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Hepatic Hydatid Cyst Diseases during Pregnancy: Diagnosis, Management and Best Practice

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ABSTRACT

Hydatid cystic disease is parasitic infestation caused by a tape worm Echinococcus granulosus. It is a common health problem especially in endemic areas such as Mediterranean and Middle East countries including Iraq. Liver and lungs are most common organ affected by hydatid cyst although all organ and tissues are liable to harbor such cyst. Hydatid cyst during pregnancy is rare with estimated incidence of 1in 20000 -30000. Most cases of hydatid cysts during pregnancy are asymptomatic and discovered accidentally during prenatal care, however decreased cell- mediated immunity and steroid produced by placenta may accelerate parasitic growth and as a result hydatid cyst enlarge in size giving rise to symptoms and complications. Although the ultimate diagnosis of hydatid cyst disease can easily be made by imaging and serology, its treatment is still a matter of debate since there is no general consensus and clear- cut guidelines are available for the ideal management of hydatid disease during pregnancy and each case should be individualized. Treatment options for hepatic hydatid cyst during pregnancy include expectant observation, medical treatment, percutaneous aspiration and surgery. In this article we present our clinical experience about management of 5 pregnant patient with liver hydatid cysts.

Keywords: Echinococcsis, Hepatic hydatid cyst, pregnancy, management options.

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BACKGROUND

Hydatid cystic diseases or cystic echinococcosis is a zoonotic parasitic infestation by the larval cystic stage of small (3-6mm long) taeniid-type tape worm (Echinococcus granulosus) which is also called dog-tape worm since the adult tapeworms inhabit the small intestine of definitive carnivorous host,mainly the dogs. The eggs of the adult tapeworms are passed in the feces of infested dog and may be ingested by herbivorous grazing animal such as sheep and cattle where they hatches in the intestine into the embryos which penetrate the intestinal mucosa and transported by the blood to the major filtering organs, mainly the liver and the lungs where they transform into the larval echinococcal cysts.[1] Humans could act accidentally the same role of the intermediate hosts by ingesting the tapeworms eggs when they handle or touch infected dogs or inadvertently ingest food or water contaminated with fecal debris containing tapeworms eggs. The disease commonly acquired during childhood and grows slowly over months or years. Hydatid disease usually remains asymptomatic for decades and may be discovered accidentally on imaging for unrelated conditions.[1,2] Symptoms that may arise are either due to pressure symptoms to neighboring and surrounding structures or due to complications like rupture and infection. Although hydatid disease is quite common and endemic in Mediterranean and Middle East countries including Iraq, the incidence in pregnancy is very uncommon as low as 1 in 20000 to 1 in 30000. [3]

The presentation, diagnosis and management of hydatid disease during pregnancy are challenging and still represent a major dilemma in medical and surgical practice.[3,4] Symptoms of pregnancy such as nausea, vomiting and abdominal pain may mask and mimic symptoms of hepatic and pelvic hydatid disease, therefore the diagnosis of hydatid disease mandates a high clinical awareness and high degree of suspicion especially in the endemic area of such parasitic infection. Till now, there is no consensus on the ideal or standardized management of the hydatid disease during pregnancy.[3,5] Furthermore, the growth of the cyst may be accelerated due to decreased cell-mediated immunity in pregnancy resulting in large size leading to critical complications such as rupture, compression on adjacent organs or communication with biliary tree in case of hepatic hydatid disease. On the other hand, the enlarged gravid uterus can compress the hydatid cyst resulting in anaphylactic shock and spillage of the cyst fluid and daughter cysts in the peritoneal cavity.[5] Although hydatid cyst during pregnancy is rare, it can be life threatening condition for both the mother and her fetus due to possible serious complications such as infection and communication between the cyst and biliary tree. The diagnosis of hydatid diseases during pregnancy is usually confirmed by imaging and serological tests, the treatment, however, is not easy or straightforward .The management is usually challenging due to risk of rupture, anaphylactic shock, abortion or premature labor, due to large sized cyst. Both medical and surgical treatment are available and tried, but still there is no standardized guidelines for typical or ideal treatment of hydatid cyst during pregnancy and each case should be individualized. [4,6]

We present in his study 5 cases of hepatic hydatid cyst diseases in pregnant ladies. Their presentation, diagnosis, management and complications were discussed with review of literatures and the guidelines of the best practice.

