



## Isolated renal pelvis rupture secondary to blunt trauma: Case report

Kerem Taken<sup>a,\*</sup>, Mehmet Reşit Oncü<sup>b</sup>, Müslüm Ergün<sup>c</sup>, Recep Eryılmaz<sup>c</sup>, Mustafa Güneş<sup>a</sup><sup>a</sup> Urology Department of Medicine Faculty, Yüzüncü Yıl University, Van, Turkey<sup>b</sup> Emergency Department of Medicine Faculty, Yüzüncü Yıl University, Turkey<sup>c</sup> Urology Department of State Hospital, Turkey

## ARTICLE INFO

## Article history:

Received 7 January 2015

Received in revised form 1 February 2015

Accepted 22 February 2015

Available online 26 February 2015

## Keywords:

Renal pelvis rupture

Blunt trauma

Surgery

## ABSTRACT

**INTRODUCTION:** Isolated rupture of the renal pelvis is a very rare condition and thus causes delays in the diagnosis of the rupture. It is most commonly seen in the setting of obstructive ureteric calculus. Other rare causes include neoplasms, trauma, and iatrogenic procedures. Diagnosis is usually established on computed tomography (CT) which demonstrates the extravasation of the contrast in the peripelvic, perinephric, or retroperitoneal collections.

**PRESENTATION OF CASE:** A 27-year-old male patient was admitted to our hospital due to multiple traumas associated with motor vehicle accidents. The patient had clear urine output. A large pelvic rupture was detected by abdominal contrast-enhanced CT and after consulting with other departments, emergency repair of the renal pelvis was performed and a ureteral stent was implanted.

**DISCUSSION:** Only a few isolated cases of pelvis rupture with resultant extravasation have been reported in the literature. The treatment of pelvic rupture should be preceded by the removal of underlying causes, followed by conservative management. However, surgical intervention should be warranted in the emergency cases presenting with the symptoms that may impede the decision-making process and in the cases whose diagnosis cannot be clarified by radiological techniques.

**CONCLUSION:** Renal pelvic injury must be considered in the differential diagnosis of blunt trauma. Surgical intervention may be necessary in some cases. We present a case who underwent surgery due to isolated renal pelvis rupture caused by blunt abdominal trauma.

© 2015 The Authors. Published by Elsevier Ltd. on behalf of Surgical Associates Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## 1. Introduction

Spontaneous rupture of the renal pelvis is well-known and is usually associated with the underlying renal disease. Moreover, spontaneous rupture of the renal pelvis in the absence of any underlying cause is extremely rare [1]. Although ruptures without predisposing factors have been described, usually they are associated with obstructive uropathy and arise from an excessive intraluminal urinary tract pressure [2]. Other rare causes include neoplasms, trauma, and iatrogenic procedure [3,4]. Diagnosis is usually established on computed tomography (CT) which demonstrates the extravasation of the contrast [5] in the peripelvic, perinephric, or retroperitoneal collections. Most commonly described phenomenon is the fornical rupture, but renal pelvis rupture without fornical rupture is extremely rare. To the best of our knowledge, only a few isolated cases of pelvis rupture with resultant extravasation have been reported in the literature

[1,6–8]. We present a case with an isolated renal pelvis rupture caused by blunt trauma.

## 2. Presentation of case

A 27-year-old male patient was transferred from another center to our hospital due to multiple traumas associated with motor vehicle accidents. The abdomen was distended. Suspicious rebound was present, and guarding was positive. Urinary catheter was present and the patient had clear urine output. The hemoglobin (Hgb) and hematocrit (Hct) levels measured in the previous center, approximately 1 h earlier, were 13.7 g/dL and 42%, respectively. In our center, Hgb was measured as 9.1 g/dL and Hct as 26.2%. Femoral and humeral fractures were seen on X-ray images. Computed tomography (CT) images showed regular renal contour. A large urinoma starting from the right perirenal area and filling the retroperitoneum was detected (Fig. 1a and b). The patient was operated on under emergency conditions in collaboration with the general surgery department. The abdomen was explored and no intestinal perforation was observed. Subsequently, the retroperitoneum was explored. Urinoma was found and was drained promptly. The kidney contour was normal and a rupture 5–6 cm in size was present in

