

Hydatid disease of the liver: A 12 year experience of surgical management

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Objective: Information about hydatid cyst disease in Ethiopia is scarce. This study was aimed at reviewing the clinical presentations, modes of surgical management and post-operative course of patients with hepatic hydatidosis in Tikur Anbessa hospital,

Methods: This was a retrospective study of 137 patients seen with hepatic hydatidosis at Tikur Anbessa Hospital, Department of Surgery, Medical Faculty, Addis Ababa University, Addis Ababa, Ethiopia.

Results: The male: female ratio was 1.2:1. Patients' age ranged from 13 to 67 years with a mean of 33.5 years. The majority (65%) of the patients came from the rural Ethiopia and 40% of the patients had been in frequent contact with domestic animals such as dogs. Abdominal pain and abdominal mass were the commonest symptoms. A palpable mass or hepatomegaly was found in 89.8% of cases, Ultrasonography and computed tomography were the main diagnostic procedures. The cysts were located in the right lobe of the liver in 76 patients (55.5%) and in the left lobe in 38(27.7 %); the other 23 patients (16.8%) had bilobar involvement. Most patients (78.1%) had a solitary cyst. Twenty-three patients had hydatid cystic lesions in other organs in addition to hepatic hydatidosis. The surgical approach was abdominal in 122(89.1%) patients, one- stage thoracoabdominal in 8(5.8%), and laparotomy and thoracotomy at interval in 7(5.1%) patients. Operative management consisted of conservative procedure in 126(92%) patients, namely evacuation in 93(67.9%), cystotomy in 21(15.3%), enucleation of intact cyst in 12(8.8%) patients. Radical procedure was done in 11(8%) patients, wedge resection in 10(5.8) patients, and lobectomy in only 1(0.7%) patient. Twenty-seven (19.7%) patients developed Postoperative complication.

Conclusion: Complete excision of hydatid cyst(s) and procedures that conserve liver tissue are appropriate for most patients with hepatic hydatid cysts.

Introduction

Hydatid disease, also known as echinococcosis or hydatidosis, is caused by infection with larval (metacestode) stage of the tapeworms of the genus *Echinococcus* (1, 2). Hydatidosis is still endemic in sheepherding areas of the world and is a public health problem in Mediterranean, Middle East, Asia, South America and Africa, including Ethiopia (3-8). Human infection with *Echinococcus granulosus* or *Echinococcus multilocularis* typically results in a slowly growing parasitic disease, most frequently seen in the liver in 52-77% of cases (9, 10). Diagnosis of hydatid disease relies on epidemiologic and clinical findings; on detection of the hydatid cyst by radiology, ultrasonography, computed tomography, magnetic resonance imaging, histopathology and serology (12). The Casoni and Weinberg tests are no longer used for the diagnostic workup mainly owing to low sensitivity (13). Because there is no effective medical therapy, surgery remains the principal mode of treatment to eradicate cystic echinococcosis (11, 13-15, 20).

Information concerning hydatid cyst disease is scarce from the study area. Hence, this retrospective study is conducted to review the clinical presentations, modes of surgical management and post-operative course of patients with hepatic hydatidosis in Tikur Anbessa hospital, Department of Surgery, between April 1994 and May 2006.

Patients and Methods

All Patients ≥ 13 years of age, admitted to the Tikur Anbessa hospital for surgical treatment of hepatic hydatid disease between April 1994 and May 2006 were included in the review. Operation theatre registry and patients' medical records were reviewed to determine the initial clinical manifestation, laboratory investigations, imaging studies, types of surgical procedures used, the intra-operative findings, post-operative course and final outcomes. Data were collected

using structured questionnaire, and analyzed using computer based statistical software SPSS version 11.0.

