



Queensland Trauma Education

ABDOMINAL TRAUMA

# Blunt hepatic trauma

Case Discussion

Facilitator resource kit

## Queensland Trauma Education

The resources developed for Queensland Trauma Education are designed for use in any Queensland Health facility that cares for patients who have been injured as a result of trauma. Each resource can be modified by the facilitator and scaled to the learners needs as well as the environment in which the education is being delivered, from tertiary to rural and remote facilities.

### Developed by

Dr Fran Williamson, Emergency Staff Specialist – MNHHS

Kimberly Ballinger, Simulation Educator - CSDS

### Reviewed by

Angelka Opie, Nurse Educator – CSDS, MNHHS

Education Working Group, Queensland Trauma Clinical Network – Clinical Excellence Queensland

### Queensland Trauma Education

#### Abdominal Trauma – Blunt hepatic trauma: Case discussion – Facilitator resource kit Version 2.0

Published by the State of Queensland (Clinical Skills Development Service), 2024



This document is licensed under a Creative Commons Attribution 3.0 Australia licence. To view a copy of this licence, visit <https://creativecommons.org/licenses/by/3.0/au>.

© State of Queensland (Metro North Hospital and Health Service through the Clinical Skills Development Service) 2024

You are free to copy, communicate, and adapt the work, as long as you attribute the Metro North Hospital and Health Service through the Clinical Skills Development Service. For more information, please contact Clinical Skills Development Service, Royal Brisbane and Women’s Hospital, Herston, Queensland +61 3646 6500, [CSDS-Admin@csds.qld.edu.au](mailto:CSDS-Admin@csds.qld.edu.au).

An electronic version of this document is available via [csds.qld.edu.au/qte](https://csds.qld.edu.au/qte)

**Disclaimer:** The content presented in this publication is distributed by the Queensland Government as an information source only. The State of Queensland makes no statements, representations or warranties about the accuracy, completeness or reliability of any information contained in this publication. The State of Queensland disclaims all responsibility and all liability (including without limitation for liability in negligence) for all expenses, losses, damages and costs you might incur as a result of the information being inaccurate or incomplete in any way, and for any reason reliance was placed on such information.

## About this training resource kit

This resource kit provides healthcare workers with an understanding of the diagnostic and therapeutic methods utilised for the optimal management of blunt hepatic trauma.

### National Safety and Quality Health Service (NSQHS) Standards



### Target audience

Emergency department medical, nursing and allied health clinicians.

### Duration

30 minutes.

### Group size

Suited to small group participation.

### Learning objectives

By the end of this session the participant will be able to:

- Understand the diagnostic methods and therapeutic interventions implemented in blunt hepatic trauma.
- Demonstrate knowledge of evidenced-based guidelines used to determine the severity of hepatic injury to support management decisions in liver trauma, including both operative and non-operative management.

### Facilitation guide

1. Facilitator to present case study overview to group and utilise question and answer guide to facilitate group discussion.
2. Utilise supporting documents to reinforce learning throughout case discussion.

### Supporting resources (in Printable Resources)

- WSES liver trauma classification.
- AAST liver trauma classification.
- Statements summary

## Case discussion

### Case study

A 34yo male is brought to the emergency department after a fall from a ladder, landing on his right side and striking his abdomen and chest. On assessment in ED he complains of significant abdominal pain.

His vital signs are HR 90 and BP 130/80mmHg. A primary survey does not identify any other areas of concern. The patient is noted to have a large bruise across his RUQ in addition to tenderness on secondary examination.

He undergoes a CT chest and abdomen (PV phase) which reveals a grade 3 liver injury with moderate haemoperitoneum without active extravasation of contrast. He has no other injuries on his trauma CT scan.

