

Management of Pancreatic Trauma

Dr. Alankar Kumar Gupta

Sr. DNB G.I Surgery

Mechanism of injury

- **Penetrating trauma** – stab / gunshot
- always associated with other injuries

- **Blunt trauma**
- RTA / Assault
- pancreas crushed against the spine
- Associated injuries of the liver or proximal small bowel

Diagnosis

- 95% of pancreatic injuries diagnosed by careful inspection following adequate exposure
- 5% of injuries require more elaborate investigative techniques to diagnose ductal injury

Plain abdominal radiographs

- **fractures** of the lower thoracic / upper lumbar vertebrae
- **retroperitoneal air bubbles** along the right psoas muscle or along the right kidney
- generalised **ground-glass appearance**
- gastrografen swallow for duodenal injury

Ultrasound

- free abdominal fluid
- Other organ injury

- Diagnostic peritoneal lavage – not proven useful

Helical multi-slice CT

- sensitivity and specificity as high as 80%
- extraperitoneal fluid
- fluid in the lesser sac, the arterial pararenal space
- between the splenic vein and the pancreatic parenchymal space
- pancreatic oedema , haematoma
- fracture and thickening of the anterior renal fascia

ERCP/MRCP

- most **accurate** method for detecting pancreatic duct trauma
- delayed presentation or injuries missed by CT
- post-injury complications – fistula, pseudocysts or distal chronic pancreatitis
- planning appropriate surgical correction
(open surgery, internal transpancreatic duct stenting, transductal drainage)

Amylase

- Elevated in > 80% cases of documented pancreatic injury
- Time dependent – after **3 hrs** of injury
- no relation with degree of pancreatic trauma
- elevated amylase in serum or peritoneal lavage fluid – further investigation

Classification of pancreatic injury

- I Contusion/haematoma, intact capsule, no parenchymal injury

- II Parenchymal injury without major duct injury

- III Parenchymal disruption, presumed major ductal injury

- IV Massive parenchymal disruption

Modified LUCAS classification

- I Simple superficial contusion or peripheral laceration with minimal parenchymal damage, any portion of the pancreas can be affected, but intact main pancreatic duct

- II Deep laceration, perforation or transection of the neck, body or tail of the pancreas, with or without pancreatic duct injury

- III Severe crush, perforation or transection of the head of the pancreas, with or without pancreatic duct injury

- IV Combined pancreaticoduodenal injuries:
 - (a) minor pancreatic injury,
 - (b) severe pancreatic and also duct injury

Box 1. Pancreatic Organ Injury Scale: American Association for the Surgery of Trauma

Grade*	Injury description†
I	Minor contusion or superficial laceration without duct injury
II	Major contusion or laceration without duct injury or tissue loss
III	Distal transaction or parenchymal injury with duct injury
IV	Proximal (right of superior mesenteric artery) transaction or parenchymal injury
V	Massive disruption of pancreatic head

*Advance 1 grade for multiple injuries in the same organ.

†Based on most accurate assessment at autopsy, laparotomy or radiologic study.

Operative Technique

- long midline incision
- first priority **control of bleeding** and of ongoing contamination
- In penetrating trauma, missile tracks should be followed in their entirety
- **Clues** suggesting the presence of pancreatic trauma include
 - lesser sac fluid collection,
 - retroperitoneal bile staining
 - haematoma overlying the pancreas
 - fat necrosis of omentum or retroperitoneum

- Intraoperative criteria of main pancreatic duct injury introduced by Heitsch et al
- direct visualisation of ductal violation
- complete transection of the pancreas
- laceration of more than half the diameter of the pancreas
- central perforation and severe maceration

- Full **mobilisation** of the injured area is of paramount importance
- Head of the pancreas - extended Kocher's manoeuvre
- distal pancreas – open lesser sac
- spleen mobilised, medially rotated and lifted towards the incision
- exposing its inferior border
- lifting pancreas from retroperitoneum

distal pancreatectomy

- splenic artery and vein are ligated 1—2 cm proximal to the injury site
- pancreas mobilised 1—2 cm proximal to the site of the proposed resection
- Closure of the pancreatic stump - overlapping
- interrupted mattress stitches of polypropylene or silk

