Turk J Gastroenterol 2006; 17 (4): 273-278

The results of surgical treatment for hepatic hydatid cysts in an endemic area

Endemik bir bölgede karaciğer hidatik kistlerine yapılan cerrahi tedavi sonuçları

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Background/aims: *Hydatid cyst remains an important public health problem in endemic areas.* ***Methods:*** *This study retrospectively reviewed medical records of 63 patients treated for hepatic cyst hydatidosis in Fırat University, Medical School, Department of General Surgery between January 1994 and December 2002.* ***Results:*** *There were 96 cysts in total in 63 patients, with 67 (69%) of them located in the right lobe of the liver. Of 96 hepatic cysts, 41 (45%) were treated with partial cystectomy and drainage, 25 (26%) with partial cystectomy and capitonnage and 15 (15%) with partial cystectomy and omentoplasty. Thirty-two patients (51%) received treatment with albendazole while 31 (49%) received no medical therapy. The postoperative complication rate was 19% and there was no significant difference in the early post-operative complications between surgical procedures (p>0.05). Cysts recurred in 6 patients (11%) and no correlation was found between recurrence of cysts and albendazole use, type of surgical procedure, number and size of the cysts, Gharbi classification as determined by ultrasound examination or the relation of the cyst with the biliary tract (p>0.05).* ***Conclusion:*** *It was concluded that there was no significant difference in the rates of complications and recurrences among different surgical procedures when performed with basic rules of the surgical principles.*

Key words: Echinococcosis, hydatid disease, albendazole

Amaç: *Kist hidatik, endemik bölgelerde hala önemli bir halk sağlığı problemidir.* ***Yöntem:*** *Bu çalışmada Ocak 1994-Aralık 2002 tarihleri arasında Fırat Üniversitesi, Tıp Fakültesi, Genel Cerrahi Anabilim Dalı'nda karaciğer kist hidatiği nedeniyle tedavi edilen 63 hastanın tıbbi kayıtları geriye dönük incelendi.* ***Bulgular:*** *Altmış üç hastada altmış yedisi (%69) karaciğerin sağ lobuna yerleşmiş 96 kist mevcuttu. Bu kistlerin 41'i (%45) parsiyel kistektomi ve drenaj, 25'i (%26) parsiyel kistektomi ve kapitonaj, 15'i (%15) parsiyel kistektomi ve omentoplasti ile tedavi edildi. Hastaların 32'si (%51) albendazol tedavisi alırken 31'i (%49) herhangi bir tıbbi tedavi almadı. Cerrahi sonrası komplikasyon oranı %19'du ve cerrahi girişimler arasında erken ameliyat sonrası komplikasyonlarda belirgin farklılık yoktu (p>0.05). Altı hastada (%11) kist nüks etti ve kist nüksü ile albendazol kullanımı, cerrahi yöntem, kistlerin sayı ve büyüklüğü, ultrasonografik incelemeyle saptanan Gharbi sınıflandırması ve kistin safra yolları ile bağlantısı arasında ilişki bulunamadı (p>0.05).* ***Sonuç:*** *Sonuç olarak, temel cerrahi prensiplere bağlı kalınarak düzenlenmiş cerrahi girişimler arasında komplikasyon ve nüks oranlarında anlamlı farklılık yoktur.*

Anahtar kelimeler: Ekinokokkozis, hidatik hastalık, albendazol

INTRODUCTION

Hepatic hydatidosis is a significant health problem in Mediterranean and tropical countries such as Turkey, the Middle East, South America and Australia. As an endemic disease, it causes social and economic losses for countries (1). On the other hand, prevention of the disease is quite easy with basic hygiene. Treatment, however, becomes difficult when the disease progresses clinically.

In this study, we evaluated the clinical features, treatments and postoperative complications of patients with hydatid disease.

The disease has a variable clinical course. Hydatidosis may be asymptomatic for many years. It may become evident when a cystic lesion is noted while the liver is imaged for other reasons (2-4). It may also be symptomatic depending on the size, location and complications of the cyst such as rupture into biliary tract and peritoneal cavity, infection, and immunologic reactions like urticaria and anaphylactic shock (5-7).

The diagnosis is based on laboratory tests including the immunological methods and radiological

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Manuscript received: 06.08.2005 **Accepted:** 12.07.2006

imaging. Ultrasound is the most useful noninvasive diagnostic test and is also used to classify the cysts (8, 9). Nevertheless, computed tomography provides better information regarding the location and size of the cyst (10).