NETHODS

This is a prospective controlled study in which 5 pregnant patients discovered by imaging mainly ultrasound to have hepatic hydatid cyst diseases during

investigation of non-specific symptoms such as upper abdominal pain nausea, vomiting and postprandial fullness or investigation for evidence of upper abdominal mass or asymptomatic discovered accidentally during prenatal care. Four patients diagnosed as primary hepatic hydatid disease and one patient had recurrent disease. These patients were studied, managed and followed for concomitant occurrence of hepatic hydatid disease regarding their presentation, treatment modalities and their outcomes. MRI was done for two patients only to identify the relation of the cyst to the adjacent billiard trees. The impact of hydatid diseases on the pregnant patient and the effect of pregnancy on hydatid disease were also studied. Ethics committee approval and informed consent were obtained for all patients participated in this study. The data that support the findings of this study are available from corresponding author upon reasonable request.

RESULTS

For the period between 2012 and 2018, 5 pregnant patients were diagnosed to have hepatic hydatid disease. The age ranges from 21 to 38 year (mean 28.4 years) and gestational age at the time of diagnosis ranges from 8 to 36 weeks (mean 22 weeks). Four patients were diagnosed as primary liver hydatid diseases and only one patient had recurrent hydatid diseases for which she had prior hydatid cyst surgery before, and she did not know about her disease recurrence. Two patients were primigravida. The clinical presentations of patients included in this study are shown in table 1.

Table 1: Clinical presentations of 5 pregnant patients with hepatic hydatid cysts.

Asymptomatic	2
Upper abdominal pain and discomfort	2
Nausea and vomiting	2
Upper abdominal mass	1
Dyspepsia and heartburn	1
Jaundice	1

Table 2: Patient characteristics and their hydatid cysts (Pre and post treatment).

Patient No.	Age	Type of cyst (WHO) Ghabri	Trimester	Initial volume	Treatment Modality	Delivery	Final Volume
1	21	CE2, II	First	5.4 × 6.4 cm	PAIR	NVD*	shrieked
2	33	CE, I	Third	3.6 × 2.8 cm	Chemotherapy	NVD	same
3	38	CE2, II	Second	6.5 × 4.3 cm	PAIR	CS**	shrieked
4	27	CE 3B III	Second	8.8 × 6.7 cm	Open surgery	CS	disappear
5	23	CE5 V	Third	3.9 × 3.6 cm	Observation	NVD	same
Mean	28.4						

*Normal vaginal delivery, ** cesarean section

The hydatid cyst in asymptomatic patients was discovered during routine follow-up for prenatal care through pelvic and abdominal ultrasonography. The other symptoms apart from one case presented with painful upper abdominal mass, were nonspecific and mimic the symptoms of pregnancy. Although the routine blood investigations were done for all patients, they were irrelevant. The ultimate diagnosis of hepatic cyst disease was made by serological investigations and ultrasound exam. Abdominal MRI was done for 2 patients only, one of them presented with epigastric mass and the second patients had a recurrent hydatid disease. The cysts were located in the right lobe of liver in 4 patients and one patient only has a left lobe hydatid disease. Three patients had single cyst and 2 patients had two cysts. The size of cysts ranges from 3.6 cm -12.2 cm (median size 6.5cm). The gestational age at time of diagnosis ranges from 8 – 36 weeks, means 26. 5 weeks. The hydatid cysts were classified according to Gharbi [7] and WHO [8] classification (table3). One patient had type I cyst (clear fluid collection) two had type II cyst (fluid collection, with detached wall), one had type III cyst (fluid collection with daughter cysts) and one had type V (calcified wall, inactive) cyst. The characteristics of the patients and their hydatid cysts are shown in table (2).

