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■ Case Report ■

Acute ureteral obstruction following superior hypogastric plexus block
-A case report-

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Pelvic visceral pain associated with both cancer and chronic benign conditions may be alleviated by superior hypogastric plexus block (SHPB). The complications of SHPB include infection, bleeding, or intravascular injection because of the adjacent location of the iliac vessel to the route of needle insertion, and pelvic visceral damage. However, acute ureteral obstruction leading to acute renal failure (ARF) as a complication of SHPB has not been reported to date in the literature. We report a patient with ARF that resulted from acute ureteral obstruction following SHPB performed for the relief of lower abdominal pain and tenesmus in metastatic ureter cancer. **(Anesth Pain Med 2014; 9: 254-257)**

Key Words: Acute ureteral obstruction, Pain, Superior hypogastric plexus.

Patients with cancer metastases of the pelvis may experience severe pain that is unresponsive to oral or parenteral opioids. Moreover, adverse effects such as excessive sedation may limit the usefulness of opioid therapy. Alternatively, since the autonomic sympathetic nervous system conveys pain from the organs in the pelvis, and pelvic cancer pain is visceral in the majority of cases, pain control can be achieved via superior hypogastric plexus block (SHPB) [1,2].

However, this procedure is associated with several complications owing to its invasive nature. The well-known complications of SHPB include infection, bleeding, or intravascular injection because of the adjacent location of the iliac vessel to the route of needle insertion, and pelvic visceral damage [3-5]. However, to our knowledge, acute ureteral obstruction leading to acute renal failure (ARF) has not been reported in the literature as a complication of SHPB. We describe a patient with ARF that resulted from acute ureteral obstruction following SHPB performed for abdominal pain relief from metastatic ureter cancer.

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CASE REPORT

A 64-year-old man who had been diagnosed with metastatic high-grade transitional cell carcinoma in the left ureter in 2011 was transferred to our pain clinic for the management of lower abdominal pain and tenesmus that had been aggravated for 2 weeks. The patient had undergone left nephroureterectomy in October 2011 and had received chemoradiation therapy thereafter. The patient had been prescribed a regimen of 100 mg/day of acetylsalicylic acid (Aspirin Protect®, Bayer Healthcare, Leverkusen, Germany) and 75 mg/day of clopidogrel bisulfate (Plavix®, Sanofi, Paris, France) for 6 months prior to stent insertion for left external iliac artery occlusive disease; he was continuing this regimen when he presented to our pain clinic. Further, he had undergone another stent insertion and balloon dilatation for inferior vena cava and common iliac vein occlusion 3 months prior to presentation.

The patient experienced dull, diffuse, and continuous lower abdominal pain with a Visual Analog Scale (VAS) of 5/10; the pain was considered visceral because of tumor extension into the pelvis. He also had severe tenesmus (VAS 8) resulting from direct tumor compression of the rectum (Fig. 1). Satisfactory pain control was not achieved with 40 mg/day of oxycodone HCL (Oxycontin CR®, Mundipharma Korea, Seoul, Korea), a 25 μg/h transdermal fentanyl patch (Durogesic

D-trans®, Janssen Korea, Seoul, Korea), and 5 mg (3 or 4 times/day as necessary) of oxycodone IR (IR Codon®, Mundipharma Korea, Seoul, Korea). Therefore, we decided to perform SHPB for sufficient pain control. Clopidogrel therapy was discontinued 7 days before the block was performed. Aspirin therapy was maintained, as suggested in the American Society of Regional Anesthesia and Pain Medicine (ASRA) 3rd edition guideline [6]. The pre-procedural coagulation test results were unremarkable.

The patient was placed in a prone position with a pillow beneath the iliac crest to flex the lumbar spine gently and to facilitate opening of the space between the transverse process of L5 and the sacral alae. The L5–S1 interspace was identified under C-arm fluoroscopy. The skin was prepared with antiseptic solution, and a point was identified that was 6 cm to the right of the midline at this level. The skin and subcutaneous tissues were anesthetized with 1.0% lidocaine. The fluoroscope was placed in an oblique fashion and was angled 15–20 degrees caudad to align the inferior endplates of the adjacent vertebra and to visualize the disc space clearly. A 22-gauge, 120 mm disposable nerve block needle (K-3 Lancet point, Unisis Corp., Tokyo, Japan) was then inserted through the previously anesthetized area and was advanced with fluoroscopic guidance in a slightly cephalad trajectory. After entry into the disc space, 0.5 ml of radiopaque iohexol solution (Omnipaque®, Amersham Health, Cork, Ireland) was administered to verify the needle position within the disc on anteroposterior and lateral views. Subsequently, the needle was directed further under lateral fluoroscopy, and a 10 ml syringe with saline was attached for detecting loss of resistance. When loss of resistance was encountered as the needle passed the anterior annulus, 3 ml of iohexol was administered to verify its final position.

