Surgical treatment of hepatic hydatid cysts

A retrospective analysis of 425 patients

Ann. Ital. Chir., 2015 86: 437-443
pii: S2239253X15023646

Yusuf Yucel*, Ahmet Seker*, Irfan Eser**, Abdullah Ozgonul*, Alpaslan Terzi*, Orhan Gozeneli*, Timucin Aydogan***, Ali Uzunkoy*

**University, Medical Faculty Department of General Surgery, Sanliurfa, Turkey*
***University, Medical Faculty Department Of Thoracic Surgery, Sanliurfa, Turkey*
****University School of Medicine, Gastroenterology Department, Sanliurfa, Turkey*

Surgical treatment of hepatic hydatid cysts. A retrospective analysis of 425 patients

BACKGROUND: *We aimed to retrospectively analyze patients who underwent surgical treatment in our clinic for hydatid cysts in terms of the surgical methods implemented and their results.*
METHODS: *Archival records of the patients who underwent surgery for the treatment of hydatid cysts between 2007 and 2014 were analyzed retrospectively.*
RESULTS: *The records of 425 patients who underwent surgery with varying ages of 16 to 88 years (mean: 44.5) were obtained. Among the patients, 33.9% (n=144) were male and 66.1% (n=281) were female. The most frequent symptoms were abdominal pain (46.4%) and dyspepsia (30.9%). About 79.5% of the patients had hydatid cysts in their livers, and 66.8% of these cysts were on the right lobe of the liver. Surgical intervention was performed on 513 cysts. The average diameter of these cysts was 8.3 cm. About 85.5% (n= 438) of the interventions implemented were partial cystectomy. Laparotomy was performed through the right subcostal incision on 81% (n=345) of the patients who underwent conventional surgery. The most frequently encountered complication was biliary fistula. The mortality rate was 0%.*
CONCLUSIONS: *The results showed that most of the cases were uncomplicated isolated hepatic hydatid cysts frequently found on the right lobe of the liver. The most frequently implemented surgical procedure was partial cystectomy. This procedure was simple, fast and applicable for uncomplicated hepatic hydatid cysts.*

KEY WORDS: Hepatic hydatid cyst, Mortality, Partial cystectomy

Introduction

A hydatid cyst is a zoonotic, chronic parasitic infection caused by *Echinococcus granulosus*, which is a cestode. The liver is the most common organ affected by hydatid cysts (30%–95%) [1-5]. Larvae may go beyond the liver sinusoids and cause infections in other organs. The second most frequent affected organ is the lungs. A hydatid cyst is the most common hepatic cystic disease. It may occur in both genders in every age group. Although it seems to be a moderate disease, it creates health hazards around the world [6]. Clinical, laboratory and radiological methods are made for its diagnosis. The treatment of hydatid cysts is surgically based [7]. Several methods, varying from interventional radiologic techniques [e.g., puncture, aspiration, injection and respiration (PAIR)] to radical resection, can be used in surgery [8]. Surgery may be performed conventionally or laparoscopically. The general situation of the patient; diameter, localization, number and type of cyst; and the surgeon's experience determine the method to be used.

In this study, we analyzed patients who underwent surgical treatment in our clinic for hydatid disease in terms of the applied surgical methods and their results.

Pervenuto in Redazione Novembre 2014. Accettato per la pubblicvazione Febbraio 2015
Correspondance to: Yusuf Yucel, Harran University Medical Faculty, Department of Surgery, 63100 Sanliurfa, Turkey (e-mail: dryusufyucel @yahoo.com)

Material and methods

After receiving the approval of our hospital's local ethics committee, the files of the patients who underwent surgery in our clinic for the treatment of hydatid disease from 2007 to 2014 were analyzed retrospectively. Age and gender of patients; primary presenting symptoms; organs affected by the hydatid cyst; number, localization and diameter of cysts; surgical methods implemented; laparotomy incision shape; complications; cases that underwent surgery due to recurrence; and mortalities were determined. The diagnosis was made through postero-anterior chest radiography, ultrasonography (US) and computerized tomography. Stages of the cyst were determined through US in accordance with the criteria determined by Gharbi et al. Types I–IV patients underwent surgical intervention according to the Gharbi classification [9]. Type V patients were excluded from the study.

