ORIGINAL ARTICLE

Liver Dome Hydatid Cyst Management: Laparotomy or Thoracotomy

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ABSTRACT

Background: The liver is the most common organ involved in the Hydatid Cyst (75%). Theoretically, any lobe could be involved. However, the right lobe is more common. The involvement liver dome or posterior segment (7th and 8th segment) has not been studied well.

Aim: To determine the best surgical approach in hydatid cyst of the liver dome

Methods: in this retrospective study, 240 patients with liver hydatid cyst who were under laparotomy or thoracotomy were evaluated. The demographic features of the patients, cyst characteristics and complication and outcome of surgery were evaluated based on the checklist. After data collection, the statistical analysis was performed by SPSS

Results: The majority of the patients were male (74.17%). 18 patients had liver and lung cyst at the same time. 164 patients had a cyst, 54 patients had 2 cysts and 20 patients had 3 cysts. In 200(83.33%) patients, right lobe was involved and in 40 patients the left lobe was involved. In 62 patients, the liver dome was involved.62(25.83%) patients were under thoracotomy and 178(74.17%) patients were under laparotomy. Among the patients who were under laparotomy, in 12 cases no cyst was found resulted to referral for thoracotomy. In addition in 6 cases, partial resection leaded to further thoracotomy. In the laparotomy group, the average day of biliary leakage was 20 days. In 6 patients, persistent biliary leakage and consequent biliary peritonitis resulted to further laparotomy. In thoracotomy group, the average day of biliary leakage was 14 days .

Conclusion: In Hydatid cyst of the liver dome or 7th and 8th segment, thoracotomy seem to be the ideal surgical approach to limitations of the laparotomy as failure to find the cyst, partial resection, cyst rupture and dissemination while surgery.

Key words: liver hydatid cyst, laparotomy, thoracotomy, laparoscopy,thoracoscopy

INTRODUCTION

Hydatid cyst is a zoonotic infection which is prevalent in the livestock areas[1,2]. There is a global outbreak however the endemic areas are Iran, Turkey, Greece, New Zealand and Australia. There is a high prevalence in areas where dogs are used as herd guardians[1,2,3].

Theoretically, any organ can be involved by hydatid cyst, but the liver is the most common organ which involve and lung is second organ after liver involve. Due to the probable serious complications of the hydatid cyst, it is generally accepted to treat all the patients with hydatid cyst just after diagnosis[1,2,3,4].

Various surgical approaches are considered for therapy. The conventional form is laparotomy which includes complete exploration, mobilization of the liver, cyst identification, protection of surrounding tissue by covering them with cetrimide soaked pads , cyst evacuation, irrigation of the cavity by isotonic saline solution ,ligation of biliary leakage site and eventually omentoplasty (5). In addition, newer methods as advanced laparoscopy are of interest. In this way, the risk of complications as perforation or cyst content dissemination is more probable[6,7,8].

It should be noted that in case of large cyst or superior-posterior segment (7th or 8th segment) or dome of the liver cyst, the thoraco-abdominal surgery is the preferred procedure[6]. Also, less complex method "thoracotomy and opening the diaphragm right at the site of the cyst has been reported[2]. Furthermore there is a case report of thoracoscopy with simultaneous laparoscopy[3].

Since 2006, conventional surgery was the only accepted surgical approach in treatment[9]. Currently, despite the increased interest in nonsurgical or laparoscopic techniques, the best therapeutic approach is still controversial. Especial consideration as knowledge of the limitation and long term prognosis of the available techniques can make a contribution to better decision. For example, in case of superior-posterior segment of the liver (7th or 8th segment) hydatid cyst, proximity of the cyst to the ribs, spine or posterior aspect of the diaphragm and cyst prominence in pleural space the thoracotomy is the preferred surgical option[6].

In this study, we aimed to evaluate the demographic features of the patients, the hydatid cyst characteristics, the surgical approach and complication of the treatments in patients who were hospitalized in Razi, Golsa and Aria Hospitals in Rasht over12 years.

