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Abstract
Blunt abdominal injuries are commonly presented in the emergency department. The most commonly injured organs are spleen, liver and small intestine. Using new imaging techniques hydatid cyst of the liver is more often incidentally diagnosed. Management of a patient with hydatid cyst of the liver who had a blunt abdominal trauma is quite difficult. A 17 years old male after a blunt abdominal trauma was transferred at a rural hospital. The initial diagnosis using CT was hematoma of the right lobe of liver. The patient was hemodynamically stable and finally transferred to our department. The new imaging with CT and MRI and the serological tests revealed a complicated ruptured hydatid cyst of the liver. The patient received treatment with albendazole for 2 months and then underwent a surgical procedure (Right Hemi-hepatectomy) taking into account multiple factors (age, complications, morphological features of the cyst). There were no postoperative complications. CT scan is the gold standard in diagnosis of hydatid cyst. It is controversial what kind of treatment is the ideal for each patient. Treatment can be medical, surgical (conservative or radical surgical methods) or percutaneous drainage. After collaboration and close interaction between surgeons, radiologists and gastroenterologists we decided that the ideal method for our patient would be Right Hemi-hepatectomy even if Hydatidosis is considered to be a benign disease. Searching at the literature we concluded that patients treated with radical surgical approach have lower recurrence and complications rates than those treated with more conservative surgical or interventional methods if those patients are treated in well organized centers from an experienced HPB surgical team. The management of Hydatidosis of the liver can be a major problem especially in patients with co-morbidities. The new imaging techniques are very useful in the diagnosis of hydatidosis. Taking in to account the experience of the center and surgical team and special features of the patient, the majority of experts agree that a more radical surgical approach is the gold standard of treatment of Hydatid cysts of liver.

Key words: blunt abdominal trauma, cystic lesion of liver, echinococcus cyst of liver, Hydatidosis, Hydatid cyst, complicated cystic liver lesions.

Introduction
Blunt abdominal injuries as a result of a road traffic accident, industrial accident or any other cause is a common cause of admission in the A&E department and often require urgent management. Commonly injured organs are the spleen (40-55%), the liver (35-45%) and the small intestine (5-10%).

Today’s imaging techniques (U/S, CT scan, and MRI) increased the incidence of incidental finding of cystic lesions of the liver and other solid abdominal and retroperitoneal organs. They are usually asymptomatic benign simple cysts, inflammatory (abscess), parasitic (hydatid), posttraumatic or rarely neoplastic cystic lesions.

Revealing the existence of such lesions after a blunt injury implicates the management of presenting patients. With an aim to discuss problems and management of the specific pathology we present a patient referred to our department.

Case presentation
A 17 year old male was transferred to a rural hospital after a blunt injury in the right upper abdominal quadrant during a football match with a history of a transient loss of conscience. On admission he had tachycardia (110bpm) and arterial pressure of 90/70mmHg, GCS 15, and on physical examination abdomen was soft with mild tenderness in the right upper quadrant. Laboratory tests were fairly normal (WBC 10.600/ML, Ht:56%, SGOT 18U/L, SGPT:11U/L, γ-GT: 13U/L, Amylase :22U/L, CRP:17,25mg/dl) and clotting results normal also. After initial assessment and resuscitation with two liters of IV Ringer’s lactate vital signs were stabilized. Following a CT scan a cystic lesion in the right lobe of the liver was discovered extending to the hilum, with features of pericystic edema, real cyst wall, that was initially characterized as a hematoma (picture 1,2). Patient remained hemodynamically stable and 48hours later was transferred to our department as a tertiary referral center because of the nature and the extent of the lesion.
On the next day of his admission in our department blood tests were: WBC 12,240/ML (NE:94.86%), Ht:38.41%, Hgb:12.30g/dl, PLT: 165000/ml. LFT’s and amylase normal. Radiologists in a repeat CT scan reported as possible diagnoses the presence of a large hydatid cyst or two cysts with an area of communication, 10 cm in diameter extending to segments V, VIII, VI and reaching the liver capsule in segment VI. Comparing to the previous CT it has increased in size and presented areas of bleeding with concomitant laminar detachment possibly of traumatic etiology. Also a satellite cyst was found probably due to implantation (picture 3).

