

Case Report

Clinicopathological Findings of Hydatid Cyst Disease: A Retrospective Analysis

Sibel Bektas^{1*}, Nilsen Yıldırım Erdoğan¹, Gurok Sahin², Gulay Kir³ and Gokhan Adas²

¹Department of Pathology, Gaziosmanpaşa Taksim Training and Research Hospital, Turkey

²Department of General Surgery, Gaziosmanpaşa Taksim Training and Research Hospital, Turkey

³Department of Anesthesiology, Gaziosmanpaşa Taksim Training and Research Hospital, Turkey

*Corresponding author

Sibel Bektas, Gaziosmanpaşa Taksim Training and Research Hospital, Department of Pathology, Gaziosmanpaşa, İstanbul 34255, Turkey, Tel: 90-0532-707-3153; Email: sibel_bektas@yahoo.com

Submitted: 06 February 2016

Accepted: 11 March 2016

Published: 14 March 2016

ISSN: 2373-9282

Copyright

© 2016 Bektas et al.

OPEN ACCESS

Keywords

- Hydatidic cyst
- Location
- Diagnosis
- Histopathology
- Treatment

Abstract

Background: Hydatid disease is a major public health problem that is spreading all over the world. We aimed to this retrospective study was to investigate clinical and histopathological features of patients with hydatid disease (HD).

Methods: Archival records of the 113 patients who diagnosed as hydatid cysts between 1997 and 2015 were analyzed retrospectively. Clinical and histopathological parameters were evaluated in all patients.

Results: Of 113 cases, 55.8% were female and 44.2% were male. Mean age was 38.3 years. The average diameter of cysts was 9.50 cm. Cysts were localized in liver (77.0%), soft tissue (5.3%), lungs (3.5%), spleen (2.7%), kidney (1.8%), cerebellum (0.9%), gall bladder (0.9%) and paraspinal site (0.9%). 7.1% of cases had multiple organ involvement. 101 cases had only one cyst and 12 cases had 2 or more cysts in the same organ. The histopathologic findings consistent laminated cyst wall, scolex and pericystic inflammatory infiltrate. All patients were treated with antihelminthic drug and surgery. The overall mortality rate was 0%.

Conclusions: Although HD is seen most often in the liver, it can be found in any part of the body. HD appears to be more common in females and between 25-50 ages. The optimal treatment is a total cystectomy regardless of the location. HD with unusual localizations may cause serious problems of diagnostic confusion and must be considered in the differential diagnosis of cystic lesions.

ABBREVIATIONS

HD: Hydatid Disease; H&E: Hematoxylin and Eosin; PAIR: Puncture, Aspiration, Injection of a scolicedal agent, Re-aspiration.

INTRODUCTION

Human hydatid disease (HD) is a chronic parasitic infection caused by Echinococcus species. HD has a worldwide geographic distribution and is endemic in the Australia, New Zealand, the Middle East, India, Africa, South America, and Turkey [1,2]. HD has become an increasing health problem by the demographic changes in recent years.

Humans can become infected by the microorganism by consuming food or water infected by its eggs, or by contacting infected dog faeces; the consequence of a human infection is the

growth of cysts in the organs [3]. Hydatid cysts may develop in any organ but occur most frequently in liver (60-70%) and lungs (5-20%), and occasionally in other organs, such as spleen, kidneys, heart, brain, soft tissue, and bone [4]. Clinical presentation of HD depends upon the size, localization, and extent of cysts as well as their relationship with adjacent organs. Hydatid cyst is diagnosed by serological methods, radiological evaluation, and histopathological examination. The main serological methods used for HD diagnosis and follow-up are based on the detection of specific IgG antibodies. Treatment approaches for HD include the use of protoscolicedal agents such as albendazole and surgery. Hydatid cysts cause death and morbidity by their associated complications such as secondary infection, anaphylactic reactions, cyst rupture, and compression of adjacent organs [3-7].

The purpose of this retrospective study was to evaluate the organ distributions, clinical and histopathological features, and treatment modalities of 113 patients with HD.