METHODS

This study was a retrospective study inRazi, Golha and Aria hospital, Rasht in 2005- 2017. 240 patients with liver hydatid cyst were evaluated. The liver was classified to three segments. In a way that, the celiac artery stem was determined using computed topography (CT) with contrast imaging. In the following, a transverse line was drawn from it across the abdomen. Next, a verticalline of xiphoid to the spine was drawn. Cysts that made up 80% of their volume in posterior segment of the liver, cysts adjacent to the ribs or spine, cysts with pleural prominence and diaphragmatic adhesion were under thoracotomy (Figs. 1,2,3,4,5,6,7).

Fig.1:

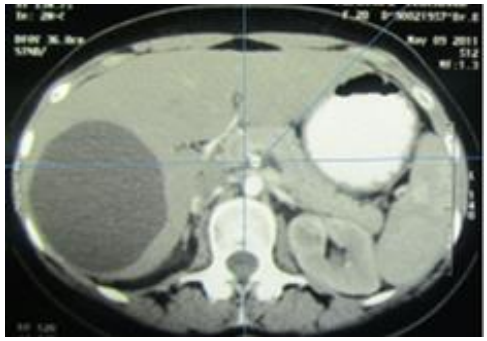


Fig.2:

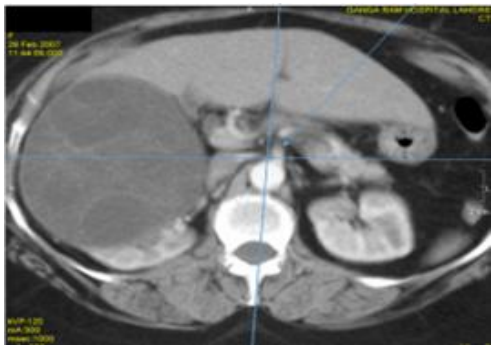
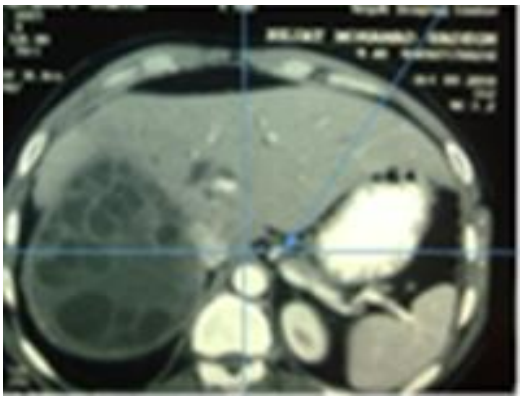


Fig.3:



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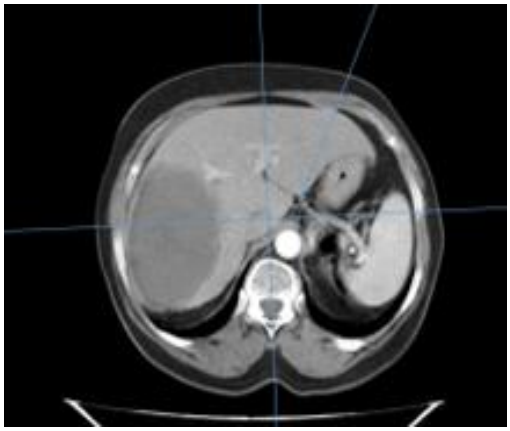

Fig.5:

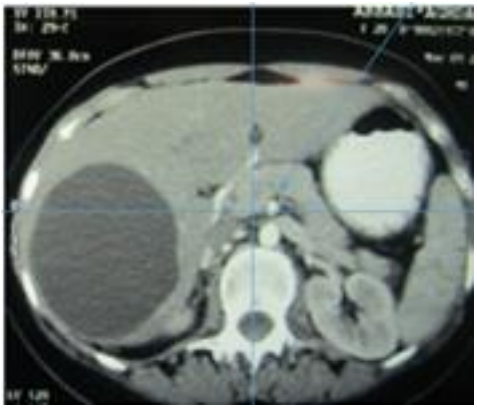

Fig.6:

