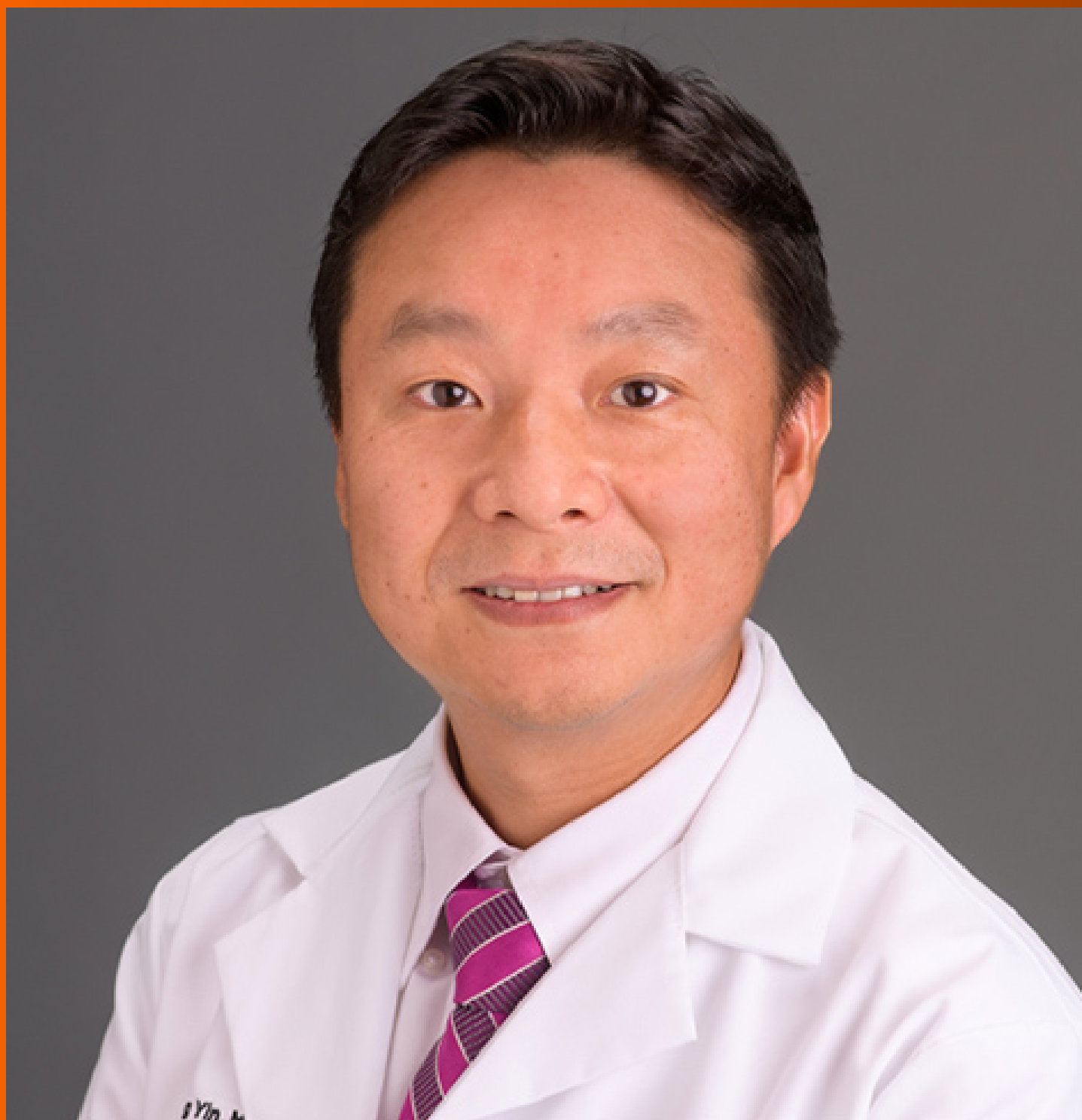


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ABOUT COVER

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Ultrasound-guided rectus sheath block for anterior cutaneous nerve entrapment syndrome after laparoscopic surgery: A case report

Ryuji Sawada, Kunitaro Watanabe, Joho Tokumine, Alan Kawai Lefor, Tadao Ando, Tomoko Yorozu

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Abstract

BACKGROUND

Anterior cutaneous nerve entrapment syndrome is defined as abdominal pain due to entrapped intercostal nerves. This is the first report of a patient successfully treated for anterior cutaneous nerve entrapment syndrome after laparoscopic surgery with an ultrasound-guided rectus sheath block. The rectus sheath block physically lysed adhesions and relieved pain from anterior cutaneous nerve entrapment syndrome.

CASE SUMMARY

The patient is a 44-year-old man who presented with severe left upper abdominal pain at an operative scar one month after laparoscopic ulcer repair. Diagnosis and treatment were performed using an ultrasound-guided rectus sheath block with 0.1% lidocaine 20 mL. The pain was relieved after the block. The diagnosis was anterior cutaneous nerve entrapment syndrome. Rectus sheath block may be effective for patients with anterior cutaneous nerve entrapment syndrome.

