

## PREDICTIVE FACTORS FOR CONSERVATIVE TREATMENT OF LIVER TRAUMA

By

**Ahmed Masoud Abd El-Wahab Mohammed, AL-Sayed Ahmed Mustafa and Basma Ahmed Mohamed**

Department of General Surgery Faculty of Medicine, Al-Azhar University, Egypt

E-mail: [drahmedmasoudmido1988@gmail.com](mailto:drahmedmasoudmido1988@gmail.com)

### ABSTRACT

**Background:** Injuries are a major public health problem. The liver is the most commonly injured intra-abdominal organ. Conservative treatment thereby not only decreases the number of non-therapeutic laparotomies but also achieves a reduction in morbidity and mortality.

**Objective:** To evaluate the management of patients with liver injury and the possible predictive factors for conservative treatment.

**Patients and methods:** Prospective outcome analysis was done for 30 patients who were candidates for conservative management of liver trauma at Al-Azhar University Hospitals and Damanhur Teaching Hospital from December 2019 till October 2020. Patients information's had been collected from the hospital data and connection with them had been through phone calling and hospital follow up visits. Patients had been subjected to clinical and radiological examination.

**Results:** The mean age of the included cases in the study group was 33.63 years (range, 6 – 75), The group included 8 females (26.7%) and 22 males (55%)ss regard type of hepatic injuries of the studied group, 8(26.7%) were isolated hepatic injuries and 22(73.3%) were combined hepatic and other organs, The success rate of the studied group showed that 21(70%) were successful and 9(30%) were unsuccessful.

**Conclusion:** Conservative management of traumatic liver injuries is safe when the decision is based on careful initial evaluation.

**Keywords:** Conservative, Hepatic, Liver, Trauma, Peritoneal Inflammatory Syndrome, Predictive Factors.

### INTRODUCTION

The liver is the most commonly injured solid organ in blunt trauma, comprising 5% of all trauma admissions and due to its size is frequently involved in penetrating trauma (*Letoublon et al., 2016*).

Following blunt trauma, the most commonly injured structures are the hepatic veins and the parenchyma. Blunt forces dissipate along segments of the liver and along the fibrous coverings of the portal triad structures; the hepatic veins, however, are not so insulated. Due

to its size and location within the abdomen, the liver is also commonly involved in penetrating trauma. Stab wounds (SW) typically result in linear injuries while gunshot (GSW) or shotgun wounds result in significant cavitory injuries due to blast effect and the “tumbling” of the missile within the liver parenchyma (*Asfar et al., 2014*).

By the early 1900s, improved management resulted in approximately 40% of blunt liver injuries proving fatal (*Hommel et al., 2015*).

World War II brought advances in a therapy including the implementation of early laparotomy; operative techniques advocated were parenchymal suturing of injuries and drainage to prevent complications (*van der Wilden et al., 2012*).

**The aim of the present work was to** evaluate the management of patients with liver injury and the possible predictive factors for conservative treatment.

## **SUBJECTS AND METHODS**

This was prospective outcome study carried at 30 patients who were candidates for conservative management of liver trauma at Al-Azhar University Hospitals and Damanhur Teaching Hospital from December 2019 till October 2020.

**Inclusion criteria:** Strict clinical and laboratory observation.

**Exclusion criteria:** A primary angioembolization in case of admission CT evidences of vascular injuries and a secondary angioembolization in presence of vascular injuries.

A written informed consent was obtained from every participant before inclusion in the study after explaining the value of the study, plus the conducted procedure.

The whole study design was approved by the ethics committee of the Faculty of Medicine, Al-Azhar University.

All cases in the study were subjected to complete history taking, general medical history and associated comorbidities, and clinical examination. All patients were subjected to Complete blood count, random blood glucose, serum urea, serum creatinine, bleeding profile, liver enzymes and ECG if indicated (Head, neck and abdominal ultrasound, CT, and MRI).

All cases were resuscitated with 1–2 l of crystalloids and colloids through a wide-bore peripheral cannula. Later, the central venous line was accessed in all cases. Conservative management was defined as no operative intervention for hepatic injury in patients within the first 24 h of admission, whereas operative management was defined as operative intervention for hepatic injury within the first 24 h of admission.

Failure of conservative treatment means that a laparotomy must be carried out, after the initial decision to treat the patient non-operatively.

**Statistical analysis:** The collected data were coded, processed and analyzed using the SPSS (Statistical Package for the Social Sciences) version 22 for Windows. A significant p-value was considered when it was equal or less than 0.05.

**RESULTS**

The mean age of the included cases in the study group was 33.63 years (range, 6 – 75). We included 8 females (26.7%) and 22 males (55%) (**Table 1**).