\* Corresponding author at: Yüzüncü Yıl Üniversitesi Yerleşkesi Dursun Odabaş Tıp Merkezi Üroloji Kliniği, 65090 Tuşba-Van, Turkey. Tel.: +90 4322150470. E-mail address: [takenyyu@yahoo.com](mailto:takenyyu@yahoo.com) (K. Taken).

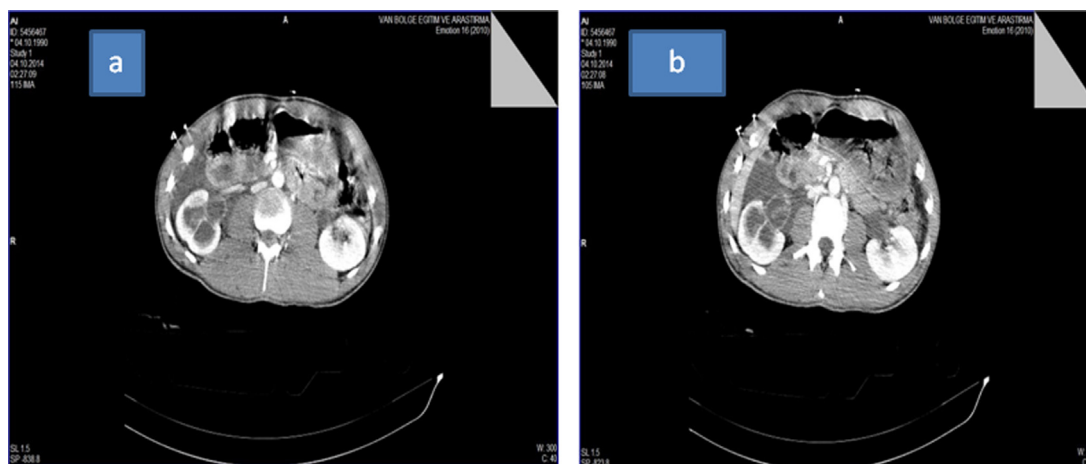


Fig. 1. a, b: Contrast CTscan-extravasation of urine from the right renal pelvis and massive fluid collection in the retroperitoneum.

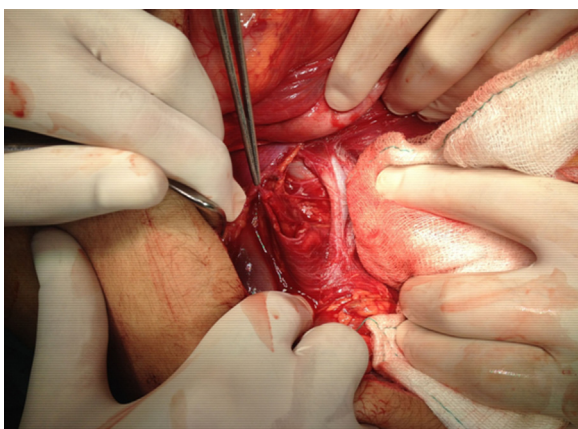


Fig. 2. Intraoperative renal pelvic rupture image after replacement DJ stent.

