FIELD OF VISION

2053  Personalized treatment - which interaction ingredients should be focused to capture the unconscious
Steinmair D, Löffler-Stastka H

MINIREVIEWS

2063  Patterns of liver profile disturbance in patients with COVID-19
Shousha HI, Ramadan A, Lithy R, El-Kassas M

ORIGINAL ARTICLE

Clinical and Translational Research

2072  Prognostic and biological role of the N-Myc downstream-regulated gene family in hepatocellular carcinoma
Yin X, Yu H, He XK, Yan SX

Case Control Study

2087  Usefulness of the acromioclavicular joint cross-sectional area as a diagnostic image parameter of acromioclavicular osteoarthritis
Joo Y, Moon JY, Han JY, Bang YS, Kang KN, Lim YS, Choi YS, Kim YU

2095  Correlation between betatrophin/angiogenin-likeprotein3/lipoprotein lipase pathway and severity of coronary artery disease in Kazakh patients with coronary heart disease
Qin L, Rehemuding R, Ainiwaer A, Ma X

Retrospective Study

2106  Postoperative adverse cardiac events in acute myocardial infarction with high thrombus load and best time for stent implantation
Zhuo MF, Zhang KL, Shen XB, Lin WC, Hu B, Cui HP, Huang G

2115  Develop a nomogram to predict overall survival of patients with borderline ovarian tumors
Gong XQ, Zhang Y

Clinical Trials Study

2127  Diagnostic performance of Neutrophil CD64 index, procalcitonin, and C-reactive protein for early sepsis in hematological patients

2138  Previously unexplored etiology for femoral head necrosis: Metagenomics detects no pathogens in necrotic femoral head tissue
### Contents

**Observational Study**

- **2147** Association of types of diabetes and insulin dependency on birth outcomes  
  *Xaverius PK, Howard SW, Kiel D, Thurman JE, Wankum E, Carter C, Fang C, Carriere R*

- **2159** Pathological pattern of endometrial abnormalities in postmenopausal women with bleeding or thickened endometrium  
  *Xue H, Shen WJ, Zhang Y*

- **2166** *In vitro* maturation of human oocytes maintaining good development potential for rescue intracytoplasmic sperm injection with fresh sperm  
  *Dong YQ, Chen CQ, Huang YQ, Liu D, Zhang XQ, Liu FH*

- **2174** Ultrasound-guided paravertebral nerve block anesthesia on the stress response and hemodynamics among lung cancer patients  
  *Zhen SQ, Jin M, Chen YX, Li JH, Wang H, Chen HX*

### META-ANALYSIS

- **2184** Prognostic value of YKL-40 in colorectal carcinoma patients: A meta-analysis  
  *Wang J, Qi S, Zhu YB, Ding L*

- **2194** Prognostic value of neutrophil/lymphocyte, platelet/lymphocyte, lymphocyte/monocyte ratios and Glasgow prognostic score in osteosarcoma: A meta-analysis  
  *Peng LP, Li J, Li XF*

### CASE REPORT

- **2206** Endovascular stent-graft treatment for aortoesophageal fistula induced by an esophageal fishbone: Two cases report  

- **2216** Quetiapine-related acute lung injury: A case report  
  *Huang YY, He GX, Zhang WJ, Li BW, Weng HX, Luo WC*

- **2222** Primary hepatic neuroendocrine neoplasm diagnosed by somatostatin receptor scintigraphy: A case report  
  *Akabane M, Kobayashi Y, Kinowaki K, Okubo S, Shindoh J, Hashimoto M*

- **2229** Multidisciplinary non-surgical treatment of advanced periodontitis: A case report  
  *Li LJ, Yan X, Yu Q, Yan FH, Tan BC*

- **2247** Flip-over of blood vessel intima caused by vascular closure device: A case report  
  *Sun LX, Yang XS, Zhang DW, Zhao B, Li LL, Zhang Q, Hao QZ*

- **2253** Huge gastric plexiform fibromyxoma presenting as pyemia by rupture of tumor: A case report  
  *Zhang R, Xia LG, Huang KB, Chen ND*

- **2261** Intestinal intussusception caused by intestinal duplication and ectopic pancreas: A case report and review of literature  
  *Wang TL, Gong XS, Wang J, Long CY*
Mixed neuroendocrine-nonneuroendocrine neoplasm of the ampulla: Four case reports

Y-shaped shunt for the treatment of Dandy-Walker malformation combined with giant arachnoid cysts: A case report
Dong ZQ, Jia YF, Gao ZS, Li Q, Niu L, Yang Q, Pan YW, Li Q

Posterior reversible encephalopathy syndrome in a patient with metastatic breast cancer: A case report
Song CH, Lee SJ, Jeon HR

Multiple skin abscesses associated with bacteremia caused by Burkholderia gladioli: A case report
Wang YT, Li XW, Xu PY, Yang C, Xu JC