Surgery is the basic treatment for the hepatic cyst. Percutaneous treatment (puncture/aspiration/injection/re-aspiration- PAIR) has been proposed as an alternative to surgery, especially in patients who cannot or do not want to undergo surgery (11-13). Chemotherapy with benimidazole compounds is a noninvasive treatment and is less limited in terms of patient's status than surgery or PAIR but not ideal when used alone (14).

PATIENTS AND METHODS

Medical records of the patients who were treated in the General Surgery Department of Firat Medical Center of Firat University for hepatic hydatidosis between January 1994 and December 2002 were reviewed retrospectively. Age, gender, presenting symptoms of the patients and findings on the physical examination, location and size of the cysts, surgical procedures performed, medical treatments administered, post-operative complications, mortality rates and length of hospital stay were recorded.

Preoperative diagnosis was based on medical history, physical examination and ultrasound examination. All cysts were classified with ultrasound as defined by Gharbi (9). Computerized tomography (CT) was used to determine the anatomical details. Only a few patients underwent serological testing and thus results of the serological investigations could not be analyzed. Pulmonary radiographs of all patients were reviewed. All patients received preoperative treatment according to World Health Organization's (WHO) guidelines for treatment of echinococcosis before 1996 (15). Patients who were operated after 1996 received preoperative treatment with 10 mg/kg albendazole. During laparotomy, intra-cystic pressure was lowered by aspirating a small amount of cyst fluid after the vicinity of the cyst was protected with compresses immersed into 10% polyvinylpyrrolidone iodide. Ten minutes were allowed to pass following the application of 10% polyvinylpyrrolidone iodide into the cyst cavity. Germinative membrane was removed by means of cystectomy. Cyst drainage, omentoplasty or capitonnage was performed following partial cystectomy. Cystectomy or hepatectomy was preferred in certain patients with cysts of small size or subcapsular location. The relation of the cystic cavity with the biliary tract was investigated in all patients. All biliary ductules that were found to communicate with the cyst cavity were sutured. Exploration of ductus choledochus, choledochoduodenostomy or T-tube insertion was performed in those patients with jaundice, cholangitis or remarkable dilatation of ductus choledochus. The patients were followed up at intervals of six months for at least two years.

Complication rates were compared using Fisher's exact test. $P<0.05$ were considered to be statistically significant. Student's t test was used to compare the length of hospital stay, which was expressed as mean ±standard deviation (SD).

RESULTS

Forty-four (69%) of the 63 patients were female and 19 (31%) were male. Most of the patients were between 15 and 30 years of age. Many of the patients were stock breeders or dog owners and were thus exposed to the disease.

The most common symptom was pain on the right-upper quadrant (63%) and the most common finding on the physical examination was a palpable mass at this location (24%, see Table 1). The diagnosis of the patients were made based on ultrasonographic investigations. Most of the cysts were classified as Gharbi class-1. Forty-one patients (63%) underwent CT in order to locate the cyst. The ultrasound results were confirmed at the time of surgery, at which time the definitive diagnosis was made and location of the cyst was precisely determined. Diagnostic sensitivity of both methods was 100%.

Table 1. Demographic and clinical features of the patients

	No. of patients (n=63) (%)
Sex	
Male	19 (31)
Female	44 (69)
Age group (years)	
15-30	23 (37)
31-45	14 (22)
46-60	17 (27)
> 60	9 (14)
Symptoms	
Right hypochondrial pain	40 (64)
Nausea and vomiting	27 (43)
Abdominal mass	15 (24)
Allergic reactions	14 (22)
Fever	5 (7)
Jaundice	4 (6)
Asymptomatic	7 (11)

Table 2. Localizations, morphologic features and treatment methods of hepatic hydatid cysts

	No. of cysts (n= 96) (%)
Localization	
Right lobe	67 (70)
Left lobe	28 (29)
Both lobe	1 (1)
Mean diameter of cyst (cm)	
≤ 5	35 (36)
6-10	43 (45)
≥ 11	18 (19)
Gharbi morphological type of cyst	
1	44 (46)
2	21 (22)
3	21 (22)
4	10 (10)
Surgical procedures	
Partial cystectomy and drainage	41 (43)
Partial cystectomy and capitonnage	25 (26)
Partial cystectomy and omentoplasty	15 (16)
Cystectomy	9 (9)
Hepatectomy	3 (3)
Splenectomy	3 (3)

Thirty-one of the patients (49%) had two cysts and one patient had three cysts. The total count of the cysts was 96, and 67 (69%) were located in the right lobe of the liver. The sizes of the cysts ranged from 6 to 10 cm in 43 (45%) of the cysts (Table 2). Six patients (9%) had extrahepatic cysts, three of which were on the surface of the spleen and the other three on peritoneal surfaces.

