Treatment of Hydatid Cyst

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Introduction

• Hydatid disease is a parasitic infestation by a tapeworm of the genus Echinococcus.
• E. granulosus is the commonest species which causes cystic disease of the liver.
• E. multilocularis causes alveolar disease and the most virulent.
• E. vogeli is very rare and occasionally found in South America.
Incidence

• Hydatid cyst disease is rare in non endemic areas.
• Commonly encountered in endemic areas with incidence of 1-22/100,000 inhabitants.
• The incidence of alveolar Echinococcus is 0.03-1.2/100,000 inhabitants.
Life cycle

• Dog is the definitive host for the parasite for European biological type and sheep and other herbivores are intermediate host.

• Wolf is the definitive host for Northern biological type.
Life cycle of Echinococcus
Life cycle of Echinococcus
Turkana children in Kenya
Diagnosis

- Hydatid cyst disease is symptomatic if the cyst is uncomplicated and small in size.
- High index of suspicion is required in order to make a diagnosis.
- If outside endemic area then history of travel is needed to clinch the diagnosis.
- Physical examination may not reveal much except pruritus.
Diagnosis

• Abdominal tenderness with or without palpable liver mass may be elicited if disease is locally advanced.
Laboratory work up

• Full blood count is usually unrevealing except that there is eosinophilia in 25 %.
• Indirect hemagglutination test and enzyme linked immuno assay tests have sensitivity of 90 % for CE and 40 % in pulmonary Echinococcus.
• Confirmation is achieved with immunodiffusion test or immuno electrophoresis to demonstrate antibodies to antigen 5.
• ELIZA is used for a follow up monitoring to detect recurrence.
Imaging studies

• Plain Film: A thin rim of calcification delineating a cyst is suggestive of CE.
• Ultrasound: Helps in the diagnosis when the daughter cysts and hydatid sand are demonstrated. Remember U/S is operator depended.
• Computerized Tomography Scan: 98% accurate, and the best modality to differentiate between hydatid cyst, pyogenic liver abscess and Amebic liver abscess.
• Casoni Test: is obsolete.
Imaging
Gharbi sonar morphological classification of the cyst.

• Type I is a cyst with clear fluid.
• Type II is a cyst with clear fluid and a split wall.
• Type III is a cyst with septa.
• Type IV with heterogeneous echo pattern.
• Type V are cysts with reflecting thick walls.
Gharbi classification

- Class II and III are characteristics of hydatid cysts.
- Class I and V are suggestive of hydatid cysts in endemic areas.
- Class IV simulate pseudotumor.
Management

• Three treatment options for uncomplicated hydatid cyst of the liver.
  • Surgery be it radical or conservative
  • Chemotherapy with benimidazoles
  • Percutaneous drainage
  • Combinations of two or more is a fourth treatment option.
Surgical treatment

- Surgical treatment for open approach
- Kocher incision is made in right sub costal margin.
- Inspect abdominal viscera for potential sites of dissemination
- Pack the area around cyst with swaps soaked with hypertonic sodium chloride solution as a scolecidal agent.
Open surgical approach

- Through a three way stop cock the cyst is punctured and the content aspirated into a 50 ml syringe.
- Replace aspirated fluid with a scolecidal agent.
- Protruding dome is incised and hydatid fragments with laminated membrane are removed with a sponge holding forceps.
- Residual cavity of the cyst was scrubbed with swabs soaked with povidone iodine and carefully inspected for biliary communication.
Open surgical approach

• Suture any visible fistula with non absorbable sutures.
• Place two drains one in the cavity and the other drain place sub hepatically to monitor for biliary leakages
• Do cavogram on day 6 to 7 to rule out biliary fistula before removal of drains.
Hydatid cyst in human liver
Open surgical approach

• Radical surgical approach involves pericystectomy, partial hepatectomy, or lobectomy.

• Conservative surgical approach include simple tube drainage, capitonage, de roofing, partial cystectomy with or without omentoplasty, and marsuialization.
Pathological specimen of liver and cyst
Horses liver full of echinococcus g. cyst
hepatic echinococcus cysts
Laparoscopic approach

- Establish pneumoperitoneum with carbon dioxide.
- Three to four trocars are required for the operation.
- 10 to 12 mm trocar is introduced as close as possible to the cyst.
- Placed two long gauzes soaked with hypertonic sodium chloride around the cyst.
Laparoscopic approach

