International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor 2024: 7.101

Beyond The Stitched Wound-Duodenal Perforation and Right Ureteric Injury in Penetrating Trauma Over Back

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Abstract: ***Stab wounds over the posterior abdomen are particularly concerning because they may traverse the retroperitoneum and involve vital structures such as the kidneys, ureters, pancreas and adrenal, major vessels, and bowel. Such injuries can cause unpredictable internal damage due to variable wound trajectory. A young male patient came with assaulted penetrating stab injuries to the back, subsequent abdominal tenderness, prompting emergency exploratory laparotomy. Intraoperative findings revealed a right ureteric injury that was successfully repaired with right side ureteric repair and DJ stenting. Combined duodenal perforation with ureteric injury is rare and requires high index of suspicion, timely diagnosis, and prompt surgical intervention. Delay in diagnosis can lead to urinoma, sepsis, loss of renal function, and the need for complex reconstruction. Early recognition and appropriate surgical intervention significantly improve outcomes. Management of ureteric trauma depends on the mechanism, hemodynamic stability and grade of injury. While non-operative management has become the standard for many blunt injuries, penetrating renal trauma often requires surgical exploration due to potential vascular injury, collecting system disruption or ongoing bleeding.***

Keyword: Ureteric injury, Duodenal perforation, Double-J (DJ) stenting, Combined visceral injury, Early surgical intervention, Multidisciplinary management

1. Introduction

A 34-year-old male presented to the emergency department with a stitched stab wound over the right back and abdominal tenderness. Due to worsening symptoms and hemodynamic instability and suspicion of internal injury, urgent CECT (abdomen + pelvis) was done and an exploratory laparotomy was performed, revealing a right ureteric injury and duodenal injury. Right ureteric repair with DJ stenting and duodenal perforation repair was done successfully and the patient recovered well postoperatively. This case highlights the need for early recognition and timely surgical management of ureteric trauma following stab injuries.

2. Case Presentation:

A 34 year old male presented to the emergency department after an assaulted stitched stab wound to the right posterior of back. Primary treatment was given in peripheral hospital in the form of wound closure.

On arrival, the patient was hemodynamically stable with complaints of abdominal pain, right flank pain, active bleeding from site of injury, decrease in urine output but not associated with hematuria, burning micturition, hematemesis, vomiting, breathlessness or chest pain.

3. Examination:

Entry wound: ~ 3cm sized obliquely placed 2cm away from midline stitchline over right posterior back.
Abdomen: moderate to severe tenderness (more in right upper quadrant) Guarding, rigidity present
Bowel sounds: diminished
Flank: localized tenderness

Initial Investigations:
Patient is vitally stable. Maintaining SpO2 on Room Air.
USG abdomen and pelvis- normal, no air foci or echoes or dilated bowel loops seen.
Hb – 12mg/dl.
TLC – 170000/cumm
Plt – 1.84 lakh/cmm
S. Creatinine – 0.99mg/dl.

CT Abdomen with contrast:
Moderate hemoperitoneum at right subhepatic space, perinephric, paranephric and peritoneal cavity including right paracolic gutter.
Pneumo-retroperitoneum noted in para duodenal region and right side retro-peritoneal region.

Right ureteric injury at upper 1/3rd level with 10-12mm strip thickness of perinephric hematoma formation likely.

Linear undisplaced fracture of right transverse process and right superior articular facet of L4 vertebrae.

Intraoperative Findings
Duodenal perforation (~1*1cm) at D2 level.
Approximately 50cc hemoperitoneum was drained.
Right ureteric injury partial transection at upper third of approx 0.5*1 cm2 noted.
Contamination with bile-stained fluid
Hematoma in right retroperitoneum.

4. Operative Management

1) Duodenal Injury:
- Primary closure of duodenal injury was done using PDS 3-0 in two-layer and this repair was reinforced with jejunal serosal patch.
- Feeding jejunostomy placed.

2) Right Ureteric Injury:
- Debridement of devitalized ureteric edges. Cystoscopy guided DJ stenting was done.
- Primary ureteric repair over a 5Fr DJ stent using vicryl 3-0.
- Peritoneal Lavage and closure in layers.

Postoperative Course:
Patient kept nil per orally, started on enteral feeds via FJ.
Broad-spectrum antibiotics
Good urine output with DJ stent functioning.

During follow up after 30 days CT urography was done showing no evidence of any contrast leak and air foci in ureter bilaterally.