Results

The files of 425 consequent patients who underwent surgery in our general surgery clinic from 2007 to 2014 were analyzed retrospectively. Among the patients, 66.1% (n=281) were female and 33.9% (n=144) were male. The female–male ratio was 1.95 and the mean age was 44.5 (16-88).

The most common presenting symptoms were abdominal pain (46.4%), dyspepsia (30.9%), intraabdominal mass (11%) and jaundice (4.7%). Among the patients, 7% were asymptomatic, and hydatid disease diagnosis was made incidentally during visualization conducted for different purposes (Table I). Among the patients who presented with abdominal pain, 1.1% (n=5) were diagnosed with cyst rupture and underwent immediate surgical procedure.

Among the patients, 79.5% were isolated hepatic hydatid disease, 14.5% were hepatic and pulmonary hydatid disease and 6% were hepatic and other organ hydatid disease cases (Table I).

TABLE I - *Features of the Patients*

Gender Female / Male	**Number (n= 425) 281/144**	**Percentage (%) 66,1/33.9**
Presenting symptom	**Number of Symptoms(n= 425)**	**Symptom percentage (%)**
Abdominal pain	197	46.4
Dyspepsia	131	30.9
Abdominal mass	47	11
Jaundice	20	7
Incidental	30	4.7
Affected Organ	**Number (n=425)**	**Percentage (%)**
Liver	338	79.5
Liver + Lung	62	14.5
Liver + other organ	25	6
Surgical Technique	**Number (n=425)**	**Percentage (%)**
Conventional Surgery	407	95.7
Right subcostal incision	345	81.1
Transdiafragmatik thoracotomy	39	9.1
Thoracoabdominal incision	23	5.5
Laparoscopic Surgery	7	1.7
PAIR	11	2.6
Complication	**Complication Number (n=52)**	**Complication Percentage (%)**
Biliary fistula	28	53.6
Wound Infection	12	23
Bilioma	3	5.8
Pleural Effusion	3	5.8
Liver Abscess	3	5.8
Gastrointestinal Bleeding	1	2
Acute Pancreatitis	1	2
Sepsis	1	2

TABLE II - *Surgical Procedure and Additional Interventions*

Surgical Procedure Implemented	**Number of Procedures (n= 513)**	**Percentage (%)**
Partial cystectomy-drainage	403	78.6
Partial cystectomy-T tube-drainage	20	3.9
Partial cystectomy- omentoplasty-drainage	15	3
Total Cystectomy	50	9.8
Left lateral segmentectomy	8	1.6
Left lobe hepatectomy	2	0.4
Splenectomy	3	0.5
Percutan Aspiration Injection Reaspiration	11	2.2
Additional Interventions Implemented	**Number of Additional Interventions (n=80)**	**Percentage(%)**
ERCP	20	25
Cholecystectomy	25	31
Omentoplasty	15	19
T tube drainage	20	25

TABLE III - *Cyst features*

Hepatic Cyst Localization	**Number of Cysts(n=510)**	**Cyst Percentage(%)**
right lobe	341	66.8
left lobe	164	32.2
caudate lob	5	1
Cyst Diameter(cm)	**Number of Cysts (n=513)**	**Cyst Percentage(%)**
< 5	118	23
5-10	312	61
> 10	83	16
Cyst Type by Garbi's classification	**Number of Cysts(n=513)**	**Cyst Percentage(%)**
Type I	114	22.3
Type II	85	16.6
Type III	185	36
Type IV	129	25.1

Among the patients, 95.7% (n=407) underwent conventional surgery, 1.7% (n=7) underwent laparoscopic surgery and 2.6% (n=11) underwent PAIR. About 81.1% (n=345) of the patients who underwent conventional surgery were operated through right subcostal incision, 9.1% (n=39) through transdiaphragmatic thoracotomy and 5.5% (n=23) through toracoabdominal incision (Table I).