Table 3: Gharbi and WHO Sonographic Classifications and Chararcterstics of Hydatid Cyst

Gharbi type	WHO type	Cyst morphology
I	CE 1	Unilocular anechoic lesion with double line sign
III	CE 2	Multiseptated rosette like honeycomb cyst
II	CE 3A	Cyst with detached membranes (water-lily sign)
III	CE 3B	Cyst with daughter cysts in solid matrix
IV	CE 4	Cyst with hetrogenous hypoechoic/hyperechoic contents. No daughter cysts
V	CE 5	Solid plus calcified wall

All patient was managed in collaboration with the gynecologist who referred them for surgical opinion and management. The treatment options for the 5 pregnant patients in this study include observation, percutaneous aspiration, surgery, and medical conservative treatment depending on the size, site and the type of the cyst as well as the symptomatology and expected or impending complications. One patient diagnosed accidentally in the third trimester to have a calcified (inactive) hydatid cyst in the posterior segments of right lobe were considered suitable for observation and follow-up. She completed her pregnancy by normal vaginal delivery. Tow patients (one in late first trimester and the second in the second trimester with hydatid cysts in right hepatic lobe presented for PAIR procedure (Puncture, Aspiration of cyst content, Injection of 20% hypertonic saline as protoscolocidal agents and Re-aspiration of the cyst) plus albendazole cover starting 5 day before procedure and continues for 1 to 3 months post procedure. This type of treatment was safe and conducted under conscious sedation using midazolasm. Injectable corticosteroids and antihistamine were standby for any inadvertent spillage of cystic fluid; however, no such complications were encountered. Both patients were followed throughout the pregnancy with no events to deliver healthy babies, one by normal vaginal delivery and the other by Cesarean section. The fourth patient was a primigravida discovered to have large cyst in early weeks of second trimester. This patient was preceded and planned for surgical drainage and removal (pericystectomy) due to large palpable cyst due to fear of rupture into peritoneal cavity or biliary tree. Written informed consent was obtained from the patient including the possible risk of the procedure on the mother and fetus. The surgery was uneventful, and patient had smooth postoperative recovery. She completed her pregnancy to have a healthy baby by cesarean section the last patient was 32 weeks pregnant woman who had hydatid cyst in the left lobe of the liver. She was managed by albendazole until delivery. She had a full-term normal delivery. She scheduled for definite surgical removal of the cyst 3 months postpartum. No specific complications related to hydatid cysts management or at the time of vaginal or cesarean section were reported Recurrence was detected in any patients during the median follow up period of 18 months (range 12-36 months)

DISCUSSION

Hydatid cystic disease is a common and challenge health problems that can be found anywhere in the world but it is endemic in certain parts such as South America, New Zealand, Australia, Mediterranean countries and Middle east including Iraq with annual incidence ranges from 1-220 per 100000 individuals. Although rare, hydatid disease can occur during pregnancy especially in endemic areas with estimated incidence ranges from 1 in 20000 to 1 in 30000.[2,4,9] Hydatid disease can affect any organ, but hepatic and pulmonary hydatids are more common. Hydatid cyst during pregnancy may grow due to decrease in cellular immunity and steroids secreted by placenta.[9], [10] The diagnosis of hydatid cyst during pregnancy requires high clinical awareness .It is usually confirmed by imaging mainly ultrasound and occasionally MRI in certain specific cases to demonstrate any significant biliary connection and for concomitant pulmonary involvement which both were not detected in any patient in our series. Serological tests such as indirect haemagglutination test (IHA) and enzyme-linked immunosorbent assay (ELISA) can also be done.[11,12] The management of this cystic disease, however, during pregnancy is challenging and problematic. Up to now, there is no consensus on the ideal and typical treatment of hydatid cyst during pregnancy. Different options are available including conservative follow up, medical treatment, percutaneous aspiration and surgery. The choice of treatment modality should be individualized for each patient. For asymptomatic hepatic hydatid cyst discovered accidentally during pregnancy, some authors stated that conservative follow up is the treatment of choice among various treatment modalities, while others emphasized that observation is not recommended as cyst complications is frequent during pregnancy which can be disastrous for both the mother and the fetus. Observation is practiced only if the cyst is asymptomatic,small and located in the posterior segments of the liver. Expectant observation was practiced for one asymptomatic primigravida young patient discovered accidentally in the third trimester to have hydatid in the left lobe of the liver in this study. She delivered a healthy baby by cesarean section. Three months later, she is presented for surgery in form of pericystectomy. Observation follow up is suitable for small, asymptomatic deeply located cyst and for calcified inactive cyst. Aliakbarian et al [13] who reported seven pregnant ladies with asymptomatic hepatic hydatid cysts diagnosed in routine prenatal care recommended conservative follow-up treatment for incidental hepatic hydatid cysts until delivery to avoid preterm labor and complications. The same advice was obtained by Rodrigues et al [3] who stated that expectant observation appeared to be the best option for hepatic hydatid cyst diagnosed accidentally during pregnancy.

