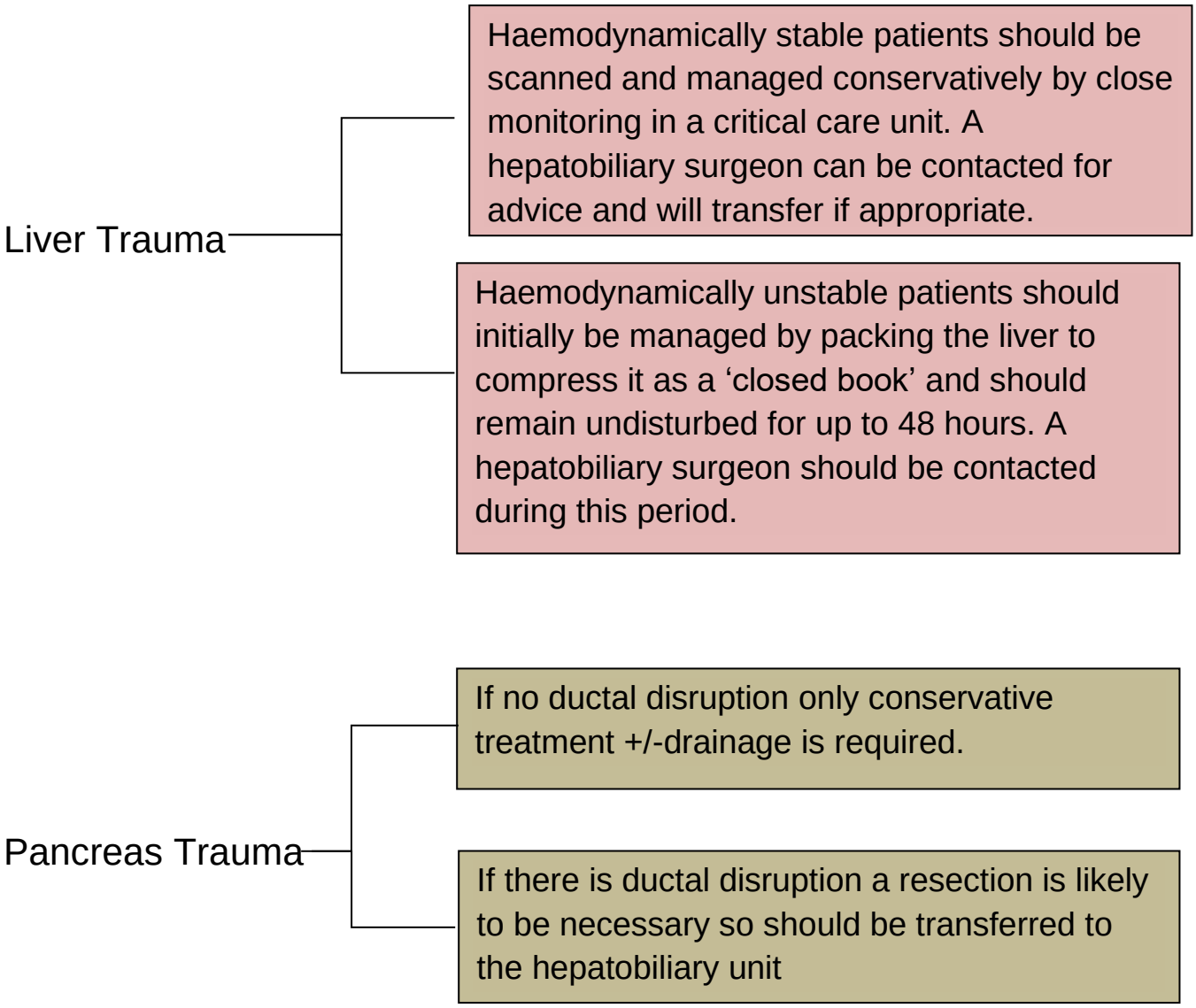
East Lancashire Hospitals NHS
NHS Trust

Guidelines for the management of HPB Trauma



A hepatobiliary surgeon can be contacted for advice in cases of hepato-pancreatobiliary trauma via East Lancashire hospitals switchboard on 01254263555.

Guidelines for the management of HPB Trauma

The preferred grading system for trauma evaluation is the AAST grades.

However management of liver trauma in particular is more dependent on the haemodynamic status of the patient than the grade of injury.