Surgical interventions were performed on 513 cysts. The most frequently implemented method was partial cystectomy, and the least was left lobe hepatectomy (Table II). In total, 510 cysts were determined in the patients' livers. Among all the cysts, 66.8% (n=341) were located on the right lobe, 32.2% (n=164) on the left lobe and 1% (n=5) on the caudate lobe. Among the patients, 9.1% (n= 46) had more than one cyst in their livers (Table III).

The mean diameter of the hepatic cysts was 8.3 cm (1 cm 19 cm). Most of the cysts (n=312) were between 5 cm 10 cm. According to the Gharbi classification, type III cyst (n=185) was the most frequently encountered cyst (Table III).

Among the cases, 5.6% (n=24) were operated because of recurrence. Among this group of patients, 29.1% (n=7) had undergone surgery in our clinic previously, and 70.9% (n=17) were the patients who were referred to our clinic because of relapsed hydatid disease.

Discussion

Although a hydatid cyst seems to be a benign disease, it remains an important health hazard in countries that conduct stockbreeding. The incidence rates of hydatid

cysts are 87-400/100,000 in Turkey and 275/100,000 in our region [10]. The disease affects mostly women. In our study, 66.1% of the patients were women, consistent with the literature [5,11].

Hydatid cysts commonly settle in the liver. In publications, the settlement rate of hydatid cysts in the liver varies between 30% and 95% [1,5]. All our cases were patients who were hospitalized in the general surgery clinic for the surgical treatment of hepatic hydatid cysts. Hepatic hydatid cysts settle into the right lobe of the liver with a probability of 50%-80% [1,5]. In our cases, the cysts were on the right lobe of the liver with a rate of 66.8%, consistent with the literature.

The size of the cysts varies between 3 cm and 42.6 cm in the literature, and the most common size is 5 cm 10 cm (70%-85%) [1,12,13]. Our results showed that 23% of the cysts were smaller than 5 cm, 61% were between 5 cm and 10 cm and 16% were larger than 10 cm. The diameter of the cysts was between 1 cm and 19 cm, and the mean diameter was 8.3 cm. One of the reasons why the cysts have large diameters is the delayed pressure to the surrounding organs.

Systemic symptoms are not generally observed in cases with hydatid cysts. The symptoms of hydatid cysts of the liver depend on the localization, size and stage. The symptoms are manifested through the pressure the cysts cause to the organ in which they are located or to the adjacent organs. These symptoms are abdominal pain, dyspepsia, jaundice and abdominal mass [6]. The most frequent symptoms we determined in our cases were abdominal pain and dyspepsia, consistent with the literature.

Type I cyst is proportionately more common in the literature. However, more type III and IV cysts were found in our cases [12]. This finding is attributed to the low socioeconomic level of our region and the patients' late admittance to our clinic.

Among the 425 hydatid cyst patients, 95.7% were treated with conventional surgery, 1.7% with laparoscopic surgery and 2.6% with PAIR. The laparoscopic approach has been used in hydatid cyst cases for the last 20 years. Technological and experimental advances in laparoscopy have reduced the morbidity and mortality rates of conventional surgery. However, only seven cases of laparoscopic cyst surgery have been performed for the last two years in our clinic, and 11 cases of PAIR have been conducted in our hospital for one year. As hydatid cyst cases largely affect the liver, most of our conventional surgery incisions were right subcostal. This incision is generally sufficient for hydatid liver cysts.

Hydatid cyst treatment has three forms: surgery, PAIR and chemotherapy. Nevertheless, the main treatment remains to be surgery. Surgical treatment is categorized as radical and conservative. Radical surgery can be partial hepatectomy or total cystectomy; conservative surgery is a partial cystectomy procedure. If the cyst is localised peripherally, total cystectomy or partial hepatectomy is recommended. However, the morbidity and mortality rates of radical surgery are higher, and its recurrence rate is lower than that of conservative surgery. Partial cystectomy is the most commonly used surgical procedure for intraparenchymal hydatid diseases, particularly for uncomplicated hydatid cysts [14]. Partial cystectomy was performed in our series with a rate of 85.5%.

