MANAGEMENT OF TRAUMATIC LIVER LESIONS

D. Timofte¹, I. Hutanu²*, Roxana Maria Livadariu¹, R. P. Soroceanu¹, Iulia Munteanu¹, C. Diaconu¹, Lidia Ionescu¹
University of Medicine and Pharmacy "Grigore T. Popa" – Iasi
Faculty of Medicine
1. Department of Surgery
2. Regional Institute of Oncology, Iasi
*Corresponding author. Email: hionut65@yahoo.com

MANAGEMENT OF TRAUMATIC LIVER LESIONS (Abstract): **Aim:** To determine the correct therapeutic approach to the different grades of liver trauma. **Material and methods:** The study is based on a retrospective analysis of treatment outcomes in 56 patients with abdominal trauma admitted over a 9-year period to the IIIrd Surgical Clinic of the Iasi “Sf. Spiridon” Hospital. It is focused on operative or non-operative management of liver trauma, surgical technique used, morbidity and postoperative mortality. Data were collected from electronic medical records and observation sheets and processed and interpreted using Microsoft Excel statistical functions. **Results:** In the interval May 26, 2005 – April 19, 2013 56 cases of abdominal trauma were recorded, 31 (55.35%) residing in urban areas, and 25 (44.64%) in rural areas. The mean age was 39 years, range 18-83 years old. The male/female ratio was 2.5/1 and the group consisted of 40 (71.42%) male patients and 16 (28.57%) female patients. The causes of abdominal trauma were: car accident in 29 (51%) cases, fall from different heights in 6 (10%) patients, workplace-related accidents in 8 patients (14%) and direct hit injury in 12 patients (21%). In our cohort, 51 (91%) patients with abdominal trauma have been emergency admitted, 3 patients (5%) were transferred from different medical units, and 2 patients (4%) were referred by a specialist doctor. Two or more simultaneous lesions were diagnosed in 53 (96%) cases. Of the 45 patients with traumatic liver injuries diagnosed on admission, 32 (71%) required surgical intervention. In the remaining 13 (29%) patients, the therapeutic management was conservative. **Conclusions:** Hepatic traumas are often severe, and frequently associated with multiple injuries. The non-operative management is indicated in liver lesions grade I, II and III according to the American Association for the Surgery of Trauma (AAST), if abdominal cavity organs are not injured. Higher grade liver lesions (over IV) in which the hemorrhagic risk persists or reappears require surgical intervention as soon as possible, and according to the type of lesion, the right procedure should be chosen. **Keywords:** TRAUMATISM, SURGICAL, LIVER, TREATMENT.

Nowadays abdominal trauma is one of the most important parts of emergency surgery. The abdominal region is widely exposed to traumatic agents acting under a lot of circumstances: car accidents, sports, workplace accidents, violence. The management of the patient with hepatic trauma has significantly evolved over the last years partly due to the changing attitude of the medical specialists from the “interventional” one at the beginning of 60’s towards the conservative (non-surgical) one in the last
20 years. Imaging analysis of liver lesions favors the decision-making regarding the therapeutic approach to be adopted, to operate or not, based on all parameters.

Liver injury is one of the most common traumatic emergency, on one hand due to the large size of the liver and fragility of the parenchyma, on the other hand due to its location in relation to the chest wall and spine, all these factors exposing it to the action of different agents which act at the level of the thoracic wall and abdomen (1-3). The management of patients with abdominal trauma and consequently of those with hepatic trauma underwent major changes in approach and concepts over the last years. These patients, victims of a true “traumatic epidemic” are usually active persons, aged 15 to 50 years. The probability of trauma-related death in this age segment is three times higher than from other causes (4).

The modern liver surgery developed in parallel with the understanding of liver anatomy and physiology, initiated by Couinaud in 1957 and later by Bismuth in 1982.

This study deals with the diagnosis, treatment, and outcome of patients with trauma to the liver (5-8).

MATERIAL AND METHODS

The inclusion criterion was traumatic liver lesion confirmed by clinical examination and laboratory investigations. The study was based on a retrospective analysis of treatment outcomes in 56 patients with abdominal trauma admitted over a 9-year interval to the IIIrd Surgical Clinic of the Iasi “Sf. Spiridon” Hospital, being focused on the operative or non-operative management of liver trauma, surgical technique used, morbidity and postoperative mortality. Ninety-one percent of patients have been admitted, investigated and treated in the Surgical Clinic, the remaining being transferred from medical units where they received primary care immediately after the accident (8%).

