS efficacy (2), targeting the applied stimulations is indeed very important to adequately compare SCS and TENS. If SCS only covered the tibial nerve territory, the inhibition would be obviously stronger during SCS. In this regard, while it is probable that in the study of Wolter et al (1) SCS effectively covered the whole territory of the tibial nerve, it was unlikely that TENS had the same effect because its electrodes were placed in the medial side of the foot (innervated by the medial plantar nerve, only one of the 2 main terminal branches of the tibial nerve) and at the medial lower leg, 15 cm above the ankle (in the territory of the saphenous nerve).

The comparison of the inhibitory effects of SCS and TENS on SEPs remains an important point to reach for a better understanding of the differences between the 2 types of electroanalgesia and for a possible use of TENS as a screening tool for SCS (3). Interestingly, it is worth noting that the pathophysiological role played by the large diameter fibers (those investigated by SEPs and activated by both SCS and TENS) in neuropathic pain conditions has gained new importance as a consequence of the official redefinition of neuropathic pain as "pain arising as a direct consequence of a lesion or disease affecting the somatosensory system" (4). This system indeed comprises both the spino-thalamic tract (sensory small fibers) and lemniscal tract (sensory large fibers). It follows that, according to the new definition, a lesion or disease involving the large diameter fibers can be considered, logically speaking, a possible cause of neuropathic pain.

Further studies are then warranted to better compare the inhibitory effect of SCS on SEPs, possibly using