Case report

Ureteric transection with jejunal injury secondary to bicycle handle bar penetrating injuryin a 13 year old boy.

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 incompletetransection of 75%of the cicumferenceof 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 ofa tear of Ggerotas fascia of left kidney. and uponOnexploration 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 wasIinitiallly managementwasd by placement of an infant feeding tube as 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 Nnephrostomy insertion. After 3 months, patient underwent definitive repair by left sided Ppyeloureterostomy over 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 literature are related to traumatic abdominal wall hernias, solid organ injury, or bowel injury.[1-5] Likewise, ureteric injury related to external trauma is also rare, with even the busiest adult trauma centres typically seeing fewer than 10 cases per year.[6] We present a unique case of ureteric transection and jejunal injury secondary to bicycle handlebar injury.

Case presentation:

An otherwise healthy 13-year-old male presented to the Eemergency department after a bicycle accident. Primary survey revealed tachycardia, hypotension and Glasgow Coma Score of 10. Secondary survey was remarkable for a deep 3-centimetre (cm) laceration in the left lower abdominalquadrant. There was active bleeding from the wound, with bowel herniating through a fascial defect. Given these findings the patient was takenbroughtt to the operating room for exploration. An exploratory laparotomy was performed via midline abdominal incision. The underlying fascial defect was found to be approximately 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 jejunumcut and evidence of tear of Ggerotas fascia of left kidney.and uponOn 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 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 haemodynamically unstable. 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 Ppyelography (CT-IVP) which showed a small leak near the repaired left ureter (see figures-1a-d).

~~So,~~ Tthe patient underwent ultrasound guided left sided percutaneous nephrostomy insertion after cystoscopy. ~~with~~Rretrograde pyelography also confirmed the leak from the left ureter (~~see~~Ffigure-2). Patient was discharged after 4 weeks on admissionwith percutaneous nephrostomy in situ. ~~After 3 months of the accident, patient was then planned for a definitive surgery.~~ThepPatient underwent definitive surgery through a left subcostal incision and ~~identifying the left ureter with~~ removal of the infant feedding tube. ~~and then~~ Uureteropyelostomy wasdoneafter adequate mobilisation of the left kidney and left ureter using 3-0 polydioxanone (PDS) suture over a double-J stent and a drain was left in place in the retroperitoneum (Figure ~~03~~3 ~~intraoperative image~~).
Post-operatively the patient recovered well and was discharged five days later ~~after the operative drain was removed.~~ The double-J stent was removed at sixpostoperative weeks. ~~six with~~Ceoncurrent cystoscopy and retrograde ureterogram demonstrated~~ting~~ a 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 mechanism of bicycle-related trauma, and the associated morbidity is underappreciated. Most cases described in the literature are secondary to blunt traumarefs. The most common injuries described include bowel perforation, solid organ injury, and traumatic abdominal wall hernia.[1-5] There are no studies on penetrating injuries ~~in case of~~due to bicycle handlebar injuries. In a retrospective review by Nadler et al.,[3] 31% of children sustaining direct-impact handlebar injuries required operative intervention. Ureteric injuries account for less than~~<~~1% of all urologic traumas,[7] with the majority being a result of penetrating trauma. ~~Table 1~~Ddata compiled from the National Trauma Database shows the varying mechanisms of ureteric injury??Sieve out the key findingsin the tables, reference the paper anddiscuss them rather thanrefering to the tables.[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 injuryrefs. Cystoscopy with retrograde ureterogram/pyelogram is the most accurate way of identifying ureteric injury, but may not be feasible if patient is hemodynamically unstablerefs. Due to a high rate of concomitant injuries, many ureteric injuries are diagnosed intra-operatively during exploration for other reasons. This can pose a challenge for the surgeon as haemorrhage or spillage of intestinal contents can make detecting leakage of a small amount of urine difficult. The possibility of ureteric injury should be suspected if there is violation of retroperitoneum. Approximately 60% 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 as~~was~~

~~used~~demonstrated in this~~our~~case is recommended~~study~~. The type of operative repair varies depend~~ings~~ on the location of the injury. Regardless of the location of injury, the basic tenets of repair always involve debridement to healthy tissue and tension-free anastomosis over a stent with absorbable sutureref s. In our patient, a unique approach of placing an infant feeding tube to bridge the ureteric defect was used as a temporary measure as the patient was haemodynamically unstable. He did undergo a definitive repair after a period of 3 months and the procedure~~it~~ was successful. Thus, this case report does add a unique perspective to~~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 ti~~d~~e over the patient till definitiverepair is carried out .~~crisis.~~