Medical treatment consisting of albendazole or mebendazole is contraindicated during the first trimester of the pregnancy due to its teratogenic effects mainly facial and limbs abnormalities. [14] The response to the medical therapy depends largely on the thickness of the cyst wall and the absence of calcification. Van Vliet et al [15] treated pregnant women with hydatid cysts in the second and third trimesters with albendazole and cover of corticosteroids during labor. Malhotra et al [16] reported in their case study of 22 weeks pregnant woman who had left hydatid cyst in the left lobe of liver treated with albendazole therapy till delivery. She had a full-term healthy baby delivered normally and 2 moths postpartum she submitted to partial cystectomy. The effectiveness of albendazole as treatment modality depends on the size and the thickness of the cyst wall as well as the absence of calcifications. Although mebendazole can also be used in treatment of hydatid cystic disease, albendazole is the preferable and the drug of choice against this disease due to its high degree of systemic absorption and penetration into hydatid cyst. The drugs is taken orally with meals in a dose of 10-20 mg/kg of body weight in two divided doses with total dose not to exceed 800 mg for 28 days course which may be repeated after 114 days rest to a total of 3 treatment courses. Peyvandi et al [17] reported that management of hydatid disease in pregnancy with albendazole has been established to be effective in certain cases but this medical therapy is usually not used as first line treatment except when the patient is asymptomatic or not fit for surgery or the cyst is small size, calcified or deeply located and for recurrent cysts. Besides, albendazole is also used as adjunct treatment to surgical and percutaneous aspiration to decrease recurrence and potential dissemination of the parasites. Patients treated with albendazole should be regularly followed up and monitored with sequential ultrasonography since treatment of hudatid disease by albendazole or mebendzole alone is not efficient and long-term results are uncertain. [18]

Percutaneous aspiration of hepatic hydatid cyst (PAIR technique, percutaneous aspiration, injection and re-aspiration) is a well-established treatment modality especially for large uncomplicated hepatic cysts in pregnant patients present with acute bothersome symptoms such as pain and vomiting. The current indications for percutaneous aspiration include Cystic Echincoccosis type 1,3 and some of type 2 cysts according to WHO classification table 2. Other indications include patient unfit for or refuse surgery, patient with multiple cysts, and recurrent cysts after surgery or chemotherapy. Contraindications for this approach include deep and inaccessible cyst, cyst with biliary communication or in vicinity of vital structures, early pregnancy, and type IV cyst according to Gharbi and WHO classification.

The PAIR technique is usually conducted under local anesthesia with conscious sedation using either ultrasound or CT guidance with albendazole prophylaxis. The process entails aspiration of the cyst by specific cannula under strict aseptic technique followed by injection of a scolicidal agent mainly hypertonic saline foe 15 to 30 minutes and then reaspiration of cystic contents. This maneuver is usually repeated until the returned aspiration is clear. The residual cyst is filled isotonic normal saline solution. Albendazole cover should continue for 1 to 3 months post procedure. Bahri et al [19]showed in their study that included six pregnant patients with six hepatic hydatid cysts who underwent percutaneous treatment via PAIR technique using hypertonic saline solution as cytotoxic agent that the percutaneous treatment of hydatid cysts in pregnancy is efficient, feasible and safe procedure for selective pregnant patients. Jayant et al [20] in their case study of pregnant patient with hydatid cyst of the liver presented as obstructive jaundice, showed that management by PAIR technique followed by long term oral albendazole could be a viable option. Smego et al [21] in their meta-analysis that compared the clinical outcomes of 769 patients with hepatic hydatid disease treated by PAIR with albendazole with 952 similar patients undergoing surgery, had shown that PAIR with albendazole is associated with greater clinical efficacy, lower morbidity, mortality and recurrence rate and shorter hospital stay compared with surgery. Therefore, PAIR technique can be considered a good alternative option for management of hepatic hydatid cyst disease during pregnancy when surgery may be technically demanding or even impossible. Anaphylactic reaction after PAIR technique does not differ significantly from that of surgical procedures.[22] Tow patients in our series were presented for PAIR. The symptoms were relieved in both patients with maximum reduction in the size of the cyst observed by serial ultrasound exam with change in the echo-pattern toward solid pattern which indicate cure. No Recurrence was detected after 18 months of this study follow up period.

