

# The New Concepts in Hydatid Cyst Surgery of The Liver

KARACİĞER KİST HİDATİĞİ CERRAHİSİNDE YENİ KURAMIAR

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## SUMMARY

120 patients with 148 hepatic hydatid cysts were operated upon by different surgeons using various surgical methods such as omentopexy, open-left technique, total or partial cystectomy with or without external drainage and introflexión. Patients whose cysts were not drained, displayed more favorable results. While mean drain keeping period was 12.4 days and mean hospitalization period was 13.2 days in the patients with intracavitary drainage, these were sequentially 3.1 and 6.8 days in the non-drainage group. Postoperative complications developed much more in the external drainage group than those of the non-drainage group. Differences between two groups were statistically significant. Moreover, the patients undergone omentopexy and open-left procedures.

**Key Words:** Hydatid cyst liver, Echinococcus

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Hydatid disease, as a serious endemic infestation, has been a great problem for years particularly in the Far East, Middle East, South American and Mediterranean countries. Cyst is developed by transmission of the larval form of echinococcus granulosus, a parasite living as an adult tapeworm in the bowels of a host animal such as dog, ox e.g., through intestinal mucosa into the portal circula-

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## ÖZET

Kliniğimizdeki çeşitli cerrahlar tarafından farklı ameliyat yöntemleri uygulanan toplam 120 hastada mevcut olan 148 karaciğer hidatik kisti gözden geçirildi. Genellikle tercih edilen yöntemler açık bırakma yöntemi, omentopeksi, parsiyel rezeksiyon ve eksternal drenaj, sadece eksternal drenaj, kapitonaj ve eksternal drenaj ile total kistektomidir. Kist kaviteleri dışa drene edilmeyen hastalarda hospitalizasyon süresi, kavite dışı drenaj süresi ve morbidite bakımından en iyi sonuçlar alınmıştır. Kaviteleri dışa drene edilen hastalarda ortalama drenaj süresi 12.4 gün ve yatış süresi 13.2 gün iken bu süreler kaviler drenaj yapılmayanlarda sırayla 3.1 gün ve 6.8 gündür. Her iki grup arasındaki farklar istatistiksel olarak manidardır. En iyi sonuçlar açık bırakma ve omentopeksi yöntemleriyle alınmıştır.

**Anahtar Kelimeler:** Karaciğer kist hidatiği, Ekinokokus

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tion. Therefore, majority of the cysts involve in the liver because of the great filtration capacity of the organ (1-6). A hepatic hydatid cyst is composed of three layers that the innermost one is active germinal membrane derived by parasite itself, another is the external acellular laminary layer and the third is the outermost pericyst developed by the host as a fibrous reaction. Thus, such a cystic formation may have a multivesicular or univesicular cavity in which the content may be clear, biled, infected, calcified or ruptured to another cavity (7-9). Although the diagnostic modalities have developed recently particularly by means of imaging methods, both medical and surgical managements are still un-

satisfactory. Mebendazole is the most popular drug that both scolicial and lethal effects are well known, however, its place in the treatment is controversial as an initial therapeutic method (5,10). Albendazole is another chemical preparation which has been proposed as the more effective drug than mebendazole in terms of scolicial influence (11,12).

## MATERIAL AND METHOD

The results of various surgical procedures performed in the patients with hydatid cyst of the liver were investigated retrospectively. 120 patients consecutively admitted to the clinic from January 1983 to January 1989 were included in the study. 4 of the patients were female and 46 were male with the mean age of 37.5 of the cases. 102 had primary, 16 had secondary and 2 had tertiary intervention for the disease. A total of 148 hydatid cysts localized in the liver were treated surgically in 120 patients.

Various surgical methods performed by different surgical teams in this period were compared with regard to drain selection and drainage period, hospitalization period and the rates of morbidity and the rates of morbidity and mortality. All cases were generally divided into nondrainage and drainage groups. The word of drainage and drainage has represented, herein, the cavitory emptying.

In the selection of the surgical procedures, general conventional tendencies of the surgeons have played a major role. Furthermore, the factors including properties of the cysts such as localization, number, diameter, content, cavitory visibility or complications and the general omentum, having whether additional pathologies or general condition of the patient, have all been taken into consideration by the surgical teams. According to these factors; partial resection and open-left method (intra-peritoneal drainage) were done for 24 cysts (16.2%), omentopexy with or without partial for 12 (8.1%), external drainage only for 10 cysts (6.8%), partial resection and external drainage for 32 cysts (21.6%) and capitonnage and external drainage for 30 cysts (20.3%). Number of the cysts that their cavities were drained externally as a primarily surgical method for treatment is 72 totally (48.6%) (Table 1).