According to the literature review, the recurrence rate of hydatid cysts is 0%-11.1% [2]. In our study, the rate of patients who underwent surgery again because of a recurrence after undergoing surgery in our clinic was 1.7%.

A total of 52 complications developed in patients who underwent surgery in the postoperative period, and 54% of these complications were biliary fistula. Choledoch distal was closed using an atraumatic clamp in patients with intraoperative biliary fistula, and serum was given physiologically by inserting it into the choledoch through the branule. The area where the biliary fistula was determined in the cyst cavity was sutured. Biliary fistulas developed in 28 patients in the postoperative period. At the end of a 10-day follow-up, endoscopic retrograde cholangiopancreatography (ERCP) and sphincterotomy were performed on 20 patients with bile leak of more than 100 mL. All the patients recovered. Three patients with hepatic abscess and three patients with bilioma were treated through percutaneous drainage. Choledoch exploration through T-tube drainage was performed on 20 patients who went to the clinic with jaundice compliant. Cholecystectomy was performed on 20 patients with T-tubes and on 5 patients who were found to have a correlation between the cyst and the gall bladder. Upper gastrointestinal bleeding developed in one patient; one patient with acute pancreatitis underwent splenectomy because of a cyst in the spleen; and pleural effusion developed in three patients with cysts close to their diaphragms. The total morbidity rate was 12.2%. According to the literature, the morbidity rate is between 0% and 54% [2,15].

The mortality rates were 2.2% for the patients who underwent surgery in Turkey [10], 0%-6.5% in other countries [2,12], and 0% in our study.

In summary, unless protective measures are taken in regions where agriculture and stockbreeding are common, hydatid diseases will increase in prevalence. Most of the cases are uncomplicated and hepatic right lobe cysts. The main treatment for hydatid cysts is still surgery. The surgical procedure usually performed in uncomplicated hepatic cysts is partial cystectomy. This procedure is a simple, efficient and applicable surgical technique.

References

1. Zaharie F, Bartos D, Mocan L, Zaharie R, Iancu C, Tomus C: *Open or laparoscopic treatment for hydatid disease of the liver? A 10-year single-institution experience.* Surgical endoscopy, 2013; 27:2110-116.

2. Smego RA, Sebanego P: *Treatment options for hepatic cystic echinococcosis.* IJID, 2005; 9:69-76.

3. Prousalidis J, Kosmidis C, Kapoutzis K, Fachantidis E, Harlaftis N, Aletras H: *Intrabiliary rupture of hydatid cysts of the liver.* AMJ Surg, 2009; 197:193-98.

4. Ozekinci S, Mizrak B: *Evaluation of cystic echinococcosis cases given a histopathologic diagnosis from 2002 to 2007 in diyarbakir.* Turkish Society for Parasitology, 2009; 33:232-35.

5. Nunnari G, Pinzone MR, Gruttadauria S, at al.: *Hepatic echinococcosis: clinical and therapeutic aspects.* World J Gastroenterol, 2012; 18:1448-58.

6. Küçük C, Akyildiz H, Sözüer E: *Surgical treatment in liver cyst hydatic cases: analysis of 276 patients.* Erciyes Medical Journal, 2008; 30:170-74.

7. Dziri C, Nouira R: *Surgical treatment of liver hydatid disease by laparotomy.* J Visc Surg, 2011; 148:103-10.

8. Aygun E, Sahin M, Odev K, Vatansev C, Aksoy F, Paksoy Y, et al.: *The management of liver hydatid cysts by percutaneous drainage.* Can J Surg, 2001; 44:203-09.

9. Gharbi HA, Hassine W, Brauner MW, Dupuch K: *Ultrasound examination of the hydatic liver.* Radiology, 198; 139:459-63.