The spectrum of surgical procedure varies from a conservative to radical resectional procedures. Conservative procedures included the use of scolicalid agents injected into the cyst cavity before manipulation, followed by evacuation (removal of cyst after needle aspiration), cystotomy (incision in the organ parenchyma and removal of the cyst) and enucleation of intact cyst. Radical techniques consisted of hepatic resection (such as wedge resection, segmentectomy and lobectomy) with or without the use of scolicalid agents. The residual cavity was treated by capitonnage (obliteration of the residual cavity using multiple purse-string sutures from the deepest to surface level) or pericystectomy (removal of the capsule or adventitial zone).

Results

A small male predominance was observed, in a male: female ratio of 1.2:1. Patients' age ranged from 13 to 67 years (mean 33.5 years), with a peak incidence between 21 to 30 years. 89(65%) patients were from the rural Ethiopia and 40% of the patients had been in frequent contact with domestic animals (such as dogs). Duration of complaints ranged between 1-120 months (mean = 20.8 months).

Among the 137 patients, 115(84%) had abdominal pain and 99(72.3%) had a palpable abdominal mass. In 123 of the patients (89.8%), a palpable mass or hepatomegally was noted on physical examination (Table I). Preoperative laboratory tests were of minimal diagnostic value. Ultrasonography and computed tomography were the usual preoperative diagnostic imaging procedures in 121(91.2%) and 32(94.1%) patients respectively (Table II).

The cysts were located in the right lobe of the liver in 76 patients (55.5%) and in the left lobe in 38(27.7 %); the other 23 patients (16.8%) had bilobar involvement. Most patients (78.1%) had a solitary cyst, double in 14(10.2%), multiple in 16(11.7%). Twenty-three patients had hydatid cystic lesions in other organs in addition to hepatic hydatidosis. In twenty-one patients

(15.3%), the cysts were complicated, including suppuration, calcification, and intrabiliary rupture.

Twenty-seven (19.7%) patients developed Postoperative complication. Most common complications were prolonged drainage >7 days in 8(5.8 %), wound infection in 6(4.8 %) and multifocal intraabdominal abscesses in 5(3.6 %) patients (Table V). There were two deaths in the immediate postoperative period from Pneumonia and multifocal intra-abdominal collections followed by sepsis. Post operative surveillance also revealed a patient who succumbed to secondary sclerosing cholangitis after wedge resection and pericystectomy. Mean postoperative hospitalization was 22.6 days, range 5-60 days. The follow-up period ranged from 1 to 30 months (mean 5 months) with visits to outpatient surgical referral clinic. Recurrent disease was detected in 4 (2.9%) patients between 6 and 18 months (mean 13.5).

Albendazole treatment was administered in 106 patients (77.4%), pre-operatively in patients with multiple hepatic cysts, additional organ involvement, and huge hepatic cysts likely to rupture during operation; and postoperatively as adjuvant treatment of cysts that has ruptured during operation. Intraoperatively, scolicalid agents were used in 124(90.5%) patients. The tissue surrounding the hydatid cyst is protected with sponges soaked in 2% formalin solution or rarely 70% alcohol. The cyst is then punctured and aspirated before being filled with formalin or alcohol for 5 minutes. This maneuver reduces the internal pressure of the cyst, sterilizes the cystic content, and makes the subsequent steps of surgery easier.

The surgical approach was abdominal (laparotomy) in 122(89.1%) patients, one- stage thoracoabdominal in 8(5.8%), and laparotomy and thoracotomy at interval in 7(5.1%) patients. Operative management consisted of conservative procedure in 126(92%) patients, namely evacuation in 93(67.9%), cystotomy in 21(15.3%), enucleation of intact cyst in 12(8.8%) patients. Radical procedure was done in 11(8%) patients, wedge resection in 10(5.8) patients, and lobectomy in only 1(0.7%) patient (Table III). Fig I and II shows laminated membrane and pericyst (adventitial zone) of liver hydatid cyst respectively.