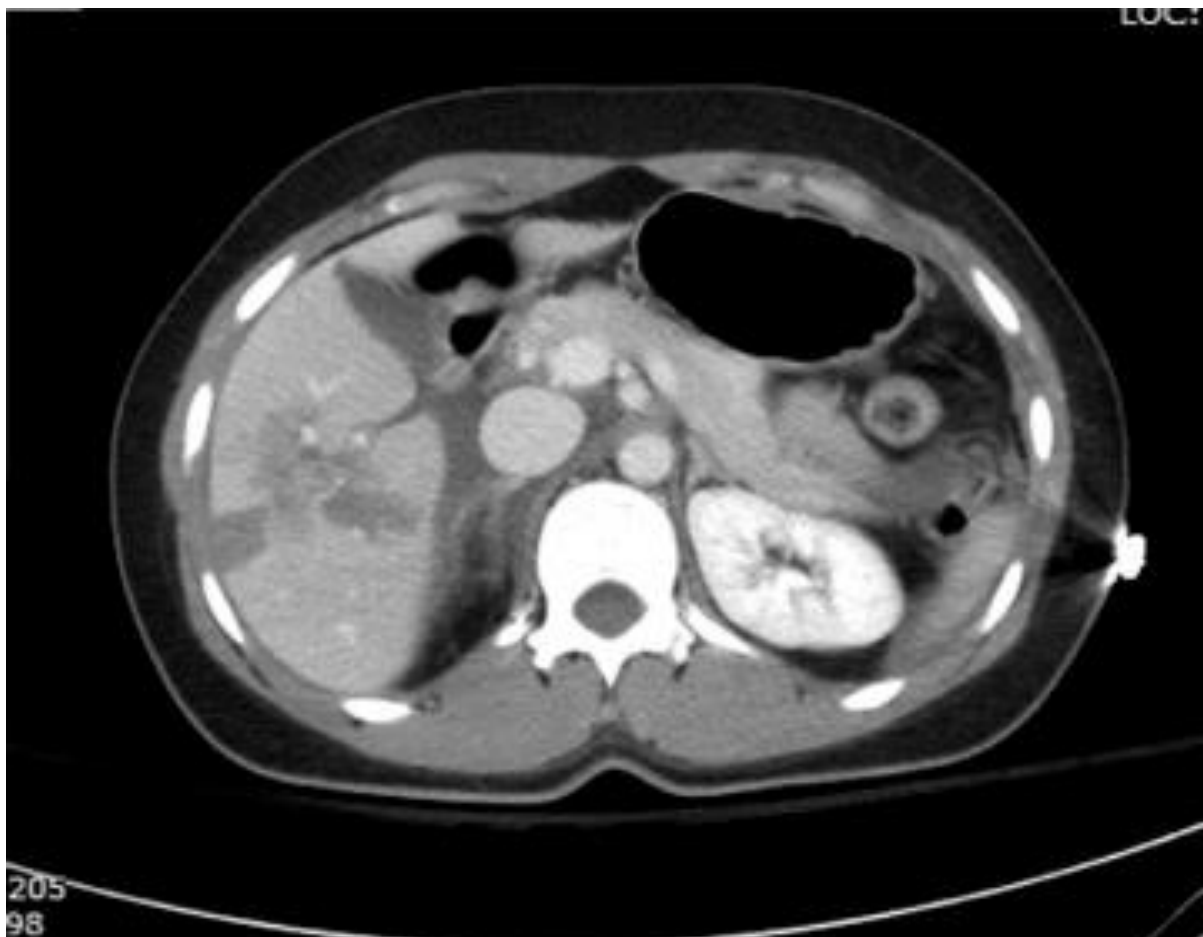


Image courtesy of: <https://doi.org/10.1016/j.circen.2016.04.006>

## Question and answer guide

### 1. Where should this patient be managed?

Blunt abdominal trauma represents a high risk of hepatic injury and further bleeding, therefore requires:

- Early definitive management in a centre where emergent operative management is available or;
- Early notification and referral to tertiary centre where emergent operative management is available.
- Ideally will be managed in a tertiary referral centre for trauma.

The patient should be managed in a critical care (ICU/HDU/trauma ward) setting with access to operating theatres as they require close observation with regular clinical consultation and review.

### 2. What ongoing clinical assessments/trends can be used to monitor this patient?

- Haemodynamic monitoring: closely observe increasing HR and lowering of systolic BP; indicative of ongoing blood loss and perfusion deficits.
- Serial abdominal exams: peritonism suggests an increase in haemoperitoneum.
- Serial haemoglobin trends (either laboratory or point-of-care): decreasing trend indicative of ongoing blood loss.

### 3. If this patient became haemodynamically unstable or is a non-responder, what is the next course of action? <sup>1</sup>

- In the unstable or non-responder patient, operative management to control bleeding should be used in the first instance.
- Transient responders may benefit from interventional radiology (IR) depending on transfusion requirements.
- Interventional Radiology (IR) can be considered in the persistent arterial bleed after damage control surgery.
- Damage control surgery intention is to control immediate haemorrhage and exclude other intraperitoneal injuries.
- Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA) can be used as a bridge to more definitive surgical control (commonly in USA and Europe).

### 4. The patient remains stable and is managed in an appropriate monitored setting. What other supportive cares should be implemented?

- Mechanical prophylaxis for DVT prevention should be commenced early.
- Chemical DVT prophylaxis can be commenced early, if the patient remains haemodynamically stable.
- Early mobilisation, even with higher grade injury, in the stable patient should occur.
- Enteral feeding is aimed to commence as soon as possible.

## 5. What is the likely overall success rate in non-operative management (NOM) of blunt hepatic trauma?

> 80% of cases are managed non-operatively.

