



Dismembered pyeloplasty for post-traumatic ureteropelvic junction avulsion in a child

Faris Abushamma^{a,b,*}, Khaled Demyati^{a,c}, Abdulkarim Barqawi^{a,c}, Mosab Maree^{a,d}, Ahmad Jaradat^{a,b}, Amir Aghbar^{a,b}

^a Department of Medicine, College of Medicine and Health Sciences, An-Najah National University, Nablus, 44839, Palestine

^b Department of Urology, An-Najah National University Hospital, Nablus, 44839, Palestine

^c Department of General Surgery, An-Najah National University Hospital, Nablus, 44839, Palestine

^d Department of Radiology, An-Najah National University Hospital, Nablus, 44839, Palestine

ARTICLE INFO

Keywords:

Ureteral trauma
Dismembered pyeloplasty
Anderson-hynes
UPJ avulsion

ABSTRACT

Non – iatrogenic ureteral injury is rare because of the well-protected retroperitoneal location of the ureter with an incidence of less than 1%. Furthermore, isolated ureteropelvic junction (UPJ) avulsion as a result of acceleration/deceleration injury is extremely uncommon and may lead to significant morbidity if the diagnosis has not been made early using CT scan with delayed excretory phase. Endourological management of partial ureteric injuries is feasible, however, uretero-ureterostomy is the standard of care for complete upper ureteric injuries. We present a fourteen years old boy presented with UPJ avulsion secondary to blunt trauma treated with dismembered pyeloplasty approach.

1. Introduction

Non-iatrogenic upper ureteral injury is uncommon with an incidence of less than 1%¹ Partial ureteral injuries are usually managed by an endourological approach while complete injuries are managed by uretero-ureterostomy² Isolated ureteropelvic junction (UPJ) avulsion creates a challenge in the prospect of diagnosis and management. It is vital to have a high index of suspicion and prompt evaluation and management for such a rare entity(3). Thus, we present our approach to dealing with a child admitted to our hospital as a victim of a road traffic accident that resulted in complete UPJ avulsion which was repaired with an open approach using dismembered pyeloplasty tips and tricks.

2. Case presentation

A fourteen years old male patient involved in a road traffic accident presented to our emergency department (ED). The patient was sitting in the back seat, restrained with a seat belt, the airbag opened, when another car hit his car from the front side. Upon his presentation to ED, he was complaining of left flank pain. Ecchymosis was noted over the left flank. He had stable vital signs and clear urine upon insertion of a

urethral catheter. A trauma CT scan with intravenous contrast and delayed images showed extravasation of contrast and tiny lower pole possible laceration. The CT scan raised the possibility of complete UPJ avulsion as the ureter received no contrast at all even after 30 minutes and contrast was completely located in the perinephric space as shown in [figure \(1-A and 1-B\)](#). Moreover, small bowel wall thickening and pneumoperitoneum were noticed.

Intraoperatively, left retrograde pyelography (RGP) showed contrast extravasation at the level UPJ and the sensor hybrid guide wire was located outside the pelvicalyceal system as shown in [figure \(1-C\)](#). Exploratory laparotomy was performed and retroperitoneal access to the left kidney was established. The distal ureter was first identified as we left a stent inside it at the time of RGP. The ureter is dissected caudally and laterally using sharp dissection to get the length and minimize injury to adventitial vessels ([Fig. 2-A](#)). A vessel loop was used to easily manipulate the ureter. Gerota fascia was opened vertically and the perinephric urinoma was evacuated. De fating of the kidney and skeletonizing of renal artery and vein was performed to access the posteriorly retracted and collapsed renal pelvis. The left kidney was flipped medially so the intrarenal renal pelvis could be accessed and dissected carefully. The decision was taken to follow dismembered pyeloplasty

* Corresponding author. Department of Medicine, College of Medicine and Health Sciences, An-Najah National University, Nablus, 44839, Palestine.

E-mail addresses: farisabushamma@hotmail.com (F. Abushamma), khaleddemyati@najah.edu (K. Demyati), abdulkarim.barqawi@najah.edu (A. Barqawi), m.maree@najah.edu (M. Maree), ajaradat@najah.edu (A. Jaradat), Amir.aghbar@najah.edu (A. Aghbar).