CONCLUSION

Ultrasound-guided rectus sheath block is a promising treatment modality for patients with postoperative anterior cutaneous nerve entrapment syndrome due to adhesions.

Key Words: Anterior cutaneous nerve entrapment syndrome; Rectus sheath block;

Hydrodissection; Laparoscopic surgery; Case report

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Core Tip: Anterior cutaneous nerve entrapment syndrome (ACNES) is defined as chronic abdominal wall pain caused by entrapment of cutaneous branches of the lower thoracoabdominal intercostal nerves. In the present report, ACNES after a laparoscopic procedure was successfully treated with ultrasound-guided rectus sheath block. Ultrasound-guided rectus sheath block may become an important part of the armamentarium.

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INTRODUCTION

Laparoscopic surgery is generally less invasive than open surgery. Recently, laparoscopic repair of perforated peptic gastroduodenal ulcers has become more commonly performed. Advantages of the laparoscopic repair of a perforated peptic ulcer are less postoperative pain[1,2], a lower rate of surgical site infection[2], and shorter postoperative hospital stay[1].

Even though laparoscopic surgery is less invasive, chronic abdominal wall pain after laparoscopic surgery can complicate postoperative recovery and be debilitating to the patient[3]. Chronic abdominal wall pain is thought to be caused either by a viscus and/or the abdominal wall. The differential diagnosis depends on the origin of the pain. Anterior cutaneous nerve entrapment syndrome (ACNES) is defined as abdominal pain due to entrapped intercostal nerves[4]. We successfully treated a patient with ACNES, which developed after laparoscopic repair of a perforated gastroduodenal ulcer, using ultrasound-guided rectus sheath block. Written informed consent was obtained from the patient for the publication.

CASE PRESENTATION

Chief complaints

A 44-year-old man underwent emergency laparoscopic repair of a perforated gastroduodenal ulcer. Laparoscopic repair was performed successfully, and he was discharged without complications on postoperative day nine. One month later, he experienced severe pain in the left upper abdomen.

History of present illness

The pain was sharp, with a stabbing sensation two or three times per day without obvious cause and lasted for at least two hours. The pain disturbed his work and degraded his quality of life. Endoscopic examination and computed tomography scan showed no abnormal findings. Treatment with acetaminophen 800 mg daily was started, but the pain continued.

History of past illness

He had a past medical history of urolithiasis treated with medication.

Personal and family history

No special notes.

Physical examination

The operating surgeon consulted with a pain specialist about the patient's pain. The pain was characterized by sudden onset, continuing for a long time, and the pain intensity was reported as 5-6/10. The patient could indicate the location where the pain began, which was at the operative scar (Figure 1). Hypoesthesia was recognized using the cold test compared to the contralateral side (6/10). There was no numbness or allodynia at the location. Carnett's test[4] was negative.



Figure 1 Postoperative scar in the anterior abdominal wall. The white arrow indicates the position of the operative scar. The white line indicates the left lateral edge of the rectus abdominis muscle. The scar is located near the lateral edge of the rectus muscle.

Laboratory examinations

Ultrasound examination.

Imaging examinations

The pain specialist imaged the operative scar with ultrasound and found an adhesion-like area on the posterior sheath of the rectus abdominis muscle (Figure 2A).

MULTIDISCIPLINARY EXPERT CONSULTATION

No expert consultation was conducted.

FINAL DIAGNOSIS

ACNES was diagnosed in this patient.

TREATMENT

A rectus sheath block was performed with 20 mL of 0.1% lidocaine. The adhesion-like area was detached from the rectus abdominis muscle by hydrodissection (Figure 2B).

OUTCOME AND FOLLOW-UP

After hydrodissection, the pain was immediately relieved. The frequency of pain decreased to 0-1 episodes per month, and the duration of the pain decreased to several minutes for each episode. The patient was satisfied with the treatment and did not want any more nerve blocks.

Further diagnostic work-up

The pain specialist conducted a Carnett's test again. Interestingly, these tests were positive this time, but the evoked pain was minimal.

DISCUSSION

ACNES is defined as chronic abdominal wall pain caused by entrapment of cutaneous branches of the lower thoracoabdominal intercostal nerves[4,5]. The pain due to ACNES is refractory to treatment, can be sharp, dull or burning in character[4-6]. Diagnosis of ACNES is based on clinical findings and

