بسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

{قَالُوا سُبْحَانَكَ لا عِلْمَ لَنَا إِلا مَا

عَلَّمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ}

صدق الله العظيم

سورة البقرة آية (32)

Ain Shams University
Faculty of Medicine
General Surgery Department

Modern Management of Liver Trauma

Essay

Submitted for the Partial Fulfillment of the Master Degree

in General Surgery

By

Mohamed Abd Elwahab Elmoghazy
M.B.B.Ch.

Under Supervision of

Prof. Dr

Emam EL-Sayed Ezzat Fakhr

Professor of General Surgery
Faculty of Medicine
Ain Shams University

Dr.

Ahmed El Nabil Mortada

Lecturer of General Surgery
Faculty of Medicine
Ain Shams University

Faculty of Medicine
Ain Shams University
2013

Contents

List of figures

List of Tables

List of Abbreviations

Abbreviations	Meaning
AAST:	American Association for Surgery of Trauma
ACS:	American Collage of Surgeons
AFP:	Alpha Feto-Protein
ATP:	Adenosine Tri-Phosphate
ATVs:	All Terrain Vehicles.
AVM:	Arterio-Venous Malformation
Ca^{2+}:	Calcium ion
cAMP:	Cyclic Adenosine Mono-Phosphate
cDNA:	Complementary Deoxyribonucleic Acid
Cl^-:	Chloride ion
CM	Conserevative Management.
CT:	Computed Axial Tomography
DCL:	Damage Control Laparotomy
DNA:	Deoxyribonucleic Acid
DPL:	Diagnostic Peritoneal Lavage
EAST:	Eastern Association for the Surgery of Trauma
ECG:	Electrocardiography
ERCP:	Endoscopic Retrograde Cholangio-Pancreatography
FAST:	Focused Abdominal Sonography for Trauma
GCS:	Galascow Coma Score
HCO_3^-:	Bicarbonate ion
IBW:	Ideal Body Weight
ICU:	Intensive Care Unite
IL-1:	Interleukin-1
IL-10:	Interleukin-10
IL-4:	Interleukin-4

Abbreviations	Meaning
IL-6:	Interleukin-6
K^+:	Potassium ion
Mg^{2+}:	Magnesium ion
MODS:	Multisystem Organ Dysfunction Syndrome
mOsm:	Milli-Osmol
Mph:	Mile Per Hour
MVAs:	Motor Vehicle Accidents
MVCs:	Motor Vehicle crashes
Na^+:	Sodium ion
NOM:	None Operative Management
OM:	Operative Management
OM:	Operative Management
PTBD:	Percutaneous Transhepatic Biliary Drainage
RBCs:	Red Blood Cells
RCTs:	Randomized Controlled Trials
SLE:	systemic lupus erythematosus
TAE:	Transarterial Embolization
TNF:	Tumor Necrosis Factor
WBCs:	White Blood Cells.

Introduction

The liver is the most frequently injured abdominal organ in blunt trauma. Incidence of liver trauma associated with other solid organ, bowel, mesenteric and diaphragmatic injury has been reported to be 15–20%. Blunt liver trauma is associated with splenic injury in45–60% of patients ***(Igrec et al., 2010).***

Penetrating injury can be seen after different kinds of events including stab wounds, gunshot wounds, industrial accidents, falls from height, traffic accidents. ***(Keskinoglu et al., 2008).***

Nonoperative management is now recommended for stab wound as well as low-velocity gunshot wound to right upper quadrant in stable patients, if other injuries have been excluded which require laparotomy ***(Demetriades et al., 2006).***

Management of blunt liver trauma has progressed over the last 20 years with the adoption of conservative non-operative management as the gold standard in 80-90% of patients. Clinical and hemodynamic changes, and CT imaging guide the conservative attitude or pose an indication for urgent surgical intervention in unstable patients ***(Bouras et al., 2010).***

