Case report

Ureteric transection with jejunal injury secondary to bicycle handle bar penetrating injury.

Abstract:

Background: Ureteric trauma is rare, occurring in <1% of all traumas. Bicycle handlebar injury is a unique trauma mechanism especially noticed in childhood.

Case presentation: We present a unique case of a 13-year-old male who sustained a penetrating abdominal injury from a bicycle handlebar. Upon initial examination there was herniation of bowel through the abdominal wound, so exploratory laparotomy was performed. There was transection of the jejunum at a distance of 10 cm from the duodeno-jejunal flexure with more than 75 % of the circumference of the jejunum and evidence of tear of gerotas fascia of left kidney and upon exploration of the retroperitoneum, there was transection of the upper one third of left ureter near the left renal pelvis with foreign body (child's cloth remnant) seen which was initiallymanaged by placement of an infant feeding tubeas a bridge between the two transected ends owing to a defect of 3 cm as a temporary emergency salvage procedure. He then underwent per cutaneous nephrostomy insertion. After 3 months, patient underwent definitive repair by left sided pyeloureterostomyover a DJ stent.

Conclusion: This case demonstrates the emergency and delayed definitive management of ureteric transection and jejunal injury secondary to penetrating bicycle handlebar injury.

Keywords:
Ureter, jejunal, bicycle, handlebar, penetrating.

Background:
Penetrating abdominal trauma secondary to bicycle handlebars is rare. Most reports regarding handlebar injuries in the literatureare related to traumatic abdominal wall hernias, solid organ injury, or bowel injury.[1-5] Likewise, ureteric injury related toexternal trauma is also rare, with even the busiest adult trauma centres typically seeing fewer than 10 cases per year.[6] Wepresent a unique case of ureteric transection and jejunal injury secondary to bicycle handlebar injury.

Case presentation:

An otherwise healthy 13-year-oldmale presented to the emergency department after a bicycle accident. Primary survey revealed tachycardia, hypotensionand Glasgow Coma Score of 10. Secondary survey was remarkable for a deep3-centimetre (cm) laceration in the left lower quadrant. There was active bleeding from the wound, with bowel herniatingthrough a fascial defect. Given these findings the patient was brought to the operating room for exploration. An exploratory laparotomy was performed via midline abdominal incision. The underlying fascial defect was found to beapproximately 5 cm.There was transection of the jejunum at a distance of 10 cm from the duodeno-jejunal flexure with more than 75 % of the circumference of the jejunum and evidence of tear of gerotas fascia of left kidney and upon exploration of the retroperitoneum, there was transection of the upper one third of left ureter near the left renal pelvis with foreign body (child's cloth remnant) seen. The jejunal injury

Comment [MA1]: The authors should re submit the presentation in more brief and sedate way and the repetitive phrases may confuse the readers, the main case presentation describe the details! Please re arrange the abstract according the journal instructions for authors!

Comment [MA2]: The authors should submit, what sort of workup done prior the decision made to operate! Usually the report should carry some lessons for the fellow junior's doctors and even those with expert! Lab., and radiological profiles! Any remarkable haematuria!

was repaired after resecting the injured segment and then handsewn anastomosis done using vicryl 3-0.The ureteric transection was initially managed by placement of a 6 Fr infant feeding tube as a bridge between the two transected ends owing to a defect of 3 cm as a temporary emergency salvage procedure as the patient was haemodynamicallyunstable. The complex abdominal wall injury was repaired primarily after placing a 32 Fr abdominal drain. Postoperatively after the patient's condition improved, he underwent Computerised Intravenous pyelography (CT-IVP) which showed a small leak near the repaired left ureter(see figures-1a-d).

