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Letters to the Editor

LETTER TO THE EDITOR

Dorsal Root Ganglion Stimulation to Treat Persistent Abdominal Pain After Bypass Surgery

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Dear Editor,

Persistent postsurgical abdominal pain is a complication of Roux-en-Y gastric bypass surgery that affects up to 15% of patients [1]. Persistent pain after bypass often has typical components of visceral pain [2]. Chronic visceral pain from pancreatitis has been treated with conventional spinal cord stimulation (SCS) with some success [3]. Dorsal root ganglion stimulation (DRGS) is a neuromodulation modality that may be able to more directly inhibit nociceptive transmission when compared with traditional SCS [4,5]. DRGS has been demonstrated to be effective in the treatment of persistent postherniorrhaphy pain [6].

A 49-year-old female presented at our institute with epigastric pain radiating to the upper low back. She described the pain as sharp, stabbing, "shooting through her body to her back," and rated the pain 10/10 on visual analog scale. The pain worsened with any type of movement.

Her abdominal pain had originally started following a Roux-en-Y gastric bypass surgery in 2011. She underwent two exploratory surgeries within six months of the initial surgery to discover and address the underlying cause of her pain. After the second exploratory surgery, with lysis of adhesions, she was asymptomatic, until the pain returned seven years later. Her abdominal pain then worsened progressively over the course of several months, resulting in multiple emergency room visits and three hospitalizations for pain management. She had an extensive workup that did not demonstrate any new findings requiring surgical intervention. An upper gastrointestinal barium swallow series demonstrated contrast entering the excluded portion of the stomach/limb of the bypass, consistent with dehiscence of the gastric suture line, but her gastrointestinal surgeon did not recommend surgical repair. Magnetic resonance imaging of the lumbar and thoracic spine were also performed; these did not reveal an underlying spinal cause of her pain. During the hospital admission, she underwent a diagnostic celiac plexus block followed by a celiac plexus neurolysis with phenol. The neurolysis provided temporary relief of part of her epigastric and back pain. She was discharged from the hospital after the celiac plexus lysis procedure and was referred to our practice for further care.

At presentation, she had been out of work as a police officer for four months and was maintained on hydromorphone 4 mg four times a day. We attempted to improve pain control by switching her hydromorphone to different opioid medications (oxycodone/acetaminophen, morphine sulfate, methadone) and neuropathic medications (gabapentin, pregabalin), with no significant improvement in pain control, quality of life, or functional capacity. We also referred her for a second surgical opinion; surgical intervention was again not recommended. At this point, we proposed a DRGS trial as an off-label option considering the patient's persistent debilitating

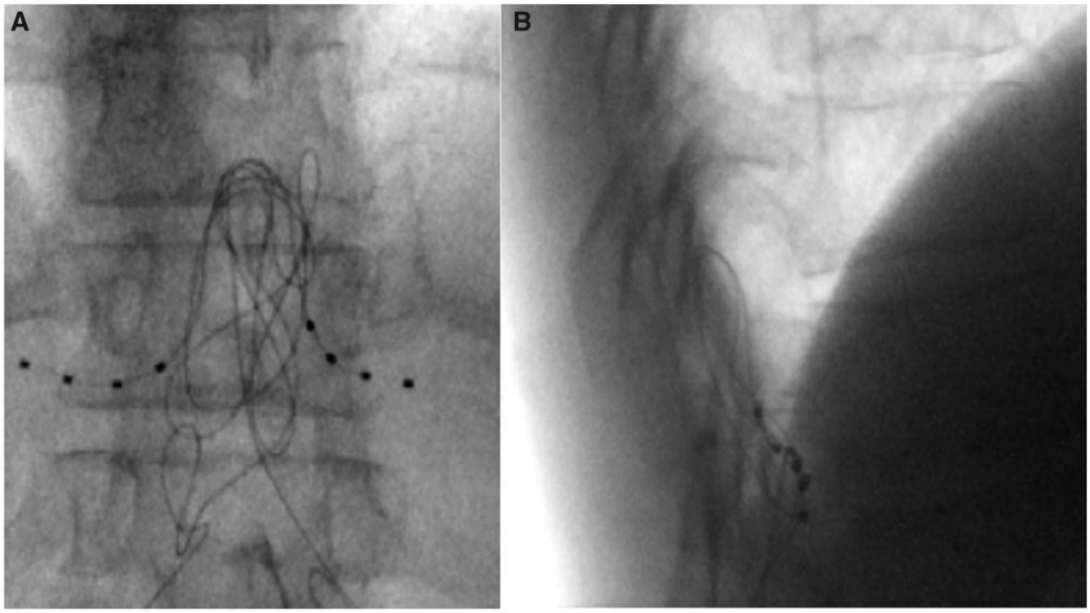

Figure 1. A) Anterior–posterior fluoroscopic image of bilateral T11 dorsal root ganglion stimulation leads (Proclaim, Abbott, Chicago, IL, USA) and (B) lateral fluoroscopic image of bilateral T11 dorsal root ganglion stimulation leads.

