Hepatic Cysts

Div.of Infectious and Tropical Diseases
IRCCS S.Matteo –Pavia University
Pavia, Italy
single protoscolices
brood capsules
< germinal layer
multilaminated layer
layer of inflammation
host tissue
ARE WE SINGING FROM THE SAME HYMN SHEET?

WHO-IWGE Classification of Ultrasound Images of Cystic Echinococcosis Cysts

CL  CE1  CE2  CE3  CE4  CE5

CYSTIC LESION  ACTIVE  TRANSITIONAL  INACTIVE
DD with NON-PARASITIC

WHO-IWGE Classification of Ultrasound Images of Cystic Echinococcosis Cysts

CL  CE1  CE2  CE3  CE4  CE5

CYSTIC LESION  ACTIVE  TRANSITIONAL  INACTIVE
In echinococcal cysts are walls of daughter cysts adjacent to one another.
• IMMUNOBLOTTING : NEGATIVE
Beware of post-surgical cavities!
Positive serology
BUT post-surgical cavities!
FNA: negative for protoscolices
TREATMENT
1970

1985

Surgery - (Traditional Therapy)

Chemotherapy

Percutaneous Treatment
FOR MOST ABDOMINAL LOCATIONS
SURGERY SHOULD BE LIMITED TO
COMPLICATED CYSTS

COMPLICATED
PERCUTANEOUS TREATMENTS

- Inactivation of Germinal layer
- Evacuation of endocyst
- RF Thermal Ablation
- PAIR

- Large bore catheter
- PEVAC
- Dilatable Multi Function Trocar
- Percutaneous Puncture Drainage and Curettage
- Others
PAIR

PUNCTURE

ASPIRATION

INJECTION

RE-ASPIRATION

An Option for the Treatment of Cystic Echinococcosis

WHO-Informal Working Group on Echinococcosis (WHO-IWGE)
# Complications and recurrences of percutaneous treatments

## 1983-2004

<table>
<thead>
<tr>
<th></th>
<th>No. punctured cysts</th>
<th>No. of events</th>
<th>% Complications</th>
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<tbody>
<tr>
<td>Deaths due to Anaphylactic shock</td>
<td>4209</td>
<td>2</td>
<td>0.047</td>
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<tr>
<td>Major complications</td>
<td>4209</td>
<td>16</td>
<td>0.38</td>
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<tr>
<td>Minor complications</td>
<td>4043</td>
<td>268</td>
<td>6.62</td>
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<tr>
<td>Recurrence</td>
<td>3830</td>
<td>49</td>
<td>1.27</td>
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</tbody>
</table>

Brunetti E et al. Parassitologia 2004
Avoiding major complications

Spillage
Anaphylactic shock
Communication w/ biliary tree
Chemical cholangitis

Prophylaxis with ABZ
Anesthesiologist
Cystography

NO INJECTION if communications w/biliary tree are found
Can biliary-cyst communication be predicted before surgery for hepatic hydatid disease: does size matter?

Mehmet Kilic, M.D., Omer Yoldas, M.D.*, Mahmut Koc, M.D., Mehmet Keskek, M.D., Nazile Karakose, M.D., Tamer Ertan, M.D., Erdal Gocmen, M.D., Mesut Tez, M.D.

Fifth Department of Surgery, Ankara Numune Training and Research Hospital, Cagri Sokak 26/4, Aydinlikevler/Ankara, 06130, Ankara, Turkey


- Cyst size greater than 7.5 cm is a risk factor for intraoperative bile leakage and postoperative biliary fistula.
Benefits of PAIR  WHO 1996

- Alternative treatment with immediate relief
- No general anesthesia needed
- No particular contraindication except for communication with biliary tree
- Less expensive than surgery and chemotherapy
- Immediate degeneration of the parasite can be monitored
- Compared to surgery much less post-treatment management
- Larger number of patients can be treated in a given time period
Turkana 1993 -1994

- parasitic cysts : 141 in 85 pts (in 2 weeks)
- anaphylactic shock : 0
- pregnant women : 6 (1 close to delivery w/ 10 cm cyst)
- children < 5 yo : 5
- 1 patient with 23 abdominal cysts - 6 catheters used
Turkana 1993-2000
by AMREF local teams (unpublished)