So, the patient underwent ultrasound guided left sided percutaneous nephrostomy insertion after cystoscopy with retrograde pyelography also confirmed the leak from the left ureter (see figure-2). Patient was discharged after 4 weeks with percutaneous nephrostomy in situ. After 3 months of the accident, patient was then planned for a definitive surgery.Patient underwent definitive surgery through a left subcostalincision and identifying the left ureter with removal of the infant feeding tube and then ureteropyelostomy after adequate mobilisation of the left kidney and left ureterusing 3-0 polydioxanone (PDS) suture over a double-J stentand a drain left in place in the retroperitoneum (Figure-03-intraoperative image). Post-operatively the patient recovered well and was discharged five days later after the operative drain was removed. Thedouble-J stent was removed at postoperative week six with concurrent cystoscopy and retrograde ureterogram demonstratinga normal ureter with no evidence of stricture.

Discussion:

According to our review of literature, most bicycle-related incidents described in the literature deal with head trauma. Handlebar injury is also an important mechanismof bicycle-related trauma, and the associated morbidity is underappreciated. Most cases described in the literature are secondaryto blunt trauma. The most common injuries described include bowel perforation, solid organ injury, and traumaticabdominal wall hernia.[1-5]There are no studies on penetrating injuries in case of bicycle handlebar injuries. In a retrospective review by Nadler et al.,[3] 31% of children sustaining direct-impact handlebar injuriesrequired operative intervention.Ureteric injuries account for <1% of all urologic traumas,[7] with the majority being a result of penetrating trauma. Table 1data compiled from the National Trauma Database shows the varying mechanisms of ureteric injury.[8]The diagnosis and management of ureteric injury is challenging and often delayed or missed. A retrospective review of traumatic ureteric injury by Medina et al. found that only 40%of patients with ureteric injury had positive findings on preoperative imaging studies[9]. Computed tomography with delayed phase images must be included if there is any suspicion of ureteric injury. Cystoscopy with retrogradeureterogram/pyelogram isthe most accurate way of identifying ureteric injury, but may not be feasible if patient is hemodynamicallyunstable.Due to a high rate of concomitant injuries many ureteric injuries are diagnosed intra-operatively during exploration for otherreasons. This can pose a challenge for the surgeon as haemorrhage or spillage of intestinal contents can make detecting leakage of asmall amount of urine difficult. The possibility of ureteric injury should be suspected if there is violation of retroperitoneum. Approximately60% of injuries occur in the proximal ureter[10].In emergency setting if the patient is haemodynamically unstable, a unique approach of placing infant feeding tube as a bridge was used in our study. The type of operative repair varies depends on the location of the injury.Regardless of the location of injury, the basic tenets of repair always involve debridement to healthy tissue andtension-free anastomosis over a stent with absorbable suture. In our patient, a unique approach of placing an infant feeding tube to bridge the

Comment [MA3]: Please submit the images or figures announcement according the journal style!

Comment [MA4]: For evidence base, did the authors agree with such type of incision, under which guidelines they did it, what about the spleen! Please clarify for the journal readers!

Comment [MA5]: Data Compiled .....!

Comment [MA6]: The lesson from the report for the junior doctors is always important accordingly the authors should announce what other literature concluded e.g. (Genitourinary (GU) trauma is often overlooked in the setting of acute trauma due to immediate, life-threatening injuries taking precedence, a missed ureteral injury can result in significant morbidity and mortality).

Comment [MA7]: According the authors report, they should announce their findings related to the solid organs perop. Precisely!

ureteric defect was used as a temporary measure as the patient was haemodynamicallyunstable. He did undergo a definitive repair after a period of 3 months and it was successful. Thus, this case report does add a unique perspective of emergency management of ureteric injuries.

Conclusion:

A high index of suspicion is necessary for timely diagnosis of ureteric injuries.Intra-operative discovery of retroperitoneal violation warrants further exploration,with identification of ureteric trauma prompting an appropriate repair based on the location of the injury. However, in an emergency setting with hemodynamic instability, novel approaches like placing an infant feeding tube to bridge the large ureteric defect can be used to tide over the crisis.

Comment [MA8]: The authors should announce and declare any financial support (conflict of interest), IRB and institutional ethical approval (ethical statement), family patient consent and acknowledgement sections!

