

## HYDATID DISEASE AMONG THE PEDIATRIC AGE GROUP

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### ABSTRACT

**Background:** Hydatid disease is a parasitic infection caused by *Echinococcus granulosus* larvae, affecting herbivorous animals and humans. It's a major health issue in endemic areas, with asymptomatic diagnosis and nonspecific laboratory tests. Laparoscopic evacuation of hydatid cysts was the common treatment. **Aim:** to examines hydatid disease in children, focusing on clinical and epidemiological aspects, geographical distribution, presentation, common sites, and surgical techniques. **Patients And Methods:** A study of 50 patients with hydatid disease in Al-Mosul General Hospitals from 2004 to 2007. The patients, aged four to fifteen and were referred from northern Iraq. The study collected data on patient demographics, operative findings, postoperative complications, and follow-up. Management was based on cyst site, with lung cysts operated through thoracotomy and hepatic cysts explored using subcostal or paramedian incisions. Postoperative antihelmenthic drugs were used in cases of cyst rupture or multiple cysts. **Results:** The study examined 50 patients with hydatid disease, predominantly females from rural areas with a history of animal contact. Symptoms ranged from 10 days to 1 year, with leading symptoms being anorexia and weight loss in lung and liver hydatid disease. Most patients had lung involvement, with cysts mostly in the lower lobes. Only 14% underwent surgery, with common complications being bronchopleural fistula, fever, prolonged air leak, and wound infection. **Conclusion:** Pulmonary hydatid disease, a common issue in rural areas, affects females, leading to weight loss and anorexia. Diagnosis involves radiologic imaging and surgical procedures.

**KEYWORDS:** Hydatid Cyst, Pediatric age.

### INTRODUCTION

Hydatid illness is a parasite infection that affects intermediate hosts, such as herbivorous animals and humans, and is brought on by the larval stage of *Echinococcus granulosus*. In endemic regions where sheep and cattle are produced and dogs have access to animal offal, it is a serious health issue. Hydatid cysts can occur in various parts of the body and affect individuals of all ages, with children having a higher infection rate due to their association with dogs.<sup>[1]</sup>

Laboratory testing are vague, and the diagnosis is frequently asymptomatic. Leucocytosis and microcytic anemia are signs of infection and blood loss, whereas eosinophilia is seen in 25% of infected individuals. In addition to being helpful for CE diagnosis and follow-up, serological testing can be utilized for screening in high-risk groups in endemic regions. Imaging studies of CE include plain films, CT scans, ultrasound, and ultrasound.<sup>[2]</sup>

Cystic echinococcosis (CE) and hepatic cysts are two types of hepatic cysts. Surgery is the primary treatment for CE, with chemotherapy being indicated for inoperable primary liver or lung cysts, cysts in multiple organs, and peritoneal cysts. Chemotherapeutic agents include benzimidazoles, mebendazole, albendazole, and praziquantel.<sup>[2,3]</sup>

Laparoscopic evacuation of hydatid cysts is a common treatment for early-stage disease, as the cystic cavity collapses completely after evacuation and biliary communication is low. Indications for laparoscopic treatment include liver, bone, kidney, inoperable patients, patients refusing surgery, multiple cysts in segment II and III of the liver, cyst lesion larger than 5 cm in diameter, relapse after surgery or chemotherapy, and inaccessible or hazardous locations of cysts.<sup>[4]</sup>

Lung hydatid cysts are treated with complete excision using techniques such as enucleation and capitonnage, cystotomy and closure of bronchial opening, wedge

resection, lobectomy, and pneumonectomy.<sup>[5]</sup> Complications include complications related to the surgical procedure and anesthesia, parasite-related recurrence, metastasis, infection, secondary echinococcosis, hepatotoxicity, anemia, thrombocytopenia, alopecia, embryotoxicity, teratogenicity, and secondary echinococcosis.<sup>[6]</sup> The current study aimed to examine hydatid disease in children, focusing on clinical and epidemiological aspects, geographical distribution, presentation, common sites, and surgical techniques.

## PATIENTS AND METHODS

A prospective clinico-epidemiological study of (50) patients with hydatid disease admitted to Mosul teaching hospitals from Feb. 2004 to Jan. 2007. The majority of these instances originated in Nineveh, while the other cases were reported from various northern Iraqi regions. Their ages range from four up to fifteen years old. All these cases referred either from the out-patient department or private clinics. Operations underwent in pediatric surgery, cardiothoracic and neurosurgery units.