DJ stent planned removal after 6 weeks.

Later on during follow up after 6 weeks DJ stent was removed subsequently FJ was removed 2 days later.

CT Urography was done and it showed no contrast leak or air foci within

Post operative period are uneventful.

*DJ stent in right ureter.

5. Discussion

1) According to AAST (American Association for the Surgery of Trauma)
Grade I – Contusion / hematoma, no devascularization
Grade II – <50% transection
Grade III – >50% transection
Grade IV – Complete transection with <2 cm devascularization
Grade V – Complete transection with >2 cm devascularization

2) Treatment According to Timing:

A) Unstable or Intraoperatively Recognized Injury:
This has the best outcomes.
Ureteral contusion or gunshot wound or stab wound → if viable → stenting → locate the site of ureter injury →
a) Unstable → damage control repair.
b) Stable → Management depends on location:
- Upper Third/ proximal: Ureteroureterostomy (end-to-end anastomosis) or ureteropyleostomy. Spatulated ends. Fine absorbable sutures (5-0 or 6-0). Place DJ stent
- Middle Third/ mid: Ureteroureterostomy → If defect is long → Transureteroureterostomy (TUU)
  Ureter anastomosed to contralateral ureter
- Lower Third/ distal: Ureteroneocystostomy (reimplantation into bladder).
  Lich-Gregoir extravesical technique.
  May require psoas hitch or Boari flap if tension exists.

B) Stable or Postoperative Recognition (within 72 hours):
If stable and local inflammation is minimal → radiological imaging (IVP or CT with delayed images) →
a) Normal → no treatment
b) Non diagnostic → 1. Stable → retrograde indigo tests → if extravasation (suspected blunt partial UPJ injury) → stenting 2. Unstable → surgical exploration.
c) Extravasation → surgical exploration → Immediate repair possible Otherwise → Urinary diversion first DJ stent → Percutaneous nephrostomy Delayed definitive repair after 6–12 weeks

C) Late Recognition (>7–10 days):
Surrounding tissues inflamed (presents with complications i.e. complication of urinary leak, urinoma, abscess, fistula, ureteric obstruction) → Repair difficult

Initial management: Percutaneous nephrostomy or urinoma drainage or urinary diversion by stenting.

Definitive reconstruction after 3 months

D) Treatment Based on Type of Injury

a) Contusion / Minor Laceration:
DJ stenting for 4–6 weeks Observation

b) Partial Transection:
Spatulation and primary anastomosis
DJ stent

c) Complete Transection

Depends on level:

Upper: 1. Ureteroureterostomy
Indication: injury of mid–upper ureter

Principles:
Minimal debridement
Wide spatulation
6-8 interrupted sutures
DJ stent mandatory

Lower: reimplantation
Lower ureter injuries:
Techniques:
Lich–Gregoir (extravesical)
Politano–Leadbetter (intravesical)

d) Long-Segment Loss
- Boari flap- Tubularized bladder flap

Works for defects up to 15 cm

- Psoas hitch- For defects up to 8 cm

Bladder hitched to psoas tendon to reduce tension

- Transureteroureterostomy (TUU)

Bowel interposition (ileal ureter) – for >15 cm defect

e) Devitalized / Crushed Segments
Excise all non-viable tissue
Perform tension-free repair

Duodenal Injury:
1) According to AAST (American Association for the Surgery of Trauma):
   - GRADE I: Hematoma: involving the single portion of the duodenum Laceration: partial thickness, no perforation
   - GRADE II: Hematoma: involving the more than one portion of the duodenum Laceration: disruption <50% of circumference
   - GRADE III: Laceration: Disruption 50% - 75% of D2. Disruption of 50%-100% of D1, D3, D4.
   - GRADE IV: Laceration: Disruption 75% of D2 involving ampulla or distal common bile duct.
   - GRADE V: Laceration: Massive disruption of duodenopancreatic complex. Vascular: devascularization of duodenum.
2) Treatment of duodenal perforation based on the severity:
   a) Peritonitis or systemic sepsis: cardiovascular stability → open or laparoscopic control → omental patch repair → add PCV or definitive ulcer treatment (if chronic ulcer or H. pylori or non-compliant patient or pt under 40) → treatment of H. pylori
   b) Localise pain or no generalised pain: radiology with oral or NG tube, water soluble contrast (if perforation is radiological sealed → no further treatment required) →
      - Non contaminated perforation or patients over 70 yrs → surgical closure → treat H. pylori.
      - Contaminated perforation or pt under 70yrs → IV fluids, IV antibiotics, NG tube → treat H. pylori.

