

## CASE REPORT

### ANTERIOR CUTANEOUS NERVE ENTRAPMENT SYNDROME IN AN ADOLESCENT MALE: A CASE REPORT

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#### Abstract

A 17-year old male presented with abdominal pain for 18 days. Pain started after sustaining blunt trauma to the scrotum while playing basketball. Extensive blood analysis and imaging were normal. Psychosocial history was unremarkable. Two days prior to presenting to our hospital, the severity of the pain worsened over the left upper quadrant. He had one episode of non-bilious, non-bloody, projectile vomiting. Abdominal examination revealed a flat, soft abdomen with normoactive bowel sounds, no rebound tenderness, and no masses. Psoas, obturator and Murphy signs were negative. Carnett and pinch tests were positive. Hyperalgesia was elicited over the entire abdomen. The patient was suspected to have anterior cutaneous nerve entrapment syndrome (ACNES). Trigger point injection therapy with lidocaine confirmed the diagnosis, as this provided complete pain resolution.

**Keywords :** Abdominal wall pain, Carnett test

#### Introduction

Patients with abdominal pain should be routinely evaluated for both visceral and parietal causes. Visceral pain originates from affected solid or hollow organs, while parietal pain usually originates from the abdominal wall. (1) Abdominal wall neuropathic pain may be elicited using simple examination techniques, such as the Carnett test. (1,2) In adults, the abdominal wall has been identified as the painful source in up to 30% of cases. (1-4) In children, the incidence of abdominal wall pain remains unknown. (1) Anterior (also referred to as "abdominal") cutaneous nerve entrapment syndrome (ACNES) is the most commonly identified cause of chronic abdominal wall pain. (2,4,5) The etiology remains unclear, but is likely related to traction or compression of lower (seventh to twelfth) intercostal thoracic nerves. (1-4,6-9) These end branches are caught in abdominal wall muscles, most commonly at the lateral border of the rectus muscle, resulting in severe neuropathic pain. (2,4,5,8) Trauma may play a role in its development. (1,5,8,9)

#### Case Report

A 17-year old male of South Asian descent with no significant past medical history returned to our institution with worsening abdominal pain. The pain was sharp, constant, non-radiating, with no known palliative or exacerbating factors for the past 18 days. The pain started after sustaining blunt trauma to the scrotum while playing basketball. The patient had sought multiple evaluations from different emergency departments, pediatric and gastroenterology clinics. Extensive blood analysis did not reveal any gastric, liver, bowel, pancreatic or renal function abnormalities. Abdominal computed tomography (CT) scan, pelvic ultrasound and colonoscopy were normal. He was sent home after each "negative" evaluation, and the pain persisted but "eventually became tolerable." Psychosocial history was unremarkable. Two days prior

to presenting to our hospital, the severity of the pain worsened over the left upper quadrant. He had one episode of non-bilious, non-bloody, projectile vomiting. He denied any fever, anorexia, nausea, dysuria nor diarrhea. He was evaluated in our emergency department. Abdominal ultrasonography, CT scan and blood analysis were repeated and were normal. On examination, the abdomen was flat and soft with normoactive bowel sounds, no rebound tenderness, no masses and no costovertebral angle tenderness. Psoas, obturator and Murphy signs were negative. Carnett and pinch tests were positive, with an extremely tender area identified over the left upper quadrant. Hyperalgesia was elicited over the entire abdomen. The patient was suspected to have anterior cutaneous nerve entrapment syndrome (ACNES). After informed consent, trigger point injection therapy was performed with 1% lidocaine. The pain decreased in severity after several hours, and completely resolved the following day. Follow-up after one month confirmed continued resolution of symptoms.

#### Discussion

All reported pediatric cases of ACNES involve male and female adolescents. (8,9) The abdominal pain is sharp, localized, severe and may worsen with physical activity. (1,2,4,5) There is usually no relationship to eating or bowel function. (8) Vital signs are normal. (1) Physical examination consistently demonstrates an extremely painful area over one side of the abdomen, although sometimes the pain is bilateral. (4,5,9) A small (< 2 x 2cm) site of extreme tenderness is located within the lateral boundaries of the rectus abdominis muscle. (1,3,4,6,7) Sensory disturbances, such as hyperalgesia, hypoesthesia or allodynia over the painful area may be elicited. (1,3,6)