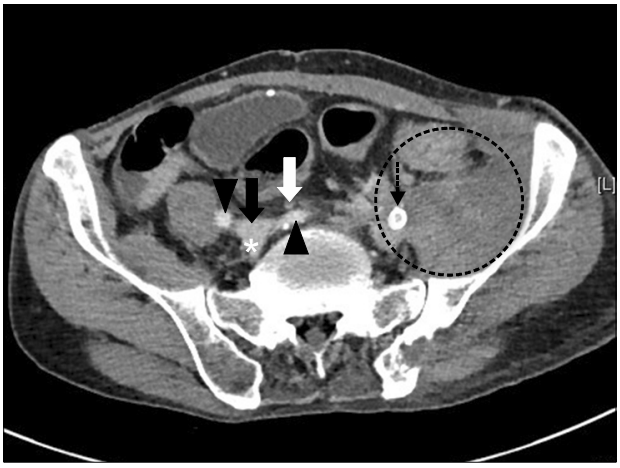

Fig. 1. CT scan demonstrating metastasis of left ureter cancer in the pelvic cavity involving the left psoas and iliacus muscles, left iliac vessels, and lymphatics (dotted circle). The right ureter (white arrow), common iliac vein (black arrow), right external and internal iliac arteries (arrowhead), stent insertion of left external iliac artery (black dotted arrow), and superior hypogastric plexus (asterisk) are shown.

In the first trial, the tip of the needle was 1 cm anterior to the vertebral body on lateral view and was slightly right-sided on anteroposterior view. We observed unexpected vertical up- and down-ward spread of contrast medium at the tip of the needle. Therefore, the needle was withdrawn to the center of the vertebral body and was reinserted medially. The iohexol would have been washed out and would not have been visible on the fluoroscopy performed during the second trial if we had punctured an artery or vein while inserting the first needle. However, the unexpected spread of contrast medium remained visible on the second fluoroscopy. Therefore, we assumed the first needle had punctured structures other than

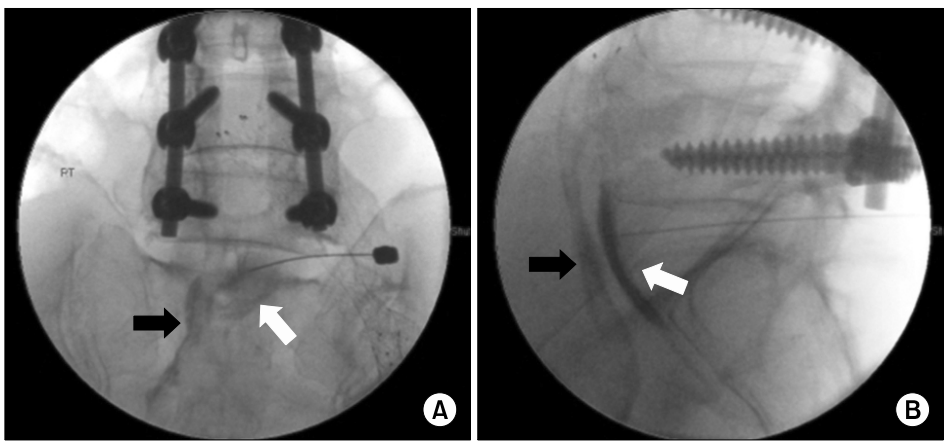

Fig. 2. Anteroposterior (A) and lateral (B) images showing proper spread of iohexol in the second trial of needle insertion (white arrow); the iohexol administered in the first trial (black arrow) is apparent in the images.

vessels (Fig. 2).

After confirming proper spread of contrast medium in front of the L5–S1 body and verifying negative aspiration tests for blood, cerebrospinal fluid, and urine, a diagnostic block was performed with 10 ml of 1% lidocaine solution. The pain decreased from VAS 8/10 to 3/10 immediately thereafter, and neurolysis was performed with 6 ml of 99.5% dehydrated alcohol 20 min after the diagnostic block. However, the patient complained of dysuria about 6 hours after neurolysis. The blood urea nitrogen/creatinine level was elevated from 14.0/1.33 to 21.6/3.44 the next day and to 30.1/4.52 at 2 days after the procedure. Right hydronephrosis was observed on abdominopelvic computed tomography (CT) (Fig. 3), and emergency ureteroscopy and retrograde pyelogram were performed for the differential diagnosis of ARF 2 days after the procedure (Fig. 4). Right ureter obstruction due to hematoma and right proximal ureter dilatation with distal lower ureteral obliteration suggestive of hematoma formation were found on ureteroscopy and radiologic examination, respectively. The dysuria disappeared with normalization of creatinine at 4 days after placement of an indwelling right double-J ureteral stent. A 6-French, 24-cm double-J ureteral stent was inserted, and the patient was discharged after a week. He returned for follow-up a week later with satisfactory pain relief (VAS 3). Currently, oxycodone HCL has been discontinued and a 12 μg/h fentanyl patch is sufficient for pain control.

Fig. 3. Right hydronephrosis (white arrow) with dilatation of the proximal ureter (black arrow) is apparent on non-contrast abdominopelvic CT; however, the limitations of non-contrast CT prevent determination of the location of the ureter in which the hematoma was formed.