MATERIALS AND METHODS

This retrospective study included 113 HD cases diagnosed by the Pathology Department of Gaziosmanpaşa Taksim Training and Research Hospital between 1997 and 2015. All patients had undergone surgical treatment. Clinical features of the cases were extracted from hospital records. Formalin-fixed, paraffin-embedded samples were cut into 5 µm sections, and stained with hematoxylin and eosin (H&E). H&E stained slides were reviewed by the same pathologist. The following properties were evaluated in all cases: sex, age, anatomic location, size, number of cyst, multiple organ involvement, histopathological findings, and treatment modalities. Statistical analysis was performed with SPSS 18.0 software (SPSS, Inc., Chicago, IL, USA). All values were expressed as the mean±standard error of mean.

RESULTS

In this series there were 63 (55.8%) females and 50 (44.2%) males. Mean age was 38.3 ± 15.07 years (range 11-74 years) (Table 1).

Maximum diameter of 113 cysts ranged between 1.0 and 21cm (mean 9.50±4.69cm). One hundred and one (89.3%) cases had only one cyst and 12 (10.7%) cases had 2 or more cysts in the same organ. The presence of 2 or more cysts was more common in females (n: 7, 6.2%) than in males and all such cysts were located in liver (Table 2).

The anatomic locations of cysts were as follows: 87 (77.0%) in liver (Figure 1A and B), 6 (5.3%) in soft tissue (Figure 1C and D), 4 (3.5%) in lungs, 3 (2.7%) in spleen, 2 (1.8%) in kidney, 1 (0.9%) in cerebellum, 1 (0.9%) in gall bladder, 1 (0.9%) in paraspinal

site, and 8 (7.1%) had multiple organ involvement. Multiple organ involvement included the combinations of liver and spleen (n: 4, 3.5%), liver and lung (n: 2, 1.8%), liver and bladder (n:1, 0.9%), and liver and omentum (n:1, 0.9%). The number of men and women were equal in cases with multiple organ involvement (Table 3).

The most frequent symptoms from hepatic, splenic, cystic, and renal involvement were abdominal pain (86%), obstructive jaundice (20%), and nausea (20%). The most common symptoms of lung cysts were chest pain (75%), cough (50%), and dyspnea (40%). Palpable lump was also a presenting symptom in patients with soft tissue cysts. The complaints of patient with paraspinal cyst were weakness and paraplegia.

The histopathologic findings included laminated cyst wall, scolex-containing multiple hooklets (Figure 2A, B, C), calcification in cyst wall (Figure 2D), pericystic fibrosis, inflammatory infiltrates containing eosinophils, plasmacytes, lymphocytes, histiocytes, and foreign body reaction in surrounding tissue (Figure 1C and 1D). The scolices were determined in 51 (45.1%) of the patients.

In all patients, the diagnosis was based on the physical examination, laboratory tests, radiographic examinations, and histopathological examination. After diagnosis, all patients were treated immediately with an antihelminthic drug for one week before surgery and for at least four weeks postoperatively. The overall mortality rate was 0%.

DISCUSSION

HD is an orally transmitted parasitosis caused by the larval form of the species Echinococcus. HD is an important health problem, especially in developing countries, such as Turkey. The estimated surgical case rate of HD is 0.9-6.6 per 100,000 in Turkey [2]. In this study, 55.8% of patients with HD were female.

Table 1: Age and gender distribution of 113 patients.

Age	Male	Female	Total
Mean± standard deviation	39.06±16.8	37.7±13.7	38.3±15.07
	n (%)	n (%)	n (%)
<25	9 (7.9)	11 (9.7)	20 (16.8)
25-50	27 (23.9)	41 (36.4)	68 (61.1)
>50	14 (12.4)	11 (9.7)	25 (22.1)
Total	50 (44.2)	63 (55.8)	113 (100)

Table 2: The number of cysts and mean diameter among 113 hydatid disease.

	Male	Female	Total
	n (%)	n (%)	n (%)
Number of cysts			
One	45 (39.7)	56 (49.6)	101 (89.3)
Two	1 (0.9)	5 (4.4)	6 (5.3)
Three	2 (1.8)	1 (0.9)	3 (2.7)
Four	2 (1.8)	-	2 (1.8)
Five	-	1 (0.9)	1 (0.9)
Mean diameter (cm) ± standard deviation	10.6±5.03	8.6±4.2	9.5±4.69

Table 3: Location of hydatid cyst with single and multiple organ involvement.