Carnett first described the clinical test for abdominal wall neuropathic pain in 1926. (8,10,11) The patient is placed in a supine position, and the maximum point of abdominal tenderness is identified. The patient lifts his head or sits halfway up (with arms folded across the upper chest) to tense the abdominal wall muscles. A positive Carnett test is elicited when there is worse pain (over the identified region) with muscle wall tension. (1-8,10) The pinch test may also determine the presence of neuropathic pain syndrome. This is performed by squeezing a fold containing the patient's skin and subcutaneous fat between the thumb and index finger. A positive pinch test is elicited when the area of interest becomes extremely painful compared to the contralateral side. (6)

A diagnostic triad of abdominal pain, circumscribed pain point (with positive Carnett test and/or local sensory disturbances) and normal blood analysis/imaging is highly suggestive of ACNES. (3,4,6,7) ACNES has been described more frequently as a source of chronic abdominal pain (i.e., >1-2 months duration); however, up to 2% of patients with acute pain have also been diagnosed. (1,2,6,7) Trigger point injection therapy with a local anesthetic is diagnostic, and may

be therapeutic. (1,3,4,6,7) Immediate resolution or decrease in the severity of pain occurs after subfascial infiltration of 1-10mL of 1% lidocaine, 0.5% bupivacaine or lidocaine/corticosteroid mixture over the most painful region, which likely represents the site of nerve entrapment. (1-4,6,7,10) For persistent abdominal wall pain, a multi-disciplinary team approach involving pain specialists/anesthesiologists and surgeons is recommended. (9) An individualized treatment plan may include regional nerve block and subsequent nerve resection. (1,2,4) Regional blocks include the transversus abdominis plane (TAP) block and rectus sheath block. (2,9) Frequent trigger injections are discouraged due to the risk of tissue atrophy and subsequent abdominal wall herniation. (6,8) Anterior cutaneous neurectomy is considered for refractory pain despite maximal medical intervention. (1)

### Conclusion

Pediatricians must routinely evaluate patients for both visceral and parietal causes of abdominal pain. Parietal pain usually originates from the abdominal wall, and may be elicited by using simple examination techniques such as the Carnett and pinch tests. ACNES is a common cause of abdominal wall pain, and if identified acutely, may resolve completely after trigger point injection therapy. Increased awareness of ACNES may prevent delay in diagnosis and treatment, as well as unnecessary invasive tests and imaging.

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### References :

1. Scheltinga MR, Boelens OB, Tjon ATWE, Roumen RM. Surgery for refractory anterior cutaneous nerve entrapment syndrome (ACNES) in children. *J Pediatr Surg.* 2011;46:699-703.
2. Nizamuddin SL, Koury KM, Lau ME, Watt LD, Gulur P. Use of targeted transversus abdominis plane blocks in pediatric patients with anterior cutaneous nerve entrapment syndrome. *Pain Physician.* 2014;17:E623-7.
3. Boelens OB, Scheltinga MR, Houterman S, Roumen RM. Randomized clinical trial of trigger point infiltration with

- lidocaine to diagnose anterior cutaneous nerve entrapment syndrome. *Br J Surg.* 2013;100:217-21.
4. Lindsetmo RO, Stulberg J. Chronic abdominal wall pain—a diagnostic challenge for the surgeon. *Am J Surg.* 2009;198:129-34.
5. Ivens D, Wojciechowski M, Vaneerdeweg W, Vercauteren M, Ramet J. Abdominal cutaneous nerve entrapment syndrome after blunt abdominal trauma in an 11-year-old girl. *J Pediatr Surg.* 2008;43:E19-21.
6. van Assen T, Brouns JA, Scheltinga MR, Roumen RM. Incidence of abdominal pain due to the anterior cutaneous nerve entrapment syndrome in an emergency department. *Scand J Trauma Resusc Emerg Med.* 2015;23:19.
7. van Assen T, de Jager-Kievit JW, Scheltinga MR, Roumen RM. Chronic abdominal wall pain misdiagnosed as functional abdominal pain. *J Am Board Fam Med.* 2013;26:738-44.
8. Zganjer M, Bojic D, Bumci I. Surgery for abdominal wall pain caused by cutaneous nerve entrapment in children—a single institution experience in the last 5 years. *Iran Red Crescent Med J.* 2013;15:157-60.
9. Bairdain S, Dinakar P, Mooney DP. Anterior Cutaneous Nerve Entrapment Syndrome in Children. *J Pediatr Surg.* 2015;50(7):1177-9.
10. McGarrity TJ, Peters DJ, Thompson C, McGarrity SJ. Outcome of patients with chronic abdominal pain referred to chronic pain clinic. *Am J Gastroenterol.* 2000; 95:1812-6.
11. Abdominal wall tenderness test: could Carnett cut costs? *Lancet.* 1991;337:1134

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