• 162 cysts in 160 patients

• 8 infections
• 3 anaphylactic shocks
• 8 non parasitical cysts
• 1 surgical intervention
Experience (Pavia) 1987-2004

67 patients

72 cysts

85 punctures
<table>
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<tr>
<th>Condition</th>
<th>Count</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Hypotensive Shock</td>
<td>1</td>
<td>1.1%</td>
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<tr>
<td>Sclerosing Cholangitis</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Secondary Echinococcosis</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Minor complications</td>
<td>18</td>
<td>21.1%</td>
</tr>
</tbody>
</table>
OUTCOME

SUCCESS 84,5 %
OUTCOME

FAILURES 15.5%

- CE2 with many daughter cysts
- CE3b predominantly solid with daughter cysts
PAIR is safe and efficacious.

First choice in CE1 and CE3a

> 5 cm in diameter
CE1, CE3a

< 5 cm  ABZ

5-10 cm  PAIR + ABZ

> 10 cm  Catheter (continuous drainage)
Percutaneous treatment of giant abdominal hydatid cysts: long-term results

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2 Department of Radiology, SSK Ankara Hastanesi (Social Security Ankara Hospital), TR-06110 Dişkapı Ankara, Turkey

Received: 11 September 2005/Accepted: 8 March 2006/Online publication: 3 July 2006

Steps 1, 2, and 3 are done on the first day, and the steps 4 and 5 are done on the second day.
FAILURES of PAIR in CE2/CE3b

30% requiring further PAIRs (up to 4)
Giorgio et al J Ultras Med 2001

61%
Kabaalioglu Eur J Radiol 2006
Metabolic viability assessment of cystic echinococcosis using high-field $^1$H MRS of cyst contents

Waldemar Hosch,¹ Thomas Junghanss,² Marija Stojkovic,² Enrico Brunetti,³ Tobias Heye,¹ Günter W. Kauffmann¹ and William E. Hull⁴

¹Department of Radiodiagnostics, University Hospital, Heidelberg, Germany
²Clinical Tropical Medicine Section, University Hospital, Heidelberg, Germany
³Division of Infectious and Tropical Diseases, RCCS San Matteo Foundation, Fovie University, Fovie, Italy
⁴Core Facility: Molecular Structure Analysis, German Cancer Research Center (DKFZ), Heidelberg, Germany

- CE3a cysts have about equal probability of being viable or nonviable, whereas CE3b cysts are usually viable.

- This difference provides impetus for the diagnostic use of the subclass designations;
• Host’s immune response is skewed towards Th2 in cysts relapsing after treatment, possibly as a result of immunomodulation by the parasite

Riganò et al, Parasite Immunology, 2004
## PATIENTS

<table>
<thead>
<tr>
<th>Stage</th>
<th>N°</th>
<th>IgG ELISA</th>
<th>IHA</th>
</tr>
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<tbody>
<tr>
<td>CE1-2</td>
<td>7</td>
<td>7/7</td>
<td>7/7</td>
</tr>
<tr>
<td>CE3a</td>
<td>6</td>
<td>6/6</td>
<td>6/6</td>
</tr>
<tr>
<td>CE3b</td>
<td>7</td>
<td>5/7</td>
<td>7/7</td>
</tr>
<tr>
<td>CE4-5</td>
<td>7</td>
<td>3/7</td>
<td>5/7</td>
</tr>
<tr>
<td>CONTROLS</td>
<td>3</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Tamarozzi F et al, Parassitologia, 2008
CYTOKINE POSITIVES by cyst stage

IL 4

- CE3b: p < 0.002

IL10

TNFa

IL12
SERUM CYTOKINES
amount by cyst stage

p 0.002

median

25° e 75° percentile
- Marker Th2
- Th0 $\rightarrow$ Th2
- MØ $\rightarrow$ Depression  AAMØ
WHO-IWGE Classification of Ultrasound Images of Cystic Echinococcosis Cysts
PERCUTANEOUS TREATMENTS