The term “trauma” is defined as an acute severe state following an impact of a different nature: mechanical, thermal, chemical or electric, being characterized by the presence of a physical injury which affects isolated or concomitant organs from one, two or more anatomical regions of the body (9-11). “Polytrauma patients” were the patient who sustained two or more injuries to organ systems, one of which or the combination of some lesions being life-threatening, with a severity score >16 on ISS scale, according to the definition accepted by the stuff of Floreasca Emergency University Department, Romania (12,13).

RESULTS

Diagnosis. The diagnosis of liver injury was made by history, complete physical examination, laboratory tests and imaging investigations. Abdominal ultrasound scan was performed in all patients. In case of diagnostic uncertainty or for a greater diagnostic accuracy a CT scan or abdominal MRI and/or angiography were performed. Liver function was assessed by determining the hepatic enzymes, bilirubin, cholesterol, serum iron, coagulation tests, serum proteins and albuminemia. In case of biliary obstruction, to determine its localization, extent, and cause the following were also performed: percutaneous cholangiography, ERCP (endoscopic retrograde cholangiopancreatography) and/or MRCP (magnetic resonance cholangiopancreatography).

Distribution. Analyzing the gathered data, in the interval May 26, 2005 – April 19, 2013 56 cases of abdominal trauma were recorded. Of these, 31 (55.35%) resided in
The management of traumatic lesions of the liver

urban areas and 25 (44.64%) in rural areas.

In the study group, the mean age at injury was 39 years, range 18 - 83 years.

The male/female ratio was 2.5/1, the study group consisting of 40 (71.42%) male patients and 16 (28.57%) female patients
(fig. 1). Most trauma patients were males, accounted for by the nature of activities performed by them (workplace accidents, agricultural or domestic activities), or incidents they were involved in (car accidents, conflicts and violence, sports).

![Fig. 1. The distribution of abdominal trauma patients based on sex](image)

![Fig. 2. Main associated lesions](image)

**Etiology.** Abdominal trauma, especially that caused by car accidents which were present in 29 (51%) of our cases was the most common cause of liver injury being found in 26 (89%) of the 29 cases. Fall from different heights caused trauma in 6 cases (10%), workplace-related accidents led to abdominal trauma in 8 (14%) cases, and direct hit injury in 12 (12%) cases.

**Admission type and associated lesions.**
In our study group, 51 patients (91%) with abdominal trauma were emergency admissions, 3 (5%) patients were transferred from different medical units, and 2 (4%) were referred by a specialist. Of the 45 patients with liver trauma (from the total of 56 abdominal trauma patients), the great majority were polytraumatized (40 cases – 89%). Isolated liver lesions were found in 5 (11%) cases, a significantly lower value compared to frequency of liver lesions in associated trauma.

The frequency of associated lesions appears to be significant, very often two or more simultaneous lesions being diagnosed. In 53 (96%) of the cases there were concomitant lesions, their nature being detailed below (fig. 2). Hemoperitoneum was most frequently associated with abdominal trauma (16 cases/28%). Multiple rib fractures were identified in 11 (19%) patients, fractures of the vertebrae in 7 (12%) patients and of the clavicle in 3 (5%) patients. The most frequently concomitantly injured retroperitoneal organ was the spleen, 5 (8%) cases.

Traumatic lesions to the liver and gallbladder were diagnosed in 15 (34%) cases, contusion and hematoma in 18 (40%) cases, minor laceration in 7 (16%) patients, moderate laceration in 1 (2%) patient, major laceration in 3 (6%) patients, and liver abscess in 1 (2%) patient (fig. 3).

<table>
<thead>
<tr>
<th>Injuries</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abcess of the liver</td>
<td>2</td>
</tr>
<tr>
<td>Major laceration of the liver</td>
<td>7</td>
</tr>
<tr>
<td>Moderate laceration of the liver</td>
<td>2</td>
</tr>
<tr>
<td>Minor laceration of the liver</td>
<td>16</td>
</tr>
<tr>
<td>Contusion and hematoma of the liver</td>
<td>40</td>
</tr>
<tr>
<td>Traumatic lesion of the liver and gall...</td>
<td>33</td>
</tr>
</tbody>
</table>