DISCUSSION

Blocking the superior hypogastric plexus can be useful for alleviating both pelvic visceral pain associated with cancer and chronic benign conditions and for palliation of tenesmus resulting from radiation therapy to the rectum. Plancarte et al. [1] first described the classic bilateral posterior approach to the superior hypogastric plexus in 1990, where 2 needles were passed to lie in front of the L5–S1 intervertebral disc with the patient in the prone position. Thereafter, various methods of SHPB have been introduced in an attempt to improve efficacy and to overcome the drawbacks. Waldman et al. [7] modified the classic technique by using a single needle with CT guidance in 1991. Ina et al. [8] performed a posterior paramedian transdiscal approach in 1996, and Kanazi et al. [9] published a CT-guided unilateral anterior approach, with risk of damage to anterior structures such as the common iliac artery,

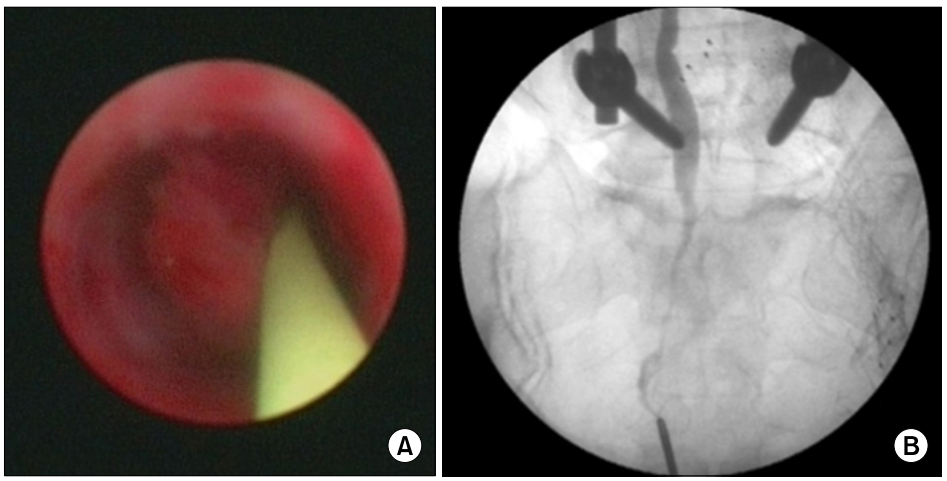

Fig. 4. A hematoma obstructing the right ureter is apparent on ureteroscopy; an indwelling right double-J ureteral stent was placed 2 days after the procedure (A). Retrograde pyelogram (RGP) (B) shows right proximal ureter dilatation with distal lower ureteral obliteration suggestive of hematoma formation. This RGP finding is identical to the iohexol spread pattern of the first trial shown in Fig. 2.

small bowel, and bladder, in 1999. Turker et al. [10] first introduced a posterior median transdiscal approach in 2005, which offers 2 significant advantages: 1) a single injection and 2) the ability to use either the prone or the lateral position. Although SHPB methods have been improved significantly, the transdiscal approach has several possible complications including discitis, disc rupture, nerve injury, bleeding or inadvertent intravascular injection, and damage to the pelvic viscera [8,10]. Anatomically, the superior hypogastric plexus is a continuation of the aortic plexus in the retroperitoneal space below the bifurcation of the abdominal aorta, and it lies on the anterior aspect of L5–S1 [11]. The ureter enters the pelvis and crosses anteriorly to the iliac vessels, which usually occurs at the bifurcation of the common iliac artery into the internal and external iliac arteries [12]. Given the anatomical relationship between the 2 structures, the possibility of ureter injury during SHPB is minimal. However, the normal anatomical structure may be deformed when pelvic visceral pain is associated with cancer, and the possibility of inadvertent complications of SHPB is increased in these cases. Since our patient had metastatic ureter cancer, the normal anatomical structure of the ureter might have been distorted and deformed. A pre-procedural CT evaluation was not performed in this case, and the last CT study had been performed 3 months before the procedure. This CT study did not show any marked displacement or distortion of the ureter (Fig. 1), which misled us about the anatomical integrity of the ureter. Consequently, although the tip of the needle was only 1 cm anterior to the vertebral body, the ureter was injured, causing hematoma formation. Additionally, continuous aspirin use and the residual effects of clopidogrel are possible explanations for the bleeding, even though clopidogrel was discontinued 7 days prior to SHPB as advised in the ASRA guideline. Injury to the unilateral ureter was sufficient to cause obstructive uropathy, which led to ARF because of the patient's post-left nephrectomy status.

Given our experience with inadvertent ureter injury, we recommend using more caution when performing SHPB in a patient with metastatic cancer because of the high possibility of deformation of normal structures. A recent pre-procedural CT evaluation should be obtained; alternatively, CT-guided SHPB is a possible option for these patients. Further, assessing the residual clopidogrel effect with the platelet function assay and thromboelastography or a change to heparin is advisable in patients receiving dual antiplatelet therapy [13].

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