<https://doi.org/10.1016/j.eucr.2021.101842>

Received 11 August 2021; Received in revised form 4 September 2021; Accepted 8 September 2021

Available online 8 September 2021

2214-4420/© 2021 Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

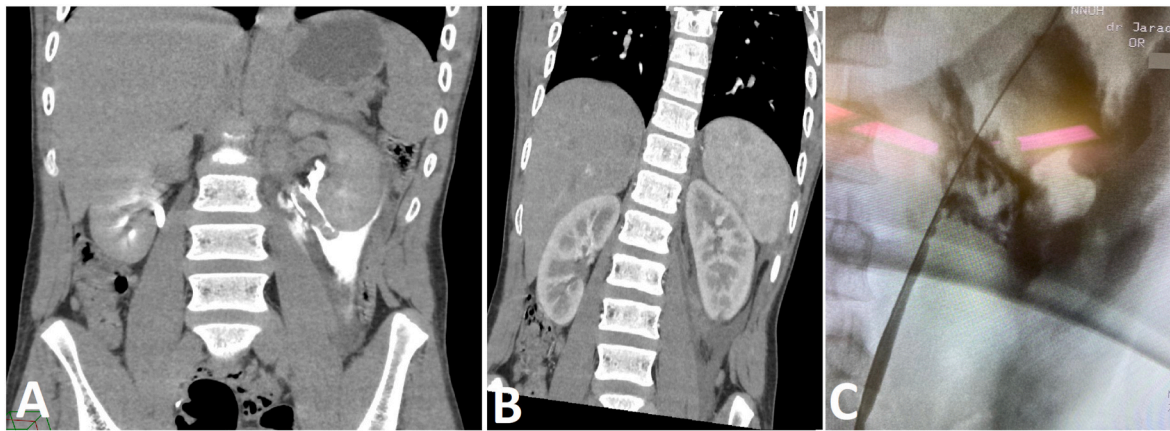


Fig. 1. Contrast imaging including preoperative CT scan and intraoperative retrograde pyelography (A) Coronal CT with delayed images shows avulsed left upper ureter manifested by complete contrast extravasation in the peri-nephric region. (B) Coronal CT-arterial phase showing possible left lower pole tiny laceration with no active bleeding. (C) Intraoperative retrograde pyelography shows complete contrast extravasation into the Gerota fascia and a sensor guide wire located outside the pelvicalyceal system.

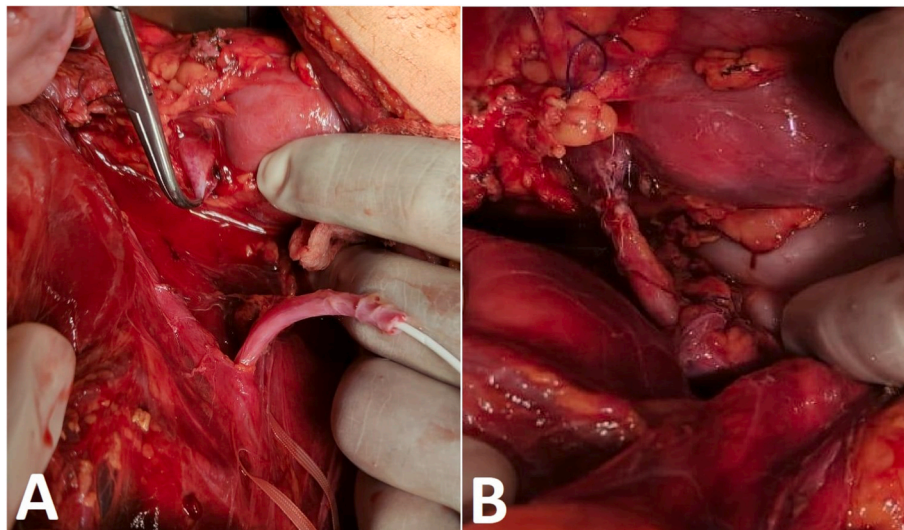


Fig. 2. Intraoperative images show (A) double J stent coming out of the proximal end of the avulsed ureter (UPJ avulsion) (B) Sealed, watertight and stented anastomosis using dismembered pyeloplasty approach.

