Management of Hepatic Trauma

Thesis

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Abstract

Hepatic injuries are one of the most common abdominal injuries following either blunt or penetrating trauma. CT scanning has revolutionized the treatment algorithm for blunt hepatic trauma. The majority of these patients are successfully treated with nonoperative management, but surgeons should have a clear understanding of the indications for operative intervention. An array of techniques including operative, interventional, and endoscopic, are often required for management of advanced grade hepatic injuries.

Key words

Hepatic trauma

Non operative management

Operative management

Aim of work

Several trends in management of hepatic injuries have evolved over past decade. The main purpose of this work is to review the previously published literatures concerning this subject and to discuss the updated management of different types of hepatic injuries to put them into a new perspective. 20 cases of hepatic injuries admitted in the casualty Unit of Kasr EL Eini Hospital will be presented.

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LIST OF ABBREVIATIONS

AAST	American association of surgery of trauma
ATLS	Advanced trauma life support
BAT	Blunt abdominal trauma
CT	Computerized tomography
CVP	Central venous pressure
DCS	Damage control surgery
DPL	Diagnostic peritoneal lavage
ED	Emergency department
ERCP	Endoscopic retrograde cholangiography
FAST	Focused assessment with sonography for trauma
HDI	Horizontal deceleration injuries
HIDA Scan	technetium-99m dimethyl iminodiacetic acid radionuclide scanning
ICU	Intensive care unit
IVC	Inferior vena cava
NOM	Non operative management
OM	Operative management
OR	Operating room
PTFE Graft	polytetrafluoroethylene graft
SAP	Systolic arterial blood pressure
SICU	Surgical intensive care unit
SIRS	Systemic inflammatory response syndrome

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INTRODUCTION

The liver is the largest intra-abdominal solid organ and is enclosed anteriorly and laterally by the rib cage. The large size of the liver, its friable parenchyma, its thin capsule, and its relatively fixed position in relation to the spine make the liver particularly prone to blunt injury. The right lobe is injured more commonly than the left, As a result of its larger size and proximity to the ribs ***(Helling et al., 2009).***

Most liver injuries (>85%) involve segments 6, 7, and 8 of the liver. This type of injury is believed to result from simple compression against the fixed ribs, spine, or posterior abdominal wall. Pressure through the right hemithorax may propagate through the diaphragm, causing a contusion of the dome of the right lobe of the liver. The liver's ligamentous attachment to the diaphragm and the posterior abdominal wall can act as sites of shear forces during deceleration injury ***(Helling et al., 2009)***.

Liver injury can also result from transmission of excessively high venous pressure to remote body sites occurring at the time of impact. Liver injury occurs more easily in children than in adults because the ribs are more flexible, allowing force to be transmitted to the liver. In addition, the liver is not fully developed in children, who have a weaker connective tissue framework than do adults ***(*Kozar *et al., 2006)***.

The liver is the second most frequently injured intra-abdominal organ after the spleen. Associated injury to other organs increases the risk of complications and death. Hepatic trauma represents a significant management challenge for the emergency surgeon and specialist alike. These injuries require a high index of suspicion, rapid investigation, accurate classification and well-defined management protocols to ensure an optimal outcome with minimal long-term consequences. This has highlighted the critical need for an accurate classification system as a basis for the clinical decision-making process. Several classification systems have been proposed in an attempt to incorporate the etiology, anatomy and extent of injury and correlate it with subsequent clinical management and outcome ***(*Gakwaya, *2004)***.

The widely accepted Organ Injury Scale is based on anatomical criteria that quantify the disruption of the liver parenchyma and defines six major sources of morbidity and mortality due to the likelihood of associated solid or hollow-organ injuries. The implication of a delay in diagnosis and management emphasizes the need for an accurate classification system. An accurate classification of liver trauma is fundamental for the development of treatment protocols in

which clinical decisions are based on the severity of injury ***(*Kozar *et al., 2006)***.

Isolated trauma of the liver is a rare event in blunt injuries of severely injured patients, yet liver injuries probably lead to a clear increase in post-trauma mortality. As the liver injury increases in severity, other organ systems become involved, so that total mortality results from the cumulation of all damaged organs. The mortality rate after liver trauma documented in the literature is widespread and ranges between 7 and 36%, this is differentiated between early mortality, mainly due to blood loss, and late mortality. Late mortality is frequently based on secondary complications from intensive medical treatment in connection with immunological failure after a trauma which can cause sepsis/SIRS and multi-organ failure ***(Poletti et al., 2002)***.

A CT-based grading system has been adapted from the American Association for the Surgery of Trauma classification of blunt hepatic injury. However, the direct application of such a CT classification, although reflective of the extent of parenchymal liver damage, cannot reliably predict the need for angiographic assessment of the liver or the probable clinical outcome of attempted nonsurgical management. Even major hepatic injuries with a severity of up to CT grade 4 typically can be managed without surgery in those patients who maintain hemodynamic stability. Some authors have described wide

discrepancies between the CT injury grade and the injury severity determined at surgery, with CT generally yielding an underestimation of the extent of injury. The value of the periportal blood track as a CT sign to help guide the management of liver trauma remains uncertain and controversial. The pooling of contrast material locally in the liver is a specific sign of active bleeding that warrants embolization (***Poletti et al., 2002***).

There was a marked decline in death rates during the25-year period. The decrease is in both total death rates and death rates described to the liver injury itself. Total death rates declined from 19% to 9%. Liver-related deaths from penetrating injuries declined from 12% to 5%, and death secondary to blunt injury was between 8% and 2%during the 5-year intervals studied. Death unrelated to liver injury showed little change during the 25-year interval. Non hepatic deaths were related to associated injuries and multiple organ failure. Deaths related to the liver injury itself were due to hemorrhage in more than 85% of patients throughout the study. Improvement in death rates clearly resulted from a decrease in deaths from hemorrhage ***(Richardson et al., 2000).***

Four major trends appeared to decrease deaths from hemorrhage: a decrease in major venous injuries requiring surgery, improved management of major venous injuries,