Abdominal Trauma

Nolan Ortega Aludino, M.D.
Department of Surgery
Ospital ng Maynila Medical Center

General Data:

D.P.

19 y/o

Male

Caloocan

Chief Complaint:

Stab Wound

History of Present Illness

1 hour PTA → patient was allegedly stabbed by a known assailant.

Immediately rushed to Tondo General Hospital advised transfer to OMMC

consult

Past Medical History

- no previous hospitalization
- no allergies
- no DM
- no hypertension

Family History

- denies history of heredofamlial disease

Personal and Social History

- Occasional alcoholic beverage drinker
- Occasional smoker

Physical Examination

General Survey:

conscious, coherent, not in cardiorespiratory distress

Vital Signs:

BP = 110/70 → 80/60

CR = 90

RR = 20s

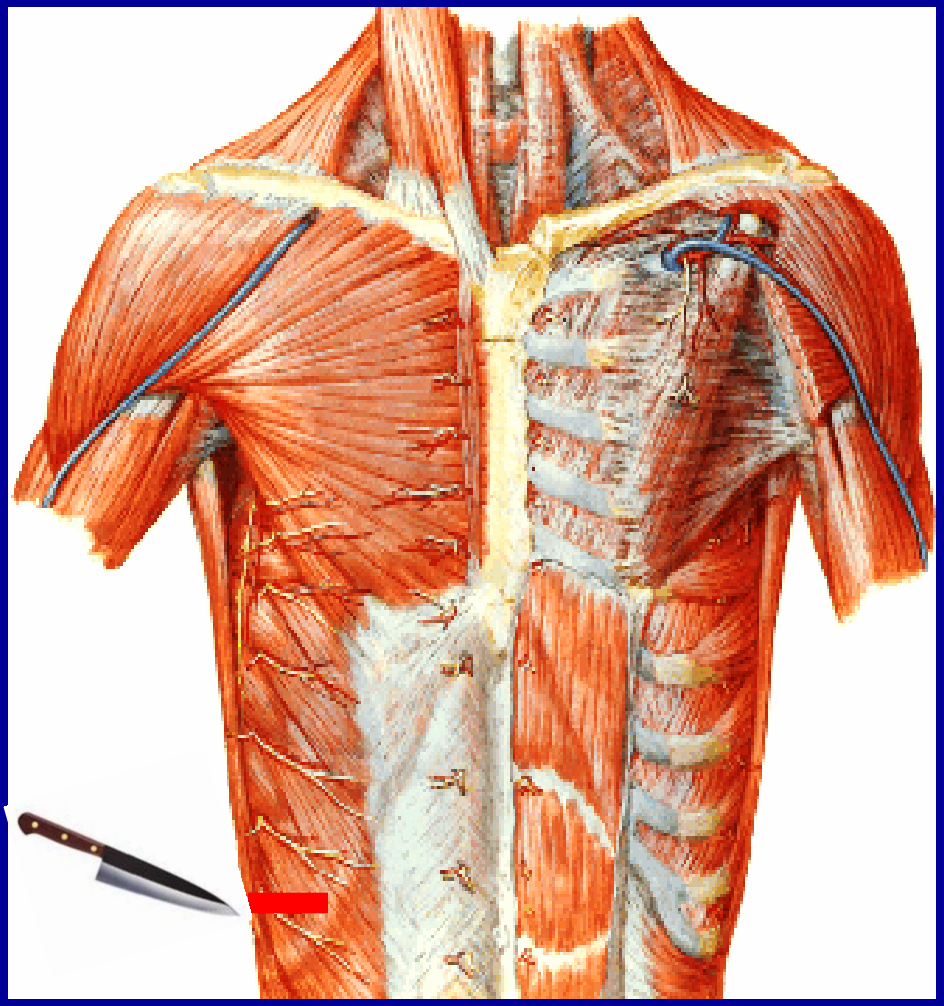
Temp = 37.5°C

Physical Examination

HEENT:

Pink palpebral conjunctivae, anicteric sclerae,

Physical Examination



Chest and Lungs:

Symmetric chest expansion, no retractions, clear and equal breath sounds

(+) stab wound, 10th ICS, MAL, Right

Physical Examination

Heart:

adynamic precordium, normal rate, regular rhythm, no murmurs

Physical Examination

Abdomen:

Flat, (+) muscle guarding at RUQ and epigastric area; direct tenderness at RUQ and epigastric area

Physical Examination

Extremities:

Grossly normal, full and equal pulses

Salient Features

- 19 y/o male
- Stab wound: 10th ICS MAL, Right
- BP = 110/70 → 80/60
- (+) muscle guarding
- (+) direct tenderness RUQ and epigastric area

Stab wound at the 10th ICS, MAL, Right

- Thoracoabdominal junction
- Penetrating
  - Abdominal
  - Thoracic
  - Abdominal + Thoracic
- Non-penetrating

Clinical Diagnosis

	Diagnosis	*Certainty*
Primary Diagnosis	Stab wound 10th ICS MAL, Right; with penetrating thoracic and abdominal injury	80%
Secondary Diagnosis	Stab wound 10th ICS MAL, Right; with penetrating abdominal injury	20%

Paraclinical Diagnostic Procedure

- Do I need to perform a paraclinical diagnostic procedure?

Yes

Paraclinical Diagnostic Procedure

	Benefit	Risk	Cost	Availability
CXR	**Sensitivity: 20.9% Specificity: 98.7%**	**Radiation exposure**	**PhP 150**	**available**
UTZ (EFAST)	**Sensitivity: 48.8% Specificity: 99.6%**	**none**	**PhP 450**	**available**
CT scan	**Sensitivity: Specificity:**	**Radiation exposure**	**PhP 3,000**	**not readily available**

Paraclinical Diagnostic Procedure

CXR upright:

- (-) pneumo-peritoneum
- (-) pneumo-hemothorax

Pre Treatment Diagnosis

	Diagnosis	***Certainty***
Primary Diagnosis	Stab wound 10th ICS MAL, Right; with penetrating abdominal injury	90%
Secondary Diagnosis	Stab wound 10th ICS MAL, Right; with penetrating thoracic and abdominal injury	10%

GOALS OF TREATMENT

- **Resolve source of peritonitis**

Treatment Options

	Benefit	Risk	Cost	Availability
Non-surgical	**Success rate: 89-98%** *** Applicable only to selected patients**	**Missed injury**	**(++)**	**available**
Exploratory Laparotomy	**Direct visualization of the injury**	**Bleeding** **anesthesia**	**(++)**	**available**

Treatment Plan

Exploratory Laparotomy

Pre Operative Management

- Psychosocial support
- Optimize patient
  - Adequate hydration
  - Adequate antibiotic coverage
- Prepare materials

Operative Technique

- Patient in a supine position under local anesthesia
- Asepsis and antisepsis techniques observed
- Sterile drapes placed
- Midline incision done from the xiphoid up to mid pubic area carried down up to the subcutaneous

Operative Technique

- Peritoneum entered by incising along the linea alba
- Intraoperative findings noted:
  - Approximately 2 liters of intraperitoneal clotted blood evacuated
  - 2 cm Grade II Hepatic Laceration, segment 7
  - No diaphragmatic laceration
- GI tract examined for other injuries

GOALS OF TREATMENT

- Repair of liver injury
- Achieve hemostasis
- Prevent further complications

Treatment Options

	Benefit	Risk	Cost	Availability
No Repair	**Less tissue injury**	**Delayed bleeding**	**(+)**	**available**
Primary repair without hepatotomy	**Less Tissue Injury**	**Hematoma Liver abscess**	**(+)**	**available**
Primary repair with hepatotomy	**Direct visualization of possible bleeders**	**More blood loss**	**(+)**	**available**