10. Ato SY, Hokelek M, Polat E, at al.: *Cystic Echinococcosis in Turkey from 2001-2005.* Turkish Society for Parasitology. 2008; 32: 208-20.

11. Pekcici MR, Uyanik I, Incekoy M: *Retrospective analysis of abdominal cyst hydatic cases.* Tip Ara tirmalari Dergisi. 2004; 2:5-10.

12. Tuxun T, Zhang JH, Zhao JM, Tai QW, Abudurexti M, Ma HZ, et al.: *World review of laparoscopic treatment of liver cystic echinococcosis-914 patients.* IJID. 2014; 16.

13. Mazoch MJ, Dabbous H, Shokouh-Amiri H, Zibari GB: *Management of giant liver cysts. The Journal of surgical research.* 2011; 167: e125-30.

14. Polat P, Kantarci M, Alper F, Suma S, Koruyucu MB, Okur A: *Hydatid disease from head to toe. Radiographics.* 2003; 23: 475-94.

15. W Chen, L Xusheng: *Laparoscopic surgical techniques in patients with hepatic hydatid cyst.* AMJ Surg, 2007; 194:243-47.

Commento e Commentary

Prof. Ciro Famulari
Ordinario di Chirurgia Gemnerale
Università di Messina

L'idatidosi epatica è un problema di salute significativo nelle aree endemiche; sebbene si tratti da patologia nota fin dai tempi di Ippocrate, il suo trattamento è ancora lontano da un soddisfacente consenso generale. Lo scopo principale della patologia dovrebbe essere l'eliminazione del parassita senza recidive ed una significativa riduzione della mortalità e morbilità. La chirurgia resta il metodo principale di trattamento con l'adozione di diverse tecniche generalmente distinte in due sottogruppi: il trattamento radicale che prevede l'asportazione totale di tutti gli strati cistici e del pericistio e la resezione epatica; il trattamento conservativo prevede l'evacuazione del contenuto cistico e l'escissione degli strati più interni. Per la scelta del metodo più adatto entrano in gioco considerazioni prognostiche: le dimensioni della cisti (> 9 cm), la sede rispetto alla cupola epatica, il numero delle cisti ed i rapporti con le vie biliari, la rottura di vasi biliari.
All'analisi multivariata solo le dimensioni delle cisti rappresentano un fattore predittivo indipendente.
La maggior parte dei pazienti con idatidosi non presentano sintomi a meno che non vi siano effetti compressivi su organi vitali come vena porta e vene sovraepatiche, l'arteria epatica intraepatica e quelle bronchiali nei polmoni, che rappresentano complicanze che mettono in pericolo la vita.
I sintomi principali sono il dolore nel quadrante superiore destro dell'addome, nausea, prurito, ittero, febbre e tosse. L'accresciuta conoscenza della storia naturale dell'idatidosi ottenuta con il monitoraggio ecografico, ha determinato lo sviluppo di una nuova classificazione standardizzata della WHO nel 1977, e successivamente quella di larga adozione di Gharbi del 1981.
Il primo gruppo clinico comprende cisti del tipo 1 e 2 che sono attive, generalmente fertili, contenenti scolici vitali; nel tipo 3 vi sono cisti in stadio transizionale con perdita dell'integrità compromessa dall'ospite o dalla chemioterapia; i tipi 4 e 5 sono rappresentati da cisti inattive che hanno perso la fertilità e in stato di degenerazione. L'uso di questa classificazione facilita l'adozione dei principi di trattamento raccomandato per ogni tipo di cisti.
Una delle fasi più importanti della chirurgia dell'idatidosi è rappresentato dall'evacuazione del contenuto cistico per eliminare gli scolici evitando assolutamente che si spargano: la contaminazione con liquido cistico è responsabile di recidive locali o di shock anafilattico intraoperatorio. Altri punti critici sono la presenza di fistole biliari ed il tratamento del cavo residuo (capitonnage, omentoplastica, drenaggio).
La reazione biologica transpericistica del fegato è responsabile di recidive locali nel caso di vescicolazione esogena.
Le maggiori complicanze settiche postoperatorie sono l'infezione della ferita, lo sviluppo di ascesso al livello della cavità residua o sottodiaframmatico, le pleuriti e la fistola biliare con peritonite.