Of these, 90% are successfully managed without the need for an operation. <sup>2</sup>

## 6. When is hepatic embolisation useful?

- After damage control surgery when arterial bleeding still ongoing.
- Used to prevent bleeding- highest success when used pre-emptively in patients who have extravasation of contrast on the initial CT scan and are haemodynamically stable.
- Success rate 68-87%. <sup>3</sup>

## 7. What complications may arise from non-operative management or hepatic embolisation?

- Increased rate of missed hollow viscous injury.
- Complications from embolisation include: arterial puncture site bleeding/infection; liver necrosis; liver abscess; inadvertent embolisation of other organs; lower extremity ischaemia from arterial intimal dissection; contrast induced allergic reactions and renal toxicity from contrast.
- Failure of non-operative management is generally related to bleeding in which case surgical management is the preferred treatment.
- Biliary tree disruption may present after a period of NOM- with a biloma or persistent biliary leak. <sup>2</sup>
- Additional factors that can increase complications include increasing age of the patient, delayed bleeding, sudden hypotension and active extravasation of contrast not controlled by embolization. <sup>4,5</sup>

## 8. When can discharge planning be considered in this group?

- Higher-grade injuries should be observed in an ICU/HDU setting for 48-72

hours to confirm clinical stability.

- Following this, if the patient has normal clinical abdominal exams, and a stable haemoglobin for 24 hours they can be considered for discharge. <sup>6</sup>

## **9. What factors are associated with a higher mortality rate?**

- Overall mortality rate 10-42%.
- Factors associated with increased mortality include: higher grade of injury, co-existing significant traumatic injuries, high levels of AST/ ALT, raised lactate, increased APTT, low fibrinogen, low platelet count.
- Improved mortality is associated with tertiary care with hepatobiliary surgical team involvement. <sup>7</sup>

## Acronyms and abbreviations

Term	Definition
AST	Aspartate transaminase (liver function test)
ALT	Alanine transaminase (liver function test)
APTT	Activated partial thromboplastin time
DVT	Deep vein thrombosis
PV	Portal venous

## References

1. Coccolini, F., Coimbra, R., Ordonez, C., Kluger, Y., Vega, F., Moore, E. E., Biffi, W., Peitzman, A., Horer, T., Abu-Zidan, F. M., Sartelli, M., Fraga, G. P., Cicuttin, E., Ansaloni, L., Parra, M. W., Millán, M., DeAngelis, N., Inaba, K., Velmahos, G., Maier, R., ... WSES expert panel (2020). Liver trauma: WSES 2020 guidelines. *World journal of emergency surgery: WJES*, 15(1), 24. <https://doi.org/10.1186/s13017-020-00302-7>
2. Alghamdi H. M. (2017). Management of Liver Trauma. *Saudi journal of medicine & medical sciences*, 5(2), 104–109. <https://doi.org/10.4103/1658-631X.204868>
3. Letoublon, C., Morra, I., Chen, Y., Monnin, V., Voirin, D., & Arvieux, C. (2011). Hepatic arterial embolization in the management of blunt hepatic trauma: indications and complications. *The Journal of trauma*, 70(5), 1032–1037. <https://doi.org/10.1097/TA.0b013e31820e7ca1>
4. Bala, M., Gazalla, S. A., Faroja, M., Bloom, A. I., Zamir, G., Rivkind, A. I., & Almogy, G. (2012). Complications of high grade liver injuries: management and outcome with focus on bile leaks. *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine*, 20, 20. <https://doi.org/10.1186/1757-7241-20-20>
5. Giannopoulos, G.A., Katsoulis, I.E., Tzanakis, N.E., Patsaouras, P.A., & Digalakis, M.K. (2009). Non-operative management of blunt abdominal trauma. Is it safe and feasible in a district general hospital?. *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine*, 17, 22. <https://sitem.biomedcentral.com/articles/10.1186/1757-7241-17-22>
6. Parks, N. A., Davis, J. W., Forman, D., & Lemaster, D. (2011). Observation for nonoperative management of blunt liver injuries: how long is long enough?. *The Journal of trauma*, 70(3), 626–629. <https://doi.org/10.1097/TA.0b013e31820d1c69>
7. Kozar, R. A., Moore, F. A., Moore, E. E., West, M., Cocanour, C. S., Davis, J., Biffi, W. L., & McIntyre, R. C., Jr (2009). Western Trauma Association critical decisions in trauma: nonoperative management of adult blunt hepatic trauma. *The Journal of trauma*, 67(6), 1144–1149. <https://doi.org/10.1097/TA.0b013e3181ba361f>



## Share your feedback

**Please complete our survey to help make Queensland Trauma Education better**

The survey should take no more than 5 minutes to complete.

Scan the QR code or visit:

[Evaluation Form - Clinical Skills Development Service \(csds.qld.edu.au\)](https://csds.qld.edu.au)



**Queensland  
Trauma Education**

**Queensland Trauma Education**

**Abdominal Trauma – Blunt hepatic trauma: Case discussion – Facilitator resource kit**

Published by the State of Queensland (Clinical Skills Development Service), 2024

Visit [csds.qld.edu.au/qte](https://csds.qld.edu.au/qte)

Email [CSDS-Admin@health.qld.gov.au](mailto:CSDS-Admin@health.qld.gov.au)

Phone [+61 7 3646 6500](tel:+61736466500)

