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TRANSIENT DORSAL CORD SYNDROME AFTER SPLANCHNIC NEUROLYSIS: A CASE REPORT

Haijun Zhang, MD[1], Tony Lo, DO[2], and Kent H. Nouri, MD[2]

Background: Image-guided splanchnic neurolysis has been performed for decades to relieve abdominal pain due to cancer. Severe complications associated with the procedure are rare but could happen. Different from the previously reported cases of paraplegia due to anterior artery (cord) syndrome, here we presented a case of transient dorsal cord syndrome involving bilateral lower extremities after splanchnic neurolysis.

Case Report: The patient had numbness and impaired proprioception of both legs, ataxic gait, and bowel and bladder dysfunctions shortly after bilateral splanchnic neurolysis. Magnetic resonance imaging of the spine shows new abnormal signals in the dorsal column. Based on the presentations and image findings, the diagnosis of dorsal cord syndrome was made. The majority of the symptoms were resolved in 2 weeks after the treatment of oral steroids and physical therapy.

Conclusions: Severe neurological complications could happen after image-guided splanchnic neurolysis. Close motoring, early imaging, and multidisciplinary collaboration with different services are strongly recommended to promote a speedy recovery and prevent a permanent deficit.

Key words: Paraplegia, dorsal cord syndrome, splanchnic neurolysis, cancer pain, case report

BACKGROUND

Splanchnic neurolysis is an effective procedure commonly performed to relieve abdominal pain secondary to pancreatic cancer (1,2). Although it is a relatively safe procedure, complications after the procedure have been reported. The most common complications are diarrhea (28%), postural hypotension (31%), weakness or numbness in the T10-L2 distribution (8%), lower chest pain (3%), failure of ejaculation (2%), pneumothorax (2%), difficult urination (1%), and retroperitoneal hematoma (1%) (3,4). More severe complications, such as paraplegia or paralysis, are extremely rare. Different from the previously reported cases of paraplegia due to anterior artery (cord) syndrome, here we reported a case of transient dorsal cord syndrome involving bilateral lower extremities after splanchnic neurolysis.

As per institutional review board (IRB) review requirements, this case report is exempt from IRB review as it is devoid of patient-identifiable information. A waiver of patient-informed consent was obtained from the IRB.

CASE PRESENTATION

The patient is a 61-year-old man with a history of pancreatic adenocarcinoma status post Whipple surgery and chemotherapy with possible recurrence. He presented with persistent abdominal pain worse on the right side and back pain not amenable to conservative approaches, including medications, and was referred to our service for bilateral splanchnic neurolysis. His lab results were normal and an abdominal computed tomography showed postsurgical changes compatible with the Whipple procedure and an interval increase

From: [1]Rutgers University, New Jersey Medical School, Department of Anesthesiology, Newark, NJ; [2]The University of Texas, MD Anderson Cancer Center, Department of Pain Medicine, Houston, TX

Corresponding Author: Haijun Zhang, MD, E-mail: haijun.hj@gmail.com
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in size and density of the soft tissue density within the surgical bed (Fig. 1). Splanchnic neurolysis was done following our standard protocol. Once the patient was placed in the prone position and his back was prepped with chlorhexidine, a 22G 5-inch spinal needle was placed under fluoroscope guidance through a posterior oblique approach to the inferior-anterior portion of the T12 vertebral body on each side. Iodine contrast was injected to confirm the proper needle placement by showing the spread along the anterior border of T12 (Fig. 2). After negative aspiration a test dose of 10 mL 2% chloroprocaine was injected on each side and significant pain relief was reported by the patient after 15 minutes. No sensory or motor deficit of lower extremities were detected. At this point, 8 mL of 98% ethyl alcohol was injected slowly on the right side first without issue. When the alcohol injection was repeated on the left, the patient experienced a burning sensation on his left flank, so the procedure was immediately stopped with only 3 mL ethyl alcohol infused on that side. The patient remained hemodynamically stable with good pain relief and no apparent motor or sensory deficit on multiple exams over 2 hours in the recovery room before discharge.