PYLORI Rx:
1) OAC (omeprazole + amoxycillin + clarithromycin) for 10 days
2) BMT (bismuth subsalicylate + metronidazole + tetracycline) for 14 days
3) LAC (lansoprazole + amoxycillin + clarithromycin) for either 10 or 14 days
4) Treatment based on the size of perforation:
   a) <= 1cm perforation **with severe contamination**: → life threatening condition → simple graham's patch closure (2-0 silk suture are placed in full thickness) plus abdominal lavage.
   b) **<= 1cm perforation with minimum contamination: → consider truncal vagotomy and antrectomy (V & A) along with omental patch repair.**
   c) Larger perforations (>2cms) → Thal patch or rarely vagotomy, antrectomy, Bilroth II reconstruction.
   d) **>=2 cms perforations → along with synchronous bleeding → may require vagotomy along with pyloroplasty, U-stich control of posterior bleeding.**

Combined duodenal and ureteric injuries are uncommon in penetrating abdominal trauma.

Duodenal injuries are often missed due to retroperitoneal location; early recognition prevents sepsis.

Ureteric injuries from stab wounds are rare; delayed diagnosis increases risk of urinoma, abscess, and renal loss.

Early surgical exploration, debridement, and repair over a DJ stent provide excellent outcomes.

On Postoperative day 10 with drains removed bilaterally and FJ in situ.

Take home message:

This case highlights the importance of high suspicion for retroperitoneal injuries in stab wounds to the back.

Early recognition with early resuscitation and prompt imaging, timely surgical exploration are essential in penetrating abdominal trauma involving retroperitoneal organs. A multidisciplinary approach with meticulous repair of associated duodenal and ureteric injuries, adequate drainage, diversion (such as feeding jejunostomy), and DJ stenting ensures optimal recovery and preservation of organ function.

References

[1] Allen GS, Moore FA, Cox CS, Jr, Mehall JR, Duke JH. Delayed diagnosis of blunt duodenal injury: An avoidable complication. J Am Coll Surg. 1998; 187: 393–9. - PubMed
[2] Bozkurt B, Ozdemir BA, Kocer B, Unal B, Dolapci M, Cengiz O. Operative approach in traumatic injuries of the duodenum. Acta Chir Belg. 2006; 106: 405–8. - PubMed

[3] Blocksom JM, Tyburski JG, Sohn RL, Williams M, Harvey E, Steffes CP, et al. Prognostic determinants in duodenal injuries. Am Surg. 2004; 70: 248–55. - PubMed
[4] Velmahos GC, Constantinou C, Kasotakis G. Safety of repair for severe duodenal injuries. World J Surg. 2008; 32:7–12. PubMed
[5] Parka Sang Hyun, Kimb Ki Hoon. Isolated ureteral injury following a stab wound: a case report. Trauma Case Rep. 2019 Jun;21 doi: 10.1016/j.tcr.2019.100197. [DOI] [PMC free article] [PubMed] [Google Scholar]
[6] Carver Brett S., Bozeman Caleb B., Venable Dennis D. Ureteral injury due to penetrating trauma. South. Med. J. 2004 May;97(5):462–464. doi: 10.1097/00007611-200405000-00009. [DOI] [PubMed] [Google Scholar]
[7] Medina D., Lavery R., Ross S.E., Livingston D.H. Ureteral trauma: preoperative studies neither predict injury nor prevent missed injuries. J. Am. Coll. Surg. 1998 Jun;186(6):641–644. doi: 10.1016/s1072-7515(98)00108-2. [DOI] [PubMed] [Google Scholar]
[8] Santucci Richard A., Schwartz Bradley Fields. Ureteral Trauma. PCH Urology. 2017. emedicine.medscape.com
[9] Ortega Sarah J., Netto Fernado S., Hamilton Paul, Chu Peter, Homer C., Tien corresponding. CT scanning for diagnosing blunt ureteral and ureteropelvic junction injuries. BMC Urol. 2008; 8: 3. doi: 10.1186/1471-2490-8-3. (Published online 2008 Feb 7) [DOI] [PMC free article] [PubMed] [Google Scholar]