

Delayed diagnosis of proximal ureter injury after a blunt abdominal trauma in Korea: a case report

Soon Ki Min, MD¹ , Byungchul Yu, MD² , Gil Jae Lee, MD² , Min A Lee, MD² , Yang Bin Jeon, MD² , Youngeun Park, MD¹ , Kang Kook Choi, MD² , Hyuk Jun Yang, MD³ 

¹Department of Trauma Surgery, Gachon University Gil Medical Center, Incheon, Korea

²Department of Traumatology, Gachon University College of Medicine, Incheon, Korea

³Department of Emergency Medicine, Gachon University Gil Medical Center, Gachon University College of Medicine, Incheon, Korea

Received: March 7, 2024

Revised: May 20, 2024

Accepted: July 7, 2024

Correspondence to

Kang Kook Choi, MD

Department of Traumatology, Gachon University College of Medicine, 191 Hambangmoe-ro, Yeonsu-gu, Incheon 21936, Korea

Tel: +82-32-460-3010

Email: choikangkook@gilhospital.com

Traumatic ureteral injuries account for fewer than 1% of traumatic urologic injuries, and those caused by blunt trauma are even rarer than those caused by penetrating trauma. The symptoms associated with ureteral injury may be subtle, with or without hematuria, making it difficult to diagnose. We report the case of a 31-year-old man with a delayed diagnosis of proximal ureter injury after abdominal blunt trauma sustained in a motorcycle traffic accident. The patient underwent emergency laparotomy on admission for liver injury, mesenteric injury, and resultant hemoperitoneum. On postoperative day 6, he underwent angioembolization for suspected remnant intra-abdominal bleeding. Persistent symptoms of flank pain and leukocytosis led to follow-up imaging studies that revealed proximal ureter injury, and the patient underwent unilateral nephrectomy. This case stresses the importance of clinical suspicion for genitourinary injuries in the presence of abdominal trauma.

Keywords: Nonpenetrating wounds; Ureter; Urinary tract; Case reports

INTRODUCTION

Ureteral injuries account for fewer than 1% of all urologic injuries in trauma patients. Traumatic urologic injuries, except obvious injuries to the kidney and bladder, are often overlooked in severely injured trauma patients because of their low priority in resuscitation. Ureteral injuries are difficult to diagnose because they do not all present with hematuria [1–5]. Failure to make a timely diagnosis may lead to adverse outcomes. Herein, we report the case of a 31-year-old male trauma patient with a delayed diagnosis of ureteral injury.

CASE REPORT

A 31-year-old male motorcycle driver experienced an accident while driving in the rain and was transferred to the trauma bay. The patient was initially hypotensive, with a blood pressure of 85/57 mmHg. The extended focused assessment with sonography in trauma (eFAST) examination exhibited positive results at the Morrison pouch and the right chest, indicative of hemoperitoneum and pneumothorax. Right pneumothorax was confirmed with chest x-ray, and right closed thoracostomy was immediately performed. The patient was responsive to resuscitation, and whole-body computed tomography (CT) scans were taken according to protocol. An abdominopelvic CT revealed

grade 1 hepatic laceration and active bleeding in the small bowel mesentery (Fig. 1). Other injuries included right-sided rib fractures with pneumothorax, a sacral fracture, and multiple fractures of the transverse processes of the lumbar spine. Immediately after imaging studies, the patient was transferred to the operating room for damage control surgery. Following exploratory laparotomy, the bleeder vessel of the mesentery was identified and ligated. The viability of the small bowel fed by the damaged mesentery was intact without the need for resection. The operation ended without any surgical manipulation of the bowel continuity.