List of abbreviations:

DJ stent - Double-J stent.
i.v. - Intravenous.
PDS - Polydioxanone

References:

1. K.P. Debbink, D.B. Tashjian, M.V. Tirabassi, R. Gaffey, J. Nahmias; Ureteric transection secondary to penetrating handlebar injury,Trauma Case Reports,Volume 10,2017,Pages 16-18,ISSN 2352-6440,https://doi.org/10.1016/j.tcr.2017.07.002.
2. Karaman, A. Karaman, M.K. Aslan, D. Erdoğan, Y.H. Cavuşoğlu, O. Tütün, A hidden danger of childhood trauma: bicycle handlebar injuries, Surg. Today 39 (7) (2009) 572–574.
3. E.P. Nadler, D.A. Potoka, B.L. Shulz, K.E.Morrison, H.R. Ford, B.A. Gaines, The highmorbidity associatedwith handlebar injuries in children, J. Trauma 58 (6) (2005) 1171–1174.
4. J. Goliath, V. Mittal, J. McDonough, Traumatic handlebar hernia: a rare abdominal wall hernia, J. Pediatr. Surg. 39 (10) (2004) 20–22.
5. T.D. Clarnette, S.W. Beasley, Handlebar injuries in children: patterns and prevention, Aust. N. Z. J. Surg. 67 (6) (1997) 338.
6. S.B. Brandes, M.J. Chelsky, R.F. Buckman, R.M. Hanno, Ureteral injuries from penetrating trauma, J. Trauma 36 (6) (1994) 766–769
7. J.C. Presti Jr., P.R. Carroll, J.W. McAninch, Ureteral and renal pelvic injuries from external trauma: diagnosis and management, J. Trauma 29 (3) (1989) 370–374.
8. S.M. Siram, S.Z. Gerald, W.R. Greene, et al., Ureteral trauma: patterns and mechanisms of injury of an uncommon condition, Am. J. Surg. 199 (2010) 566–570.
9. D. Medina, R. Lavery, S.E. Ross, D.H. Livingston, Ureteral trauma: preoperative studies neither predict injury nor prevent missed injuries, J. Am. Coll. Surg. 186 (1998) 641–644.
10. Pereira BMT, M.P. Ogilvie, J.C. Gomez-Rodriguez, et al., A review of ureteral injuries after external trauma, Scand. J. Trauma 18 (6) (2010).

Figure Legends:

Figure-1a	CT IVP image
Figure-1b	First delayed scan CT IVP
Figure-1c	Second delayed scan-CT IVP image after clamping the drain tube.
Figure-1d	Reconstructed CT-IVP image showing left sided repaired ureteric injury by a bridging IFT and leakage of contrast through the distal part of the repair into the left perinephric drain
Figure-02	Left sided RGP image confirming leakage
Figure-03	Intraoperative image showing left ureteropyelostomy after adequate mobilisation of the left kidney and left ureter using 3-0 polydioxanone (PDS) suture over a double-J stent.
Table-1	Mechanism of ureteric injury
Table-2	Pertinent reconstructive option for repair of ureteric injury; based on location

Figures:

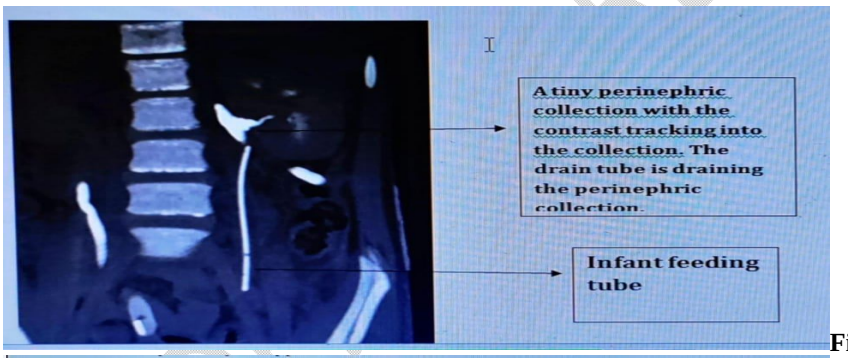
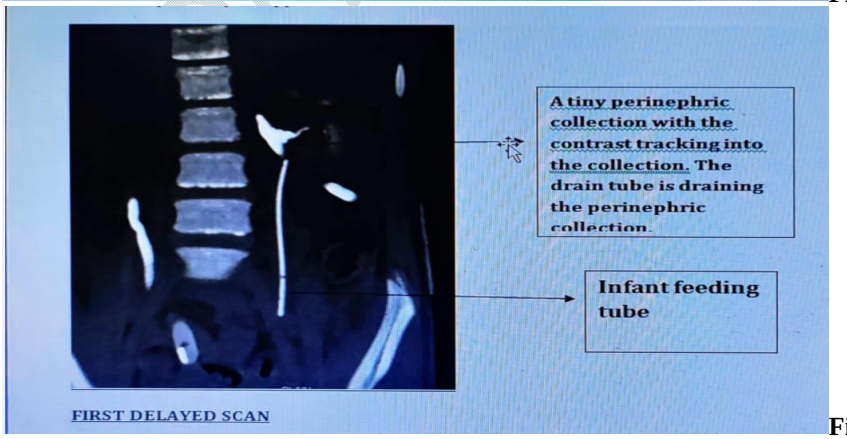


Figure-1a



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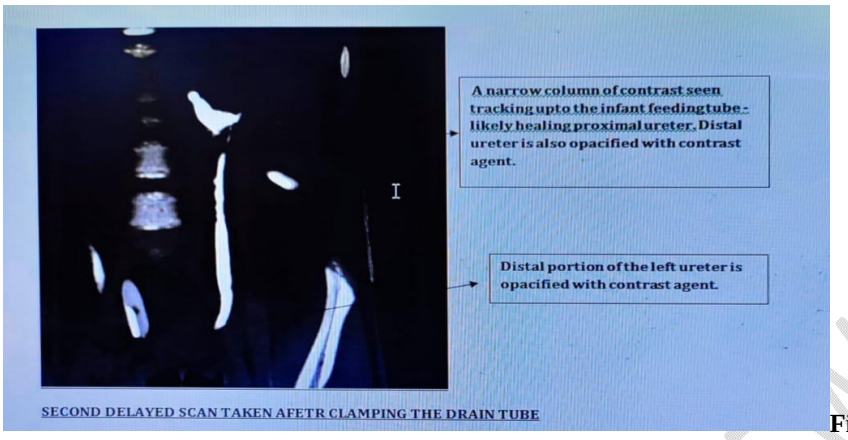