steps to avoid perioperative and long-term complications. A stay suture of 4–0 vicryl placed in the anterior surface of the ureter after refreshing ureteric edges. Another stay suture was placed in the midportion of the anterior surface of the renal pelvis near the parenchyma. An incision was made in the renal pelvis to create a diamond-shaped defect. Cephalad and caudal angles were both ready and controllable by the anterior stay stitch. The ureter pulled toward the renal pelvis cephalad angle by traction suture to visualize the length and confirm the absence of tension of the proposed anastomosis. The ureter was spatulated along its lateral segment by Potts scissor (away from its vascular supply and the stay stitch). Apical ureteral and renal pelvis anastomosis was performed using 5-0 suture using (out: in - in: out) and the knot was tied on the outside of the collecting system. The posterior suture was run as a continuous stitch to join the posterior renal pelvis and ureter together until reaching the caudal angle. The stent then was pushed into the renal pelvis. There was efflux of urine from the stent upon filling the bladder which confirmed the good location of the distal tip inside the bladder. The anterior suture was run as a continuous stitch to join the anterior renal pelvis and ureter together until reaching the caudal angle. Both anterior and posterior sutures were joined together and the knot was done outside the collecting system (Fig. 2-B) shows anastomosis site.

sixteen French drain was inserted. Two serosal colonic tears at the splenic flexure were repaired. Also, a small bowel segment resection and primary anastomosis were performed to treat dusky and possibly ischemic small bowel segment. Drain output was minimal over the next 72 hours, then removed. The patient was discharged well on the fourth day post operation. Two weeks later, he was in the clinic with no apparent complication and he was booked for stent removal in 6 weeks.

3. Discussion

Dismembered pyeloplasty is a well-known procedure for UPJ obstruction. However, variations in techniques and even in indications have been detailed since it was originally described⁴ Anderson-Hynes' dismembered pyeloplasty was previously reported in case of pre-existing hydronephrotic renal pelvis rupture secondary to blunt trauma⁵ However, we do believe that this approach is rarely used to deal with UPJ avulsion secondary to blunt trauma in a previously normal kidney. The advantages that dismembered pyeloplasty provide over the traditional uretero-ureterostomy are wide UPJ anastomosis, less anastomotic site tension, and watertight, sealed, and stented anastomosis³

The diagnosis and management of ureteric injuries is difficult due to

the rarity of their occurrence. However, a high index of suspicion is required for the diagnosis of ureteric injuries as delayed repair may be associated with significant urine leak, urinoma, and urosepsis^{1,2,3}. In this case, the huge amount of contrast extravasating directly from UPJ and the absence of contrast in the left ureter raised the possibility of complete UPJ avulsion. Furthermore, RGP images were conclusive for UPJ avulsion, thus an open approach was followed. Nevertheless, percutaneous nephrostomy is still considered an option if surgery has to be delayed for any reason. If an open surgical approach is undertaken, complete kidney de-fattening and early identification of renal pedicle are essential in case nephrectomy is required. A posterior approach to the renal pelvis is sometimes required if we encounter a collapsed intra-renal renal pelvis.

4. Conclusion

Open dismembered pyeloplasty is a safe and feasible option in case of UPJ avulsion secondary to blunt abdominal trauma.

Ethical statement

Informed consent was taken from the patient's parents for publication of this case report and the associated images.

Funding

This research received no specific funding or grant.

Author contributions

All authors made substantial contributions to conception and design. They have all agreed to submit to the current journal; gave final approval of the version to be published; and agree to be accountable for all aspects of the work.

Declaration of competing interest

The authors have no conflicts of interest.

Acknowledgments

Thanks to Dr. Sa'ed Zyoud, Clinical Research Center of An-Najah National University Hospital, for his wise pieces of advice. Also, we would like to thank Ms Samantha Kearly from BUI, Bristol, UK for English language editing of this article.

References

1. Elliott SP, McAninch JW. Ureteral injuries from external violence: the 25-year experience at san francisco general hospital. *J Urol.* 2003;170(4 Pt 1):1213–1216.
2. Elliott SP, McAninch JW. Ureteral injuries: external and iatrogenic. *Urol Clin.* 2006;33(1):55–66. vi.
3. Dar TI, Rather MH, Khawaja AR, Mir MA, Nazir SS. Post traumatic isolated ureteropelvic junction avulsion in a child. *Current urology.* 2017;10(3):160–162.
4. Adam A, Smith GH. Anderson-Hynes pyeloplasty: are we all really on the same page? *ANZ J Surg.* 2016;86(3):143–147.
5. Gschwend JE, Sauter TW, de Petriconi R, Hautmann RE. Renal pelvis rupture after blunt abdominal trauma. *Urol Int.* 1995;55(2):108–110.