Treatment Plan

Primary repair, without hepatotomy

Operative Technique

- Primary repair of liver injury using horizontal mattress sutures with chromic 4-0
- Peritoneal lavage done
- GI tract re-examined for other injuries
- Hemostasis secured
- Layer by layer closure
- DSD

Final Diagnosis

Stab Wound, 10th ICS MAL, Right

Grade II Hepatic Laceration, Segment 7

Postoperative Management

First POD	→	**clear liquids**
		NGT removed
Second POD	→	**soft diet**
		encouraged to ambulate
		shifted to oral medications:
		Cloxacillin 500mg/cap 1 cap q6
Third POD	→	**DAT**
Fourth POD	→	**MGH**

After Managing the Patient

- I HAVE DISCHARGED MY PATIENT :
  - IMPROVED
  - FREE OF COMPLICATIONS
  - HAPPY AND CONTENTED WITH THE OUTCOME

Discharge Advise

- Continue medications (Cloxacillin) at home until day 7
- Daily wound care
- Resume normal daily activities
- Follow up after a week or earlier if any problem arises

Sharing of Information

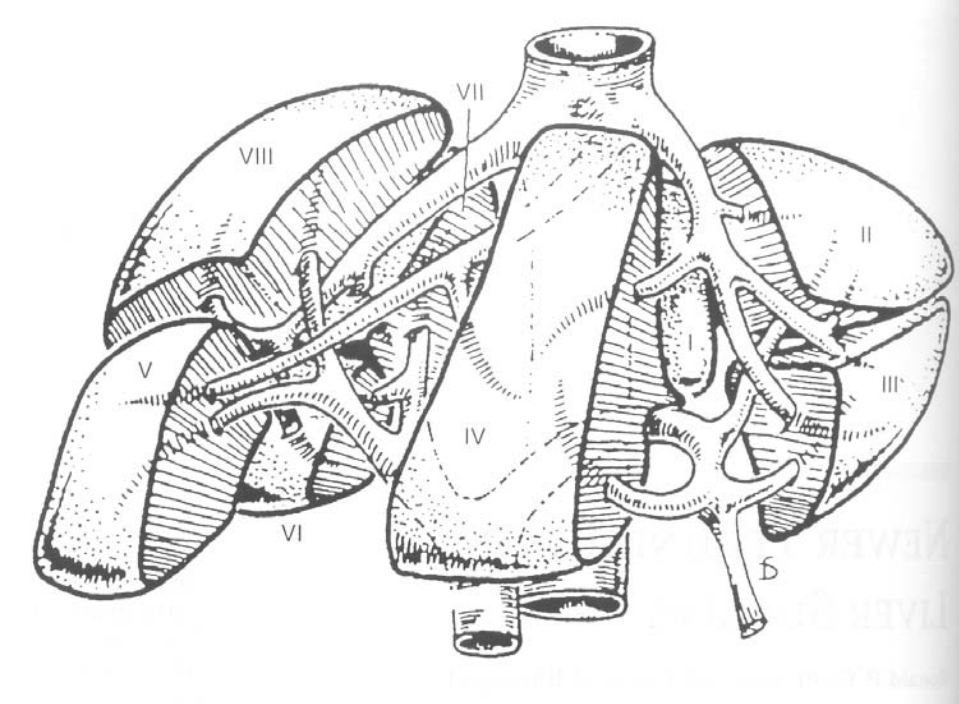
HEPATIC INJURIES

- Liver injury occurs in approximately 5% of all trauma admissions
  - Size
  - Anatomic location