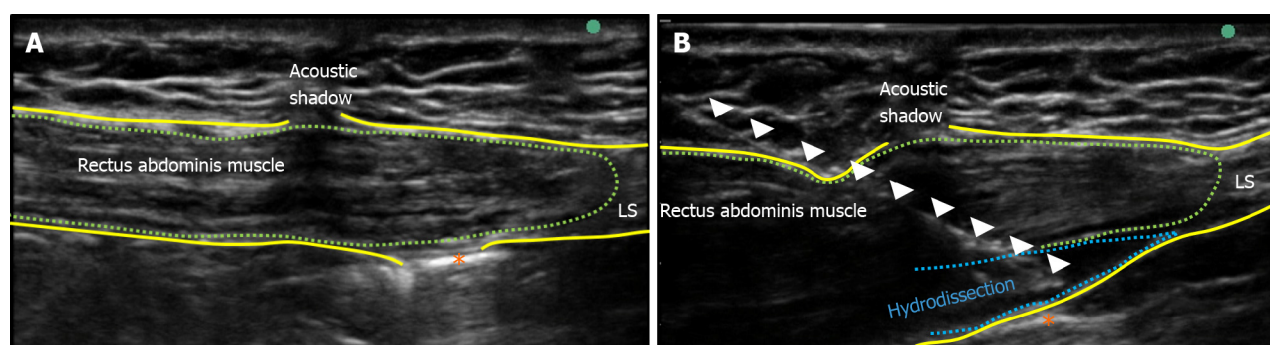


Figure 2 Ultrasound view at the site of the operative scar. A: An acoustic shadow is present at the site of the scar. An adhesion-like object (orange asterisk) is observed behind the scar; B: White arrow heads indicate a needle. Through the needle, 0.1% lidocaine solution 20 mL is injected beneath the rectus abdominis muscle (green dashed line) above the posterior wall sheath. Hydrodissection proceeded between the rectus abdominis muscle and the posterior rectus sheath (rectus sheath block). Approach to the rectus sheath block is an in-plane approach from medial to lateral. LS: Linea semilunaris.

excluding other diagnoses, which include bowel-related (functional abdominal pain; irritable bowel syndrome, constipation), gynecologic (ovarian cyst *etc.*), pain after trauma or surgery, urologic (infection, *etc.*), posture-related pain (orthopedic, *etc.*) [4,7] and psychogenic abdominal pain [8]. Therefore, routine postoperative pain should be excluded from consideration as ACNES [4]. However, surgery was reported to cause ACNES in some patients [4]. In the present patient, entrapment of an anterior cutaneous nerve by the operative scar was thought to be the most likely cause. The commonly held definition (above) of ACNES may be incomplete. The clinical entity of ACNES is a syndrome of the same type of pain. We would like to propose a new definition, in which ACNES is classified into primary and secondary types. Primary ACNES is defined as the originally characterized ACNES which is idiopathic in nature, and secondary ACNES is defined as anterior cutaneous nerve entrapment caused during the healing process after surgery or a traumatic injury.

Clinical findings of ACNES are characterized as a specific type of pain [4-8]. The pain is always in the same location, just lateral to the middle of the abdomen and provoked by daily activities [6]. A special maneuver for diagnosis is Carnett's test [4,7]. A positive Carnett's test means that tenderness is present when placing a finger on the pain location during abdominal muscle tensing caused by lifting the head or legs [4,7]. In the present patient, the Carnett's test was negative during the first physical examination, but was positive at the next physical examination. Physical findings strongly suggested that the pain was derived from the abdominal wall. Boelens *et al* [9], reported that a positive Carnett's test in patients suspected to have ACNES was 88% sensitive, but inconclusive or negative tests were 9% and 3% respectively. In the present patient, Carnett's test might not have been performed completely due to the patient's fear of refractory pain. Some clinicians might not perform the physical test with sufficient strength at the first examination. This speculation might explain why the second test became positive.

Trigger point injection [10], transverse abdominis plane block [11] and rectus sheath block [12] and have been reported as useful examinations to establish the diagnosis and also the treatment of ACNES. In the present report, ACNES after a laparoscopic procedure was successfully treated with ultrasound-guided rectus sheath block. We speculate that if the anterior cutaneous nerve is entrapped as defined by ACNES, the main effect of rectus sheath block may be to release the entrapped nerve with hydrodissection rather than the effect of the local anesthetic. Recently, ultrasound-guided nerve hydrodissection has been established as a treatment for nerve entrapment [13]. In experiments using animal models of neuropathic pain, nerve hydrodissection reduces nerve irritability and improves blood flow to the nerve by relieving pressure on the free nerve endings surrounding the epineurium and the feeding vessels [13]. The application of ultrasound-guided techniques to the treatment of ACNES is still in development, and further studies will be needed to determine their efficacy.

CONCLUSION

The number of laparoscopic procedures is steadily increasing, and chronic pain after laparoscopic surgery is also becoming more common [14]. Some instances of pain were thought to be ACNES [15]. To the best of our knowledge, this is the first report of ACNES induced by a laparoscopic procedure being treated successfully with ultrasound-guided rectus sheath block. Ultrasound-guided rectus sheath block is a potential solution to the etiology of ACNES itself. Effective treatment is needed for ACNES, and ultrasound-guided rectus sheath block may be an important part of the armamentarium.

FOOTNOTES

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