Table 1. Initial Clinical Manifestation of 137 Patients With Hydatid Disease of the Liver, TAH, A.A, E

Symptoms	No of Patients	%
Abdominal pain	115	84
Abdominal mass	99	72.3
Nausea and/or vomiting	17	12.4
Fever	16	11.7
Weight loss	16	11.7
Weakness	13	9.5
Asymptomatic	2	1.5
Signs		
Mass or Hepatomegaly	123	89.8
Jaundice	9	6.6
Ascites	1	0.7

Table 2. Results of Diagnostic imaging studies in 137 patients with hydatid disease of the liver, TAH, A.A, Ethiopia, between April 1994 and May 2006

Imaging studies	No of Pts Tested	Positive Diagnostic results	
		No.	%
Ultrasonography	137	121	91.2
Computed tomography	34	32	94.1
Abdominal film	28	7	25.0
Chest X-ray	69	9	13.0

Table 3. Surgical techniques and immediate postoperative results of 137 patients with Hepatic Hydatidosis, TAH, AA, Ethiopia, April 1994 – may 2006

Surgical procedures (%)	Additional procedures (%)		Morbidity	Mortality
	Capitonage	Pericystectomy		
Mean time of			%	%
<u>Hospitalization</u>				
				days
ranges				
Conservative (n=126)				
Evacuation	93(67.9)	59(43)	10(7.3)	13(9.5)
5-60				1(0.7)
Cystotomy	21(15.3)	10 (7.3)	3(2.2)	7(5.1)
6-60				1(0.7)
Enucleation of	12(8.8)	5(3.6)	2(1.5)	3(2.2)
5-58				24.1
Intact cyst				
Total	126(92)	74(54.8)	15(10.9)	23(16.8)
5-60				2(1.5)
Radical (n=11)				
Wedge resection	10(5.8)	3(1.5)	3(1.5)	3(2.2)
11-49				1(0.7)
Lobectomy	1(0.7)			1(0.7)
23				
Total	11(8)	3(2.2)	3(2.2)	4(2.9)
11-49				1(0.7)
Grand Total	137(100)	77(56.2)	18(13.1)	27(19.7)
5-60				3(2.2)
				22.6

Figure 1. Laminated membrane of liver hydatid cyst, TAH, A.A, Ethiopia, between April 1994 and May 2006



Figure 2. Liver-membrane (Pericyst) of Echinococcal Cyst, TAH, A.A, Ethiopia, April 1994 - May 2006.

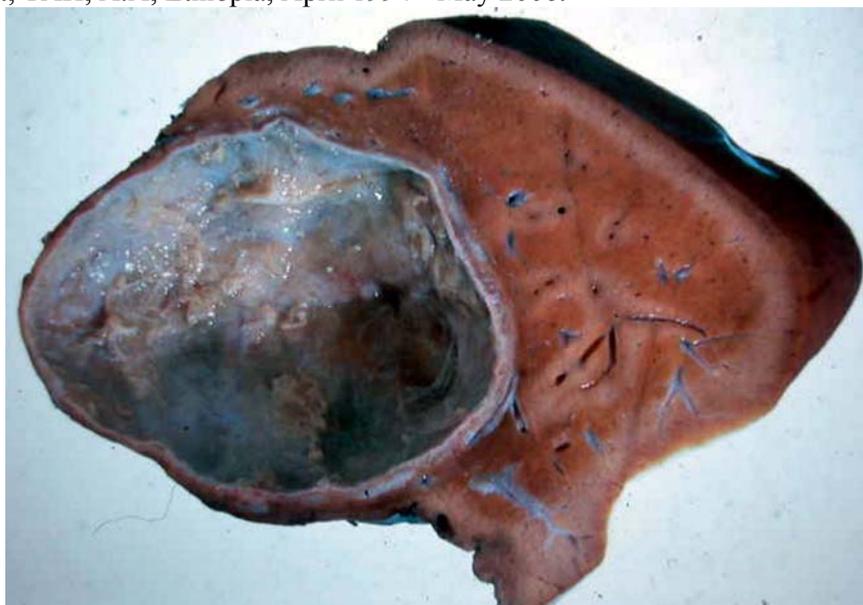


Table 4. Immediate Complications after surgical treatment of 137 patients with hydatid cyst of the liver, TAH, A.A, Ethiopia, between April 1994 and May 2006