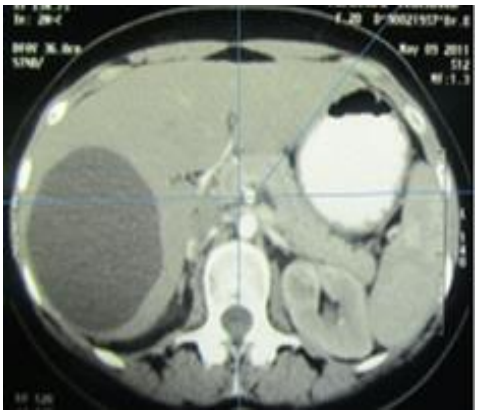

Fig.7:

Then, the data collection was done by a check list prepared based on the patients ' medical profile which were included the patients demographic features as age, sex, past medical history, habitual history, occupational state and clinical presentation and cyst characteristics as size, location , simultaneous other organ involvement. In addition, the complication and prognosis of either surgical approach was evaluated. To evaluate the severity of the pain between two groups, visual analogue scale (VAS) was applied. After data collection, the statistical analysis was performed by using SPSS v22.0.

RESULTS

The majority of the patients were male (74.17%). The age of the patients was 6-15 and 8-68 years old in female and male patients, respectively. 18 patients had liver and lung cyst at the same time. 164 patients had a cyst, 54 patients had 2 cysts and 20 patients had 3 cysts. In 200 patients, right lobe was involved and in 40 patients the left lobe was involved. In 62 patients, the liver dome was involved. 62 patients were under thoracotomy and 178 patients were under laparotomy. Among the patients who were under laparotomy, in 12 cases no cyst was found resulted to referral for thoracotomy. In addition in 6 cases, partial resection leaded to further thoracotomy. The complication of the surgery was included biliary leakage and biliary peritonitis, air leak due to pleural adhesion and atelectasis.

In the laparotomy group, the average day of biliary leakage was 20 days (126 cases for a week, 62 cases for 2 weeks, 48 cases for 3 weeks and 30 cases for 5 weeks). In 6 patients, persistent biliary leakage and consequent biliary peritonitis resulted to further laparotomy. In thoracotomy group, the average day of biliary leakage was 14 days (38 cases for a week, 14 cases for 2 weeks and 10 cases for 3 weeks).

Among patients who were under thoracotomy, in 6 patients, air leak and 8 patients atelectasis occurred which completely improved by palliative therapy. Complete Capitonnage was seen on 48.32% of the laparotomy group and 74.19% of the thoracotomy group. The mean hospitalization period for laparotomy and thoracotomy group was 4 and 5 days, respectively. The mean score of VAS in both groups were 4-5 which did not show a significant difference. The summary of the results are brought on table1.

Table1. The patients' characteristics

Variable		**Number (percent) / Mean ± standard deviation (95% confidence interval)**
Gender		
-	Male	178 (74.17)
	Female	62 (25.83)
Number of cysts		
240	One	166(69.17)
	Two	54(22.50)
	Three	20(8.33)
Liver lobe		
-	Right	200(83.33)
	Left	40(16.67)
Duration of bile secretion from drain in laparotomy		
266	One week	126
	Two weeks	62
	Three weeks	48
	Five weeks	30
Duration of bile secretion from drain in thoracotomy		
62	One week	38(61.29)
	Two weeks	14(22.58)
	Three weeks	10(16.13)
Duration of bile secretion from drain in thoracotomy		
	Yes	68(48.32)
	No	92(51.68)
Complete capitonnage in thoractomy		
	Yes	46(74.19)
	No	16(25.81)

DISCUSSION

Hydatid cyst is a zoonotic disease which is caused by the tapeworm of the genus Echinococcous parasite. Although it a worldwide disease, it is seen mostly on areas with traditional livestock farming which results to close relationship of animals as dogs, goats or cows[1].