HEPATIC INJURIES

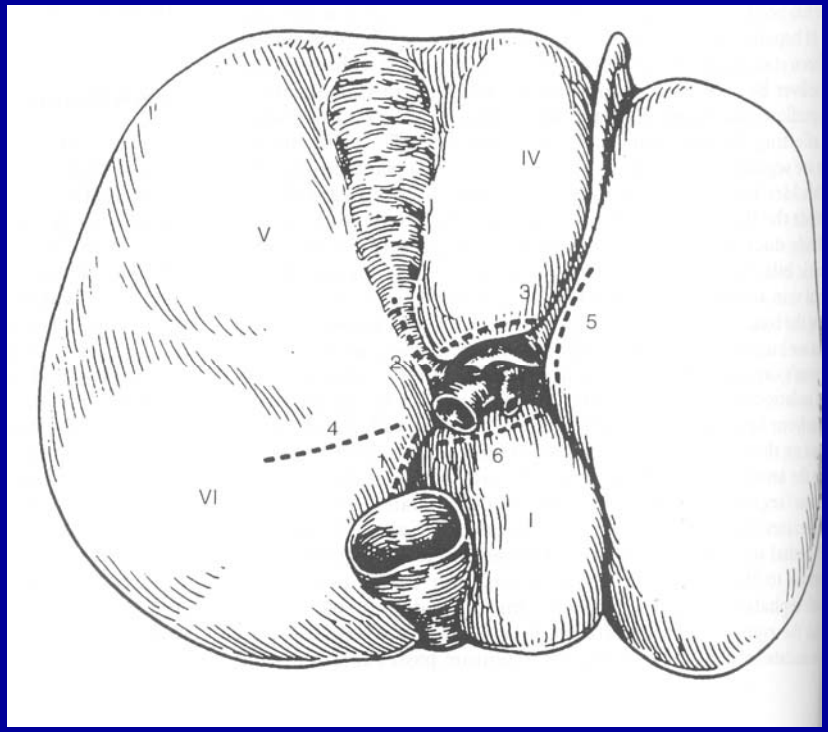
- Two types of liver injury
  a. Blunt
  b. penetrating

Anatomy



I) caudate/Spigel lobe
II) left posterolateral segment
III) left anterolateral segment
IV) IVa) left superomedial segment
IVb) left inferomedial segment
V) right anteroinferior segment
VI) right posteroinferior segment
VII) right posterosuperior segment
VIII) right anterosuperior segment

Anatomy



I) caudate/Spigel lobe
II) left posterolateral segment
III) left anterolateral segment
IV) IVa) left superomedial segment
IVb) left inferomedial segment
V) right anteroinferior segment
VI) right posteroinferior segment
VII) right posterosuperior segment
VIII) right anterosuperior segment

GRADING OF LIVER INJURIES

Grade I	Capsular avulsion; periportal blood tracking; superficial laceration less than 1-cm deep; subcapsular hematoma less than 1-cm thickness
Grade II	Laceration 1- to 3-cm deep; subcapsular/central hematoma 1- to 3-cm diameter

GRADING OF LIVER INJURIES

Grade III	Laceration greater than 3-cm deep; subcapsular/central hematoma greater than 3-cm diameter
Grade IV	Massive central or subcapsular hematoma greater than 10 cm; lobar tissue maceration or devascularization
Grade V	Bilobar tissue maceration or devascularization

CRITERIA FOR NON OPERATIVE MANAGEMENT

- The patient is hemodynamically stable
- Abdominal pain and/or tenderness are not persistent
- Absence of other peritoneal injuries requiring laparotomy
- <4 units of pRBCs required
- <500ml of hemoperitoneum on abdominal CT
- Simple hepatic laceration or intrahepatic hematoma on abdominal CT

COMPLICATIONS

a. ***Bleeding***
b. ***Hemobilia*** – jaundice, RUQ pain, falling Hct , UGIB
c. ***Bilhemia*** – bilous venous blood dissolved in bloodstream. Increase in serum bilirubin with normal LFT
d. ***Biliary Fistula***