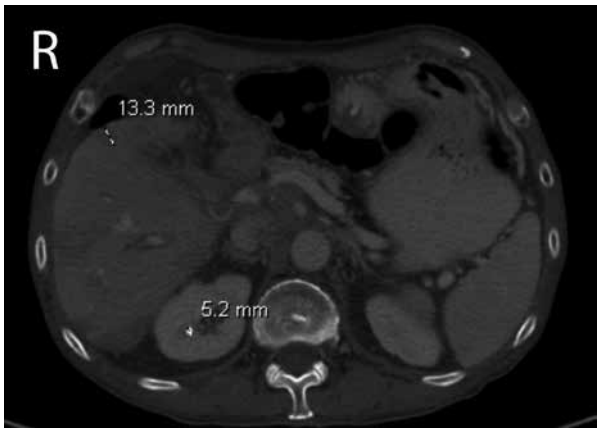

Fig. 1. CT scan of abdomen. CT: Computed tomography; R: Right side.

On postprocedure day one, we were notified by the patient that he had difficulty with ambulation, urination, and bowel movements and was instructed to follow-up in the clinic immediately. On exam, his sensation was decreased below T12/L1 dermatomes bilaterally with saddle anesthesia and strength was noted to be 5/5 in all groups of bilateral lower extremities. Impaired proprioception of both legs and ataxic gait were noticed as well. The patient required the assistance of a rolling walker to ambulate as he complained of subjective weakened hip flexion bilaterally; however, the neurological exam did not show weakness and his gait slowly improved while walking with the assistance during the clinic evaluation. His abdominal pain was well controlled and it was felt his symptoms may be attributed to a transient sensory block from local anesthetics, and he was discharged from the clinic and instructed to contact us if his condition remained unchanged or worsened. Two days after the procedure, the patient was sent to the emergency department by his oncologist for increased difficulty of walking and worsening back pain. His numbness in the lower extremities remained the same. A magnetic resonance imaging (MRI) of the thoracic and lumbar spine showed a T2 hyperintense signal along the left and right dorsal aspect of the cord from T10 through T11 (left greater than right) and focal signal abnormality within the gray matter at T10, suggesting infarction vs inflammation (Fig. 3). Neurosurgery and neurology services were consulted and a diagnosis of dorsal cord syndrome due

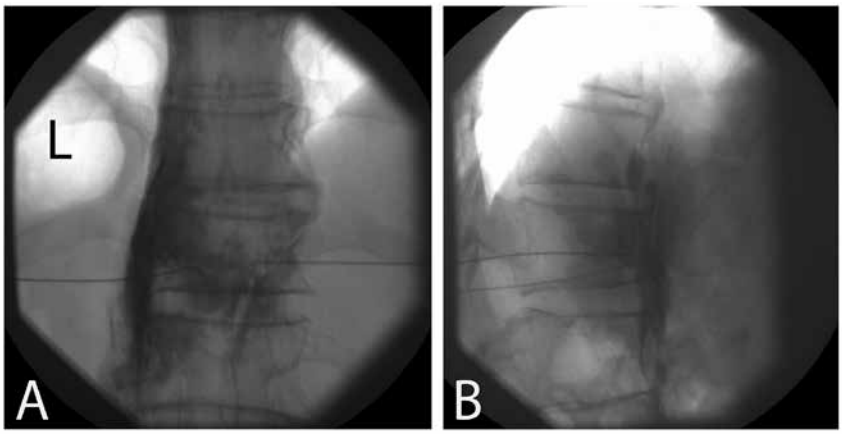

Fig. 2. Fluoroscopic images of splanchnic neurolysis with anteroposterior (A) and lateral (B) views. Both needles were placed at the level of T12. Contrast spread was seen in retroperitoneal space. L: left side.