List of abbreviations:

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

References:

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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

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Figures:

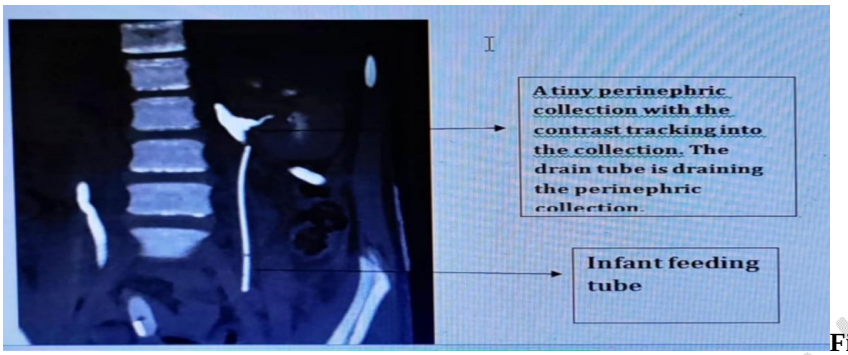
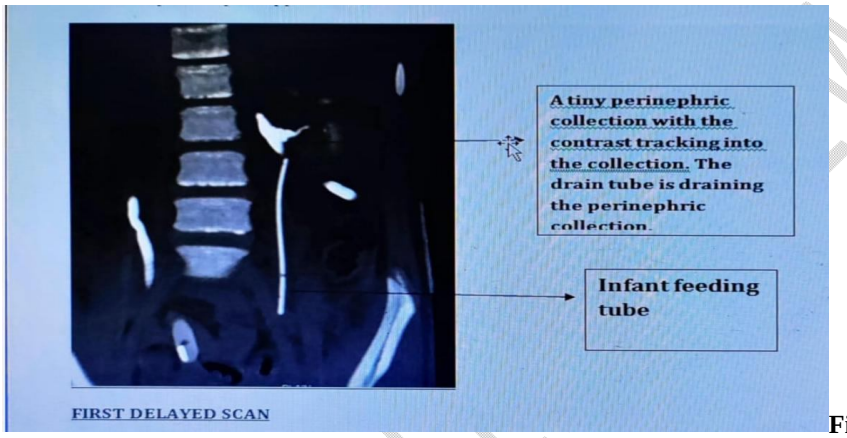


Figure-1a



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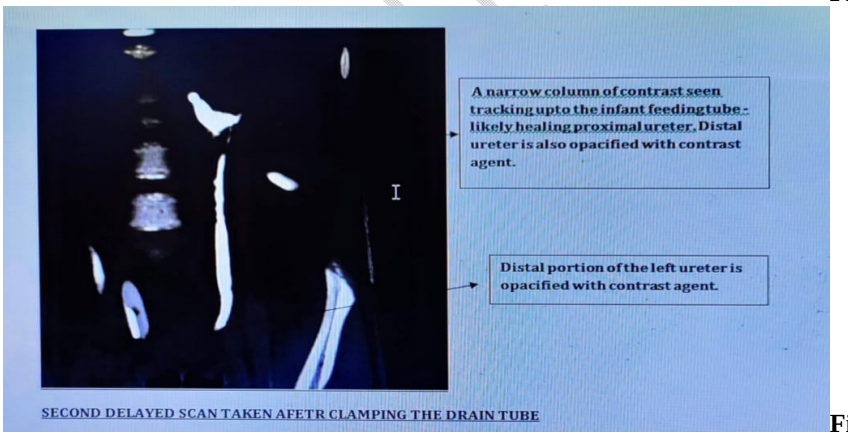