Fig. 3. Liver injuries diagnosed on admission

_Type of treatment received._ Of the 45 patients with traumatic liver injuries diagnosed on admission, in 32 (71%) cases a surgical intervention was required. In the remaining 13 (29%) patients, the therapeutic approach was conservative. Of the 15 patients with injuries to the liver and gallbladder, 5 (33%) patients were treated conservatively, and a surgical intervention was required in 10 (67%). As to the patients diagnosed with contusion and hematoma of the liver, in 5 (28%) cases the conservative treatment was preferred, and in the remaining 13 (72%) cases surgical intervention was required. The minor liver laceration was treated conservatively in 2 (29%) cases and surgically in 5 (71%) cases. The only case of moderate liver laceration received conservative treatment, while for major liver laceration surgery was required in all 3 patients. The patient diagnosed with a liver abscess was also surgically treated.

_Patient discharge status._ It should be mentioned that in 23 (51%) patients the
The management of traumatic lesions of the liver

discharge diagnosis was cured, in 10 (22%) patients, improved health status, in 4 (9%) patients, stationary health status, and 8 (18%) patients died (fig. 4). Analyzing the number of deceased patients, we concluded that 8 of 9 patients died due to the severity of liver trauma and associated lesions.

As to mortality, none of the 8 deaths were caused by the liver trauma itself, but by the association with other severe lesions. US and CT screening are compulsory for the correct diagnosis, stadialization of lesions, adequate treatment and prevention of possible complications (8).

CONCLUSIONS
Liver traumas are often severe, and frequently associated with multiple injuries (in 96% of the cases concomitant lesions being identified). In the vast majority of cases, the patients were admitted in emergency (91%).

The non-operative approach is indicated in liver lesions grade I, II and III according to the American Association for the Surgery of Trauma (AAST), if abdominal cavity organs are not injured. In 29% of the patients the therapeutic approach was conservative.

High-grade liver lesions (over grade IV), in which the hemorrhagic risk persists or may reappear, surgical intervention is necessary as soon as possible, and the procedure adequate to the type of lesion should be chosen. Surgery was required in 71% of cases.

ACKNOWLEDGEMENTS
Dr. Huțanu Ionuț is a fellow of POSDRU grant no. 159/1.5/S/136893 with title: “Strategic partnership to improve the quality of medical research in universities through doctoral and postdoctoral–DocMed.Net_2.0”.

REFERENCES
PRIMARY CLEAR CELL SARCOMA OF THE TONGUE

Clear cell sarcoma shares features with melanoma, but frequently shows EWSR1 rearrangements. It is an aggressive tumor typically occurring in the soft tissues of the extremities, with a gastrointestinal variant with less consistent melanocytic differentiation. It is extremely rare in the head and neck region, with no reported cases in the oral cavity. The authors report a case of an 82-year-old woman with a clear cell sarcoma arising in the tongue, with cervical lymph node metastases. Histologically, the tumor showed some features of gastrointestinal clear cell sarcoma. No osteoclast-type giant cells were present. The tumor cells were positive for S100 protein and negative for other melanocytic markers. Fluorescence in situ hybridization showed rearrangements of EWSR1 and ATF1. This case expands the spectrum of clear cell sarcoma with a gastrointestinal-like variant in a novel site, emphasizing the need to consider it as a differential diagnosis to melanoma in mucosal sites. This report raises the question of whether CCS of head and neck mucosal sites is a rare distinct subtype within the GI CCS spectrum, or whether this case is merely a “typical” CCS arising in an unusual site. The morphologic and immunophenotypic features of this case support the former interpretation, but additional cases will be necessary to confirm this interpretation. Given the morphologic and immunohistochemical overlap with malignant melanoma, it is also possible that such cases were previously diagnosed as melanoma. In agreement with that, a recently published study performed on cases from the GI tract that were diagnosed as melanoma showed that a small fraction in fact were CCS. While future studies may answer this question, the practicing pathologist should be aware of CCS when encountering an S100 protein–positive epithelioid and spindle cell neoplasm arising in an unusual site without diagnostic features of melanoma, such as an in situ component, and should have a low threshold for performing additional molecular studies to further investigate this possibility (Stefan Kraft, Cristina R. Antonescu, Andrew E. Rosenberg, Daniel G. Deschler, G. Petur Nielsen, Primary Clear Cell Sarcoma of the Tongue. Arch Pathol Lab Med. 013;137:1680–1683).