The diagnosis was made using the patient's history and a thorough clinical examination, supported by radiological tests and ultrasound (US) or CT scans, which were conducted in 12 instances and MRI in just two. Accordingly, further investigations were conducted, such as CXR.

A special data collecting form had been used after obtaining the written consent including: name, age, sex, residency, nationality, history of contact with animals, presentation, investigations, site, size and number of the

cysts and whether infected or not, containing daughter cysts or not, operative findings, postoperative complications and Follow-up.

Management was done according to the site of the cyst. Lung cysts were operated through thoracotomy, the approach has been used was enucleation of the cyst leaving adventitial layer. Fistulous communications with the bronchus had been identified and closed using non-absorbable suture materials; two tube drains used in most of the operations, while one tube drain used in the others.

Hepatic cysts were explored using subcostal or paramedian incisions, identifying the cyst and then aspiration of approximately 15-20 ml of the fluid and injection of scolicidal agents (10% povidone iodine, diluted Savlon "0.5% cetrimide with 0.05% chlorhexidine") agents, avoiding spillage of the cyst's content using good packing around the cyst cavity and then marsupialization done to prevent recollection using non-absorbable suture materials. Drainage of the remnant cystic cavity using either tube drain or corrugated drain, other cases dealt with using enfolding of the cystic cavity without drain left inside. Laparoscopic surgery had been done as a new technique in managing hydatid cyst and endocystectomy done for hydatid spleen with tube drain left inside.

Antihelminthic drugs were used postoperatively in patients who developed rupture of the cyst pre or perioperatively, and in some cases with multiple hydatid cysts. Complications that developed during the follow-up period post operatively were identified and treated accordingly.

## RESULTS

Females were predominant among the studied sample accounted for 56.0% as shown in figure (1).

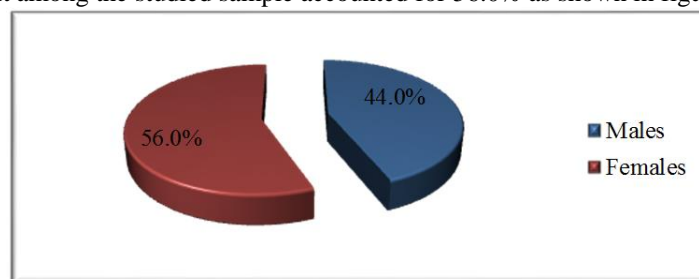


Figure (1): Distribution of the studied sample according to sex.

Table (1) demonstrated the geographical distributions and history of contact with animals and showed that 38(76%) presented from rural areas, history of contact with animals was positive in 30(60%) patient of them.

Twelve patients (24%) presented from urban areas, history of contact with animals was positive in five (10%) patients of them.

Table (1): Geographical distribution & history of contact with animals.

Residence	Contact with animals		Total	%
	+Ve	-Ve		
Rural area	30	8	38	76
Urban area	5	7	12	24
Total	35	15	50	100

Among the fifty patients with hydatid disease in different organs, duration of symptoms ranging from 10 days up to 1 year and the presenting sign and symptoms were different according to the organ involved, as shown in

table (2). The significant leading symptoms were anorexia and weight loss in both lung and liver hydatid disease, though cough observed in lung hydatid and abdominal discomfort mainly in liver hydatid.

**Table (2): Symptoms & signs of hydatid.**

		Respiratory manifestations	No.	%
Lung	Symptoms	Cough	20	40
		Dyspnoea	15	30
		Chest pain	10	20
		Repeated chest infection	1	2
		Hemoptesis	5	10
	Signs	Diminished air entry	25	50
		Deviation of the mediastinum	10	20
		Bulging of the hemithorax	3	6
Abdomen	Symptoms	Abdominal pain and discomfort	12	24
		Visible abdominal Mass	8	16
		Acute abdomen	1	2
	Signs	Palpable abdominal Mass	10	20
		Abdominal tenderness	7	14
Brain	Symptoms	Head ache	5	10
		Blurring of vision	3	6
		Convulsion	1	2
	Signs	Papilloedema	3	6
		Sequent	1	2
General	Symptoms	Fever	14	28
		Vomiting	8	16
		Anorexia and weight loss	30	60
		Fatigability	14	28
	Incidental findings		15	30

A study found that 68% of patients had lung involvement, with cysts mostly located in the lower lobes. Out of 34 patients, 36% had isolated pulmonary hydatidosis. In 24 patients, 83.3% had cysts in the right lobe, 8.3% in the left lobe, and 8.3% in both lobes. 18% had isolated hepatic hydatidosis, with most in the right

lobe. In 22% of cases, the cysts were solitary, while in 16%, they were multiple. In 22% of cases, hydatid cysts were found in both lung and liver, with 10% of cysts being solitary, 8% multiple, and 4% bilateral pulmonary hydatidosis with coexistent hepatic cysts as shown in table (3).