In order to define the diagnoses an ELISA anti-Echinococcosis antibodies detection test was performed in our hospital that turned out negative. Based on those results an MDT meeting was held during which radiologist insisted on the diagnosed of a ruptured hydatid cyst. An anti-Echinococcosis antibodies (IgG, IgM) test was send to Aristotle University of Thessaloniki Veterinary Medical School that came back positive this time. To conclude the diagnosis tumor markers (aFP, Ca 19-9, CEA, Ca 15-3), Hepatitis B and C tests and fecal parasitological tests were performed that all came back as normal or negative. From the patients history a daily contact with dogs was revealed.

The dilemma now was which is the correct path for the management of this young patient. Proceed directly to surgery? Or anti-Echinococcosis oral regiment first and then surgery?. A second meeting was held and with the input of the Gastroenterologists the decision was to postpone surgery and start anti-Echinococcosis therapy. The patient was discharged on the 22nd day from admission with prescription of oral Albendasol for a month. Following that patient had a two week brake from therapy and after the completion of a second cycle a repeat CT scan performed that reported small decrease in size of the cyst. Surgery was scheduled and another dilemma presented concerning the ideal surgical approach for this young patient. Right hemihepatectomy with complete removal of the cyst or a more conservative approach? Despite the benign nature of the disease we decided that the best surgical approach for this patient to minimize recurrence is the right hemihepatectomy taking also in to consideration his young age, his general condition and the location of the lesion. A pre-op liver MRI-MRCP was performed to visualize the biliary tree and recognize any existing bilio-cystic communications that reported no abnormalities (Picture 4). A chest CT was also performed that did not reveal any extrahepatic disease.

Procedure: Right hokeystick incision, mobilization of the right Liver, suprahepatic IVC and RHV displayed. Liver mobilize from IVC. Cystic artery and cystic duct ligated with a long stump for control cholangiography after resection. Gallbladder kept in place due to close contact with the cystic lesion (pic. 5). Dissection of the hilar plate
recognition of the bile duct bifurcation transection and suturing of the right stump at the bifurcation due again to cyst tight adhesion. Inflow control with division of the right hepatic artery and portal vein and outflow with stapling of the RHV. Transection of the liver along the demarcation line with SONOCA 300 SORING, Quickborn Germany. Low CVP <5mmHg during transection. Blood loss <100ml, no Pringle time. Two drains used. Patient recovered easily and transferred directly to the ward (pic.6,7,8)
Mild raise in LFT’s normalized the 3rd postoperative day, patient had an uneventful post op period and was discharged the 10th post op day. Post op MRCP was normal.

Because of the radical nature of the surgical procedure no postoperative oral therapy with Albendasol was used.

Repeat anti-Echinococcosis antibodies in one month after operation and abdo CT in six months were planned.

