CIRUGÍA ESPAÑOLA

www.elsevier.es/cirugia

Original article

# Surgical Treatment of Blunt Liver Trauma, Indications for Surgery and Results☆

*Carlos H. Morales Uribe,*[a,b,*] *Carolina Arenas López,*[b] *Juan Camilo Correa Cote,*[b] *Sebastián Tobón Franco,*[b] *Maria Fernanda Saldarriaga,*[b] *Jackson Mosquera,*[b] *María I. Villegas Lanau*[b]

[a] *Hospital Universitario San Vicente Fundación, Universidad de Antioquia, Medellín, Colombia*
[b] *Universidad de Antioquia, Medellín, Colombia*

ARTICLE INFO

*Article history:*
Received 7 March 2013
Accepted 1 August 2013
Available online 14 February 2014

*Keywords:*
Liver trauma
Blunt trauma
Non-operative management
Operative management

ABSTRACT

*Introduction:* The liver is the most frequently injured organ in blunt abdominal trauma. Patients who are hemodynamically unstable must undergo immediate surgical treatment. There are 2 surgical approaches for these patients: Anatomical Liver resection and non-anatomic liver resection. Around 80%–90% of patients are candidates for non-operative management. Several risk factors have been studied to select the patients most suited for a non-operative management.

*Materials and methods:* We performed a retrospective study based on a prospective database. We searched for risk factors related to immediate surgical management and failed non-operative management. We also described the surgical procedures that were undertaken in this cohort of patients and their outcomes and complications.

*Results:* During the study period 117 patients presented with blunt liver trauma. 19 patients (16.2%) required a laparotomy during the initial 24 h after their admission. There were eleven deaths (58%) amongst these patients. Peri-hepatic packing and suturing were the most common procedures performed. An RTS Score<7.8 (RR: 7.3; IC 95%: 1.8–30.1), and ISS Score >20 (RR 2,5 IC 95%: 1.0–6.7), and associated intra-abdominal injuries (RR: 2.95; IC 95%: 1.25–6.92) were risk factors for immediate surgery. In 98 (83.7%) patients a non-operative management was performed. 7 patients had a failed non-operative management.

*Conclusion:* The need for immediate surgical management is related to the presence of associated intra-abdominal injuries, and the ISS and RTS scores. In this series the most frequently performed procedure for blunt liver trauma was peri-hepatic packing.



☆ Please cite this article as: Morales Uribe CH, Arenas López C, Correa Cote JC, Tobón Franco S, Saldarriaga MF, Mosquera J, et al. Tratamiento del traumatismo cerrado de hígado, indicaciones de cirugía y desenlaces. Cir Esp. 2014;92:23–29.

* *Corresponding author.*
E-mail address: cmorales@medicina.udea.edu.co, cmorales@une.net.co (C.H. Morales Uribe).

2173-5077/$ – see front matter 

## Tratamiento del traumatismo cerrado de hígado, indicaciones de cirugía y desenlaces

*Palabras clave:*
Traumatismo hepático
Traumatismo cerrado
Tratamiento no operatorio
Tratamiento operatorio

RESUMEN

*Introducción:* El hígado es el órgano que se afecta más frecuentemente en el traumatismo cerrado de abdomen. Los pacientes que ingresan con inestabilidad hemodinámica deben ser intervenidos de inmediato. Existen 2 posturas en la literatura como aproximación quirúrgica: la resección anatómica y la resección no anatómica. El 80–90% de los pacientes son susceptibles de manejo no operatorio. Se han explorado diferentes factores de riesgo para seleccionar los pacientes candidatos a manejo no operatorio del traumatismo hepático.

*Materiales y métodos:* Estudio retrospectivo a partir de una base de datos prospectiva. Exploramos los factores de riesgo relacionados con la indicación de cirugía inmediata y el fallo del manejo no operatorio. Se describen los procedimientos quirúrgicos realizados y sus desenlaces.

*Resultados:* Se presentaron 117 pacientes con traumatismo cerrado de hígado. Diecinueve pacientes (16,2%) de los admitidos con traumatismo cerrado de hígado requirieron laparotomía inmediata en las primeras 24 h siguientes al ingreso en la institución. Hubo 11 muertes en este grupo (58%). El procedimiento quirúrgico más practicado fue sutura y empaquetamiento. Fueron factores de riesgo para requerir cirugía inmediata tener un RTS menor de 7,8 (RR: 7,3; IC 95%: 1,8–30,1), ISS mayor de 20 (RR: 2,5; IC 95%: 1,0–6,7) y la presencia de lesiones intraabdominales asociadas (RR: 2,95; IC 95%: 1,25–6,92). En 98 (83,7%) pacientes se optó por el manejo no operatorio. En 7 hubo fallo del manejo no operatorio.

*Conclusión:* La necesidad de cirugía inmediata está directamente relacionada con la puntuación RTS, ISS y la presencia de lesiones intraabdominales asociadas. En esta serie el procedimiento quirúrgico más frecuentemente realizado fue el empaquetamiento perihepático.



## Introduction

The liver is the most frequently injured organ after open and blunt abdominal trauma.[1] Until two decades ago peritoneal lavage was used to make a diagnosis and patients were regularly subjected to surgery without the extent of the trauma being known; the surgical procedure was often unecessary.[2] Since then with the advent of computerised tomography, it has been possible to classify the extent of liver injury more accurately and the safety of the selective, non-operative management of patients with blunt trauma and even of some patients with penetrating liver trauma who are haemodynamically stable has been demonstrated.[3,4] However, there are a number of patients who, due to the severity of their liver injury or because they have associated intra-abdominal injuries, do require operative management, and there are different surgical techniques which can be used. The decision as to which technique to use is controversial and it is often down to the attending surgeon to decide according to their experience and preference. Techniques include simple surgical suturing, anatomical and non-anatomical resection, packing and even liver transplant.[1,5]

We have reported earlier our experience with the non-operative management of liver trauma before[6]; this is the follow-up of the previous study with a special focus on the techniques used for managing patients who required surgery. The best surgical option is to preserve the parenchyma, however in the current literature there are two different opinions for patients requiring a hepatic resection; anatomical resection[7] and non-anatomical resection.[2,3,5]

The aim of this study is to explore, in a cohort of patients with blunt liver trauma treated at a reference hospital, the risk factors which require operative management in the first 24 h following admission, the risk factors for failure of non-operative management and to describe the surgical techniques used in the operated patients and their results.

## Materials and Methods

A retrospective study was undertaken using a prospective database, from January 2005 to December 2011. Patients over the age of 15 were included with blunt abdominal trauma, admitted to the Emergency Department of the University Hospital San Vicente Fundación de Medellín, Colombia, a reference centre for trauma, where liver injury was confirmed by computerised tomography (CT) or intra-operative findings. Patients with trauma evolution of more than 24 h, those who had been operated in a different hospital and those who did not wish to participate in the study were excluded.

Included in the study were: demographic variables, age, gender, history of abdominal surgery and the trauma mechanism, trauma severity indices, *Revised Trauma Score* (RTS), *Injury Severity Score* (ISS) and the use of abdominal ultrasound for trauma (FAST). The liver injury was classified using the organ injury scale (OIS) of the American Association for the Surgery of Trauma (AAST).[8] The extent of injury in