	Male	Female	Total
Cyst location	n (%)	n (%)	n (%)
Single organ involvement			
Liver	37 (32.8)	50 (44.2)	87 (77.0)
Soft tissue	1 (0.9)	5 (4.4)	6 (5.3)
Lung	3 (2.7)	1 (0.9)	4 (3.5)
Spleen	1 (0.9)	2 (1.8)	3 (2.7)
Kidney	2 (1.8)	-	2 (1.8)
Serebellum	1 (0.9)	-	1 (0.9)
Gall bladder	-	1 (0.9)	1 (0.9)
Paraspinal	1 (0.9)	-	1 (0.9)
Multiple organ involvement			
Liver and spleen	1 (0.9)	3 (2.7)	4 (3.5)
Liver and lung	1 (0.9)	1 (0.9)	2 (1.8)
Liver and bladder	1 (0.9)	-	1 (0.9)
Liver and omentum	1 (0.9)	-	1 (0.9)
Total	50 (44.2)	63 (55.8)	113 (100)

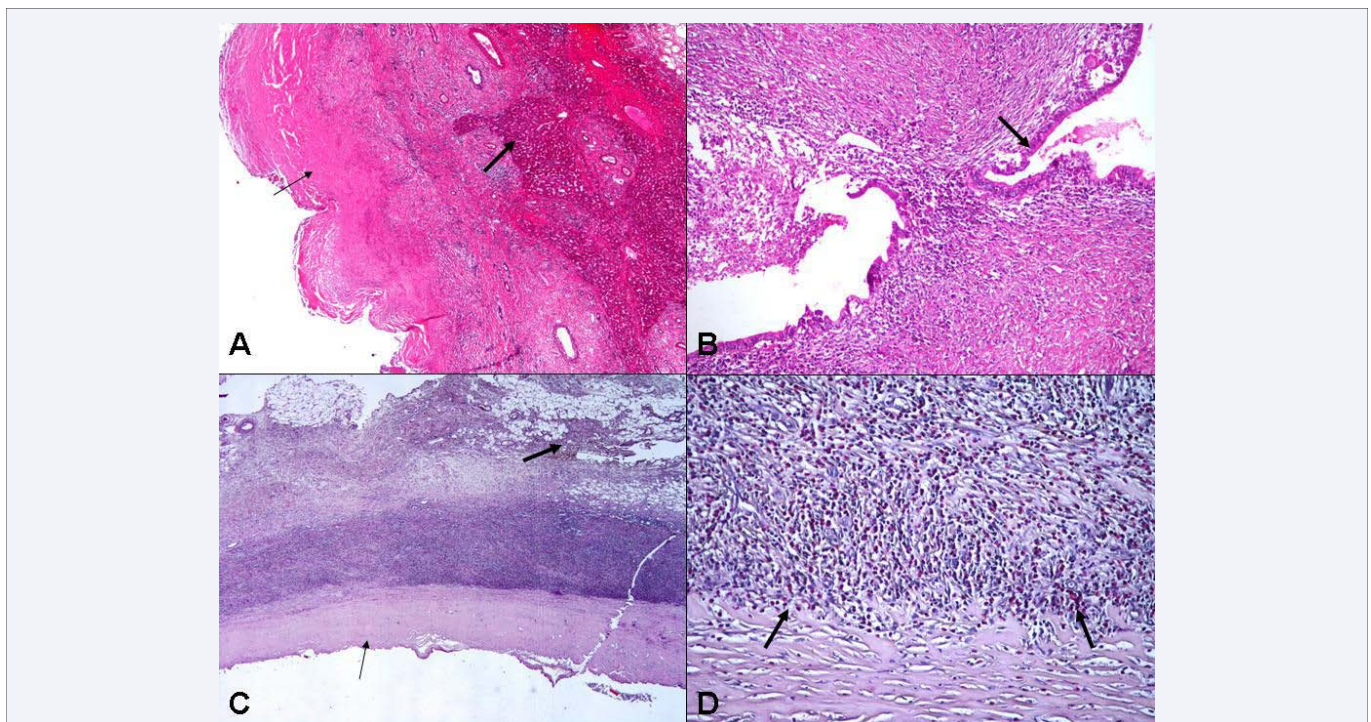


Figure 1 The histopathological section of hydatid cyst in the liver: (A, x10) reactive hepatocytes (thick arrow) and laminated cyst wall (thin arrow); (B, x20) mixed inflammatory infiltrate around bile ducts (arrow); (C, x10) Hydatid cyst wall (thin arrow) in the soft tissue (thick arrow) and (D, x40) cyst wall is infiltrated by eosinophils, lymphocytes and plasmacytes (arrow) (H & E).