**Table 1. Distribution of Surgical Procedures in 148 cysts**

Surgical Procedure	Number of the cyst	%
Open-left method	24	16.2
Omentopexy	48	27.0
Complete excision	12	8.1
Partial Resection and External Drainage	32	21.6
External Drainage only	18	6.8
Capitonnage and external drainage	38	28.2
Total	148	100.0

Patients whose cystic cavities were drained temporarily during surgical procedure in which both open-left and omentopexy methods had been performed, were excluded from the study.

Extracavitory drainage procedures in all patients, moreover, were taken into account for evaluation of the result.

Open-left method (intra-peritoneal drainage of the cystic cavity) was performed by only one surgeon (A.K.) as an initially preferred technique in the existence of definite criteria as follows:

- 1) Having clear cystic fluid,
- 2) Having large and solitary cyst,
- 3) Having visible cystic cavity,
- 4) Having no communication with biliary tree,
- 5) Having no another intra-abdominal pathology,
- 6) Having no fistula between the cyst and hollow viscera,
- 7) Having the greater omentum in sufficient length.

Almost same factors were taken into consideration in order to perform omentopexy, however, the status of the greater omentum was particularly attended.

In either above mentioned method, the edges of the cystic wall were sutured continuously for hemostasis using OO hydroxyglactin material in the patients whose cysts were resected partially. Intra-cavitory drains were resected partially. Intra-cavitory drains were avoided in both open-left and omentopexy methods for fear of causing infection as the personal view of the surgeons involving in these two methods. Subhepatic and subdiaphragmatic regions were usually drained in such cases.

Generally, small and easily removable cysts were excised totally. And these patients were included in the non-cavitory drainage group.

Only the patients with similar characteristics whose cavities were drained externally as the primary traditional method of choice by some aged surgeons of the clinic were included the study.

Surgical approach has been different in the complicated hydatid cyst cases. Surgeon's tendency has been the most important factor in the selection of the operation types in such patient. However, in the open-left and omentopexy techniques, visible openings of biliary ducts were closed and the methods were performed despite the biled or infected cavitory fluid.

The recurrence rates in the patients have not been discussed in the article because of the available short follow-up periods.

Student's t test has been used for the statistical evaluations.

## RESULTS

External cavitory drainage was performed for a total of 72 cysts (48.6%) in 53 of the 120 patients (44.2%) with liver hydatid disease. 76 cysts (51.4%) were not drained externally. There were 67 patients (55.8%) in the nondrainage group (Table 2).

68 intracavitory various drains were used in the external drainage group. 27(39.7%) were mushroom type drains with the mean drainage period of 21.6 day. Open lastic or silicon drains were used in 4 cysts (5.9%) with the mean drainage period of 10.4

**Table 2.** Distribution of the Two main Groups With Regard to Numbers of Cases and Cysts.

Surgical Procedure	Number of Case	Number of cyst
External Cavitory Drainage	53 (44.2%)	72 (48.6%)
Moncavitory Drainage	67(55.9%)	76(51.4%)
Total	120 (100.0%)	140 (100.0%)

**Table 3.** Distribution of the intracavitory and Extracavitory Draine Used in 53 Patients With External Cavitory Drainage

Type Of Drain	Intracavitory Drainage		Extracavitory Drainage	
	No. of Draine	Drainage Period	No. of Drains	Drainage Period
Mushroom	27(39.7%)	21.6 Day	8(12.5%)	6.2 Day
Open Lastic	4 (5.9%)	10.4 Day	27 (42.2%)	3.4 Day
Foley Sump	37 (54.4%)	5.2 Day	29 (45.3%)	4.3 Day
Total	60 (100%)	Mean: 11.4 Day	64 (100%)	Mean: 4.4 Day

**Table 4.** Extracavitory Draine Used in the Non-cavitory Drainage group. Number of Various Draine and Drainage Periods Are Seen Herein.