L'effetto compressivo sui dotti biliari e sui vasi può determinare colestasi, ipertensione portale e sindrome di Budd-Chiari. La rottura intrabiliare è la più comune e seria complicazione (da 1 a 25%) dell'idatidosi epatica; le piccole rotture sono in genere asintomatiche mentre nel caso di fistole cisto-biliari franche, individuate nel corso dell'intervento chirurgico, si può osservare colangite, ittero ostruttivo, pancreatite acuta e cronica e presenza di frammenti di membrana proligera nelle feci.

Gli intervento conservativi sono indicati nel caso d i cisti chiare uniloculari son sottile pericistio mentre è preferibile la chirurgia radicale nei casi di cisti plurivescicolate, gialle per suppurazione o necrosi con spessi strati pericistici calcifici. Gli intervento conservativi sono procedure semplici e sicure, ma con più elevata frequenza di complicanze postoperatorie, di recidive e durata della degenza ospedaliera

Il trattamento chirurgico è necessario nei casi di malattia sintomatica e raccomandabile nel caso di cisti vitali e diffuse per l'elevato rischio di complicazioni. Per quelle profonde ed adiacenti a grossi vasi è consigliabile l'approccio conservativo.

La scelta dell'incisione chirurgica dipende da molti fattori: il controllo ottimale e completo dei segmenti epatici interessati dalla malattia, la possibilità di esplorare l'intero fegato e le vie biliari extraepatiche. Per quelle localizzate nei segmenti anteriori del lobo destro è preferibile la laparotomia sottocostale destra o bilaterale, per quelle dei segmenti posteriori, in presenza di spesse aderenze flogistiche epato-diaframmatiche, l'approccio ottimale è rappresentato dalla toracofrenolaparotomia, ed un'incisione sottocostale bilaterale o una laparotomia mediana per le localizzazioni ai segmenti di sinistra.

Negli anni più recenti è stata gradualmente introdotta la chirurgia laparoscopica, che ha guadagnato spazi; si tratta di una tecnica in grado di raggiungere gli scopi del trattamento. La pericistectomia laparoscopica presenta minori morbilità, recidive e durata della degenza postoperatoria, queste tecniche laparoscopiche offrono, a paragone con la chirurgia laparotomica, con il migliore ingrandimento, un controllo ottimale della cavità cistica e migliore possibilità di visualizzazione delle fistole biliari.

La fase più difficile è quella dell'evacuazione delle cisti figlie e delle membrane stratificate che può dar luogo a recidive locali. Alcuni autori hanno adottato diversi strumenti con maggiore capacità di rettifica e di aspirazione. Per evitare il rischio del blocco e conseguente filtrazione si usano strumenti in grado di aspirare frammentando gli strati superficiali della cisti.

Una revisione della letteratura sul trattamento laparoscopico dell'idatidosi riferisce l'adozione pià frequente nelle tecniche conservative (77,2%) nei confronti del 5,8% delle pericistectomie totali nei pazienti sottoposti al trattamento radicale. I criteri per escludere il trattamento laparoscopico sono le cisti rotte nell'albero biliare, il tipo di localizzazione, le dimensioni > di 15 cm, il numero superiore a 3; uno svantaggio è rappresentato dalla mancanza di prevenzione delle filtrazioni in presenza della elevata pressione inrtaaddominale dello pneimoperitoneo. Ogni comunicazione tra cisti e sistema biliare va chiuso, va effettuata una colecistectomia e drenato il dotto cistico. Se il drenaggio non è perfetto espone all'ascessualizzazione della cavità residua, allo sviluppo di un biloma o di una peritonite.