Right subcostal incision was preferred in 39 patients (61.0%). Median incision followed this figure in 19 patients (30.1%). Four patients underwent bilateral subcostal incision whereas the operation was performed with thoracotomy in one patient. Of 96 hepatic cysts, 41 (45%) were treated with partial cystectomy and drainage, 25 (26%) with partial cystectomy and capitonnage and 15 (15%) with partial cystectomy and omentoplasty. Those patients with cysts in the spleen further underwent splenectomy and those with cysts on the peritoneal surfaces underwent cystectomy. Operative methods performed are given in Table 2. Six patients (9.5%) had communication with the biliary tract, and all of them underwent choledochotomy. Following irrigation of the ductus choledochus, four patients underwent insertion of T-tube, one patient choledochoduodenostomy and one patient choledochojejunostomy. Eight patients underwent cholecystectomy. None of the patients developed perioperative complications. Thirty-two patients (51%) received albendazole treatment while 31 patients (49%) did not.

Postoperative complication rate was 19% (Table 3). Wound infection developed in four (6%) of the patients and was the most common early post-operative complication. Abscess developed in two patients, which were drained percutaneously. Biliary fistula was observed in two patients. In one, hepatectomy was performed and in the other, partial cystectomy with ligation of the communicating biliary ductule to the cyst cavity. All fistulas in these patients healed with no need for intervention. There was no significant difference in the type of surgical procedures and early post-operative complications ($p>0.05$). Fifty-one of the patients could be followed up. Five patients who did not receive albendazole treatment and seven patients who did receive albendazole treatment were lost to follow-up. Mean follow-up time was 51±29 (12-98) months. There was recurrence of the disease in six patients (11%) (3 with albendazole treatment and 3 without). Recurrence developed after an average of 14±5 (8–23) months following the operation. No correlation was found between recurrences and albendazole treatment, type of surgical procedure, number and size of the cysts, Gharbi classification as determined by ultrasound examination, and relation of the cyst with the biliary tract ($p>0.05$).

Table 3. Treatments administered, postoperative complications and recurrences

	PCD	PCC	PCO	PCD+ PCC	PCD+ PCO	PCC+ PCO	C	H	PCD+S	PCC+S+C (i.p)	PCC+C (i.p)
No. of patients (%)	15 (23.8)	6 (9.5)	1 (1.5)	13 (20.6)	11 (17.4)	3 (4.7)	6 (9.5)	3 (4.7)	2 (3.1)	1 (1.5)	2 (3.1)
Wound infection	1			1	2						
Abscess				1	1						
Bleeding	1										
Biliary fistula						1		1			
Atelectasis		1		1						1	
Recurrence	2	1		2	1						

PCD: Partial cystectomy + drainage, PCC: Partial cystectomy + capitonnage, PCO: Partial cystectomy + omentoplasty, C: Cystectomy, H: Hepatectomy, S: Splenectomy, i.p: Intraperitoneal

DISCUSSION

Hepatic hydatid cyst is still an endemic health problem in our country as in some other areas of the world. The parasite is bound to the intestinal mucosa of animals such as dog, fox and wolf and millions of parasite eggs are scattered with each defecation of the animal. The parasite reaches the liver via portal vein and lymphatics after passing the intestinal mucosa as a consequence of ingesting contaminated foods (16). A considerable portion of our patients were dog owners. This relation ship demonstrates that prevention of hydatidosis is possible by following fundamental hygienic measures.

Clinical findings vary considerably with symptoms depending on the size and location of the cyst, relation of the cyst with the biliary tract and vessels, complications such as cyst rupture and infection and immunological reactions. There may also be some asymptomatic cases. It has been reported that asymptomatic cases constituted 38 to 60% of all patients (2). Most of our patients with hepatic hydatid cyst were asymptomatic and the most common symptom was pain on the right upper quadrant and nausea and vomiting. Findings on the physical examination were present in very few of the patients and the most common finding was a palpable mass on the right upper quadrant. These symptoms and findings are encountered in a number of conditions, and physical examination especially is not helpful in differential diagnosis of the disease. Thus, hepatic hydatidosis should be suspected in those patients living in endemic areas and presenting with pain on the right upper quadrant, nausea and vomiting.