Type of Drain	Extracavitory Drainage	
	No. of Drains	Drainage Period
Open lastic	11 (13.9%)	2.4 Day
Foley Sump	46 (58.2%)	2.7 Day
Penrose	22 (27.9%)	4.1 Day
Total	79 (100%)	Mean: 3.06 Day

**Table 5.** Distribution of The Complicated Cysts in The Patients

Complication	Nondrainage	External Drainage	I
	Group	Group	
Infected Fluid	5 (26.3%)	14 (73.7%)	19
Biled	4 (44.4%)	5 (55.6%)	9
Biliary Rupure		3 (100%)	3
Total	9 (29%)	22 (71%)	31

day. Sump drais of Foley catheters were in majority in the external drainage group (54.4%). Mean drainage period with sump drains was 5.2 day. In the external drainage group, some extracavitory regions such as Morrison pouch or subdiafragmatic spaces) had also been darindc using various drains. The drains used and their drainage periods have been shown in Table 3.

Morison pouch was usually drained with various kinds of drains in the nondrainage group. Selected extracavitory drains and drainage periods have been listed in Table 4.

In the group of patients with eternal cavitory drainage, mean drainage period was longer than that of extracavitory group (nonintracavitory group). The difference was statistically significant ( $p < 0.01$ ).

Mean hospitalization period was 13.2 day in the external drainage group. This was 6.8 day in the noncavitory drainage patient. The difference showed statistically significance ( $p < 0.01$ ).

31 of the 148 cysts were complicated (20.9%). Of the complicated cysts. 19 had infected (61.3%) and 9 has biled (29%) cystic fluid. Moreover, biliary ruptur of the cystic content was found in 3 cystic content was found in 3 cysts (9.7%). Distribution of the complicated cycts with respect to surgical procedures have been shown in Table 5.

**Table 6.** Distribution of a Total of 49 Complications Established in 120 Patients.

Complication Type	Open-Ixft N: 22		Omentopexy N: 34		T. Cystectomy N: 11		External Dra nage N: 53		Total N: 120	
Wound Infection	4	18.1%	3	8.8%	2	18.1%	9	17.0%	18	15.0%
Biliary Drainage	2	9.1%	2	5.9%	–	–	9	17.0%	13	10.8%
Biliary Fistula	–	–	–	–	–	–	3	5.7%	3	2.5%
Cholangitis	–	–	–	–	–	–	1	1.9%	1	0.0%
Subphrenic Abes.	–	–	–	–	–	–	1	1.9%	1	0.0%
Ascendant Enfect	–	–	–	–	–	–	5	9.4%	5	4.2%
Pneumonia	–	–	1	2.9%	–	–	4	7.5%	5	4.2%
Pleural Effusion	–	–	1	2.9%	–	–	2	3.8%	3	2.5%
Thrombophlebitis	–	–	–	–	–	–	1	1.9%	1	0.8%
Total Number	6		7		2		35		49	

22 of the 53 patients undergone external cavitory drainage (41.5%) had a total of 35 postoperative complications. However, in the non-cavitory patient, a total of 13 complications developed in 10 patients (14.9%) (Table 6). The difference between the two groups have shown statistically significance in favor of nondrainage patients ( $p < 0.01$ ).

## DISCUSSION

There is no consensus yet in terms of surgical treatment of the liver hydatid disease in the literature. No detailed arguments have been encountered because of the endemic properties of the disease. The therapeutic purpose is not only to kill the parasite, but to remove the cyst or to manage the residual cavity remove the cyst or to manage the residual cavity (1,5,6). Although it is seemed that percutaneous aspiration of the cystic fluid has some risky events such as peritoneal implantation of the daughter vesicles or anaphylactoid reactions (5,9), particularly in the cases with recurrent and large cysts located centrally in higher position, developed in the previous surgery (15).

Complete excision of the cyst is the ideal therapeutic method in the liver hydatid disease (1,5,6). Though small and pediculated cysts in proper localization can be easily excised, hepatic resection is also required in some patients with deep localization of the cyst some patients with deep localization of " he cyst in the liver tissue. For this reason, complete excision is actually advised in the patient. Whose cysts are pediculated or located peripherally particularly in the left lateral segment (1,2).

Calcified hepatic cysts are seen all times in the patients. Calcification is the finding of the host

defence that the parasite has been either isolated or killed. The cysts less than 5 cm in diameter need no treatment. However, than 5 cm in diameter need nom treatment. However, the diameter of the cyst should often be eamined in such cases (9). Surgical approach is necessary in the patient with calcified cysts more than 5 cm in diameter because of the probability of having alive parasite (9).