**Table (3): Localization of common site of hydatid disease.**

Site of the cyst	Number of the patients			Total	Total no. of the cysts
	Solitary	Multiple unilateral	Bilateral		
Lung	12	2	4	18(36%)	26
Liver	3	6	-	9 (18%)	12
Lung & Liver	5	4	2	11(22%)	22
Total	20	12	6	39 78%)	60

Among the 50 patients with hydatid cysts in different organs, 30 cysts (60%) were uncomplicated, 10 cysts (20%) were infected, 2 cysts (4%) were calcified, while the other 8 cysts (16%) were ruptured with adhesions to

the surrounding tissues of the organ involved. Also, forty nine cysts (98%) were unilocular while just one cyst (2%) was multilocular, as shown in table (4).

**Table (4): Hydatid cyst's condition and multiplicity.**

		%	No.
Operative findings	Simple cyst "not infected "	30	60
	Infected cyst	10	20
	Rupture cyst	8	16
	Calcified cyst	2	4
	Total no.	50	100

Type of the cyst	Unilocular	49	98
	Multilocular	1	2

Out of fifty patients underwent surgery for hydatid cysts in our study; only 7 (14%) patients developed postoperative complications. The most frequent

complications encountered were Bronchopleural fistula (6%); fever (6%); prolonged air leak (4%); wound infection (n=2, 4%) as shown in table (5).

**Table (5): Complications.**

Complications	No.	%
Bronchopleural fistula	3	6
Fever	3	6
Prolonged air leak	2	4
Wound infection	2	4
Pneumothorax	1	2
Pneumocyst	1	2
Lung abscess	1	2
Lung collapse and atelectasis	1	2
Total	14	28

## DISCUSSION

An end stage of the parasite is humans. It is thought that childhood is when *E. granulosus* infections first develop. It frequently takes years for clinical signs to appear following infection because the cysts develop slowly. CE is therefore a very uncommon illness that affects youngsters generally, particularly in low-prevalence nations.<sup>[7]</sup>

Sex incidence of the hydatid disease was different in relation to the age. In our study, female predominance was greatly obvious. This result does fit to a study conducted by Shahriarirad et al.<sup>[8]</sup> in Fars Province, southwestern Iran. This finding is in line with our previous study and also a retrospective hospital-based study by Abdulhameed<sup>[9]</sup> in Basrah, Iraq, where females were reported to be the main victims of hydatid disease. This might be attributed to the frequent contact of females with animals especially in areas with low socio-economic status where the families engaged their little girls to look after the sheep and work with dogs in farm. According to earlier research, males are more likely than females to have pulmonary HC infection in both children and adults, with up to 74% of children having the infection.<sup>[10]</sup> The fact that boys are more active outside may help to explain this.

In our study we encountered 38 (76%) patients presented from rural areas with history of contact with animals affected by hydatid cyst was positive in 30 (60%) of them, while just 12 (24%) patient presented from urban areas, history of contact with animals was positive in 5 (10%) of them. This is similar to a previous study in Turkish people that conducted by Tamarozzi et al.,<sup>[11]</sup> which reported that all cases were living in sheep-raising and agricultural areas with low socio-economic status. Another study of Sarkari et al.,<sup>[12]</sup> suggested that individuals in rural areas have the highest chance of contact with sources of infection such as dogs, soil, and vegetable where the disease is more prevalent, however,

in studies of Qaqish et al.<sup>[13]</sup>, such associations were not observed.

Hydatid disease's clinical manifestation varies based on the organ involved and the presence or absence of complications. In children, it may be asymptomatic for years, appearing as a painful mass in the abdomen or elsewhere. It can be discovered during routine investigations, chest x-rays, or during laparotomy for other causes.<sup>[5]</sup> In a study reported by Aydin et al.,<sup>[5]</sup> on ruptured hydatid lung cyst in a child, signifies the importance of geographical distribution and a good history, especially of contact with dogs in patients who develop respiratory or abdominal complaints spontaneously or following trivial trauma to chest or abdomen and such patients should be investigated on the lines of hydatid cysts anywhere so as to avoid unnecessary delay in the diagnosis and inconvenience to the patient. This was in accordance to our study where 15 (30%) of our patients diagnosed incidentally by investigations which had been performed for them for other problem. Nazari et al.,<sup>[14]</sup> found that the disease most frequently occurs in the liver (63%), the lungs (25%), muscles (5%), and bones (5%) respectively. Additionally, the most frequent presenting complaint was stomach discomfort, while some individuals also had other constitutional indications. The liver's right lobe was primarily affected. According to Samanta et al.<sup>[15]</sup> and Baruah et al.<sup>[16]</sup>, the right lobe prevalence of hydatid cysts can be explained by the fact that it is significantly bulkier than the left lobe and that its main venous drainage comes from the portal vein.