Ultrasonography is the most useful noninvasive diagnostic tool and is also used to classify the cysts (8, 9). Its specificity and sensitivity rates are 90% and 98%, respectively (8). In the present study, the accuracy of the diagnosis of all patients was based on ultrasonographic examination and this was confirmed at the time of surgery (sensitivity of 100%). Gharbi's classification as determined by ultrasonography describes the stage of the cyst and is still being used. WHO developed the last ultrasonographic classification scheme. The classification scheme of the WHO groups stages 1 and 2 in the Gharbi's system as active, stage 3 as transitional and other stages as inactive cysts (17). Almost all of the hepatic hydatid cysts in our patients were in groups 1, 2 or 3. CT provides better information regarding the size and location of the cysts, its relationship between the adjacent structures and the presence of the cysts in other organs. Its sensitivity rate is 100%. It is more useful for following up the lesions during chemotherapy, demonstrating the calcifications and determining postoperative recurrences (10). We used CT in those patients with multiple cysts and recurrences. The basic principle of the immunological tests is based on determining the antibodies produced as a consequence of leaking antigens from the cyst fluid. The tests may be negative if there is no leakage, the cyst is calcified or the parasite is dead. Weinberg's complement fixation test that becomes negative following the treatment and precipitation tests may be used in diagnosing and monitoring the patients (18). We performed immunological tests in only a few patients. Thus, we did not analyze the result of these tests.

Surgery is the basic treatment for hepatic hydatidosis. The main goal of surgical treatment is to eradicate the parasite, to prevent intraoperative spillage of cyst contents and to obliterate the residual cavity. Various surgical procedures have been advocated to achieve these goals. Scoleces in the cyst have been first inactivated with scolicidal agents such as formalin, hypertonic saline, cetrimide, hydrogen peroxide, polyvinyl-iodine and silver nitrate. While using these agents, the cystic cavity should be aspirated as much as possible and then the scolicidal agent should be applied into the cystic cavity and 15 minutes should be allowed to pass. We used poly-vinyl iodine as scolicidal agent. One should avoid use of this agent if there is a communication between the cyst and biliary tract because of the risk of sclerosing cholangitis. Non-anatomic hepatic resections should be performed for the cysts of relatively small size and subcapsular location whereas anatomic resections should be performed for the cysts impairing most of the hepatic segments. The common aim of various surgical procedures is to reduce the obliteration period by internal and external drainage of the possible fluid accumulation in the residual cavity. Among these procedures, we mostly preferred drainage, omentoplasty or capitonnage with partial cystectomy.

Exploration of the biliary tract with choledochotomy and placement of a T-tube or choledochoenterostomy are mandatory in cases of hepatic hydatidosis complicated with rupture into biliary tract. Exploration of ductus choledochus was performed in six of our patients with cyst hydatidosis complicated with rupture into the biliary tract. Routine

preoperative endoscopic retrograde cholangiopancreatography is an alternative approach in cases of hepatic hydatidosis with this complication. With this method, the common bile duct is cleaned of the germinal vesicles and an efficient drainage is provided (19, 20).

Perioperative complications, age-related diseases and infection of the residual cyst cavity are considered as the main causes of death in hepatic hydatid cyst surgery, ranging from 1 to 3%. The postoperative complication rate of hepatic hydatid cyst has been reported to range from 6 to 47% (21-23). In the present study, there was no mortality during or after operation and post-operative complication rate was 19%. We did not find significant difference in complications and recurrence among the different surgical procedures.

The most popular chemotherapeutic agent in the medical management of hepatic cyst hydatidosis is albendazole. It may be preferred for cases in whom chemotherapy and surgery after PAIR method alone cannot be performed, or in those patients who do not accept the treatment, or in the presence of cysts in several organs and over the peritoneal surfaces. But its efficacy alone is low (24, 25). Thus, WHO advises use of albendazole together with the surgery in the period from the preoperative 4th day to the postoperative first month (15). This study concluded that there was no difference in recurrence rates between those patients receiving or not receiving albendazole in the post-operative period.

Percutaneous drainage has been suggested as an alternative to the surgery (26). Addition of albendazole has improved the efficacy of the treatment (27). It has been reported that it can be used in type 1 and 2 hydatid cysts and in those patients for whom the surgery is contra- indicated (28, 29).

Surgery is an effective treatment in hydatid cyst, a disease that can be prevented by following basic hygienic principles. Our results suggest that there was no significant difference in complication and recurrence rates among different surgical procedures when following basic surgical principles.

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