CONTRIBUTION OF CT EXAM TO THE ASSESSMENT OF THE LIVER TRAUMA

ALINA VENTER¹, ADRIANA PIRTE²

¹,² University of Oradea

Keywords: liver trauma, haematoma intraparenchyma, hemoperitoneum

Abstract: Abdominal trauma in particular closed from traffic accidents are the most common causes of liver injury. Computer tomography abdominal parenchymal organs inventoried trauma injuries, the compulsory administration of contrast CT intravenous.

Aim. Hepatic evidentiation. Material type of lesion and retrospectively method. Study 1.02.2010-30.03.2011 conducted from the patients examined in the CT Department of Hospital Oradea clinical County. Results and conclusions. Computer tomography with intravenous contrast is the method of choice in thorough review of abdominal trauma injuries, the most rapid and effective evaluation. It contributes substantially to conduct appropriate treatment. In our group traumatic lesions of liver were ranked second by the spleen in the abdominal parenchymal organ injuries. Their etiology was in 56% of traffic accidents. In 6 cases were associated with other visceral injuries.

Cuvinte cheie: traumatism hepatic, hematom intraparenchimatos, hemoperitoneu


INTRODUCTION

Abdominal trauma, especially the closed one from the traffic accidents represent the most frequent cause of liver lesions[1]. The rupture of hepatic parenchyma with the formation of a intra-parenchyma or sub-capsullary haematoma may lead to important haemorrhages in the abdominal cavity as a result of capsullary rupture[2]. In cases of shot wounds and by stabbing, the haematoma is formed during the perforation tract. The CT exam, next to the ultrasound, represents an useful method in the imagistic emergency diagnosis of patients with abdominal traumatisms[3]. However, the ultrasound does not have to be chosen as the first intervention method in the investigation of such patients due to the examination difficulties (non-cooperative patients, meteorism), due to the long time necessary for the assessment of parenchyma lesions. The CT inventorizes the lesions of traumatisms of abdominal parenchyma organs, the administration of intravenous contrast being compulsory[3,4].

THE AIM OF THE STUDY

The aim of the study is to emphasis the type of hepatic lesion through CT.

MATERIAL AND METHODS

The retrospective study performed during the period 1.02.2010-30.03.2011 on the patients examined in the CT Department of the Oradea County Clinical Hospital.

RESULTS

Out of a total of 11881 patients examined in this period, 4515 (38%) came from the Emergency Care Unit; from these, 1788 patients (agend between 4 and 69 years old - 57% males and 43% females) respectively 39% were involved in major or minor traumas. They performed a number of 3962 examinations, that is:

![Figure 1. Type of CT exams](chart)

Out of the 192 abdomen examinations, 37 presented lesions of abdominal parenchyma organs. The study contains the analysis of the 37 cases at which were identified lesions of parenchyma organs. Their etiology is shown in figure no. 2.

![Figure 4: Abdominal lesions identified on CT scan](chart)

¹ Corresponding Author: Alina Venter, 51, block of flats D65,app.9, Bdul Stefan cel Mare street, Oradea, Romania; e-mail: alinaventer@gmail.com; tel +40-0 724243934
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CLINICAL ASPECTS

The intraparenchymal haematoma is the result of a severe intraparenchymal bleeding and appears as a round-oval hyperdense collection on the native examination, which, after the administration of contrast does not change. The density is changed in time due to the resorption of blood. The plaques interesting the liver surface may cause subcapsular haematomas[2,3].

Table no. 1. Gradual classification of the hepatic traumatic lesions (Moore and others, 1989)

<table>
<thead>
<tr>
<th>Degree</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>Small capsular laceration or/and parenchyma laceration not deeper than 1 cm, periporal hypodensities. Small subcapsular haematoma smaller than 10 % of the liver’s surface.</td>
</tr>
<tr>
<td>2nd</td>
<td>Parenchymatous wound of 1-3 cm. Central or subcapsular haematoma with the diameter of 1-3 cm.</td>
</tr>
<tr>
<td>3rd</td>
<td>Deeper parenchymatous wound of 3 cm, central or subcapsular haematoma larger than 3 cm.</td>
</tr>
<tr>
<td>4th</td>
<td>Devascularization and distraction of the hepatic lobe. Haematoma larger than 10 cm in diameter.</td>
</tr>
<tr>
<td>5th</td>
<td>Devascularization and distraction of both hepatic lobes with hepatic snatching.</td>
</tr>
</tbody>
</table>

The subcapsular haematoma is a blood lentiform collection between the hepatic capsule and the parenchyma, being hypodense[2].