La recidiva locale è un altro aspetto importante del trattamento chirurgico dell'idatidosi, la cui incidenza è stata riportata in diversi studi tra il 1,1% ed il 9,6%, e la formazione di cisti figlie intorno al 29,5%. La membrana proligera si sviluppa in senso centrifugo e comporta lo sviluppo di cisti figlie al di fuori della cavità interna (cisti figlie esogene). Queste se non visibili nelle membrane esterne possono non essere rimosse, e rappresentano una causa di recidiva locale: l'incidenza è diversa nei trattamento conservativi (12,5%9 e quelli radicali (1,5%).

Una CPRE è indicata in pazienti con sicura rottura intrabiliare preoperatoria in cui gli elementi cistici sono evidenti nel dotto biliare. Le tecniche di drenaggio percutaneo possono essere adottate come alternativa alla chirurgia in pazienyti selezionati con cisti uniloculari non complicate (Tipo I-II di Gharbi e III tipo selezionato) e in presenza di gravi comorbilità.

La tecnica a risparmio, la endocistectomia con parziale pericistectomia è la procedura più frequentemente adottata nei casi complicati, di cisti ampie e multiple.

Nelle aree endomiche i chirurghi che si confrontano con i casi più complicati preferiscono generalmente le tecniche conservative, considerando troppo radicali le resezioni in confronto con una malattia sostanzialmente benigna. Le recidive locali, le complicazioni postoperatorie e la durata della degenza ospedaliera nei casi di trattamento radicale sono minori nei confronti dei trattamenti conservativi; per la scelta del metodo più appropriato i fattori importanti sono da considerare la sede della csiti, grandezza, numero, rapproti con l'albero biliare e vasi sanguigni, e soprattutto l'esperienza del chirurgo.

* * *

The hepatic hydatid cysts are a major health problem in endemic areas; although the disease has been identified since the time of Hippocrates, the treatment is still far from a general and satisfactory agreement. The main goal of therapy should be the elimination of parasite with disappearance of recurrences and significant reduction of the morbidity and mortality. Surgery remain the mainstay of treatment using different techniques which generally are divided in two subgroups, radical one (total excision of the cysts on removing all the cystic layers as well as pericystial one, hepatic resections) and conservative (evacuation of the cyst content and excision of the inner cystic layers) techniques. For choosing the suitable surgical

approach, prognostic factors are needed to be concern: cyst's size (>9cm), location in hepatic dome, number, relationship with biliary tract, vessel and intrabiliary rupture. At multivariate analysis only the size of cysts was an independent predictive factor. Most patients with hydatid disease have no symptoms unless there is a compression of vital organs such as hepatic or portal vein, hepatic artery in the liver and bronchia in the lungs resulting in life threatening complication. The main symptoms are pain in the right upper quadrant of abdomen, nausea, pruritus, jaundice, fever and coughing. The increased knowledge of natural history of hydatid cysts monitored with ultrasound imaging, have produced the development of a new WHO standardized classification (1997) after that, widely used, of Gharbi (1981). The first clinical group include cysts types 1 and 2 that are active, usually fertile, containing viable scolices; type 3 are cysts in a transitional stage with loss of integrity compromised by the host or by chemotherapy; types 4 and 5 are inactive cysts that have lost their fertility and are degenerative. The use of classification will facilitate the application of principles of treatment currently recommended for each cyst type. One of the most important step in surgery of hydatid disease is the evacuation of the content of the cavity to eliminate scolices without any spillage; loss of hydatid fluid is responsible for local recurrence or intraoperative anaphylactic shock. Other critical points are the presence of biliary fistula and the management of the residual cavity (capitonage maneuver or omentoplasty, drainage). Liver transpericystic biologic reaction is responsible of local recurrences for the development of exogenous vesciculation. The main post-operative septic complications are the wound infection, the presence of an abscess at level of residual cavity and/or diaphragmatic, pleuritis and biliary fistula with peritonitis.