Figure-1c

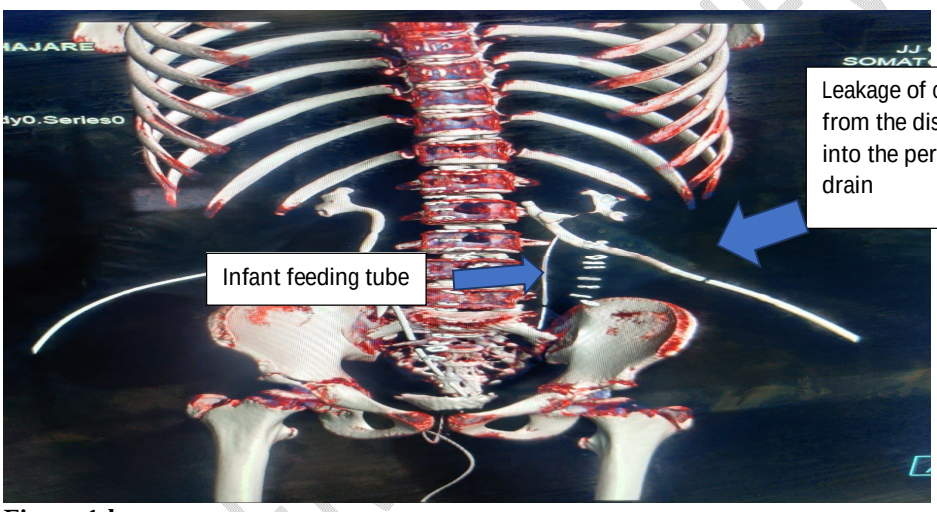

Figure-1d

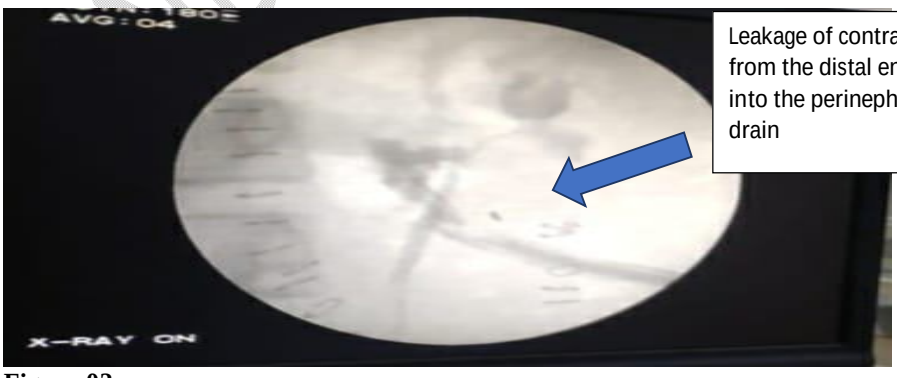

Figure-02

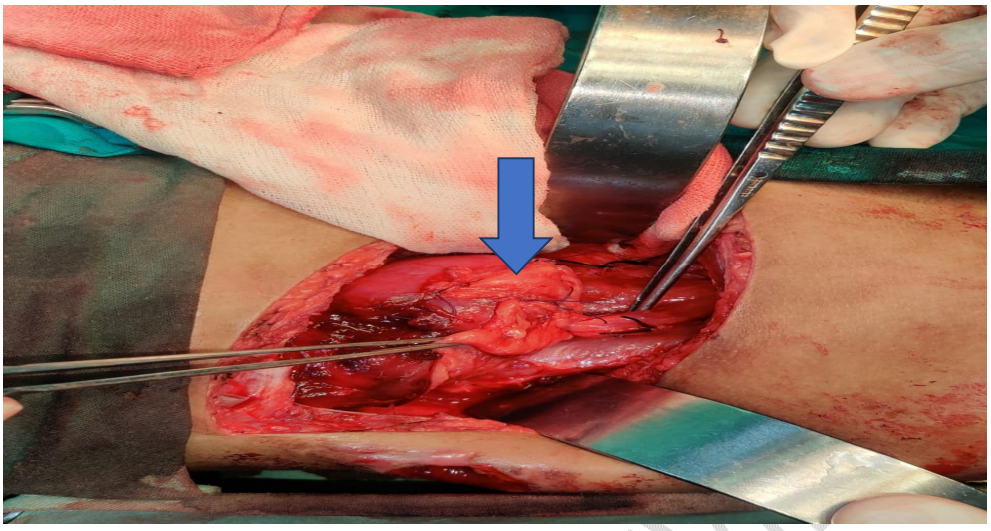

Figure-03

Table 1
Mechanism of ureteric injury.

	n	% of total cases
Blunt trauma	224	38
Motor vehicle collision	110	19
Pedestrian	25	4
Motorcyclist	18	3
High fall	15	3
Low fall	8	1
Cyclist	3	<1
Other	45	8
Penetrating trauma	358	62
Gunshot wound	316	54
Stab	29	5
Other	13	2

Table 2
Pertinent reconstructive options, based on location.

Upper third	Uretero-ureterostomy
	Ureteropyelostomy
Middle third	Uretero-ureterostomy
	Transuretero-ureterostomy
	Anterior wall bladder flap (Boari)
Lower third	Ureteroneocystostomy (direct reimplantation)
	Ureteroneocystostomy (psoas hitch)