**Table (1): Distribution of studied sample according to patient’s demographic data**

	Number	Percent
<b>Age (years)</b>		
≤20	9	30.0
20-30	5	16.7
30-40	7	23.3
40-50	2	6.7
50-60	5	16.7
>60	2	6.7
Range	6-75	
Mean±S.D.	33.63±18.138	
<b>Sex</b>		
Male	22	73.3
Female	8	26.7

As regard to cause of hepatic trauma in the studied group, there were 8 cases (26.7%) the cause at which was fall from height, 18 cases (60 %) were caused by motor vehicle crashes, and 4 cases (13.3%) due to sharp tools injury. On comparing patients according to their hemodynamic state there were 9 cases

(30%) with hemodynamic instability, 18 cases (60%) were stabilized after intravenous liquid administration and 3 cases (10%) hemodynamic stable. As regard success rate of the studied group 21cases (70%) were successful and 9 cases (30%) were unsuccessful (**Table 2**).

**Table (2): Distribution of studied sample according to patient’s causes of hepatic trauma, Hemodynamic status and success rate**

<b>Causes of hepatic trauma:</b>	Number	Percent
Falls from height	8	26.7
Motor vehicle crashes	18	60.0
Sharp tools	4	13.3
<b>Hemodynamic status:</b>		
Hemodynamic instability	9	30.0
Stabilized after intravenous liquid administration	18	60.0
Hemodynamic stability	3	10.0
<b>Success rate:</b>		
Successful	21	70.0
Unsuccessful	9	30.0
<b>Total</b>	30	100

## DISCUSSION

The main aim of this study was to evaluate the safety and effectiveness of non-operative management (NOM) in the treatment of blunt liver trauma, following a standardized treatment protocol.

A prospective outcome analysis was done for 30 patients who were candidates for conservative management of liver trauma at Al-Azhar University Hospitals and Damanhur Teaching Hospital. The duration of the study ranged from 6-12 months.

As regards sociodemographic data, age ranged from 6-75 years. Male cases were 73.3% while female cases were 26.7%.

Our results were supported by study of *Winata and Rudiman (2017)*. The majority of them were males (73%). Furthermore, *Elhattabi et al. (2020)* revealed that the mean age was 32 years with an age interval of 15 to 60 years of which males represent 83.1%.

As regard to cause of hepatic trauma in the studied group there were 26.7% the cause at which was falls from height, 60% were caused by motor vehicle crashes and 13.3% due to sharp tools injury.

Our results were in agreement with study of *Saleh et al. (2018)* as they reported that 70% patients had blunt injuries 30% patients had penetrating injuries, *Bernardo et al. (2010)* reported that the injuries were due to traffic accidents (63.3%), stab wounds (10.5%), falls (11.2%) and firearms (2.1%).

The current study showed that as regard blood transfused of the studied group that 30% needed 1 unit, 23.3%

needed 2 units, 13.3% need 3 units, 20% need 4 units and 13.3% needed 5 units.

Our results were in line with study of *Buci et al. (2017)* as they demonstrated that 35.9% were transfused with 1 unit of blood, 23.8% were transfused with 2 units, 17.9% were transfused with 3 units, 12.8% were transfused with 4 units, and 9.6% were transfused with more than 4 units. Furthermore, *Kaptanoglu et al. (2017)* revealed that approximately 0–20 units of blood were transfused preoperative and it was statistically correlated with the grade of liver injury.

In the study in our hands, the injury frequencies, according to the Couinaud segment of the studied group showed that 3.3% had I segment, 6.7% had II segments, 13.3% had III segments, 23.3% had IV segments, 13.3% had V segments, 13.3% had VI segments, 10% had VII segments and 16.7% had VIII segments. As regard WSES grade of the studied group show that 30% had grade I, 33.3% had grade II, 10% had grade III and 26.7% had grade IV. However, *Buci et al. (2017)* revealed that the injury frequencies, according to the Couinaud segment, were as follows: I segment 2.5%, II segment 3.1%, III segment 5%, IV segment 10%, V segment 15.3%, VI segment 23.8%, VII segment 20.3%, and VIII segment 20%. The frequency of liver injury according to the WSES were WSES grade I 37.6%, WSES grade II 31.8%, WSES grade III 3.5%, and WSES grade IV 27.1%.

## CONCLUSION

Conservative treatment is an adequate treatment in a great number of patients. Failure of conservative treatment did not show a higher incidence of complications or mortality.