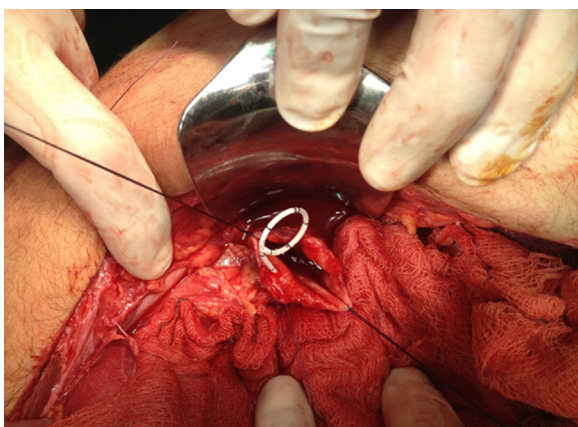


Fig. 3. Intraoperative renal pelvic rupture image after replacement DJ stent.

the extrarenal pelvis (Fig. 2). The proximal ureter was explored and the ureter was intact. A 4.7 F 26 cm-long double J stent was placed in the pelvis (Fig. 3) and the pelvis was closed with continuous 5/0 Vicryl sutures.

### 3. Discussion

Spontaneous urine extravasation from the pelvicalyceal system into the perinephric space is an uncommon condition [9]. It is most commonly seen in the setting of obstructive ureteric calculus. Other

rare causes include neoplasms, trauma, and iatrogenic procedures [2–4,9]. Most commonly described phenomenon is forniceal rupture, but renal pelvis rupture without forniceal rupture is extremely rare [9]. Urinary collecting system rupture may be caused by any process that dilates and increases the intraluminal pressure, such as stone, pelvic mass, pregnancy, retroperitoneal fibrosis or congenital anomalies (posterior urethral valve, ureteropelvic stenosis), or malignancy and vesicoureteral reflux [10,11]. In our patient, the pelvic rupture occurred secondary to blunt trauma and no other causes were detected.

Diagnosis is often difficult because gastrointestinal symptoms may prevail and often there are no urinary symptoms at all. For this reason, the correct pre-operative diagnosis may be difficult and complicated. However, an absence of hematuria does not exclude renal or collecting system injury [12]. Computed tomography does not confirm only contrast extravasation, but may also show the site of rupture. Therefore, CT is reported to be advantageous over sonography, excretory urography, and plain abdominal radiographies [4,7,9]. In our patient, the diagnosis was established by the CT. These cases may present with acute and persisting flank pain, hematuria, nausea, vomiting, fever, peritoneal irritation signs and sepsis [13]. Our case experienced blunt trauma and hematuria was negative. He had multiple traumas; the abdomen was distended, and guarding was positive. The general surgery department could not exclude the intestinal injury, and thus, the patient was considered operable.

Small-sized urinomas may be resorbed spontaneously even without drainage. Currently, spontaneous renal pelvis rupture is successfully treated by conservative methods with ureteral stent implantation [6,14,15]. The treatment success is relatively higher in the cases with delayed diagnosis and surgical intervention, those with large urinomas, and the ones that have an organic pathology that must be corrected [16]. However, surgical intervention should be warranted in emergency cases, in cases that present with the symptoms that may impede the decision-making process and in the cases diagnosis cannot be clarified by radiological techniques. In the case presented, surgical intervention was carried out due to the presence of a large urinoma and the possibility of concurrent intestinal injury. The pelvic laceration was 5–6 cm in size. A DJ ureteral stent was implanted and the rupture was closed primarily.

### 4. Conclusion

Renal pelvic injury must be considered in the differential diagnosis of blunt trauma. The diagnosis is established by

contrast-enhanced CT. Conservative management may be successful, but surgical intervention may be necessary only in some cases.

#### Conflict of interest

All authors hereby declare that they have no conflicts of interest to disclose.

#### Sources for funding

No funding was obtained for the preparation of this manuscript.

#### Consent

A written informed consent was obtained from the patient for the case report and accompanying images. A copy of the written consent is available for review by the Editor in Chief on request.

#### Authors' contribution

All authors participated in data collection, analysis, writing and editing of the manuscript.