After the initial surgery, the patient complained of unresolving right-sided pain, which later was localized in the right flank with mild fever and leukocytosis (body temperature, 37.5 °C; white blood cell count, 10,450 cells/ μ L), and a follow-up CT scan was taken on postoperative day (POD) 5 (Fig. 2). The CT scan showed fluid collection in the right side of the abdomen with a blush of contrast media suggestive of remnant bleeding. Interventional radiology was consulted for angiography and embolization, which the patient underwent the next day. The angiographic findings suggested no active bleeding at the suspected location; however, there was a pseudoaneurysm at the distal

branch of the ileocolic artery. The inflow and outflow of the pseudoaneurysm vessel were embolized, and a completion angiography was done to confirm successful embolization. The patient, however, continued to complain of right flank pain. A review of the formal report of the CT taken on POD 5 suggested the fluid collection to be a urinoma, and CT urography was performed on POD 8. The delayed-contrast enhanced images (10 minutes, 1 hour) of CT urography revealed increased fluid collection in the right retroperitoneal space with contrast blush, right hydronephrosis, and retention of the contrast media in the right kidney, suggestive of a retroperitoneal genitourinary tract injury (Fig. 3).

The following day, the patient was taken to the operating room, and a urologist performed a retrograde pyelogram, which revealed a discontinuity of the right ureter. An attempt was made to insert an open-end ureteral catheter along the suspected damaged ureter to guide the search intra-abdominally, but the catheter insertion failed to advance beyond the point of discontinuity. A laparotomy, followed by careful dissection of the right kidney, revealed a right proximal ureter injury with complete transection. Ureter repair could not be achieved due to prolonged in-

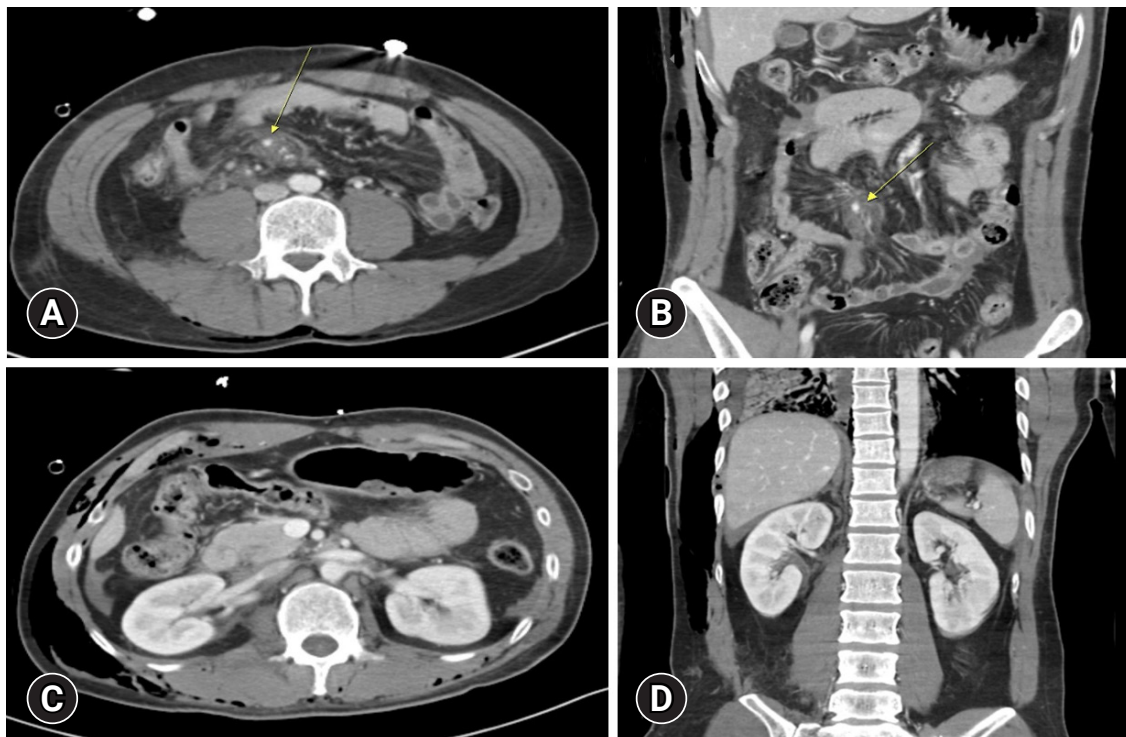


Fig. 1. Abdominopelvic computed tomography (CT) scan images taken on the admission day with portal phase only. (A) Axial view of the initial CT scan shows the mesenteric vessel injury (arrow). (B) Coronal view of the initial CT scan shows the mesenteric vessel injury (arrow). (C) Axial view of the initial CT scan shows a minimal amount of fluid in the right perirenal space. (D) Coronal view of the initial CT scan shows a minimal amount of fluid in the right perirenal space.