References

1. Kirkpatrick, A, Sirois, M, Laupland, K, Liu, D, et al. Hand-Held Thoracic Sonography for Detecting Post-Traumatic Pneumothoraces: The Extended Focused Assessment With Sonography For Trauma (EFAST). Journal of Trauma-Injury Infection & Critical Care. 57(2):288-295, 2004.
2. Sheldon GF, Rutledge R. Hepatic trauma. Adv Surg. 1989;22:179-93.
3. Parks RW, Chrysos E, Diamond T. Management of liver trauma. Br J Surg. 86(9):1121-35, 1999.
4. Pachter HL, Spencer FC, Hofstetter SR, Liang HG, Coppa GF. Significant trends in the treatment of hepatic trauma. Experience with 411 injuries. Ann Surg. 215(5):492-500; 1992.
5. Christopher M., Vascular and Solid Organ Trauma - Interventional Radiology. eMedicine, 2005
6. Khan A., Liver, Trauma. eMedicine, 2005
7. Abdominal Trauma: Evaluation of Penetrating Abdominal Trauma. trauma.org 9:8, 2004
8. Martin J., lecture on liver Laceration, unpublished. 2003.

MCQ #1

Intraoperative findings revealed a laceration at segment V about 4 cm deep with a subcapsular/central hematoma 1- to 3-cm diameter. What would be your liver injury grade?

a. Grade I
b. Grade II
c. Grade III
d. Grade IV

MCQ #1

Intraoperative findings revealed a laceration at segment V about 4 cm deep with a subcapsular/central hematoma 1- to 3-cm diameter. What would be your liver injury grade?

a. Grade I
b. Grade II
c. Grade III
d. Grade IV

MCQ #2

A 23/f arrived at the emergency room with an stab wound at the epigastric area. What segment of the liver would have the greatest chance for injury?

a. Segment 1
b. Segment 2
c. Segment 4
d. Segment 7

MCQ #2

A 23/f arrived at the emergency room with an stab wound at the epigastric area. What segment of the liver would have the greatest chance for injury?

a. Segment 1
b. Segment 2
c. Segment 4
d. Segment 7

MCR #1

The following are the criteria for non-operative management of liver injuries.

(a = 1,2,3; b = 1,3; c = 2,4; d = 4 only; e = all)

1. The patient is hemodynamically stable
2. Abdominal pain and/or tenderness are not persistent
3. Absence of other peritoneal injuries requiring laparotomy
4. ≤ 750cc hemoperitoneum by CT scan

MCR #1

The following are the criteria for non-operative management of liver injuries.

(a = 1,2,3; b = 1,3; c = 2,4; d = 4 only; e = all)

1. The patient is hemodynamically stable
2. Abdominal pain and/or tenderness are not persistent
3. Absence of other peritoneal injuries requiring laparotomy
4. ≤ 750cc hemoperitoneum by CT scan

MCR #2

A 40 y/o man, 6 months post-op for hepatic trauma, had an incidental finding of an elevated serum bilirubin. Liver function tests however showed normal values. He might be suffering from?

(a = 1,2,3; b = 1,3; c = 2,4; d = 4 only; e = all)

1. Hemobilia
2. Biliary Fistula
3. Hepatic abscess
4. Bilhemia

MCR #2

A 40 y/o man, 6 months post-op for hepatic trauma, had an incidental finding of an elevated serum bilirubin. Liver function tests however showed normal values. He might be suffering from?

(a = 1,2,3; b = 1,3; c = 2,4; d = 4 only; e = all)

1. Hemobilia
2. Biliary Fistula
3. Hepatic abscess
4. Bilhemia

MCR #3

A 24 y/o man, three weeks post op for hepatic trauma, complains of episodes of hematochezia and black tarry stools. What complication(s) of hepatic surgery can we consider?

(a = 1,2,3; b = 1,3; c = 2,4; d = 4 only; e = all)

1. Bilhemia
2. Biliary Fistula
3. Liver Hematoma
4. Hemobilia

MCR #3

A 24 y/o man, three weeks post op for hepatic trauma, complains of episodes of hematochezia and black tarry stools. What complication(s) of hepatic surgery can we consider?

(a = 1,2,3; b = 1,3; c = 2,4; d = 4 only; e = all)

1. Bilhemia
2. Biliary Fistula
3. Liver Hematoma
4. Hemobilia

Thank You.