HYDATID CYST OF THE LIVER

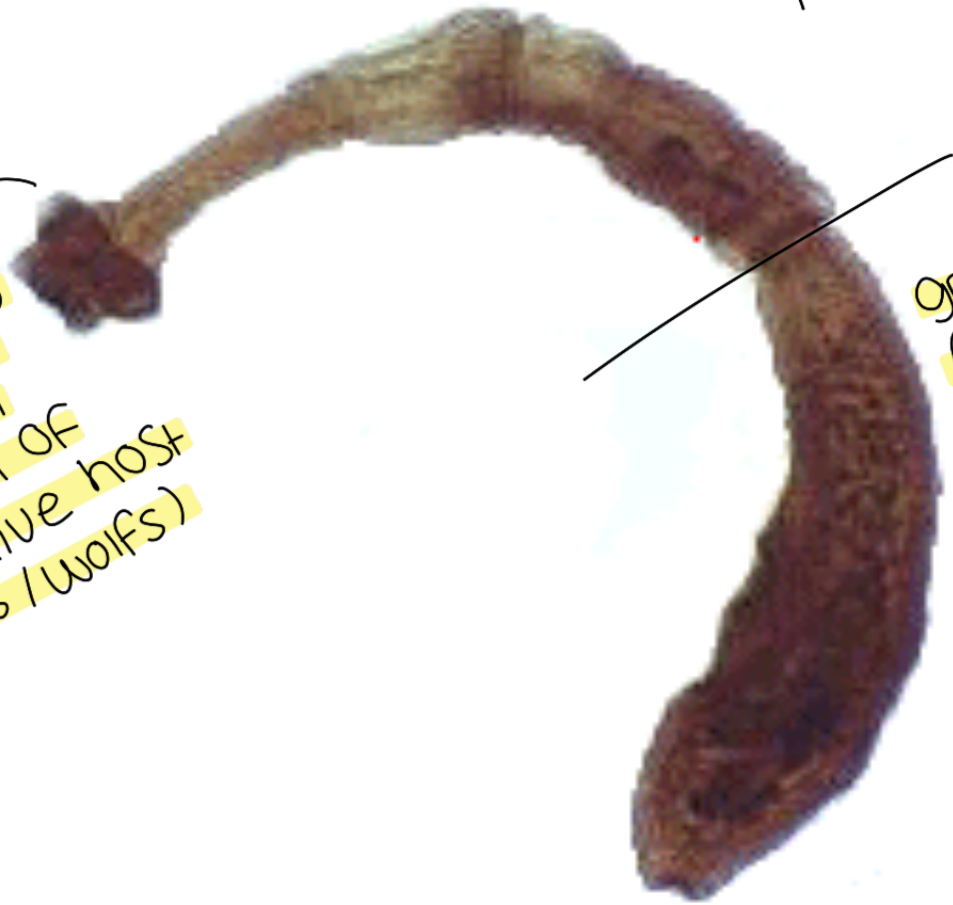
Salam Daradkeh

DEPARTMENT OF GENERAL SURGERY

Echinococcus granulosus

adult

microscopic parasite



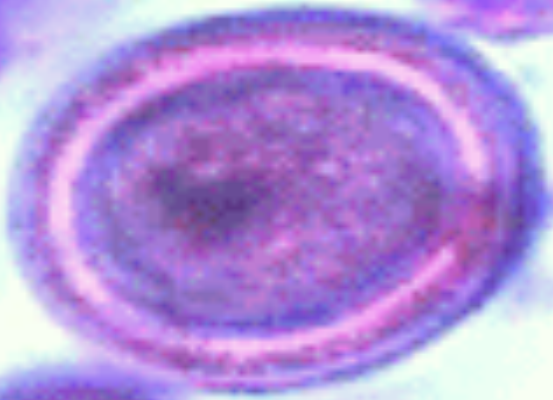
head with suckers to attach to intestinal mucosa of definitive host (dogs / wolfs)