Discussion
Echinococcosis is caused mainly by echinococcus granulosus and echinococcus multilocularis larvae with the first producing cystic lesions in the targeted organs and the second causing parenchymal destruction via diffuse infiltration. Humans are infected via the oral route by consuming foods and mainly vegetables polluted by feces of dogs and other primary host animals. Echinococcosis nymphs are implanted in the liver and other target organs via the portal circulation. Most common form of Echinococcosis especially in the Mediterranean countries is echinococcus granulosus. The liver and especially the right lobe is the most common site of hydatid cyst formation (50-93%). During its expansion or after trauma cysts are ruptured and communication with the small bile ducts, pleural cavity and free peritoneal cavity can be observed. Clinical manifestations can comprise pain and jaundice when rupture occurs towards the biliary system, cough and shock when rupture occurs towards pleural cavity. Signs and symptoms of acute abdomen can be observed and anaphylactic shock if there is free rupture off the cyst to the peritoneal cavity. Usually hydatid disease is incidentally discovered during imaging for other pathology. CT scan is the preferred diagnostic method and has a high diagnostic value together with radiologist experience for liver hydatidosis and its complications. In our case the initial CT scan was misleading reporting possible liver rupture and hematoma due to the morphology of the lesion, clinical history of blunt trauma and drop in hemoglobin. Repeat scan in our hospital as a tertiary referral center with expert radiologists confirmed the diagnosis of a large hydatid liver cyst. MRI scan and MRCP have specific indications like communication of the cyst with the biliary tree and presence of daughter cysts in the primary and main biliary ducts. ELISA IgG detection test has 95% sensitivity and 90% specificity and finally confirmed the diagnosis of hydatidosis.

Therapeutic administration of albendasol commences immediately after diagnoses is confirmed and additional interventional techniques like percutaneous drainage, surgical excision or drainage can follow.

Albendasol administration alone was 30% curing rate so it has to be completed with the previously mentioned interventional techniques.

Percutaneous drainage is CT guided and completed with injection of antiparasitic agents in the remnant cyst.

Surgical intervention has as a goal the complete excision or drainage. The type and the timing of intervention is related to many factors including general status and age of the patient, morphology, number, location and complexity of the cysts and also the Centers capabilities and Surgical team expertise. In our case after an MDT meeting it was decided that the best therapeutic pathway for this young patient was a first line of albendasol administration followed by complete cyst excision.

Surgical treatment techniques are divided into more conservative approach techniques (simple drainage, omentoplasty or capitonnage, partial cystectomy, subtotal cystectomy) and radical techniques (total pericystectomy or anatomic major/minor liver resections). In the literature still there is no consensus concerning the superiority of conservative vs radical surgical approach. Nevertheless dramatic progress in liver surgery often produced better results with radical than conservative approach. Surgical approach generally aims to eradicate the disease by dealing also with the pericystic layer and the remaining cavity. Anatomic liver resection theoretically is an ideal approach to control the disease and avoid complications. Some authors indicate that a major liver resection is a major over treating procedure to deal with a benign disease like Hydatidosis. Indications for resection are cysts located in the peripheral segments (the easy segments): II, III, IVb, V, VI or cysts located deep in the liver parenchyma or multiple cysts located in the same part of the liver that cannot be dealt individually. Radical resections avoid complications like post op bile leak and biliary fistulas often encountered with conservative surgical methods. Another major complication is anaphylactic shock during the evacuation of the cyst and the injection of anti-echinococcosis agents and chemical cholangitis if there is a communication of the cyst with the biliary system. Also daughter cyst spillage and secondary echinococcosis during evacuation is another major complication. In a study with 135 patients treated over a period of 10 years and divided into two groups according to conservative or radical surgical management, conservative management group had higher complication rate 28% vs 19% (in the radical group). Also hospital stay was longer (15+/- 3.1days) vs (5+/- 1.5days) in the conservative group together with higher recurrence rates. In another study the operative mortality is slightly higher with radical management but with significant lower complication rates. I our case taking into consideration the very young age and relative fitness of the patient, the morphology of the lesion and the departments capabilities...
and surgeons experience we decided to perform a right Hemi-hepatectomy resulting in an uneventful post op period.

**Conclusion**

Liver Hydatidosis is a benign disease presenting with some difficulties in diagnosis despite the evolution in imaging techniques, especially when complicated if combined with other pathologies.

Management of the disease is individualized and accompanied with high rates of complications and recurrence. As a result of that a multimodality meeting is necessary to plan the therapeutic pathway of each patient individually.

Surgical intervention is the method of choice with the more radical approach gaining ground progressively but always taking in to consideration patient individualities, surgeons experience and capabilities of each Center.

**References**


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