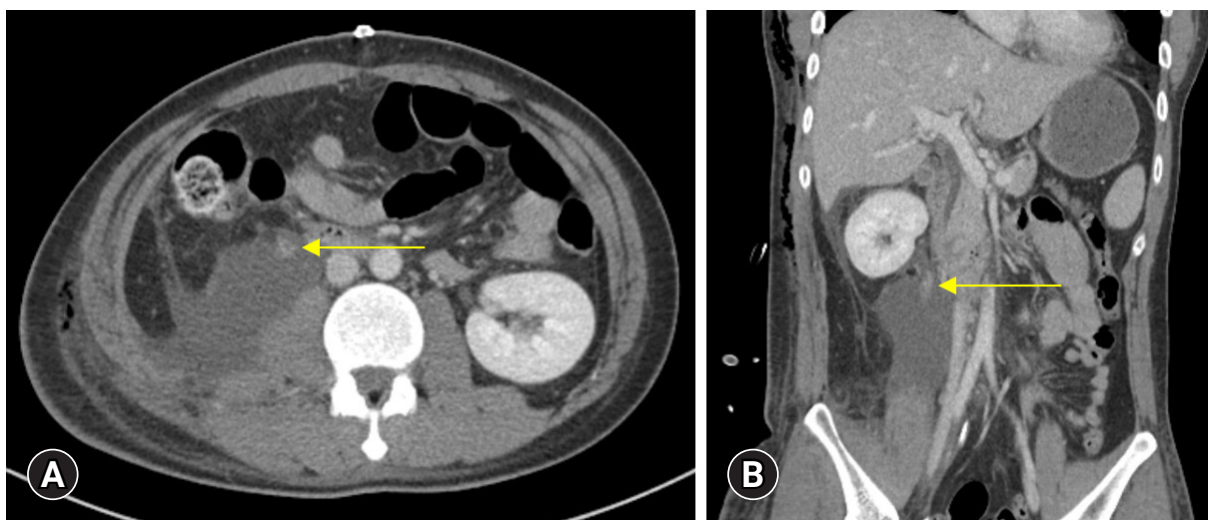


Fig. 2. Follow-up abdominopelvic computed tomography (CT) taken on postoperative day (POD) 5 with portal phase only. (A) Axial view of the POD 5 CT scan shows contrast blush, suspected to be leaking from the initial injury of the small intestinal mesentery (arrow). (B) Coronal view of POD 5 CT scan shows contrast blush, suspected to be leaking from the initial injury of the small intestinal mesentery (arrow).