Mechanical compression (mass effect) on bile ducts and vessel can induce cholestasis, portal hypertension and Budd-Chiari syndrome. Intrabiliary rupture is the most common and serious complication. (range 1-25%) of hepatic hydatid disease; small ruptures are usually asymptomatic while in cases of frank cystobiliary fistula, detected during surgical treatment, can be observed a cholangitis, an obstructive jaundice, an acute or chronic pancreatitis and detection of germinative membrane in the feces. The conservative operations are indicated in presence of a univescicular clear cyst with a thin pericystic layer while radical surgery in cases of plurivescicular yellow cyst, suppurative or necrotic with thick or calcific pericystic layers. Conservative operations are simply and safe procedures but comparing to radical one post-operative complications, recurrence and hospital stay time are higher. Surgical treatment of hydatid cysts has to be considered mandatory in symptomatic cyst and recommended in viable and diffuse cysts because of the risk of severe complication. For the cysts near to great vessels and deep is advised a conservative approach.

The choice of surgical incision is related to several factors: optimal and complete control of hepatic segments interested by disease, possibility of exploration of whole liver and of extrahepatic biliary tract. For the cysts localized in anterior segments of right lobe is preferable a subcostal right or bilateral incision, for the posterior segments, in presence of thick flogistic hepato-diaphragmatic adherences, optimal approach is a thoraco-phreno-laparotomy and a subcostal bilateral incision or a median laparotomy for the left segments. In recent years laparoscopic surgery has been gradually introduced and, with the technological advances, have gained wider acceptance; laparoscopic approach is a suitable technique to achieves, as the open operation, the aims of the treatment. The laparoscopic pericystectomy result in lower morbidity and recurrence rates and shorter hospital stay. The laparoscopic procedures compared to open surgery offer, under magnification, an optimal visual control of the cyst cavity and a better detection of the biliary fistula.

The most common difficult step meet with evacuation of daughter cysts and laminated membrane that may result in local recurrence. Some authors designed different devices with the increased capacity of grinding or powerful suctioning ; the risk for system blockage and subsequent leakage could be decreased by using these suction system able to fragment the slight layers of cysts. A review of world literature on laparoscopic approach report that the most common procedures performed were of conservative type (77.2%) versus the 5,8% of total pericystectomy in patients submitted to radical operation. The criteria to exclude laparoscopic approach are the rupture of cyst in biliary tract, localization, dimension (>15 cm), number (>3); a disadvantage is the lack of precautionary measures to prevent spillage under the high intrabdominal pressure caused by pneumoperitoneum. Any passage between cyst and biliary system should be closed, performed a cholecistectomy and placed a drainage through the cystic duct; if not drained perfectly leads to the formation of an abscess in the remaining cavity, biloma or peritonitis.

Local recurrence is another important aspect of surgical treatment of hydatid cysts which rate has been reported in several studies from 1,1 to 9,6%, the daughter cysts formation around 29,5%. Germinative layer advance toward the external wall and lead to growth of daughter cysts outside the inner cavity (exogenous daughter cyst). The exogenous cysts not visible if the external layer would not been entirely removed, represent a cause of local recurrence; there is a significant difference between conservative (12,5%) and radical approach (1.5%). An ERCP is indicated in patients with pre-operative frank intrabiliary rupture in whom hydatid elements are clearly seen in bile duct. Percutaneous drainage techniques can be performed as alternative approach to surgery in selected patients with univescicular uncomplicated cyst (Gharbi type I–II and selected type III) and with severe comorbydities.

Tissue sparing technique, endocystectomy with partial pericystectomy, is the most frequent procedure for the management of complicated, large and multiple hydatid cysts. In endemic areas surgeons that observe more complicated cases usually prefer conservative procedures because consider surgical resection too radical and extensive for a benign disease.

Local recurrences, postoperative complications and hospital stay time in radical approach are lesser compared to conservative one; for choosing the appropriate approach, important factors are needed to be concern, such as the cyst's location, size number, relation to biliary tract, vessel and above all surgeon's experience.