Hepatic laceration / wound. It is the most common hepatic lesion, especially interesting the right hepatic lobe. In the massive traumatisms may exist multiple lacerations which have as result the star aspect and which may reach to the capsule. In the majority of cases in which the capsule is interested, the anterior face of the liver is lacerated, and in the right paracolic space a collection may be noticed [2,3]

The hepatic fracture is a term used for the extended lacerations from a hepatic surface to another one, having as result a segmentary or lobe rupture[1,8].

The posttraumatic infarction occurs if the lesion leads to the occlusion of great intrahepatic vessels; in relation to the calibre of such vessels it may interest segments or even lobes. The infarctions appear as unclearly limited hypodense areas, without postcontrast intensification. Occasionally, these infarctions by overinfection may be transformed in hepatic abscesses[1,9,10].

Haemoperitoneum in hepatic lesions. The quantity of intraperitoneal free blood was found to be a significant index of prognosis for the patients with hepatic traumatisms[5]. If the blood is not resorbed within a week from the native CT exam, we may consider that we have a persistent haemorrhage in case of the lesion[6].

Vascular complications. The pseudoaneurisms are developed after closed abdominal traumatisms, as well as after abdominal penetrating traumatisms[8,9,11]. Although their
presence may be sometimes proven by CT exam with i.v. contrast, the angiographic emphasis is necessary. Their typical positioning at the margin of laceration and the clinical symptomatology is demonstrated by the haemorrhage. The embolization represents the chosen treatment which may be effectively and safely performed[6,12].

**Figure no. 6. Intraparenchimatous hematoma that interest and liver surface**

**Figure no. 7. Right lobe infarction posttraumatic**

**Figure no. 8 Hematoma intraparenchimatous LS and LD dilacerare small area**

**Figure no. 9. Intraparenchimatous hematoma LD**

**Figure no. 10. Intraparenchimatous hematoma associated with haemoperitoneum**

*Arterovenous fistulae.* The arterovenous intrahepatic communication is very rare and less than 50 cases were described in the specialty literature. The majority of cases are due to traumatisms: penetrating traumatisms, the status following the biopsy and the closed abdominal traumatisms. The majority of fistulae occur between the hepatic artery and branches of port vein. In cases with large communication, the portal hypertension may develop with all its consequences. In case of communication between the hepatic artery and the hepatic vein, a severe cardiac insufficiency may instal, depeing on the shunt’s size. Also, large fistulae have to be embolized or, if this is not possible, operated[7,9,11].

**Lesions of juxtahepatic veins.** The leof juxtahepatic veins are rare, but almost always fatal. They include rupture or grabbing of the cave retrohepatic vein or of the large hepatic vein. The majority of these patients cannot benefit from the imagistic examination due to the seriousness of extreme gravity of lesions[9,12].

*Hepatic avulsion.* It is the most severe hepatic lesion, having as result the devascularization of the liver. Due to this cause, there is no intensification with contrast of the entire organ at CT exploration[8,9,12].

*Haemobilia.* The haemobilia occurs after the post-traumatic communication between the blood vessels and the biliary channel. The most frequent etiology is the rupture of pseudoaneurysm in the biliary channel. The diagnosis is usually angiographically performed[2,9,11].

**CONCLUSIONS**

1. The CT with intravenous contrast represents the chosen method in the complete analysis of the lesions of abdominal traumatisms, being the fastest and most efficient method in their assessment. It essentially contributes to an adequate therapeutical behavior.
2. In our lot, the hepatic traumatic lesions were classified on the 2nd place following the spleen within the traumatisms of abdominal parenchyma organs.
3. Their etiology was in 56% of the cases the traffic accidents.
4. In 6 cases these were associated to other visceral lesions.

**REFERENCES**