Radiological methods

- Intraoperative evaluation of the biliary and pancreatic ducts
- conventional operative cholangiogram through the cystic duct
- insert a 25-gauge butterfly needle into CBD
- Intraoperative pancreatography
 - transduodenal cannulation
 - pancreatic tail cannulation
 - ERCP
- 5- Fr paediatric feeding tube
- 2—5 ml of radiographic contrast material
- Three fold reduction in mortality

Contusions and lacerations without duct injury

- haemostasis and drainage
- capsular laceration should not be repaired

Distal injury with duct disruption

- best treated by distal pancreatectomy and splenectomy
- Spleen preserving Pancreatectomy in stable cases esp. Children
- ?? resection margin anastomosed to a Roux-en-Y loop

Proximal injury with probable duct disruption

- safest option - external drainage, if no devitalisation of the pancreatic head or duodenum and the ampulla is intact
- fistula if formed - good chance of healing with adequate nutrition and infection control
- Any Roux-en-Y anastomosis – ill advised, high risk of anastomotic breakdown

Combined pancreaticoduodenal injuries

- Minor - duodenal repair and pancreatic drainage
- Major - duodenal decompression with pancreatic drainage
 - pyloric exclusion
 - three-tube decompression (gastrostomy with twin jejunostomies)
 - gastrostomy and duodenostomy
 - duodenal diverticulisation

Pancreaticoduodenectomy

- **two-stage** procedure
- initial damage control operation - haemostasis
 - stomach, jejunum and pancreatic stump are stapled off
 - common bile duct is ligated or drained
- anastomoses are completed at reoperation within the next 48 h, when the patient is stable
- Not necessary to remove the **uncinate process**
- **Gall bladder** is not removed
- It can be used for biliary-enteric reconstruction

Management of the pancreatic stump after pancreaticoduodenectomy

- ligation of the pancreatic duct – high leak
- pancreaticoenteric – difficult in unstable patient
- gastric anastomosis
- Total Pancreatectomy – endocrine cripple

Role of octreotide

- perioperative administration of octreotide reduced typical postoperative complications after pancreatic resection, particularly in the presence of tumours - 1992, Buchler et al multicentric RCT, Am J Surg 1992
- prophylactic use of octreotide was associated with no pancreatic complications and no negative sequelae in pancreatic trauma – Amirata et al, Am J Surg.1994

Complications

- 20—40% will present with complications
- higher in combined pancreaticoduodenal injuries
- Sepsis and multiple organ failure cause 30% of deaths

pancreatic fistula

- most common complication
- Most fistulae resolve spontaneously within 1 or 2 weeks after injury
- adequate external drainage and nutritional support
- endoscopic stenting
- distal pancreatectomy
- Roux-en-Y loop to the head of the pancreas

abscess

- 10% to 25% incidence
- majority of these abscesses are peripancreatic
- abscesses within the parenchyma are rare and require operative intervention
- percutaneous drainage with ultrasound
- CT assessment and guidance

Secondary haemorrhage

- pancreatic bed or the surrounding vessels
- angiographic embolisation - first line of management
- laparotomy
 - overrunning the bleeding vessels
 - packing

Pseudocyst

- weeks or months after the original injury.
- status of the pancreatic duct – most imp.
- ERCP or MRCP
- percutaneous aspiration or pigtail drainage
- endoscopic stenting
- endoscopic drainage/internal surgical drainage
- distal pancreatectomy

- **Mild pancreatitis** – 18 % cases
- transient abdominal pain and raised serum amylase
- self limiting

- **Haemorrhagic pancreatitis** – 80% mortality
- **Endocrine and exocrine insufficiencies** – very unusual

Thank You