Although surgery is considered the treatment of choice for patients with hepatic hydatid cystic diseases, such intervention during pregnancy is difficult or even impossible and its preferable timing is controversial as it may precipitate abortion or preterm labor. Surgery is still the treatment modality of choice for type III and type IV cysts, cyst larger than 5 cm, infected cyst, imminent to rupture cyst and for complicated cysts such as cyst communicating with bile ducts or ruptured into peritoneal or thoracic cavities since medical treatment and percutaneous aspiration are not suitable options. The surgical procedures for hydatid disease performed during pregnancy could be conservative such as evacuation and de-roofing of the cyst (cystotomy and cystotomy with capitonnage) or radical operation such as peri-cystectomy and rarely hepatic resection 9 segmentectomy and lobectomy). Liver parenchyma saving procedure rather than resection surgery are commonly performed and preferred by most surgeons. Therefore, the indication, timing and the type of surgery should be individualized. The World Health organization (WHO) does not preferred surgery for hydatid disease during pregnancy, surgery, however is still required and indicated for certain pregnant patients to prevent the rupture of large cyst during labor, and hence some surgeons advice cesarean section delivery for these patients. The preferred and the safe time for surgery is the second trimester due to lower risk of abortion and the gravid uterus is unlikely to obstruct the surgical field as in third trimester. One patient with large (more than 8 cm) and superficial cyst (Gharbi type III, WHO type CE3B) in our series was proceeded for surgery. This pregnant patient presented in the second trimester with acute upper right and mid-abdominal pain associated with nausea and frequent vomiting. Pericystectomy was done after aspiration and evacuation of cystic contents. Cysto-biliary communication was not detected. Post-operative

events were smooth and patient was followed until normal vaginal delivery Ercetin et al found [23] in their clinical review of 7 pregnant patients with acute presentation of hepatic hydatid disease that urgent surgical treatment is required for such patient to decrease morbidity and mortality and decrease fetal wastage. Carlos et al [24] recorded 11 pregnant patients with hepatic hydatid cystic disease. Nine of them underwent surgery (1 in the first trimester, 6 in second trimester, and 2 in the third and at delivery. They stated that the indications for surgical intervention in pregnant patients with hydatid diseases include : cysts in the 3rd, 4th, 5th, and 6th hepatic segments, cysts localized in the spleen and kidney and thoracic cavity, cyst larger than 5cm in diameter, complicated cust like rupture or communication with bile ducts and infected cysts. Haluk et al [25] reported in their case study of two pregnant patients with hepatic hydatid disease who underwent surgery that radical surgical treatment is the ideal treatment and superior to conservative surgical treatment due to less risks of recurrence, infection, dissemination and anaphylactic shock. Surgery for 3 pregnant patients with hydatid disease in Libya [26] had been performed during caesarean section.

Recurrence of hydatid disease is not uncommon and still represents a major concern both to the patient and the therapist. Recurrent hydatid disease during pregnancy had been reported. [27, 28]. It can cause severe complications that could be fatal top both mother and the fetus. The recurrence of hydatid disease during pregnancy could be due to ineffective primary treatment or due to decreased cell- mediated immunity.

CONCLUSION

Although rare, hepatic hydatid cystic disease can present during pregnancy especially in endemic areas like tropical and middle east countries including Iraq. the management of hydatid disease during pregnancy is challenging, problematic and not straightforward. Up to now there is no consensus of the management of hydatid disease during pregnancy and each case should be individualized. Conservatives follow up of asymptomatic hepatic hydatid disease diagnosed incidentally during pregnancy deemed to be the best practice. Chemotherapy by albendazole or mebendazole is contraindicated during the first trimester due to its teratogenic effects. It is usually not used as first line treatment except when the patient is n unfit for surgery or the cyst is small size, calcified or deeply located and recurrent. Besides, albendazole is also used as adjunct treatment to surgical and percutaneous aspiration to decrease recurrence and potential dissemination of the parasites. PAIR technique can be considered an efficient and safe alternative option for management of hepatic hydatid cyst disease during pregnancy in selected cases when percutaneous aspiration is indicated or when surgery is technically demanding or even impossible. Surgical treatment can be safely offered for acute presentation and complicated cases and the best time for surgery is the second trimester.

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