This rate has been reported as 66.1% by Yücel et al in Turkey [8]. Studies from other countries similar to our study have reported that the incidence is higher in women than men [9-12]. The age of the cases in our study ranged between 11 and 74 years, with 25-50 years being the peak age group in both sexes (61.1%). Literature studies have reported higher proportions of young people and middle age groups [8,9].

The hydatid cyst size may be highly variable. The average diameter of cysts in our case series was 9.5±4.69 cm (range 1.0-21 cm). Giant liver cysts reaching 30 cm in diameter have also been reported in the literature [13]. Giant cysts need radical therapy because they might lead to perforation and anaphylaxis in some patients [7,13]. HD may lead severe and life-threatening complications, with mortality rates of 2-4 per 100.000 residents

[14,15]. Infection with Echinococcus results in the development of one or several cyst that develop in liver (60-70%), lungs (5-20%), or some other body sites (10%) [4]. In our study, liver was the most commonly involved organ (77.0%) in both genders. While the main hosts for HD are the dogs, the intermediate hosts are sheep, cattle, horses, and goats. Humans get infection via oral ingestion of tapeworm eggs with contaminated food or water or direct contact with host. The eggs hatch after digestion of the outer capsule in the intestinal mucosa and the larvae penetrate the mucosa, reaching the liver through the portal vein. Most of these embryos become lodged in the hepatic sinusoids, where they either die or develop into hydatid cyst.

Liver acts as the first effective filter for most of the larvae and is therefore the most common site of involvement. If the larvae are able to pass through the first filter, they reach lungs which are the second most frequently involved site. If the larvae are not trapped in either liver or lungs and they can pass on the hepatic sinusoid or pulmonary capillary barriers, they can be inoculated in any part of the body. Other routes of spread may be lymphatic invasion by the parasite and retrograde migration from vena cava to subclavian vein [16]. To know the routes of spread of HD can help in its control and prevention.

Unusual localizations of HD have been reported, such as pericardium, mediastinum, heart, thyroid, bone, central nervous system, pancreas, spleen, gall bladder, head and neck, and soft tissue. Incidence of HD involving each of spleen, kidney, peritoneal cavity, skin, and muscles is about 2-3% while the incidence of the involvement of each of heart, brain, bone, ovaries, pancreas, gallbladder, thyroid, breast, and bones is about 1%

[3,9,11,17,18]. In our case series unusual locations of HD involved soft tissue (5.3%), spleen (2.7%), kidney (1.8%), cerebellum (0.9%), paraspinal site (0.9%), and gall bladder (0.9%). In this study, 7.1% of patients with HD had multiple organ involvement. Grozavu et al. described 84 (16.5%) patients with multivisceral HD in a series spanning over a period of more than 10 years [19].

The majority of hydatid cysts are asymptomatic. There are many variable signs and symptoms but none is pathognomic for hydatid cysts. For this reason HD is frequently under diagnosed and detected only when complications arise or by chance. Typical radiological findings are well known and very helpful in the diagnosis of the disease. Ultrasonography, computerized tomography, and magnetic resonance imaging are highly accurate in detecting HD. These imaging techniques help to determine the cystic a vascular nature of the lesion and also daughter cysts, vesicles and internal septa. Different serological tests are done for the diagnosis, screening and post-operative follow-up for HD. These tests consist of hydatid immunoelectrophoresis, latex agglutination, indirect hemagglutination test, and enzyme-linked immunosorbent assay. For HD, only eosinophilia can be detected in the routine laboratory tests. The main serological methods based on the detection of specific IgG antibodies are used for the diagnosis and follow up of HD. Although the sensitivity of serology is low lung (50-56%) and other organs (25-56%), it is very high for liver cysts (80-100%). These tests are very important mainly in the follow up of treated patients. The increased titer shows recurrence of disease and decreased titer shows resolution. As diagnostic and follow-up tools for HD, specific recombinant antigens have good potential, however progress in this field is hampered by lack of standardization [5,6].

