

Letters to the Editor

Pulsed Radiofrequency for Chronic Abdominal Pain

TO THE EDITOR

Chronic abdominal pain is one of the most common symptoms evaluated and treated by physicians across all specialties. In most cases, patients go through a significant clinical work-up, including imaging and upper gastrointestinal (GI) endoscopy, often with no findings of disease or malfunction (1). It has been estimated that approximately 10% to 20% of chronic abdominal pain originates from the abdominal wall itself (2,3), with the most common cause of abdominal wall pain being anterior cutaneous nerve entrapment syndrome (ACNES). ACNES was first described by Applegate (4,5). In those reports Applegate suggested the cause of the abdominal pain is nerve entrapment/irritation by intra- or extra-abdominal pressure or by postoperative scar tissue formation resulting in pain.

From an anatomical standpoint, after exiting the spinal neuroforamin, the thoracic intercostal nerves from T9 to T12 split to form the subcostal nerves located between the internal and transverse abdominis muscles and the lateral cutaneous nerves which course along the external oblique muscle, ultimately penetrating the rectus sheath forming the anterior cutaneous nerves. Any of these superficial cutaneous nerves are at risk for axonotmesis and neuroma formation in the perioperative setting (6). Since both the deep subcostal nerves, and the more superficial lateral cutaneous nerves, originate from the neuroforamin, it is possible to provide interventional treatment for anterior wall pain with greater anatomic certainty than if the problem were approached at the peripheral source of pain. We are reporting a case of diagnostic thoracic transforaminal local anesthetic injection followed by pulsed radiofrequency thermocoagulation of the thoracic dorsal root ganglion (DRG) for a patient with chronic anterior abdominal wall pain resulting in excellent relief.

A 33-year-old, right-handed white female was referred by the surgery department for management of ongoing abdominal pain. She stated her pain began after having laparoscopic ventral hernia repair 4 years ago. Previously, the pain would be intermittent but recently had become continuous with no less than 6 out

of 10 on the visual analog scale (VAS). The pain was described as stabbing and sharp with electrical sensations mainly over the hypogastric region and occasionally radiating to the back. Previous medications and treatments had not improved the pain rating and no diagnostic modality could identify a visceral or anatomic source. The patient also had 4 to 5 episodes of nausea and vomiting, sans blood, every day. Recently, she had taken a leave of absence from her job as a teacher because of constant pain and GI symptoms.

Her past medical history is positive for hypothyroidism controlled by medication. She recently developed mild, chronic pain-related depression and was undergoing treatment with marginal improvement in her mental outlook. The subject reported several abdominal surgeries including right hemi-colectomy for colon cancer in 2002, lysis of adhesions in 2003, 3 C-sections, appendectomy, cholecystectomy, and laparoscopic ventral hernia repair in 2008. She also reported several diagnostic procedures including esophagogastroduodenoscopy, abdominal and pelvis CT scans, and exploratory laparoscopy. All of these tests were inconclusive as to the source of pain. A small bowel follow-through revealed a mild tear proximal to her enterocolonic anastomosis while an MRI of the thoracic and lumbar spine was inconclusive as well. She was trialed on antacids, proton pump inhibitors, and prokinetic medication with no beneficial effect from any. In addition, opioids, antiepileptic, and antidepressant medication for neuropathic pain were either poorly tolerated or not helpful for the pain.

We suspected ACNES based on history and exam and proceeded with a transforaminal local anesthetic injection at the T10–T11 level. After informed consent was obtained, diagnostic bilateral transforaminal injections were performed using 0.25% bupivacaine under fluoroscopic guidance (7). The patient tolerated the procedure well and, upon examination approximately 30 minutes after the procedure, she reported a 70% decrease in her pain on both sides. Based on these results, bilateral T10 and T11 pulsed radiofrequency thermo-

coagulation was performed. At 6 weeks and 10 weeks follow-up the patient reported pain of one out of 10 on VAS. She resumed employment as a teacher. At 10 months she was still experiencing pain relief.

Chronic abdominal wall pain is among the most common patient complaints seen by primary care doctors, surgeons, gastroenterologists, and pain physicians. While there are many conditions which result in referral of abdominal pain to an interventional pain center, it has been estimated that 10% to 30% of such referrals may have ACNES (4). With regard to chronic abdominal wall pain, women appear 4 times more likely to be affected than men (4:1) (8), the reasons for this are unclear. Individuals between the ages of 30 to 50 years old are more commonly affected (8) as well. From a physical perspective, patients with ACNES usually have maximal point tenderness over one of the exit sites which perforates the rectus abdominis sheath. Carnett's test, abdominal wall pain with raising the head and feet 6 inches from the table simultaneously is a physical exam sign that has been applied to diagnose ACNES. The perforator branches arise from the T8-T12 spinal levels (10,11).

Precise localization of pain and positive Carnett's test is regarded as diagnostic for ACNES (12). Pain relief by injection of 1 to 2 mL of local anesthetics to the point of maximal tenderness also confirms this diagnosis. In our case, tenderness was diffuse and Carnett's test was not confirmatory. We made the diagnosis of ACNES based on a history of multiple abdominal surgeries and pain relief after diagnostic bilateral T10 transforaminal injection.

Treatment options for ACNES include oral opioids, neuropathic pain medicine, local injection to maximal point of tenderness, and release of the entrapped nerve. Our patient was intolerant of oral opioids and neuropathic medication. She did not have a point of maximum tenderness to inject or to perform release for entrapment. Because of the limited options available to treat her pain, we decided to proceed with pulsed radiofrequency (RF) ablation of bilateral T10 and T11 DRG, which has previously been successfully used for post thoracotomy pain (13).

RF is a neuroablative technique which produces controlled tissue damage (thermocoagulation) using

heat. Currently 2 types of RF therapy are widely in use; continuous RF and pulsed RF. Continuous RF uses a constant output of high frequency current to produce temperatures of 45° centigrade or more (commonly as high as 80°C), resulting in neuroablative thermocoagulation (14). Pulsed RF delivers a clinically significant current density flow to the nerve without concomitant dramatic increases in temperature. It also prevents the development of a histologically visible lesion by delivering the current in brief pulses (15). Regardless of the amount of heat produced, a radiofrequency current appears to have therapeutic benefit at the targeted nerve tissue (15). Pulsed RF has been used successfully in several painful conditions, including cervical radicular pain, SI {sp} joint pain, facet arthropathy, shoulder pain, radicular pain, groin pain, and many painful conditions caused by peripheral nerves (16). Pulsed RF of the DRG has been less commonly reported, hence the relatively novel nature of the current observation. This technology has been successfully applied to produce analgesia in chronic segmental thoracic pain (17) and in post thoracotomy pain (13). Like these thoracic chest wall pain syndromes, we are reporting the use of pulsed RF for underdiagnosed abdominal pain that is certainly difficult to treat. This case report offers another treatment option for neuropathic abdominal wall pain.

Pravardhan Birthi, MD
Fellow in Pain Management
University of Kentucky
Department of Anesthesiology
Lexington, KY, 40536
pravardhanbirth@gmail.com

Derek Calhoun, APRN
University of Kentucky
Department of Anesthesiology
Lexington, KY, 40536
derek.calhoun@uky.edu

Jay S. Grider, DO, PhD
University of Kentucky
Department of Anesthesiology
Lexington, KY, 40536
jsggrid2@uky.edu

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