Giant infected hepatic cyst causing exclusion pancreatitis: A case report
Kenzaka T, Sato Y, Nishisaki H

Cutaneous leishmaniasis presenting with painless ulcer on the right forearm: A case report
Zhuang L, Su J, Tu P

Gastrointestinal amyloidosis in a patient with smoldering multiple myeloma: A case report

Breast and dorsal spine relapse of granulocytic sarcoma after allogeneic stem cell transplantation for acute myelomonocytic leukemia: A case report
Li Y, Xie YD, He SJ, Hu JM, Li ZS, Qu SH

Synchronous but separate neuroendocrine tumor and high-grade dysplasia/adenoma of the gall bladder: A case report
Hsiao TH, Wu CC, Tseng HH, Chen JH

Novel mutations of the Alström syndrome 1 gene in an infant with dilated cardiomyopathy: A case report
Jiang P, Xiao L, Guo Y, Hu R, Zhang BY, He Y

Acute esophageal obstruction after ingestion of psyllium seed husk powder: A case report
Shin S, Kim JH, Mun YH, Chung HS

Spontaneous dissection of proximal left main coronary artery in a healthy adolescent presenting with syncpe: A case report
Liu SF, Zhao YN, Jia CW, Ma TY, Cai SD, Gao F

Relationship between treatment types and blood–brain barrier disruption in patients with acute ischemic stroke: Two case reports
Seo Y, Kim J, Chang MC, Huh H, Lee EH

Ultrasound-guided rectus sheath block for anterior cutaneous nerve entrapment syndrome after laparoscopic surgery: A case report
Sawada R, Watanabe K, Tokumine J, Lefor AK, Ando T, Yorozu T
ABOUT COVER
Editorial Board Member of World Journal of Clinical Cases, Feng Yin, MD, PhD, Assistant Professor, Department of Pathology and Anatomic Sciences, University of Missouri, Columbia, MO 65212, United States.
fengyin@health.missouri.edu

AIMS AND SCOPE
The primary aim of World Journal of Clinical Cases (WJCC, World J Clin Cases) is to provide scholars and readers from various fields of clinical medicine with a platform to publish high-quality clinical research articles and communicate their research findings online.

WJCC mainly publishes articles reporting research results and findings obtained in the field of clinical medicine and covering a wide range of topics, including case control studies, retrospective cohort studies, retrospective studies, clinical trials studies, observational studies, prospective studies, randomized controlled trials, randomized clinical trials, systematic reviews, meta-analysis, and case reports.

INDEXING/ABSTRACTING
The WJCC is now indexed in Science Citation Index Expanded (also known as SciSearch®), Journal Citation Reports/Science Edition, Scopus, PubMed, and PubMed Central. The 2021 Edition of Journal Citation Reports® cites the 2020 impact factor (IF) for WJCC as 1.337; IF without journal self cites: 1.301; 5-year IF: 1.742; Journal Citation Indicator: 0.33; Ranking: 119 among 169 journals in medicine, general and internal; and Quartile category: Q3. The WJCC’s CiteScore for 2020 is 0.8 and Scopus CiteScore rank 2020: General Medicine is 493/793.

RESPONSIBLE EDITORS FOR THIS ISSUE
Production Editor: Lin-YuTong Wang; Production Department Director: Xiang Li; Editorial Office Director: Jin-Lei Wang.
Ultrasound-guided rectus sheath block for anterior cutaneous nerve entrapment syndrome after laparoscopic surgery: A case report

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

**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;
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.

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
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.
REFERENCES

Author contributions: Sawada R and Tokumine J helped in writing the original draft; Watanabe K and Tokumine J helped in the conceptualization of the case report; Lefor AK helped in writing the review and editing the manuscript; Ando T and Yorozu T helped with literature acquisition and data validation.

Informed consent statement: Written informed consent was obtained from the patient for the publication.

Conflict-of-interest statement: The authors declare that they have no competing interests.

CARE Checklist (2016) statement: The authors have read the CARE Checklist (2016), and the manuscript was prepared and revised according to the CARE Checklist (2016).

Open-Access: This article is an open-access article that was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative Commons Attribution NonCommercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: https://creativecommons.org/Licenses/by-nc/4.0/

Country/Territory of origin: Japan

ORCID number: Ryuji Sawada 0000-0002-1366-1364; Kunitaro Watanabe 0000-0002-8319-0406; Joho Tokumine 0000-0003-3481-2085; Alan Kawarai Lefor 0000-0001-6673-5630; Tadao Ando 0000-0002-9651-107X; Tomoko Yorozu 0000-0002-2161-4525.

Corresponding Author's Membership in Professional Societies: Japanese Society of Anesthesiologists, 00006209.

S-Editor: Liu JH
L-Editor: A
P-Editor: Liu JH

FOOTNOTES


Sawada R et al. US-guided rectus sheath block for ACNES