The advantages of nonoperative management include lower hospital cost, earlier discharge, avoiding nontherapeutic celiotomies (and their associated cost and morbidity), fewer intra-abdominal complications, and reduced transfusion rates. Selective nonoperative management of blunt hepatic injury is associated with an improvement in mortality when compared with operative therapy ***(Christmas et al., 2005).***

The main indication of the operative approach to the blunt liver injury is hemodynamic instability, not the grading of the injury. Although a higher grade injury has higher potential for failure of nonoperative management, hemodynamic instability remains the most important branch of the decision tree indicating operative intervention ***(Velmahos et al., 2003).***

High-velocity gunshot wounds can be devastating and will require resectional debridement or lobectomy. Isolation of the liver can be temporarily achieved by using Satinsky clamps on the suprahepatic inferior vena cava, , and the porta hepatis. ***(Donald el al.,2002)***

Aim of the work

The aim of this work is to review the different modalities in diagnosis and treatment of hepatic trauma.

Anatomy Of The Liver

☞ Functional Anatomy:

The three main hepatic vein branches divide the liver into four sectors, each of which is supplied by a portal vein branch. The liver is further sub-divided into eight segments according to the course of portal and hepatic vein branches. Hepatic veins and portal vein branches are intertwined like the digits of two hands ***(Dancygier, 2010; O'Connell et al., 2008).***

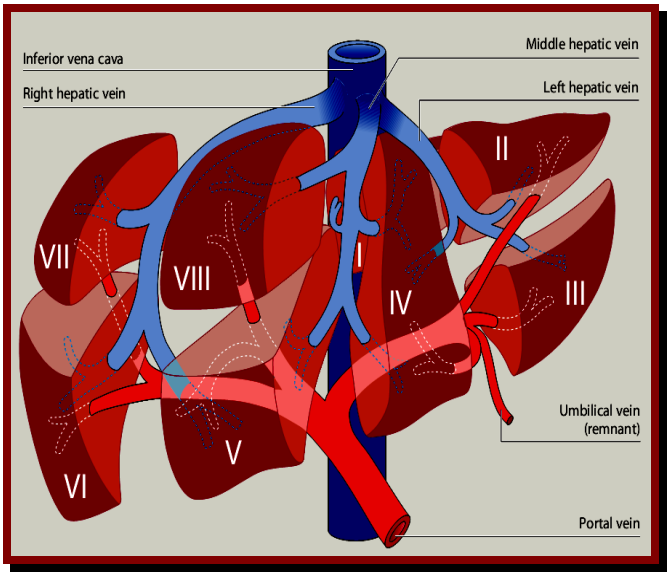

Fig. 1: Segmental anatomy of the liver. Hepatic veins (blue) and large portal vein branches (red) are interdigitating. Each of the four sectors, sub-divided by the main branches of the hepatic vein is supplied by a portal venous branch. Further ramifications of the portal triad subdivide the sectors into eight independent segments, each with its own blood supply and biliary drainage.

In Fig. 1, the segmental anatomy of the liver is depicted. The right liver is made up of the right-posterior sector with segments 6 (inferior) and 7 (superior), and the right-anterior sector with segments 5 (inferior) and 8 (superior). The left liver consists of the left-anterior sector with segments 4 (medial) and 3 (lateral), which are separated by the umbilical fissure. The left-posterior sector is the sole sector having one segment only (segment 2). Segment 1 is the caudate lobe. It has a unique position, receiving its portal venous blood from the right and left portal vein branches, and having its venous outflow drain directly to the retrohepatic inferior vena cava, thus bypassing the hepatic veins. This exceptional anatomical position of the caudate lobe attains clinical significance in hepatic venous outflow tract disorders, such as Budd-Chiari syndrome ***(Dancygier, 2010; Takasaki, 2007).***

An imaginary plane through the middle hepatic vein divides the liver into a right and left part (not identical to the right and left lobe described above). The right and left part of liver are completely independent units, receiving separate arterial and venous blood supplies and biliary drainage. The right and left hepatic vein sub-divide each part into an anterior and a posterior sector. With its right and left main branch, the portal vein supplies the right and