#### References

- [1] E. Ferri, G.L. Casoni, G. Morabito, L. D'Alonzo, L. Magrini, S. Di Somma, C. Capotondi, Rupture of the renal pelvis complicating a renal colic: report of a case, *Am. J. Emergency Med.* 24 (3) (2006) 383–385.
- [2] H.L. Claashen van der Grinten, L.A. Monnens, R.P. de Gier, W.F. Feitz, Perinatal rupture of the uropoietic system, *Clin. Nephrol.* 57 (6) (2002) 432–438.
- [3] H. Paajanen, J. Kettunen, H. Tainio, et al., Spontaneous peripelvic extravasation of urine as a cause of acute abdomen, *Scand. J. Urol. Nephrol.* 27 (3) (1993) 333–336.
- [4] S. Koga, Y. Arakaki, M. Matsuoka, et al., Spontaneous peripelvic extravasation of urine, *Int. Urol. Nephrol.* 24 (5) (1992) 465–469.
- [5] S.G. Silverman, J.R. Leyendecker, E.S. Amis, What is the current role of CT urography and MR urography in the evaluation of the urinary tract? *Radiology* 250 (2) (2009) 309–323.
- [6] A. Kokter, D. Unal, G. Dilmen, et al., Spontaneous rupture of the renal pelvis caused by calculus: a case report, *J. Emergency Med.* 33 (2) (2007) 127–129.
- [7] S.D. Ashebu, Y.H. Elshebiny, M.H. Dahniya, Spontaneous rupture of the renal pelvis, *Australas. Radiol.* 44 (1) (2000) 125–127.
- [8] E.S. Diaz, F.G. Buenrostro, Renal pelvis spontaneous rupture secondary to ureterolithiasis: case report and bibliographic review, *Arch. Esp. Urol.* 64 (7) (2011) 640–642.
- [9] A. Gulati, M. Prakash, A. Bhatia, R. Mavuduru, N. Khandelwal, Spontaneous rupture of renal pelvis, *Am. J. Emergency Med.* 31 (4) (2013) 762, e1–e3.
- [10] A.H. Balcom, H. Pircom, D. Worthington, M. Carr, Spontaneous resolution of an in utero perirenal urinoma associated with posterior urethral valves, *Urology* 54 (2) (1999) 366–367.
- [11] B. Kalafatis, K. Zougkas, A. Petas, Primary ureteroscopic treatment for obstructive ureteral stone-causing fornix rupture, *Int. J. Urol.* 11 (12) (2004) 1058–1064.
- [12] M. Murawski, A. Golebiewski, L. Komasa, P. Czauderna, Rupture of the normal renal pelvis after blunt abdominal trauma, *J. Pediatr. Surg.* 43 (9) (2008) 31–33.
- [13] S. Satoh, A. Okuma, Y. Fujita, M. Tamaka, H. Nakano, Spontaneous rupture of the renal pelvis during pregnancy: a case report and review of the literature, *Am. J. Perinatol.* 19 (4) (2002) 189–195.
- [14] E. Huri, A. Ayyıldız, B. Nuhoğlu, B. Germiyanoglu, Spontaneous rupture and emergency repair of the renal pelvis, *Inter. Urol. Nephrol.* 39 (2) (2007) 413–415.
- [15] W.M. Li, C.C. Liu, W.J. Wu, Y.H. Chou, C.H. Huang, C.C. Li, Rupture of renal pelvis in an adult with congenital ureteropelvic junction obstruction after blunt abdominal trauma, *Kaohsiung J. Med. Sci.* 23 (3) (2007) 142–146.
- [16] I. Fernandez, M. Sanchez Gonzalez, Surgical treatment of the kidney pelvis spontaneous rupture, *Arch. Esp. Urol.* 51 (7) (1998) 728–730.

#### Open Access

This article is published Open Access at [sciedirect.com](http://sciedirect.com). It is distributed under the [IJSCR Supplemental terms and conditions](#), which permits unrestricted non commercial use, distribution, and reproduction in any medium, provided the original authors and source are credited.