• Puncture the cyst with a 14 gauge 120 mm insufflation needle and the cyst content is rapidly aspirated.
• An additional aspirator is placed around the point of puncture.
• Fill the cyst with an anti-scolecidal agent and leave it for 5 to 10 min.
• Unroof the cyst wall and evacuate the endocyst into specimen receiver bag.
Laparoscopic approach

- Irrigate the cavity with hypertonic saline.
- Put in the camera and begin to inspect for biliary communication and possible retained daughter cysts.
- Placed drains into the cavity and sub hepatically and close abdominal wounds.
Percutaneous treatment

• This method has been used to treat liver hydatid cyst with Gharbi type I to III.
• Several percutaneous techniques have been used including: percutaneous puncture and curettage, double percutaneous aspiration and injection, and percutaneous evacuation of cyst.
Percutaneous drainage. Cont.

• The most widely used and gaining recognition is the Puncture Aspiration- Injection- Reaspiration. (PAIR).

• All forms of percutaneous drainage have been viewed with skepticism because of the potential for soiling and dissemination of the cyst.
PAIR

• It’s made indication is in un complicated hydatid cyst.
• It is carried out under ultra sound or computerized tomography scan guidance.
• Use of needle to puncture accessible cyst, aspirate cyst content up to half of its content.
• Injects almost equal amount of scolecidal agent, mainly hypertonic saline, and in the absence of biliary fistula, alcohol.
Chemotherapy

- Bendimidazoles (albendazole and mebendazole) have been used for treatment of patient with hydatid cysts of the liver and lungs.
- They are used in patients who are unfit for surgery or extensively disseminated cystic disease.
- They have also been used as adjunct in the surgical procedures.
Management of uncomplicated hydatid disease.

Which of the three mentioned modalities is the first line management for uncomplicated hydatid cyst disease and is there any evidence to support that?
PAIR v.s Open surgery

• Semago conducted a meta-analysis comparing 769 patients with 1072 hepatic cysts managed with pair method and compared it with era matched 952 patients managed surgically.

• PAIR was either combined with albendazole or with out albendazole.
PAIR v.s open Surgery

- PAIR meets almost all the goals open surgery of in activation of the cestode parasite, evacuation of the cyst, removal of germinal layer, and obliteration of the remaining cavity.
- Except that it substitutes removal of germinal layer with germinal membrane sclerosis with scolecidal agent.
PAIR v.s Open surgery

- Anaphylaxis, cyst infection, intra abdominal abscess, sepsis, and biliary fistula occurred in 7.9% and 25.1% of PAIR treated and surgical control subjects respectively, p value(< .0001).
- Fever and allergic reactions were encountered more frequently in PAIR group (5.5% and 2.5% respectively (p < .002).
- Minor reactions occurred more commonly among surgical groups then PAIR, 13.1% and 33% p<.0001.
PAIR v.s Open surgery

- No peritoneal dissemination in PAIR group.
- Clinical and parasitologic cure occurred in 95.8% in PAIR and 89.8% in surgery, p<.0001.
- Incomplete response occurred in 2.0% and 3.2% respectively, p<.1249.
- Disease recurrence occurred in 1.6% and 6.3% respectively, p<.0001.
- One procedure related death in PAIR compared to 6.3%, p<.0001.
PAIR v.s Surgery

• Smego therefore concludes that PAIR has greater clinical efficacy, low rates of major and minor complications, mortality, recurrence rate and short hospitalization days.
Criticism about the study

• There was no test of heterogeneity
• Of 45 entries only 21 studies were included in PAIR, where we do not know many where not included in surgery group.
• It is not clear what type of patients have gone to surgery.
• Follow up period of PAIR group was 20 months compared to 32 months in surgery arm.
Systematic Review

• Nasseri and colleagues performed an extensive review of published data on percutaneous aspiration (PAIR) with or without benzimidazole for uncomplicated hepatic hydatid disease including the Cochrane hepato biliary Group controlled trials register.

• Identified only two randomized trials, one comparing PAIR v.s surgery (N=50) and the other comparing PAIR plus albendazole and albendazole alone (N=30).
Systematic Review

• PAIR plus albendazole obtained similar cyst disappearance as compared to surgery, with fewer adverse effects (32 % v.s 84 %) p< .001.

• Hospital days of 4.2 versus 12.7 days respectively.
Systematic Review

• All symptoms were relieved in patients treated with PAIR (100 % n=20, compared to 20 %, n=10 of albendazole alone, p<0.001.

• All cysts treated with PAIR(n=22) and only 2(18.2) of those treated with oral albendazole alone showed reduction in size and changes in echo pattern compatible with loss of viability. P<0.01.
Systematic Review

• Maximum size reduction was seen in PAIR and albendazole arm, p <0.05.