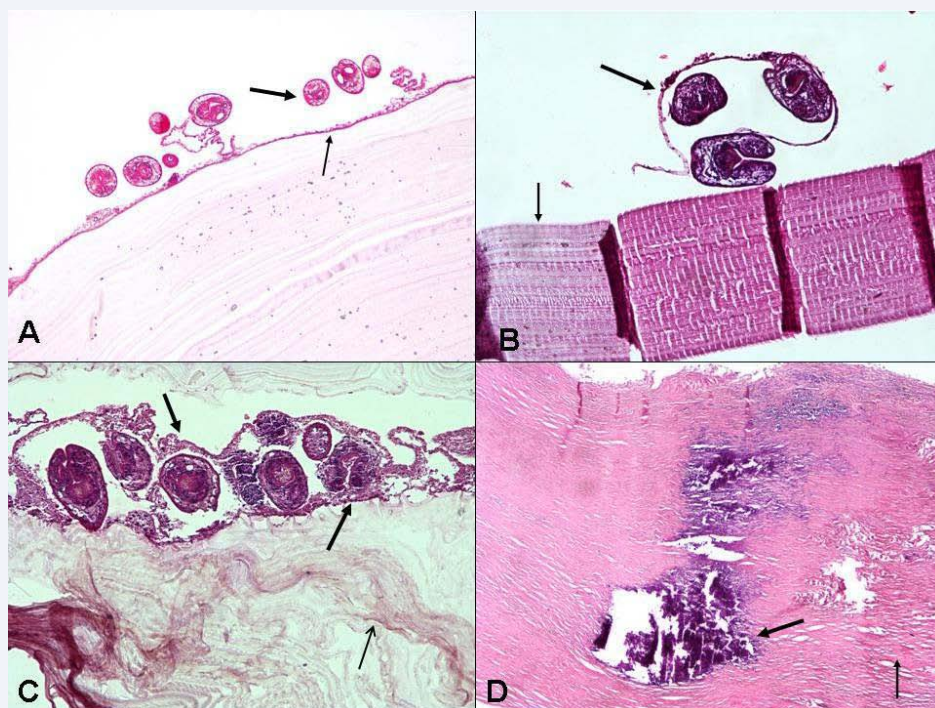


Figure 2 Histologic patterns seen with hydatid cyst: **(A, x10)** inner germinal layers of cyst wall (thin arrow) and protoscolices (thick arrow), **(B and C, x40)** eosinophilic acellular cuticular membrane (thin arrow) and scolex containing multiple hooklets (thick arrow); **(D, x10)** calcification (thick arrow), in cyst wall and pericystic fibrosis (thin arrow) (H & E).

Histopathologically, the wall of the hydatid cyst has 3 structural components: an outer acellular laminated membrane; the germinal membrane; and the protoscolices. Cyst wall may contain calcifications. Hydatid cyst may be surrounded by either a fibrous capsule or granulation tissue including inflammatory infiltrate [12]. Histopathologically, our cases were also characterized by scolices (45.1% of the patients), an acellular lamellar cyst wall, germinal membrane and the surrounding host reaction which is composed of the foreign body reaction, and inflammatory fibrous or granulation tissue. Vatankhah et al. indicated an attenuated cell-mediated immunity and diminished activation of various T cell phenotypes in infected liver with *Echinococcus granulosus* [20]. In addition, it is reported that the increased expression of TLR2 and IL-23 might play a potential role in modulating tissue infiltrative growth of the parasite and its persistence in the human host [21].