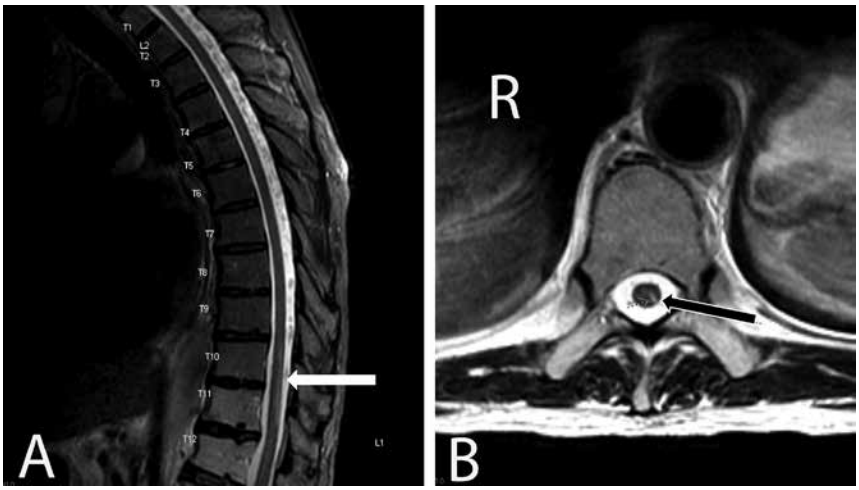

Fig. 3. MRI images of thoracic spine with sagittal (A) and axial (B) views. Abnormal signals were detected in the dorsal aspects of spinal cord from T10 to T11, left greater than right (arrows). MRI: Magnetic resonance imaging; R: Right side.

to an inflammatory reaction was made. The patient was started on oral steroids and admitted for inpatient physical therapy. By the second day of hospitalization, the patient had improved sensation in both lower extremities and resolution of his urine incontinence and constipation. By the seventh day, he continued to improve with only minor residual numbness of lower extremities and completely recovered proprioception. He was then discharged with a steroid taper and advised to continue physical therapy. At his 4 months follow-up visit, his sensation and gait were completely recovered. A new MRI showed stable hyperintensity in the dorsal spinal cord at approximately T9-T11. The patient was satisfied with the recovery following his treatment.

DISCUSSION

The greater, lesser, and least splanchnic nerves along with the preganglionic fibers from T5-T12 provide the principal contribution to the celiac plexus. The splanchnic nerves transmit a major portion of the nociceptive information from the abdominal viscera. Neurolysis of the celiac plexus/splanchnic nerves is commonly used for abdominal pain relief due to malignancies from the lower esophagus to the transversus colon (1). The safety of this procedure has been significantly improved with the image-guided technology. Severe permanent complications were rare but transient impairment of motor and sensory functions have been reported.

Here we reported a case of rare neurological complication following splanchnic neurolysis. This patient developed transient impairment of sensation, and proprioception of both lower extremities, along with difficult urination and constipation after splanchnic neurolysis. His MRI confirmed spinal dorsal column damage from T10 through T11. His clinical presentation and imaging study are consistent with dorsal cord syndrome, which typically presents with gait ataxia and paresthesia with or without constipation and difficulty emptying the bladder secondary to damage of bilateral dorsal columns, corticospinal tracts, and descending central autonomic tracts (5). While anterior spinal artery (cord) syndrome presumably due to spasm of spinal arteries, such as the artery of Adamkiewicz following splanchnic/celiac neurolysis, has been more frequently reported before (3, 6-11), dorsal cord syndrome has not been reported.

The proposed mechanisms include intrathecal or epidural infiltration of alcohol through T12 neural foramen, incidental intravascular access, and vasospasm induced by alcohol or needle manipulation. The lack of vascular intake of contrast made vascular access less likely. In general, vasospasm often affects the spinal anterior (ventral) horn resulting prominent motor deficit, which we did not see in this patient. We think that the posterior spread of alcohol infiltrating intrathecal/intrathecal space through neural foramen was the most likely cause of the spinal dorsal column and descending autonomic tracts injury in this case. Even though the injection of the testing dose of chloroprocaine did not induce any sensory impairment of both lower extremities, the following injection of ethyl alcohol may still spread retrogradely due to the increased resistance in the retroperitoneal space. It has been suggested that the total volume of the compartment containing splanchnic nerves is approximately 10 mL on both sides (12), thus limiting the injectate volume

to this amount may prevent the unwanted retrograde spread during injection.

CONCLUSIONS

Although the safety of image-guided splanchnic neurolysis has been significantly improved, complications related to the procedure cannot be completely excluded. We have presented a rare neurological complication, dorsal cord syndrome, after splanchnic neurolysis for cancer pain management. The presumed cause is the retrograde spread of the ethyl alcohol into the epidural/intrathecal space through the neuroforamen. Limiting the injectate volume may prevent this from happening. Close motoring following the completion of the procedure is recommended. Earlier imaging, such as MRI and a thorough neurological exam, may provide early detection of the severe neurological complications. Formulating a treatment plan through multidisciplinary collaboration with different services, such as Neurology, Neurosurgery, and Rehabilitation Medicine, may promote speedy recovery and prevent a permanent deficit.

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