Haemodynamically stable patients with liver trauma

- Nonoperative management of blunt adult and pediatric hepatic and splenic injuries is the treatment modality of choice in haemodynamically stable patients, irrespective of the grade of injury, neurologic status, and/or the presence of associated injuries.
- Abdominal CT with intravenous contrast is the most reliable method to identify and assess the severity of the injury to the liver.
- The clinical status of the patient should dictate the frequency of follow-up scans.
- There is no evidence supporting routine imaging (CT or US) of the hospitalized, clinically improving, haemodynamically stable patient.
- There is no evidence to support keeping the clinically stable patient on bedrest.
- Haemodynamically stable patients with grade 2 and above injuries should be discussed with an HPB surgeon. More severe injuries may need to be transferred to a HPB centre depending on clinical state and coexisting injuries.
- A haemodynamically stable patient who continues to bleed may be treated with angiographic embolization.
- Thromboprophylaxis measures should be considered on an individual patient basis. If there is no other contraindication mechanical thromboprophylaxis should be used immediately and LMWH is recommended when there has been no clinical indication of on-going bleeding and haemoglobin levels have not shown significant decline (< 1 gram drop in 24 hours).

Haemodynamically unstable patients with liver trauma

- Haemodynamically unstable patients with blunt liver trauma should ideally be stabilized in accordance with ATLS principles and the liver packed – They may need to be transferred to the HPB centre for further treatment.

- Patients who are haemodynamically unstable with suspected HPB trauma should be have an emergency laparotomy.
- If a liver injury is found then primary treatment should be haemodynamic control usually obtained by packing the liver as a 'closed book'.
- Ideally the liver should be mobilized if possible and tightly packed in such a way as to close the lacerations and maintain the liver contour either gauze roll or abdominal packs can be used for packing all around the liver posterior to both the right and left lobe, anteriorly, superiorly and inferiorly. DO NOT pack within the liver substance.
- Mepitel or other non-adherent dressings may be placed directly on the liver surface to prevent adherence of the packing substance to liver parenchyma.
- Do not disrupt/drain stable haematomas.
- Angioembolization may be used to control bleeding after packing.
- If a hepatic injury has been packed the packs should be removed within 24-48hr. This should be done by an HPB surgeon-ideally at the HPB centre.

Pancreatic Trauma

- A high level of suspicion is required if the mechanism is suggestive as abdominal signs may be absent or conversely, suggestive of associated multiple injuries.
- Both CT scan and amylase/lipase levels are suggestive but not diagnostic of pancreatic injury.
- MRCP can be used to assess ductal integrity in a stable patient
- Delay in the recognition of pancreatic duct injury causes increased morbidity.
- Grade I and II injuries can be managed by non-operative treatment/ drainage alone.
- ERCP and stenting may be used in selected cases but should be done at an HPB centre
- Grade III and higher injuries should be managed with resection and drainage by a HPB surgeon.
- Evidence for the use of octreotide in pancreatic injuries is contradictory.
- Thromboprophylaxis measures should be considered on an individual patient basis.

Extra hepatic biliary tract and gall bladder trauma

- Gallbladder injuries with laceration/bile leak should be treated with a cholecystectomy
- Extra hepatic bile duct injuries should be repaired by a HPB surgeon.
- Primary repair may be performed if < 50% circumference is involved and there is distal drainage otherwise a Roux-en-Y hepatico-jejunostomy is required.
- If there is associated vascular injury then complex vascular reconstruction may be required
- long-term outcome may be complicated by biliary strictures, anastomotic leaks, cholangitis and cirrhosis

Duodenal trauma

- If the CT scan shows periduodenal air in addition to fluid or stranding, the safest approach is immediate laparotomy
- In a stable patient periduodenal fluid or stranding on CT should be further evaluated with a repeat CT scan with duodenal contrast to exclude extravasation.
- Haematomas should be managed expectantly- nasogastric tube decompression may be required
- Lacerations should be closed primarily if possible- preferably transverse
- If primary closure not possible then either
    - Roux –en –Y duodenojejunostomy over the injury
    - If the injury is proximal to the ampulla close the distal duodenum & Roux-en-Y duodenojejunostomy/ gastrojejunostomy
- If the patient requires damage control surgery the focus should be on hemorrhage controlled, and control of contamination by simple closure of the duodenum, the bile duct can be cannulated and externally drained or may be ligated for future repair
- Duodenal trauma grade 4 and above (ie ampullary disruption) should be repaired by a HPB surgeon.
- If the ampulla or CBD is involved a pancreaticoduodenectomy or complex Roux –en-Y reconstruction will be required.