Complications	No. (%)	Death
Uneventful	110(80.3)	
Prolonged drainage >7 days	8(5.8)	
Wound infection	6(4.8)	
Multiple intraabdominal abscess	5(3.6)	1(0.7)
Subphrenic abscess	3(2.2)	1(0.7)
Persistent Biliary leak	3(2.2)	
Atelectasis , pneumonia	2(1.5)	1(0.7)
Total	137(100)	3(2.2)

Discussion

Hepatic echinococcosis is common in shepherding areas of the world, including Ethiopia, where it is particularly common in the rural population and at an early age^{3,4,17,18}. The disease should be suspected in patients who reside in sheep raising regions and have abdominal pain and hepatomegaly or palpable hepatic mass³. Hepatic hydatid cysts can remain asymptomatic for many years and then be discovered incidentally. Long duration of complaint ranging 1-120 months (mean 20.8) is in agreement with most authors^{10,12,17,21}. Extensive preoperative laboratory tests in these patients should be limited to the base lines since our findings and those of Kevin E et al³, Langer and associates²² suggest that the results of most screening laboratory examinations are within normal limits.

We have found that computed tomography (94%) and ultrasonography (91%) are highly accurate in diagnosing hepatic hydatidosis, defining the internal structure, number, and location of the cysts and presence of complication. Our finding is in accordance with other reports that indicate the specificity of ultrasonography and computed tomography to be in the range of 90-95 % and 98% respectively^{3,21,22,23}.

Generally hepatic hydatid cysts are single, uncomplicated, and located in the right lobe of the liver^{3,5,24,25}. Our review is in agreement with those cited in literature, where a single cyst was encountered in 107 (78.1%) cases and the disease was confined to the right lobe

of the liver in 76 (55.5%) cases. Bilobar involvement as noted in 23 patients (16.8%), a pattern that reportedly occurs in 10-20 % of cases^{24, 26, 27}.

When a hydatid cyst is diagnosed, treatment should be instituted to prevent complications such as infection, calcification, cirrhosis, atrophy and rupture of cyst in to the adjacent structures, or anaphylaxis. Treatment options for cystic hydatid disease are surgery, drug therapy and percutaneous drainage. Surgery has the potential of removing the cyst, leading to complete cure^{6,7,13}. Intra operatively, inactivation of scolices with various agents has been tried with varying success. Instillation of scolecidal agents is effective in destroying 80% to 90% of scoleces^{28,29}. In our practice, frequently we have used 2% formalin solution and rarely 70% alcohol in a total of 124 patients (90.5%). Despite some reports, we have not encountered significant complications secondary to the use of these solutions²⁶.

The surgical procedures of choice in our experience were mainly conservative approach with removal of the germinal and laminated layers and preservation of pericyst i.e. complete excision of the disease processes with maximum preservation of tissue. This is also the experience of other authors^{5,6,17,30}. Occasionally, cyst is removed by pericystectomy, segmentectomy or partial hepatectomy^{5,6,7,17}. We utilized hepatic resections in 11(8%) patients, which is in agreement with Kevin and others^{3,5,26} who reported hepatic resection rate of 4-11%. Hepatic wedge resections are indicated only when there is atrophy of the liver or cysts situated laterally in the left lobe. The principal indications for lobectomy are large cysts

involving more than half of the lobe or no salvageable parenchyma of the lobe remains, multiple unilocular cysts and sequel of hydatid disease such as suppuration, fibrosis, cirrhosis, atrophy and calcification^{26, 30, 31}.

Some advocates of radical resection approaches claim that postoperative complications, mean postoperative hospitalization and recurrence rates are decreased^{32,33}. It is well known that using this approach, the exogenous cysts are included within the resected material, an important factor for avoiding recurrence. Despite these advantages, there is a large group of surgeons who believe that these procedures, especially liver resection, are overtreatment of a benign disease^{20,22,32,33}.