• Cyst infection (10%), fever in 15%, cyst biliary rupture 5% and urticaria 10% were seen in PAIR group while reversible elevation of liver enzymes was noted in Albendazole group.

• Neither of the studies evaluated cost effectiveness.
Systematic Review

• Conclusion is that PAIR may be safe and effective but no enough evidence to support or refute its treatment of uncomplicated hydatid liver disease.
Systematic Review by Dziri

• 46 studies in the management of hydatid cyst disease of the liver to address three questions:
  1. Should chemotherapy be used alone or in association with surgery?
  2. What is the best surgical technique?
  3. When is PAIR indicated?
Dziri Review

• They concluded that chemotherapy alone is not ideal for the treatment of uncomplicated hydatid cyst (level II evidence grade B).
• The level of evidence was too low to decide between radical versus conservative surgery (level IV grade C).
• Omentoplasty is efficient in preventing deep abscesses (level II grade A).
Dziri Review

• Laparoscopic approach is safe. (level IV evidence grade C).

• Combination of albendazole with surgery or with PAIR where found to be safe in selected patients. (level II grade B).
Institutional Reports


• Between 1981-2007, they treated 112 patients with frozen seal method.
Institutional Reports

• All cases were diagnosed with either ultrasound or computerized tomography.
• Confirmation was achieved in 92.9% using immunofluorescence method.
• Liver cysts were seen in 73.5% of the cases.
• Relapse was seen in 9 (8.0%) cases.
• Radiological drainage was performed in 3.6%.
• Reoperation was done in 2.7%.
Institutional Reports

- No mortality was recorded.
- Frozen seal method is safe but further studies are needed.
Institutional Reports

• Yagci and colleagues published their 10 year experienced with treatment of hydatid disease of the liver in world journal of surgery, 2005.
• They compared laparoscopic surgery, open surgery, and percutaneous methods for treatment of liver cysts.
• They managed 355 patients with 510 hydatid cysts of the liver.
• 128 females and 227 males
Institutional Reports

- There were 2 deaths in open surgery group.
- 28 biliary leakages were recorded in surgery group.
- 10 patients had biliary leakages in PT group.
- 2 patients had biliary leakages in laparoscopic group.
- Recurrence rates were 16.2%, 3.3%, and 3.5% after open surgery, laparoscopic treatment and percutaneous treatment respectively.
- Laparoscopic and PAIR are safe in selected cases type I to III.
Management of complicated hydatid cysts

- Hepatic hydatid cysts which has ruptured into common bile duct is managed by common bile duct exploration with intraoperative cholangiogram and T tube drainage.
- Continue chemotherapy for three months.
- Pre-operative ERCP and sphincterotomy has been shown to reduce incidence of post operative external fistula.
Management of complicated hydatid

• Hydatid cyst involving the thorax with possible involvement of common bile duct must be approach through abdomen.
• Acute abdomen due to rupture into peritoneal cavity requires an urgent laparotomy.
• Pulmonary echinococcus disease is approach through thorocotomy with suture bronchial fistula and perform capitonage.
• Splenic hydatid disease enucleation is preferred if cyst is peripherally located and in cases of children, other wise performed splenectomy(level IV grade C evidence.
• Cardiac echinococcus, cysto pericystectomy is the gold standard.
• Kidneys involvement is managed with cystectomy in 75 %.
Cyst communicating with biliary system.
Summary

• Hepatic hydatid cyst is a parasitic zoonosis frequently seen in endemic areas.
• Man is infected accidentally and carnivorous are the definitive host while the herbivorous are intermediate hosts.
• 50 to 80 % of the cysts are usually found in the liver. 10 to 15 % are found in the lungs.
• 85 % of hepatic cysts are in the right lobe
• While 25 to 30 % are multiple in nature.
summary

• Surgery remains the curative management, while Puncture –aspiration-injection-Reaspiration(PAIR) is safe and effective and gaining popularity.
• Laparoscopic management is also safe but can not be recommended as a primary means of surgical management for cysts located near vital structures.
• The role of chemotherapy will remain as adjunct to surgery except in the extreme cases in those patients who are not operable.
• Good personal hygiene as well as good veterinary services will be the best preventive method in breaking the transmission of hydatid cyst disease.
Referrences


2. Siavosh Nasseri et al. Percutaneous needle Aspiration, injection, and reaspiration with or without Benimidazole coverage for uncomplicated hepatic hydatid cysts: systematic Review. Archives of Iranian Medicine, vol. 9, no.4: 390-402