Figure-1c

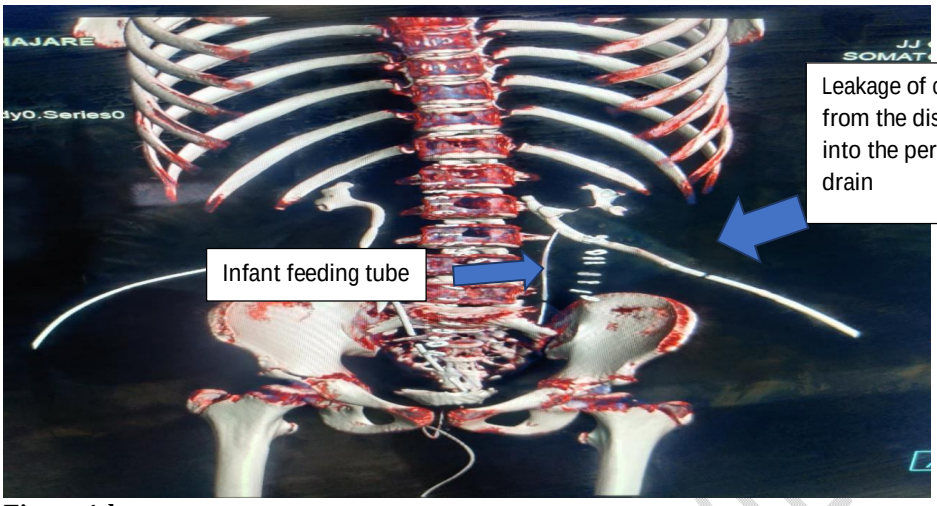

Figure-1d

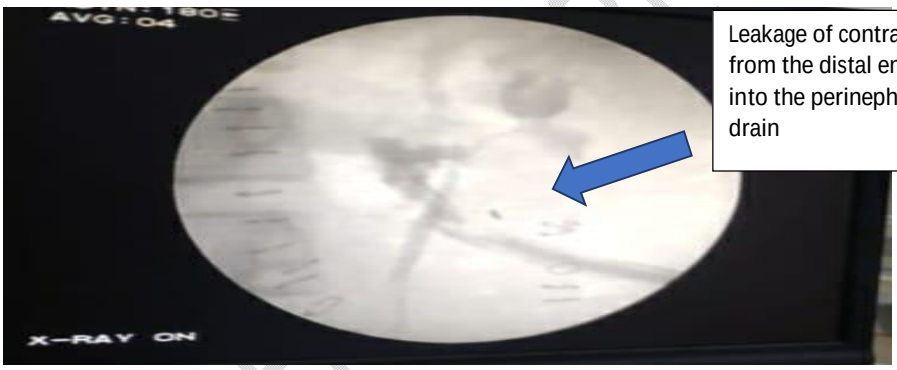

Figure-02

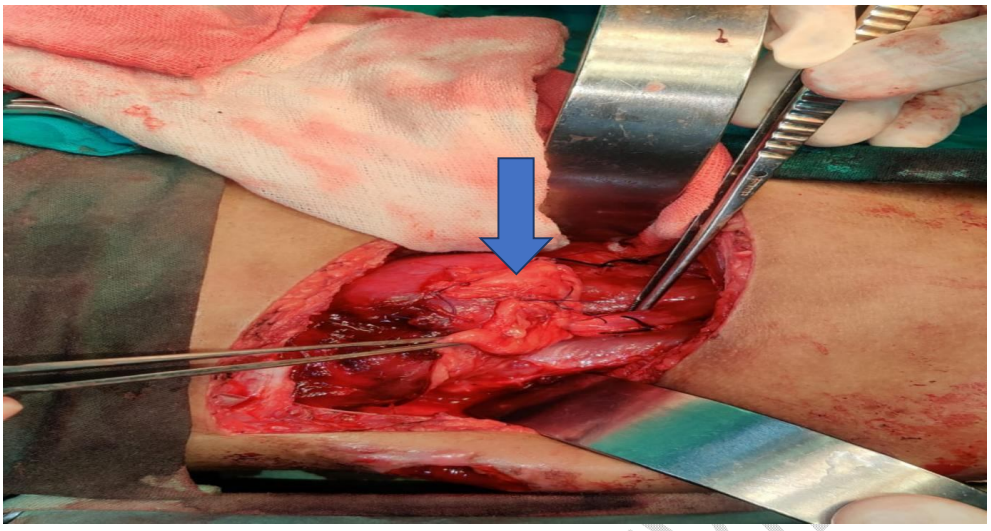

Figure-03

The radiographs are not clear and could be better presented

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)

Tables 1 and2 did not evolve from thiscase report and should be DELETED. The authors can referto them and cite them in the discussion.

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