Proponents of conservative surgical procedures reported low mortality (less than 5%); a recurrence rate of less than 10% and comparable hospital stays^{3,5,17,35}. Radical surgical intervention, however, is associated with a recurrence rate of less than 5 percentage^{26,27}, but bleeding and persistent biliary fistulas may necessitate reoperation in as many as 6% of patients²⁶. Although, it is difficult to compare conservative (126/137) versus radical procedures (11/137) in terms of their morbidity, mortality, and hospital stay, this review revealed that radical procedures were accompanied by high morbidity (4/11), mortality (1/11), and comparable mean time of hospital stay (22.4 versus 21.7 days).

Major postoperative complication and operative mortality were seen in 27(19.7%) and 3 (2.2%) patients respectively. These finding are similar to Huguier and co-workers³⁶, and others^{3-5,26,35}. Mean postoperative hospitalization was 22.6 days, range 5-60. This is also in accordance to many authors^{3,35,36}. The follow-up period ranged from 1-30 months (mean 5 months). A recurrence rate of 2.9% is acceptable compared to most surgeons^{3,5,26,27,35}.

Conclusion

Hepatic echinococcosis is common in rural communities of Ethiopia, the disease should be suspected in patients who reside in sheep/cattle-raising regions and have abdominal pain and hepatomegaly or palpable hepatic mass. Abdominal ultrasound should be the investigation of choice. Hepatic Hydatid cysts

are benign infectious lesions that necessitate early surgical therapy to prevent complications. Complete excision of hydatid cyst(s) and procedures that conserve liver tissue are appropriate for most patients with hepatic hydatid cysts. Additional pharmacological treatment with Albendazole should be carried out for high-risk group patients.

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References:

1. Pawlowski ZS. Terminology related to echinococcus and echinococcosis. *Acta Trop* 1997; 67:1-5.
2. Lewall DB. Hydatid disease: biology, imaging and classification. *Clin Radiol* 1998; 53:863-74.
3. Kevin E.Behrns, Jon A Heerden. Surgical Management of Hepatic Hydatid Disease. *Mayo Clin proc.*1991; 66:1193-97.
4. Burgos R, Varela A, Castedo E, Roda J, Montero CG, Serrano S. et al. Pulmonary hydatidosis: surgical treatment and follow-up of 240 cases, *Eur J Cardiothorac Surg* 1999; 16:628-35.
5. Adem A, Hagos B, Dereje. Experience of Surgical Therapy in 72 Patients with Thoracic hydatidosis over a 10-Year Period. *Ethiop Med J* 2005, 43(1):1-8.
6. Khuroo MS. Hydatid disease: Current status and recent advances. *Annals of Saudi Medicine* 2002; 22(1-2):56-63.
7. Sayek I, Yalin R, Sanaç Y. Surgical treatment of hydatid disease of the liver. *Arch.Surg.* 1980; 115:847-50.
8. Beltrán de Heredia JM. Hydatidosis pulmonar. In: Balibrea Cantero JL (ed) *Tratado De cirugía*, Vol. 1, Barcelona, Ediciones Toray SA., 1988; pp. 1210-25.
9. Morris DL, Richards KS. *Hydatid Disease*, Oxford, Butterworth-Heinemann 1992; pp 23.
10. Timothy D, Taylor BR, Langer B. Recurrence of Hydatid Disease. *World J Surg* 2001; 25:83-86.
11. Safioleas M, Misiakos E, Manti C, Katsikas D, Skalkeas G. Diagnostic evaluation and