The liver is the most common organ involved (65-75%). Liver hydatid cysts grow slowly over months to years[4]. Although hydatid cyst considered as benign disorder, it might lead to serious complications. Those that are on the upper surface of the liver, grow upward to the pleura pushing the lung and diaphragm and those that on the inferior surface of the liver grow to the abdomen which might rupture to the peritoneum which might result to anaphylactic shock or biliary peritonitis[11]. Regarding to the correlation of clinical presentation and the location of the cyst, it is in paramount of importance to identify the most part of the cyst[11].

With the introduction of new diagnostic methods, early diagnosis of Hydatid cyst is possible. CT scan is one of the best imaging with a 98% sensitivity to demonstrate daughter cysts[12].

It is generally accepted to treat all the newly diagnosed hydatid cysts to prevent the rare, probable catastrophic complications of the disease[1,2,3,4]. Despite of various therapeutic approaches, the surgery is still the mainstay for treatment. In recent years, laparoscopic procedureshave gained more popularity. However, the recurrence rate, the risk of intraperitoneal Dissemination and anaphylactic shockis higher with laparoscopy than with the conventional approach[6,7,8,13].

The main goal of surgery is radical resection of the cyst, prophylaxis of the cyst content dissemination and consequent anaphylactic shock or sepsis and recurrence of the cyst by remnant cavity irrigation[14].The appropriate therapeutic approach is adopted by considering different factors as the cyst location, size and probable complication of any available methods and clinical presentation and the patient's immunity status. For example, in case of superior-posterior segment of the liver hydatid cyst, proximity of the cyst to the ribs, spine or posterior aspect of the diaphragm and cyst prominence in pleural space the thoracotomy is the preferred surgical option[6]. In the study of Saiedi et al, the choice of surgical approach was based on a hypothetical horizontal line of the xiphoid to the spine. Any cyst above this line was under thoracotomy. In contrast, the cysts below this line were under laparotomy[9]. Interestingly, Saiedi et al also reported a case of large hydatid cyst of the right lobe (the superior posterior segment) which was evacuated by thoracoscopy and laparoscopy[3]. .

In the study of Aghajanzadeh et al, they showed that in case of simultaneous hepatic and liver cyst, the best surgical approach is the double-stage procedure. In a way that in the first step, the lung cyst is removedby thoracotomy followed by the liver cyst resection through the diaphragm by which no further thoraco-abdominal or distinct laparotomy was in need[2].

In this study, the choice of surgical approach was based on the liver zone classification. While thoracotomy, we identified the cyst location. Then we covered the

surrounding tissue by hypertonic saline and aspirated through the diaphragm. In the following, a 6 cm incision was applied through the diaphragm which clarified the liver surface in gray color. We cautiously evacuated the cyst content and fill the cyst remnant cavity by normal saline. We aimed for maximal capitonnage. Next, awe embedded a drain in the cavity. Eventually, we inserted a chest tube and sutured the site of surgery. We did not encounter any difficulty to find and evacuate the cyst.

CONCLUSION

In Hydatid cyst of the liver dome or segment 7,8 , laparotomy has been encountered with important limitations as the failure to find the cyst, partial resection, cyst rupture and dissemination while surgery. In contrast, all the patients treated by thoracotomy improved well with no serious complication. As a result, we highly recommend thoracotomy in management of patients with Hydatid cyst of the liver dome or 7^{th} and 8^{th} segment of the liver.

Ethics approval and consent to participate: Approval ID of research ethics certificate is IR.GUMS.REC.1397.152 at the Guilan University of Medical Sciences. The research ethics certificate was obtained on 02-07-2018.

Conflict of interest: The authors declare that they have no competing interests.

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