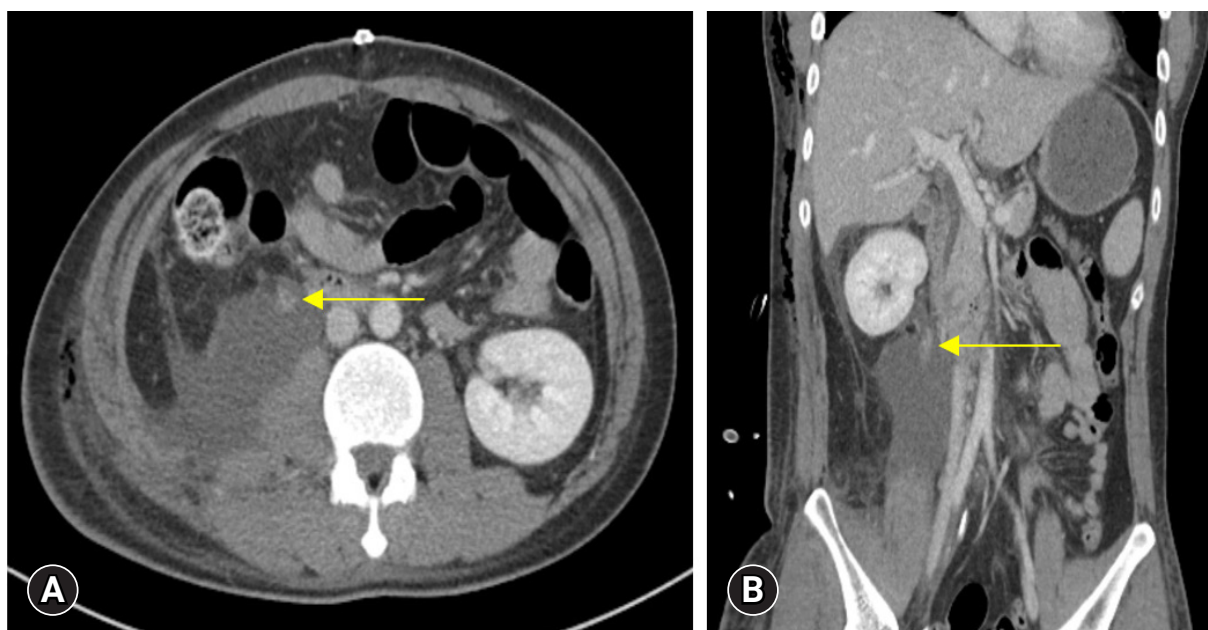


Fig. 3. Computed tomography (CT) urography taken on postoperative day 8 with pre, arterial, portal, and delayed phases. (A) A 1-hour delayed axial view of the CT urography shows contrast retention in the right kidney in comparison to the left kidney (arrow). (B) A 10-minute delayed topogram of CT urography shows the intact left ureter as compared to the nonvisible right ureter with contrast media retained in the right kidney parenchyma (arrow).

flammation; thus, nephrectomy was performed. Postoperatively, the patient recovered without further urologic complications and was discharged days later.

Ethics statement

This study was approved by the Institutional Review Board of

Gachon University College of Medicine (No. GCIRB2024-054), which waived the requirement for informed consent.

DISCUSSION

In patients with traumatic torso injuries, urologic injuries (espe-

cially ureteral injuries) are often overlooked. Unless otherwise suspected because of urologic symptoms such as hematuria or confirmed with imaging studies, they take low priority in diagnosis while resuscitating hemodynamically unstable patients [1–5]. In addition, the anatomical location of the ureter makes the likelihood of injury less suspect because it is protected in the retroperitoneum by the bony pelvis, psoas muscles, and vertebrae [2,5]. The diagnosis of ureteral injury is even less likely if the mechanism of injury is blunt trauma [1–5].

The diagnosis of ureteral injury should be suspected and evaluation initiated when there is a direct injury towards the genitourinary tract by penetrating injuries or when there are clinical indicators such as hematuria, abdominal/flank pain, and altered genitourinary sensorium. However, clinical indicators are often unreliable in predicting ureteral injuries. Moreover, in cases of polytrauma, initial CT scans without delayed-contrast enhanced images often fail to successfully diagnose ureteral injuries. Initial CT findings such as perinephric stranding, low-density fluid around the kidney and ureter, and perinephric hematoma should direct physicians to evaluate further [3,4]. In this case, the clinical indicators, especially hematuria, came back negative on urinalysis on POD 8, which proved their unreliable nature in predicting ureteral injuries. However, the right-sided torso pain, which was later localized as flank pain, accompanied by perinephric injuries could have been important clues to such a diagnosis.

Clinical suspicion is of utmost importance in the early diagnosis of ureteral injuries. It is important not only to look for clinical indicators but also to consider the possibility of hidden injuries close to the obvious injuries, such as those encircling genitourinary tracts. Although other major organ injuries take precedence over ureteral injuries in times of hemodynamic instability, a secondary review of the urologic system is important after the patient's status stabilizes whenever there is a possibility of urologic injuries.

ARTICLE INFORMATION

Author contributions

Conceptualization: all authors; Writing—original draft: SKM, KKC; Writing—review & editing: all authors. All authors read and approved the final manuscript.

Conflicts of interest

Gil Jae Lee is the Editor-in-Chief, Min A Lee is the Associate Editor, and Kang Kook Choi is an Editorial Board member of *Journal of Trauma and Injury*, but were not involved in the peer reviewer selection, evaluation, or decision process of this article. The authors have no other conflicts of interest to declare.

Funding

The authors received no financial support for this study.

Data availability

Data sharing is not applicable as no new data were created or analyzed in this study.

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