- surgical management of hydatid disease of the liver. *World J Surg* 1994; 18(6):859-65.
12. Biava M, Dao A, Fortier B. Laboratory Diagnosis of Cystic Hydatid Disease. *World J.Surg.*2001; 25:10-14.
 13. Sayek I, Onat D. Diagnosis and Treatment of Hydatid Cyst of the Liver. *World J.Surg.*2001:21-27.
 14. Schantz PM: Effective medical treatment of hydatid disease? (editorial) *JAMA* 1985; 253:2095-97.
 15. Braithwaite PA: Long- term high-dose mebendazole for cystic hydatid disease of the liver: failure in two cases. *Aust N Z J Surg* 1981; 51:23-27.
 16. Ben slama M.R: Problèmes diagnostiques et thérapeutiques dans le Le Kyste hydatique du rein: apropos de 70 cas. Thèse, faculté de Médecine-Tunis, 1997, p.146.
 17. Istimangil T, Toker A, Gorur R, Sebit S, A novel dissemination pathway of hydatid cyst. *Eur J Surg* 2002; 21:1127-8.
 18. Salih OK, Topcuoglu MS, Celik SK, Ulus T, Tokcan A. Surgical treatment of hydatid lung cysts, *Eur J Cardiothorac Surg* 2001; 19:914-17.
 19. Uysal A, CelikM, Halezeroglu S, Armo B.: Surgical treatment of pulmonary hydatid cyst in childhood. *S.Am .J. thorac. surg* 1988;1:11
 20. Sayek I, Yalin R, Sanaç Y. Surgical treatment of hydatid disease of the liver. *Arch Surg* 1980; 115:847-50.
 21. Milićević M. Hydatid disease. In: Blumgart LH, editor. *Surgery of the liver and biliary tract.*2nd edition. Vol 2 Edinburgh: Churchill Livingstone.1994; 1121-50.
 22. Langer JC, Rose DB, Keystone JS, Taylor BR, Langer B. Diagnosis and management of hydatid disease of the liver. A 15-year North American experience. *Ann Surg* 1984; 199:412-7.
 23. Hageman G, Gottstein B, White OW. Isolated Echinococcus granulosus hydatid cyst in the CNS with severe reaction to treatment. *Neurology* 1995; 2:1100-1.
 24. Dawson JL,Stamayakis JD, Stringer MD, Williams R. Surgical treatment of hepatic hydatid disease. *Br J Surg* 1988; 75:946.
 25. Sharma SK, Eggleston FC, Management of hydatid disease. *Arch Surg* 1969; 99:59-63.
 26. Morel P, Robert J, Rohner A, Surgical treatment of hydatid disease of the liver. A survey of 69 patients. *Surgery* 1988; 104:859-62.
 27. Elhamel A. Pericystectomy for the treatment of hepatic hydatid cysts. *Surgery* 1990; 107:316-20.
 28. Besim H, Karayalçın K, Hamamci O, Güngör Ç Korkmaz AI. Scolicidal agents in hydatid cyst surgery. *H.P.B. Surg* 1998; 10:347.
 29. Gökce O, Gökce M, Hüseyinoglu K, Günel S.Povidone iodine in experimental peritoneal hydatidosis. *Br J Surg* 1991; 78:495.
 30. WHO Informal Working Group on echinococcosis. Guidelines for treatment of cystic and alveolar echinococcosis in humans. *Bull W.H.O.*1996; 74:231-42.
 31. Pitt HA, Korzelius J, Tompkins RK. Management of hepatic echinococcosis in Southern California. *Am J Surg* 1986; 152:110-14.
 32. Magistrelli P, Masetti R, Coppola R, Messia A, Nuzzo G, Picciochi A. Surgical treatment of hydatid disease of the liver: a 20 year experience. *Arch Surg* 1991; 126:518.
 33. Mentès A. Hydatid liver disease. a perspective in treatment .*Dig Dis* 1994; 12:150.
 34. Magistrelli P, Masetti R, Coppola R, Messia A, Nuzzo G, Picciochi A. Surgical treatment of hydatid disease of the liver: a 20 year experience. *Arch Surg* 1991; 126:518.
 35. Cangiotti L, Giulini SM, Muiesan P, Nodari F, Begni A, Tiberio G. Hydatid disease of the liver: long term results of surgical treatment. *G Chir* 1991, 12:501.
 36. Barros JL, Hydatid disease of the liver. *Am J Surg* 1978, 597-600.
 37. Huguier M, Hobeika J, Houry S. Hydatid Cysts of the Liver-Surgical Treatment. *Dig Surg* 1995; 12:314-17