In our study, we have observed around 60% of cases presented with anorexia and weight loss, which is non-specific symptom and not related to specific site of the hydatid disease, while abdominal pain and discomfort account for just 24% of all cases and cough in 40% of cases. This was significant and could be attributed to the toxic manifestation and high demand of the parasite

leading to lack of certain vitamins and minerals, especially in those pediatric patients.

The findings were published by Kaman et al.<sup>[18]</sup> and Djuricic et al.<sup>[17]</sup> Hydatid cysts in children are more frequently seen in the lung than the liver, according to other research.<sup>[19]</sup> Lung cyst formation appears to be favored by vascularization, negative pressure, and tissue elasticity.<sup>[20]</sup> The earlier and more noticeable signs of lung cysts in children (such as coughing and chest pain), which might occasionally encourage parents to seek medical attention sooner, may also be a contributing factor in the increased frequency of pulmonary cases.<sup>[21]</sup>

Which seemed to be in consistence with our study, as (68% of cases) had lung involvement, 18 (36%) had isolated lung involvement, 11 (22%) had concomitant lung and liver involvement, while 5 (10%) had concomitant involvement of the lung and of organs other than the liver. Liver involvements have been demonstrated in (48% of cases), which is the second most common site of involvement in our series. Nine of patients only (18%) had isolated liver involvement. The possibility of infection by inhalation of dust containing the eggs of the parasite, due to dusty atmosphere and more contact of children with dogs than adults do.

We found that 30 out of 50 patients with hydatid disease having simple cysts, while the other 20 patients coming with complicated cysts whether infected, perforated or calcified, and these results were differed from that reported by Şahin and Kaya<sup>[22]</sup>, in which sixteen patients had multiple cysts in the same region, and 6 patients had cysts in different regions. The most common site of involvement was the liver (n=21, 70.0%), followed by the lungs in 4 patients (13.3%). Single cases of brain, spinal cord, spleen, kidney, and bone involvement were observed.

Complications from hydatid cyst surgery should be minimal with a clear preoperative diagnosis and well-planned surgery. Children are more susceptible to complications due to larger cysts and longer resolving time, increasing infection risk. In our study complications relating to removal of uncomplicated hydatid cysts preoperatively were negligible, and carry good prognosis, provided that the area of the operation field is properly isolated and spillage is minimum, and this is in accordance to Kuehn study.<sup>[23]</sup> Also, patients with hepatic hydatidosis have very excellent post-operative period and no complications were encountered. This might be attributed to the good technique and experience of the surgeons and good drainage of the cavity, this result was against that reported by Agarwal et al.<sup>[24]</sup> where biliary complications developed in 14 (16%) patients in form of bilio-cutaneous fistula and localized intra-abdominal bile collections. In Hussen study<sup>[25]</sup> the rate of morbidity in children was 13.6%, atelectasis being the most frequent one. While Biswas et al in Kollata found that air leak continued for 3 weeks in 4

patients and 12 weeks in one patient post operatively.<sup>[26]</sup> In our study, non-fatal and transient complications were noticed in seven patients (14%). Bronchopulmonary fistula being the most frequent one, and encountered in three patients as well as the prolonged air leak. Relatively high rate of fistula postoperatively may be attributed to already infected and complicated cysts encountered during the operations. Those with fistulas required reoperations while prolonged air leak finally healed with conservative therapy. Just one patient in our study recorded to have atelectasis; this may be attributed to good postoperative rehabilitation programs and good analgesia.

## CONCLUSIONS

Pulmonary hydatid disease, particularly in rural areas, affects females due to exposure to dogs and cattle. It leads to weight loss and anorexia. Pediatric hydatid disease affects any part of the body, with pulmonary disease more common in children. Diagnosis is made using radiologic imaging and surgical approaches preserve tissue. Uncomplicated hepatic hydatidosis has no morbidity risk compared to lung hydatid repair.

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