Inactivation of Germinal layer

Evacuation of endocyst

PAIR

RF Thermal Ablation

- Large bore catheter
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- Others
Percutaneous evacuation (PEVAC) of multivesicular echinococcal cysts with or without cystobiliary fistulas which contain non-drainable material: first results of a modified PAIR method

H G Schipper, J S Laméris, O M van Delden, E A Rauws, P A Kager

Gut 2002;50:718–723
Figure 5. Ultrasound before percutaneous evacuation (PVE/C) of multivesicular cyst which had spontaneously ruptured into the biliary tree (left). Computed tomography scan 13 months after PVE/C shows (arrow) partially calcified cyst remnant (right).
12 patients follow up 17.9 (4–30) months after PEVAC, 7 cysts had disappeared and 5 cysts had decreased in size.

In 8 patients with multivesicular cysts, a cystobiliary fistula, and infection, cyst size was 12.5 (6–20) cm, catheter time 72.3 (28–128) days, and hospital stay 38.1 (20–55) days.

At 17.3 (4–28) months of follow up, six cysts had disappeared and in two cysts residual size was 1 and 2.9 cm, respectively.

In 4 patients without a cystobiliary fistula, cyst size was 14.4 (12.7–16) cm, catheter time 8.8 (3–13) days, and hospital stay 11.5 (8–14) days.

Schipper HG et al, Gut 2002
What Have We Learned?

STAGE-SPECIFIC APPROACH
WHO-IWGE Classification of Ultrasound Images of Cystic Echinococcosis Cysts

CL | CE1 | CE2 | CE3 | CE4 | CE5
---|-----|-----|-----|-----|-----
Cystic Lesion | Active | Transitional | Inactive

[Image of ultrasound images with red circles highlighting specific images]
Cystic Echinococcosis

- CHRONIC condition
- Natural history still unknown
- Three therapeutic options not yet compared properly
Areas where improvement is needed

• Signs of improving coordination (serology) but still a long way to go – serology / US classification
• Need to improve: evaluation of treatments
• Research is needed on: pathogenesis and natural history
Outcome criteria

• A: Size reduction > 50%, homogeneous and hypoechoic content, no daughter cysts, normalization or significant reduction of serology.

• B: Size reduction < 50%, heterogeneous (mixed) content, reduction of serological values.

• C: No morphological changes and/or new daughter cysts with increased serology.
Percutaneous Treatment of Liver Hydatid Cysts: Comparison of Direct Injection of Albendazole and Hypertonic Saline Solution

Yahya Paksoy¹
Kemal Ödev¹
Mustafa Şahin²
Ahmet Arslan³
Osman Koç¹

OBJECTIVE. The purpose of this study was to compare the effect of intracystic injection of albendazole and hypertonic saline in patients with liver hydatid disease.

MATERIALS AND METHODS. Fifty-nine patients with a total of 109 hydatid cysts were treated percutaneously. In all cases, local anesthesia was applied. Twenty percent hypertonic saline was used in 31 patients (40 cysts, group 1) as the sclerosing agent, and albendazole solution was used in 28 patients (69 cysts, group 2). The PAIR (percutaneous puncture, aspiration, injection, reaspiration) method was applied in group 1. In group 2, we used a different procedure that could be called the PAI (percutaneous aspiration and injection) method. After this procedure, routine sonography and CT examinations were conducted. The results of both groups were compared.

RESULTS. Follow-up examinations showed that liver hydatids expanded approximately to their original size after a significant reduction during the first month. In the follow-up period, fluid contents totally disappeared; thickening and irregularities were also observed in the cyst walls and a solid, hyperechogenic, heterogeneous pseudotumor appearance representing a degenerated membrane was seen in all patients. Hypertonic saline solution inactivated the scolices from the beginning of the treatment. However, scolices were inactive in the cysts aspirated 1 month after the procedure in group 2. A significant correlation was noted between elapsed time after the treatment and the cyst size using Wilcoxon's signed rank test (p = 0.000). No difference was seen between two groups in the amount of cyst size reduction using the Mann-Whitney test (p = 0.521).

CONCLUSION. In addition to its oral use, albendazole may be injected intracystically as we did in our study. It sterilizes the cyst cavity and affects scolices as well.
Avoiding major complications

- Spillage
- Anaphylactic shock
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