## REFERENCES

1. **Asfar S, Khoursheed M, Al-Saleh M, Alfawaz AA, Farghaly MM and Nur AM. (2014):** Liver Trauma Registry Group. Management of liver trauma in Kuwait. *Med PrincPract.*, 23:160—6.
2. **Baldoni F, DiSaverio S, Antonacci N, Coniglio C, Giugni A and Montanari N. (2011):** Refinement in the technique of perihepatic packing: a safe and effective surgical hemostasis and multidisciplinary approach can improve the outcome in severe liver trauma. *Am J Surg.*, 201: 5-14.
3. **Behboodi F, Amiri ZM, Masjedi N, Shojaie R and Sadri P. (2016):** Outcome of Blunt Abdominal Traumas with Stable Hemodynamic and Positive FAST Findings. *Emergency*, 4(3): 136-139.
4. **Bennett S, Amath A, Knight H and Lampron J. (2016):** Conservative versus operative management in stable patients with penetrating abdominal trauma: the experience of a Canadian level 1 trauma centre. *Can J Surg.*, 59(5): 317-321.
5. **Buci S, Torba M, Gjata A, Kajo I, Bushi G and Kagjini K. (2017):** The rate of success of the conservative management of liver trauma in a developing country. *World Journal of Emergency Surgery*, 18: 19-23.
6. **ElhattabiK, Bachar A, Bensardi F, Mourid K and Fadil A. (2020):** Serious Liver Trauma: Predictive Factors Of Therapeutic Choice And Prognostic Factors (About 65 Cases). *EJMED*, 2(3):136-139.
7. **Kaptanoglu L, Kurt N and Sikar HE (2017):** Current approach to liver traumas. *International Journal of Surgery*, 39:255-9.
8. **Saleh AF, Sageer EA and Elheny A, (2016):** Management of Liver Trauma in Minia University Hospital, Egypt. *Ind J Surg.*, 78(6): 442-7.
9. **Winata AA and Rudiman R. (2017):** Predictors of failure in non-operative management of blunt liver trauma. *IntSurg J.*, 4: 2913-9.

## دراسة العوامل التنبؤية للعلاج التحفظي لاصابات الكبد

أحمد مسعود عبد الوهاب محمد, السيد أحمد مصطفى, بسمه أحمد محمد

قسم الجراحة العامة, كلية الطب, جامعة الأزهر

E-mail: [drahmedmasoudmido1988@gmail.com](mailto:drahmedmasoudmido1988@gmail.com)

**خلفية البحث:** دراسة تأثير العلاج التحفظي لاصابات الكبد خاصة للمرضي المستقرين نسبيا. والمعرفة الجيدة بتشريح الكبد تشكل شرطاً أساسياً للجراحة الحديثة للكبد. قد تكون صدمة الكبد نتيجة لقوى غير حادة مثل حادث سيارة أو جسماً جنبي مخترق مثل سكيناً و صاروخ. و أي إصابة بالغة بما يكفي لإحداث صدمة كبدية غالباً ما تتسبب في إصابات متعددة في مناطق أخرى من الجسم و الحاصي.

**الهدف من البحث:** تقييم سلامة وفعالية العلاج غير التخليه في علاج الصدمات لكبدية الفظة، بعدوضع بروتوكول علاج موحد.

**المرضي وطرق البحث:** تم إجراء تحليل النتائج المحتملة لـ 30 مريضاً كانوا مرشحين للعلاج التحفظي لصددمات الكبد في مستشفيات جامعة الأزهر ومستشفى دمنهور التعليمي. وتراوحت مدة الدراسة بين 6 و12 شهرا في الفتره من ديسمبر 2019 وحتى اكتوبر 2020 وتم جمع معلومات المرضى من بيانات المستشفى وكان الاتصال بهم من خلال المكالمات الهاتفية وزيارات المتابعة بالمستشفى. تم إخضاع المرضى للفحص السريري والإشعاعي.

**نتائج البحث:** كانت حالات الذكور 22 (73.3 في المائة) بينما كانت حالات الإناث 8 (26.7 في المائة). وهناك أسباب للصدمة الكبدية لدى المجموعة المدروسة توضح أن 18 (60%) السبب كان حوادث السيارات، 8 (26.7%) كان السبب وراء ذلك هو السقوط من اعلي،

و4(13.3%) كان السبب في ذلك أدوات حادة. توضح حالة ديناميكية الدم لدى المجموعة المدروسة أن 9 (30%) تعاني من عدم استقرار الدورة الدموية، وأن 18 (60%) قد استقرت بعد تناول السائل في الوريد، وأن 3 (10%) تتمتع باستقرار الدورة الدموية. ويظهر معدل نجاح المجموعة المدروسة أن 21 (70%) كانت ناجحة و9 (30%) لم تنجح.

**الاستنتاج:** الإدارة المحافظة لإصابات الكبد الرضحية تكون آمنة عندما يعتمد القرار على تقييم أولي دقيق.

**الكلمات الدالة:** محافظ، كبدي، كبد، رضوض، متلازمة التهاب الصفاق، عوامل تنبؤية.