The choice of the treatment depends on many factors including the stage, size, and location of the cysts; patient-specific factors, and local therapeutic modalities available in each health center. The main effective treatment of HD is total surgical excision of the cyst without causing its rupture [17,22]. Medical management is composed of protoscolicidal agents such as praziquantel and albendazole [23,24]. Although praziquantel is not able to penetrate through hydatid cyst wall, it can be used in case of cyst fluid spillage due to its high efficacy and lethal effects on free scolices. A highly soluble albendazole is used for the therapy of small multiple cysts in inaccessible sites. The usage of praziquantel and albendazole together is more efficacious than using each drug alone. To sterilize the cyst and diminish the anaphylaxis risk and recurrence, albendazole and praziquantel should be considered in pre- and postoperative periods [25,26]. Also there are some minimally invasive approaches such as PAIR (Puncture, Aspiration, Injection of a scolical agent, Re-aspiration) for a long time [3]. But the total surgical excision of the cyst is still the most curative and effective treatment with respect to prevention of recurrences and achieving an excellent prognosis [27]. In most of the reference centers, laparoscopic intervention replaced open surgery in cyst treatment in over 90% cases; albendazole has been used to reduce size and recurrence of cysts in both pre- and postoperative periods in recent years [28].

CONCLUSIONS

Although echinococcosis is found most often in liver and lungs, it seems that any organ can be involved by this zoonotic parasitic disease. The clinical manifestations of HD depend on location, size, and stage of development of cysts. HD is largely asymptomatic until complications occur. HD with unusual localizations may cause serious problems of diagnostic confusion. HD must be considered in the differential diagnosis of cystic lesions, especially in patients who have spent time in endemic areas. The histopathologic findings of HD consistent laminated cyst wall, scolex, fibrosis and varying degrees of inflammatory response. The combination of clinical history, radiological and histopathological findings, and serological test results are valuable in diagnosing atypical HD. Surgical removal and use of protoscolicidal agents are the most effective treatments of hydatid cysts. This disease can rarely cause substantial morbidity and mortality. In addition, a periodic

deparasitation of dogs and the avoidance of feeding them with entrails from dead animals are recommended to control the spreading of the disease.

REFERENCES

1. Sadjjadi SM. Present situation of echinococcosis in the Middle East and Arabic North Africa. *Parasitol Int.* 2006; 55: 197-202.
2. Altintas N. Past to present: echinococcosis in Turkey. *Acta Trop.* 2003; 85: 105-112.
3. McManus DP, Zhang W, Li J, Bartley PB. Echinococcosis. *Lancet.* 2003; 362: 1295-1304.
4. Grosso G, Gruttadauria S, Biondi A, Marventano S, Mistretta A. Worldwide epidemiology of liver hydatidosis including the Mediterranean area. *World J Gastroenterol.* 2012; 18: 1425-1437.
5. Cappello E, Cacopardo B, Caltabiano E, Li Volsi S, Chiara R, Sapienza M, et al. Epidemiology and clinical features of cystic hydatidosis in Western Sicily: a ten-year review. *World J Gastroenterol.* 2013; 19: 9351-9358.
6. Manzano-Román R, Sánchez-Ovejero C, Hernández-González A, Casulli A, Siles-Lucas M. Serological Diagnosis and Follow-Up of Human Cystic Echinococcosis: A New Hope for the Future? *Biomed Res Int.* 2015; 2015: 428205.
7. Belli S, Akbulut S, Erbay G, Koçer NE. Spontaneous giant splenic hydatid cyst rupture causing fatal anaphylactic shock: a case report and brief literature review. *Turk J Gastroenterol.* 2014; 25: 88-89.
8. Yuçel Y, Seker A, Eser I, Ozgonul A, Terzi A, Gozeneli O, et al. Surgical treatment of hepatic hydatid cysts: A retrospective analysis of 425 patients. *Ann Ital Chir.* 2015; 86: 437-443.
9. Kohansal MH, Nourian A, Bafandeh S. Human Cystic Echinococcosis in Zanjan Area, Northwest Iran: A Retrospective Hospital Based Survey between 2007 and 2013. *Iran J Public Health.* 2015; 44: 1277-1282.
10. Mihăilă DE, Potecă TD, Potecă A, Pițuru S. Single-centre epidemiological study on the incidence of hepatic hydatid cyst. *Rom J Intern Med.* 2015; 53: 170-173.
11. Lianos GD, Lazaros A, Vlachos K, Georgiou GK, Harissis HV, Mangano A, et al. Unusual locations of hydatid disease: a 33 year's experience analysis on 233 patients. *Updates Surg.* 2015; 67: 279-282.
12. Canda MS, Guray M, Canda T, Astarcioglu H. The Pathology of Echinococcosis and the Current Echinococcosis Problem in Western Turkey (A Report of Pathologic Features in 80 Cases). *Turk J Med Sci* 2003; 33: 369-374.
13. Ettore GM, Vennarecci G, Santoro R, Laurenzi A, Ceribelli C, Di Cintio A, et al. Giant hydatid cyst of the liver with a retroperitoneal growth: a case report. *J Med Case Rep.* 2012; 6: 298.
14. Junghans T, da Silva AM, Horton J, Chiodini PL, Brunetti E. Clinical management of cystic echinococcosis: state of the art, problems, and perspectives. *Am J Trop Med Hyg.* 2008; 79: 301-331.
15. Belhassen-García M, Romero-Alegria A, Velasco-Tirado V, Alonso-Sardón M, Lopez-Bernus A, Alvela-Suarez L, et al. Study of hydatidosis-attributed mortality in endemic area. *PLoS One.* 2014; 9: 91342.
16. Mushtaque M, Mir MF, Malik AA, Arif SH, Khanday SA, Dar RA. Atypical localizations of hydatid disease: experience from a single institute. *Niger J Surg.* 2012; 18: 2-7.
17. Çağlayan K, Celik A, Koç A, Kutluk AC, Altinli E, Celik AS. Unusual localizations of hydatid disease: diagnostic and surgical management of a case series. *Surg Infect (Larchmt).* 2010; 11: 349-353.
18. Adas G, Karatepe O, Altioğ M, Battal M, Bender O, Özcan D, et al.