abdominal pain. The patient decided to proceed and underwent a bilateral T11 DRGS trial (Figure 1), resulting in 90% pain relief during the one-week trial with concomitant improvements in functional capacity. Subsequent DRGS implantation at the bilateral T11 DRGs was performed without incident. Her stimulator was set at a frequency of 16 Hz, with a pulse width of 260 ms and an amplitude of 0.360 mA. One month after implantation, she had stopped using any opioid medication, and she returned to her work in the police force the subsequent month. At six-month follow-up, she was continuously experiencing ~90% pain relief, had decreased disability (Oswestry Disability Index from 78% at baseline to 10%), and had increased quality of life (SF-36 mental component score from 20.9 at baseline to 58.0; SF-36 physical component score from 15.5 at baseline to 58.1).

Persistent abdominal pain is a common complication after bypass surgery and can be refractory to treatment [1]. Upon literature review, we encountered one other case report on DRGS for chronic abdominal pain. Justiz and Smith reported on the successful treatment of chronic abdominal pain due to hereditary pancreatitis with T8/T10 DRGS [7]. Consistent with our case, the authors suggested that midthoracic DRGS may be a novel approach for management of chronic abdominal pain. Before case reports on DRGS for chronic abdominal pain, it was reported that thoracic dorsal nerve root stimulation using conventional SCS electrodes could be effective in the treatment of abdominal postsurgical pain syndromes [8].

Our patient presented with back pain in the upper low back, in addition to upper abdominal pain. We interpreted her back pain as referred pain from a likely

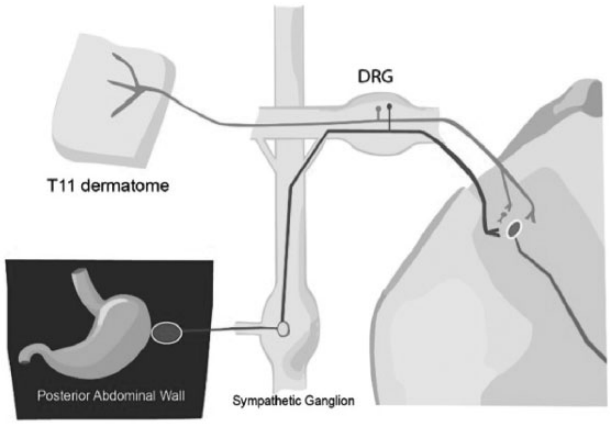

Figure 2. Schematic representation of innervation and assumed mechanism of action of dorsal root ganglion stimulation in treatment of chronic pain after bypass surgery.

visceral cause of her persistent pain syndrome, considering her positive response to celiac plexus blocks. Upper gastrointestinal ulcers have been described to cause referred pain in the lower back through convergence [9], and back pain is well described in the context of chronic pancreatitis. Pain from abdominal viscera is transmitted to the central nervous system via both vagal and spinal pathways. The T8-T12 DRGs have been shown to contain the greatest number of sensory neurons from the esophagus and stomach [10]. Our assumption was that using DRGS close to the junction of somatic and visceral convergence would be an optimal mode to inhibit her pain transmission, and the observed clinical effect seems consistent with that theory (Figure 2).

For chronic postsurgical visceral abdominal pain, splanchnic, celiac, or hypogastric plexus blocks and potentially neurolysis can provide relief. However, these procedures may lose their therapeutic effect and are not without risk when repeated over time. In this case report, we demonstrated that DRGS may be a longer-term treatment option for postsurgical visceral abdominal pain. Treatment with DRGS at the T11 resulted in almost complete pain relief and return of functional status to normal levels based on her Oswestry Disability Index and SF-36 scores. We were able to achieve this clinical result with low-frequency subthreshold stimulation. Larger-scale prospective studies exploring the application of DRGS in patients with abdominal visceral pain syndromes may help corroborate a potential role for DRGS in this area.

Acknowledgments

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Letter to the Editor

Ultrasound Imaging for a Rare Cause of Postpartum Forearm Pain: Diffuse Enlargement Rather than Focal Swelling of the Deep Branch of the Radial Nerve

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