Hepatic lobectomy or partial hepatectomy have been suggested as the radical methods (6,7,8,9). Morbidity and mortality rates are decreased in recent years in terms of the well-known anatomy of the liver and modern technical supplies (6). However, such a major and risky surgery is rarely required among the patients with hepatic hydatid disease (1,3). Hepatic lobectomy is generally suggested in the patients whose hyatid cysts destroy the lobe almost completely or in the patients with the compression findings of the vascular pedicles of a lobe (6,7,8). Even though we do not have an experience on these radical methods, we always prefer conservative approaches in such a benign disease.

We would rather aspirate the cystic fluid as the first step of the operation of chemical agent, have been proposed so far in the literature (1,2,5). To behave very carefully and curiously daring this pcedure is the most reportant factor in the decrease of recurrence rates. However, intraabdominal contamination can be seen even in the careful exploration. For thes reason Morris (16), has suggested the preoperative use of albendazole. We prefer to use sodium chlorur solution in 20% concentration. Direct injection of the solution into the cavity is a sufficient method for the elimination of the parasite. In a short follow-up period, we do not encounter a case of early recurrence or contamina-

tion. 40% of formaldehyde solution has been used for years in the same clinic. However, because its serious toxicity has been noted (3,5,17), we abandoned the use of this solution. Another method in which the cavity is frozxn with carbondiolyde seems to have ideal superiority in the near future (2).

The main controversial point in the surgery of the liver hydatid disease is on the procedures directed to the cavity. Two essential approaches are: 1) External cavitory drainage (tube drainage or marsupialisation) or enternal draiage (enteroanastomosis), 2) Cavitory obliteration or close

Without drainage. Second approach comprises capsuloraphy (1), capittonage (18) and omentopexy (3).

Marsupialisation has been recently abandoned because of having high morbidity rates and long hospitalization and drainage periods (1,3). Enteroanastomosis has been advised only in the patient, carrying high risk and having too large cysts (7). Capsuloraphy and introflesion methods have always danger of infection due to having potential pouch.

Results of our series have shown that both drainage and hospitalization periods are toolong in the patients with external cavitory drainage, Furthermore, postoperative complication rate is higher in these patiens (1,3). Enteroanastomosis has been advised only in the patients carrying high risk and having too large cysts (7). Capsuloraphy and introflesion methods have always danger of infection due to having potential pouch.

Results of our series have shown that both drainage and hospitalization periods are too long in the patients with eternal cavitory drainage. Furthermore, postoperative complication rate is higher in these patient. We believe that external cavitory drainage should be chosen only in the patient, who have serious cavitory infection or bile communication. Some authos have also pointed out that internal drainage methods should be avoided in these conditions (3,4,5,8). Same authors have aggested that internal drainage may safely be used in the cases whose cavities show very slight communication with small bile ducts. The methods suggested are omentopexy (3), myoplasty (4) and enteroanastomosis (13).

Recently, a tendency to comentopexy has been noticed among the surgeons. However, This

method may cause the necrosis of the greater omentum fixed to the cavity. Furthermore, it is fact that there may be some problems in the fact that there may be some problems in the postoperative follow-up periof of such patient, particularly in the diagnostic imaging medhods. We had a case undergone surgery for recurrent disease, however, it was understood in surgery that there was no recurrence but small collection due to previous omentopexy technique.

One of the authors of this study (A.K.) has performed another technique in which the cavity is left open in the abdomen. In this method, cyst is resected partially and then, wall and visible openings of the bile ducts in the cavity are stured. These method has been selectively done in limited patients taking definite criteria into account. This method may be thought as an internal drainage into the peritoneum. Drains are also avoided in this method. The rationale of the method is to prevent the necrosis of the greaeter omentum and intracavitory ascenden infection.

Our results have shown that in the patients with intracavitory drains, the selection of the drains is very important point. Unlike the recent concepts, it is now thought that, thick and open drains lead to high rate of ascendent infections, increase the amounts and period of drainage, work and economic loss due to long hospitalization. If the drainage is mandatory, the use of closed sump drains for short period is sufficient approach to the matter. Instead of the conception of routine drainage in the infected and biled cysts, it would be useful to remember the omentopexy or myoplasty as the methods of choice in such paients.

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