The AAST liver injury grading system (2018 Revision) CT findings

- Grade I : (AIS severity 2)
  - haematoma: subcapsular<10% surface area
  - laceration : capsular tear, < 1cm depth
- Grade II : (AIS severity 2)
  - haematoma: sub capsular, 10 - 50% surface area
  - haematoma : intraparenchymal < 10cm diameter
  - laceration 1 - 3cm depth, < 10cm length
- Grade III : (AIS severity 3)
  - subcapsular haematoma > 50% surface area, ruptured subcapsular or parenchymal hematoma
  - laceration > 3 cm depth
  - intraparenchymal laceration> 10 cm diameter
  - Any injury in the presence of a liver vascular injury or active bleeding contained within liver parenchyma
- Grade IV : (AIS severity 4)
  - Active bleeding extending beyond the liver parenchyma into the peritoneum
  - parenchymal disruption involving 25 - 75% hepatic lobes
- Grade V : (AIS severity 5)
  - Parenchymal disruption involving >75% hepatic lobes
  - Juxtahepatic venous injuries (retrohepatic IVC, central major hepatic vein)

More than one grade of liver injury may be present and should be classified by the higher grade of injury. .Advance one grade for multiple injuries up to grade III.

The AAST pancreatic injury grading system

- Grade 1. Minor contusion/superficial laceration without ductal injury
- Grade 2. Major contusion or laceration without ductal injury or tissue loss
- Grade 3. Distal transection or pancreatic parenchymal injury with ductal injury
- Grade 4. Proximal transection or pancreatic parenchymal injury involving ampulla
- Grade 5. Massive disruption of the pancreatic head.

Advance one grade for multiple injuries up to grade III. Proximal pancreas is to the patients' right of the superior mesenteric vein.

The AAST duodenal injury grading

- Grade 1
  - Haematoma: Involving single portion of duodenum
  - Laceration: Partial thickness, no perforation
- Grade 2
  - Haematoma: Involving more than one portion
  - Laceration: Disruption<50% circumference
- Grade 3
  - Disruption of 50–75% of circumference of D2.
  - Disruption of 50–100% of circumference of D1, D3 and D4
- Grade 4
  - Disruption of > 75% of circumference of D2
  - involving ampulla or common bile duct
- Grade 5
  - Massive disruption of pancreatico-duodenal complex.
  - devascularisation of the duodenum

Advance one grade for multiple injuries up to grade III

The AAST extrahepatic biliary tree injury grading

- Grade 1
  - Gallbladder contusion/hematoma
  - Portal triad contusion
- Grade 2
  - Partial gallbladder avulsion from liver bed; cystic duct intact
  - Laceration or perforation of the gallbladder
- Grade 3
  - Complete gallbladder avulsion from liver bed
  - Cystic duct laceration
- Grade 4
  - Partial or complete right hepatic duct laceration
  - Partial or complete left hepatic duct laceration
  - Partial common hepatic duct laceration (<50%)
  - Partial common bile duct laceration (<50%)
- Grade 5
  - >50% transection of common hepatic duct
  - >50% transection of common bile duct
  - Combined right and left hepatic duct injuries
  - Intraduodenal or intrapancreatic bile duct injuries

Advance one grade for multiple injuries up to grade III

Summary

- Contrast CT is the investigation of choice in patients with HPB trauma if haemodynamically stable.
- Regardless of degree of injury a haemodynamically stable patient with no hollow viscera perforation should be managed conservatively. The scans can be reviewed by hepatobiliary surgeon for advice and transfer if appropriate.
- In a haemodynamically unstable patient the initial management is to control haemostasis –in liver trauma this is achieved by packing the liver to compress it as a 'closed book'. A hepatobiliary surgeon should be contacted for further management – as long as the patient remains haemodynamically stable the packs should remain for about 48 hours.
- If the patient is physiologically compromised damage control surgery and resuscitation is most appropriate, with the focus on hemorrhage control and control of contamination if possible- by simple closure of the duodenum, cannulation and external drainage of the bile duct or even ligation, and drain placement. If it is not possible to control all contamination it may be appropriate to place drains and leave the abdomen open.
- Thromboprophylaxis measures should be considered on an individual patient basis. If there is no other contraindication mechanical thromboprophylaxis should be used immediately and LMWH is recommended when there has been no clinical indication of on-going bleeding and haemoglobin levels have not shown significant decline (< 1 gram drop in 24 hours).

HPB unit referals indicated if:

- Haemodynamically unstable patient with liver trauma—pack liver---refer for transfer if possible.
- Haemodynamically stable patient with liver trauma seek opinion-may need to be transferred.
- Pancreatic trauma especially grade 3 and above (ductal transection) refer for potential transfer.
- Duodenal trauma grade 4 and above (ie ampullary disruption) refer for potential transfer.
- A hepatobiliary surgeon will attend a trauma case on site when required but they will they will need appropriate theatre support and surgical assistance.
- Any patient treated by a hepatobiliary surgeon will remain under the care of the consultant at the referring hospital whilst an inpatient at that hospital.
- A hepatobiliary surgeon will always be available for discussion of cases.
- A hepatobiliary surgeon can be contacted for advice in cases of hepato-pancreatobiliary trauma via East Lancashire hospitals switchboard on 01254263555.

References

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Flow chart -Management of liver trauma