- Diagnostic problems with parasitic and non-parasitic splenic cysts. *BMC Surg.* 2009; 9: 9.
19. Grozavu C, Ilias M, Pantile D. Multivisceral echinococcosis: concept, diagnosis, management. *Chirurgia (Bucur).* 2014; 109: 758-768.
20. Vatankhah A, Halász J, Piurkó V, Barbai T. Characterization of the inflammatory cell infiltrate and expression of costimulatory molecules in chronic echinococcus granulosus infection of the human liver. *BMC Infect Dis.* 2015; 15: 530.
21. Tuxun T, Ma HZ, Apaer S, Zhang H, Aierken A, Li YP, et al. Expression of Toll-Like Receptors 2 and 4 and Related Cytokines in Patients with Hepatic Cystic and Alveolar Echinococcosis. *Mediators Inflamm.* 2015; 2015: 632760.
22. Brunetti E, Kern P, Vuitton DA; Writing Panel for the WHO-IWGE. Expert consensus for the diagnosis and treatment of cystic and alveolar echinococcosis in humans. *Acta Trop.* 2010; 114: 1-16.
23. Saimot AG, Meulemans A, Cremieux AC, Giovanangeli MD, Hay JM, Delaitre B, et al. Albendazole as a potential treatment for human hydatidosis. *Lancet.* 1983; 2: 652-656.
24. Dharker SR. Hydatid disease. In: Ramamurthi B, Tandon PN, editors. *Text Book of Neurosurgery.* 2nd ed. New Delhi: Churchill Livingstone; 1996. 535-544.
25. Adas G, Arıkan S, Kemik O, Oner A, Sahip N, Karatepe O. Use of albendazole sulfoxide, albendazole sulfone, and combined solutions as scolicidal agents on hydatid cysts (in vitro study). *World J Gastroenterol.* 2009; 15: 112-116.
26. Pandey S, Pandey D, Shende N, Sahu A, Sharma V. Cerebral intraventricular echinococcosis in an adult. *Surg Neurol Int.* 2015; 6: 138.
27. Mueller PR, Dawson SL, Ferrucci JT Jr, Nardi GL. Hepatic echinococcal cyst: successful percutaneous drainage. *Radiology.* 1985; 155: 627-628.
28. 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. *Int J Infect Dis.* 2014; 24: 43-50.

Cite this article

Bektas S, Erdogan NY, Sahin G, Kir G, Adas G (2016) *Clinicopathological Findings of Hydatid Cyst Disease: A Retrospective Analysis.* *Ann Clin Pathol* 4(3): 1071.