gravid segment filled w/ scolesis (detached from parasite & eliminated w/ feces

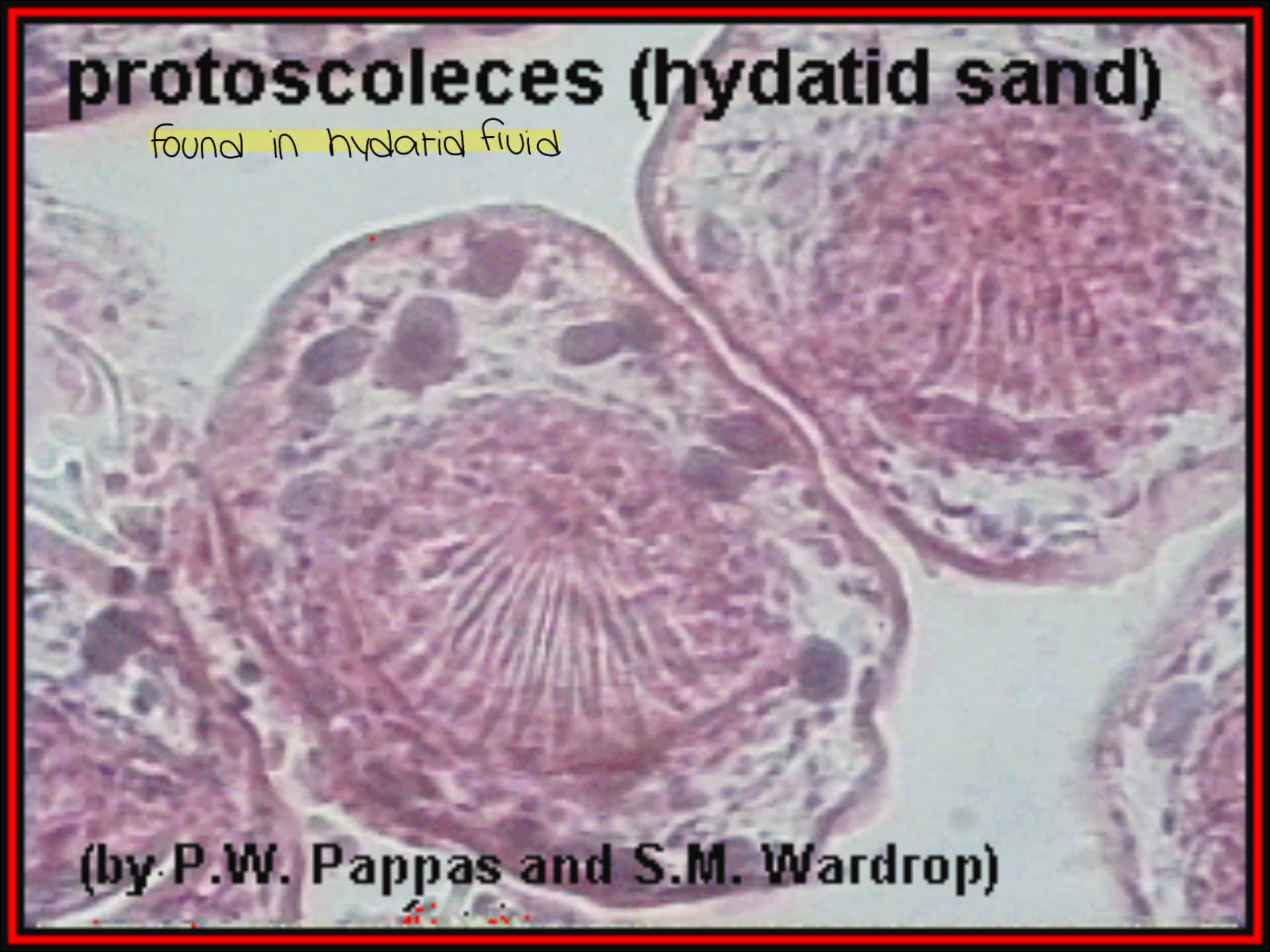
(By P.W. Pappas and S.M. Wardrop; original by P. Darben)

Echinococcus granulosus egg

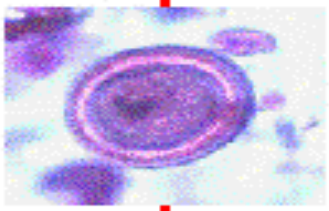
→ found in gravid segment



(By P.W. Pappas and S.M. Wardrop;
original by P. Darben)


protoscoleces (hydatid sand)
found in hydatid fluid
(by P.W. Pappas and S.M. Wardrop)

The adult tapeworm is found in the small intestine of the canine (definitive) host.



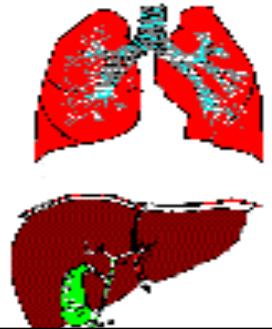
Eggs are passed in the host's feces.

The eggs are ingested by an intermediate host. Many species of warm blooded vertebrates can be infected.

mostly liver then lung

dogs eat diseased sheep

The larva develops into a hydatid cyst.



The protoscolex attaches to the host's intestine and develops into a tapeworm.

The definitive host is infected when it ingests the hydatid cyst (protoscoleces).

histopathologically:

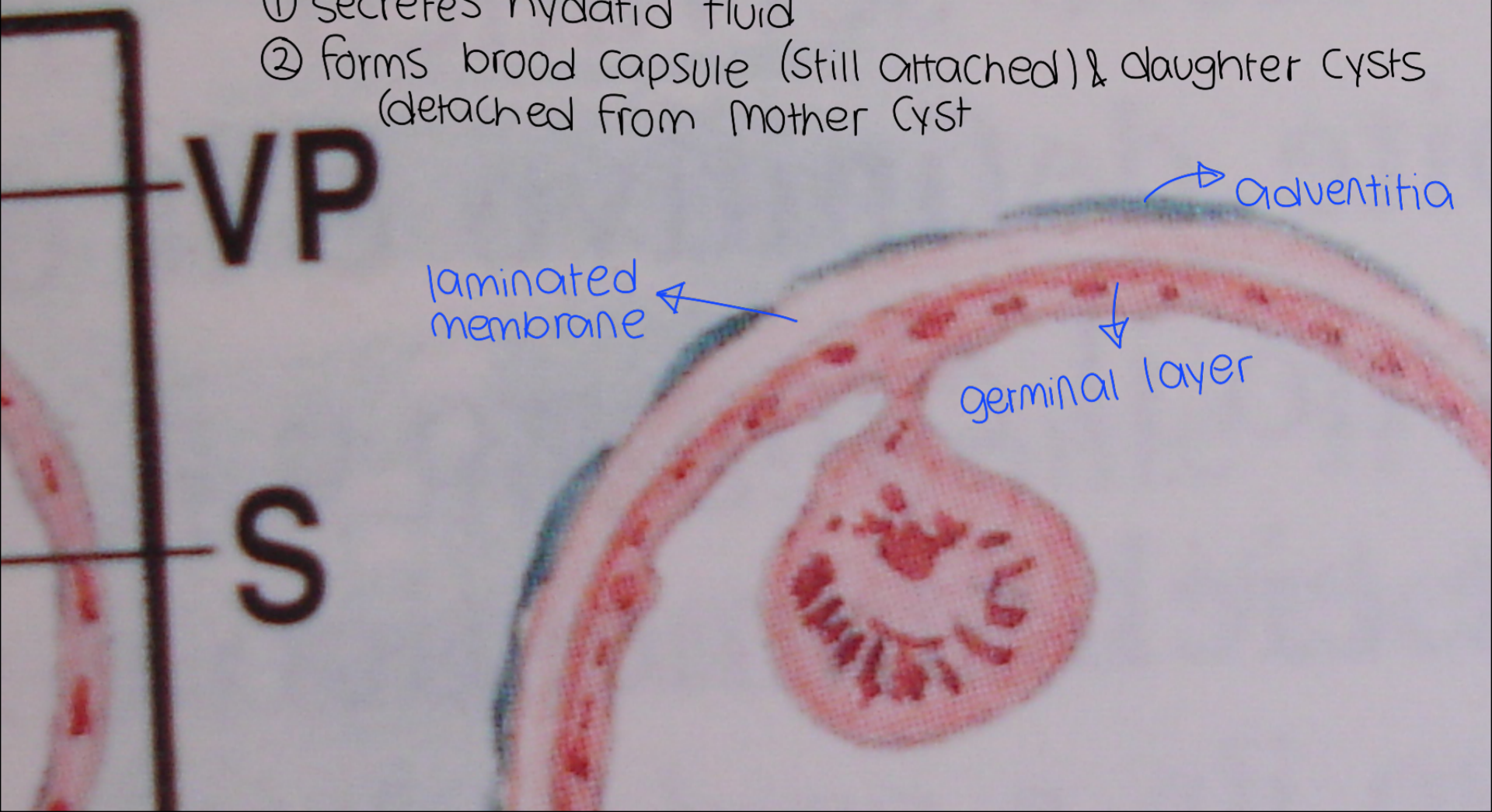
ectocyst (pericyst) → adventitia (fibrous capsule, rxn w/ host organ)

endocyst → laminated & germinal layer

germinal layer: single epithelium (living parasite)

① secretes hydatid fluid

② forms brood capsule (still attached) & daughter cysts (detached from mother cyst



CLINICAL FEATURES

incidental finding

- **LATENCY**(Asymptomatic,Abdominal pain).
- **SUPPURATION:** 11%-27%. E.COLI (complicated by infxn)
- **PRESSURE EFFECTS:** LIVER TISSUE, HILUM,HEPATIC VEINS .....etc.

Clinical Features

- RUPTURE:

  - Obscure: rupture of the endocyst. (within ectocyst)

  - Communicant Rupture: biliary tree, bronchial tree. (when cyst develops near tree → increased pressure in tree causes erosion & fistulization)

- Free Rupture: free body cavities or adjacent organs.(1-4%)

  ↳ peritoneal

  ↳ hollow viscous colon, small bowel, stomach

* rupture into pleura can cause pleural & pericardial effusion

DIAGNOSIS- IMAGING

- PLAIN X-RAY: CALCIFICATION.
- ULTRASONOGRAPHY: H.Gharby 1981 classification:

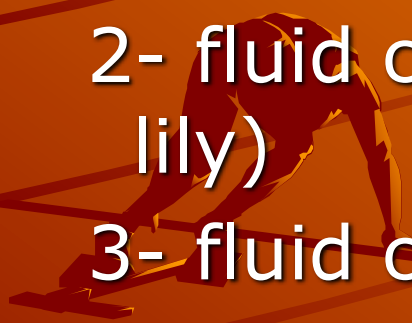
1- simple hydatid cyst.(budding + h.sand)

2- fluid collection with a split wall(Water-lily)

3- fluid collection with septa(Honeycomb).

4- heterogeneous appearance.

5- reflecting thick wall.



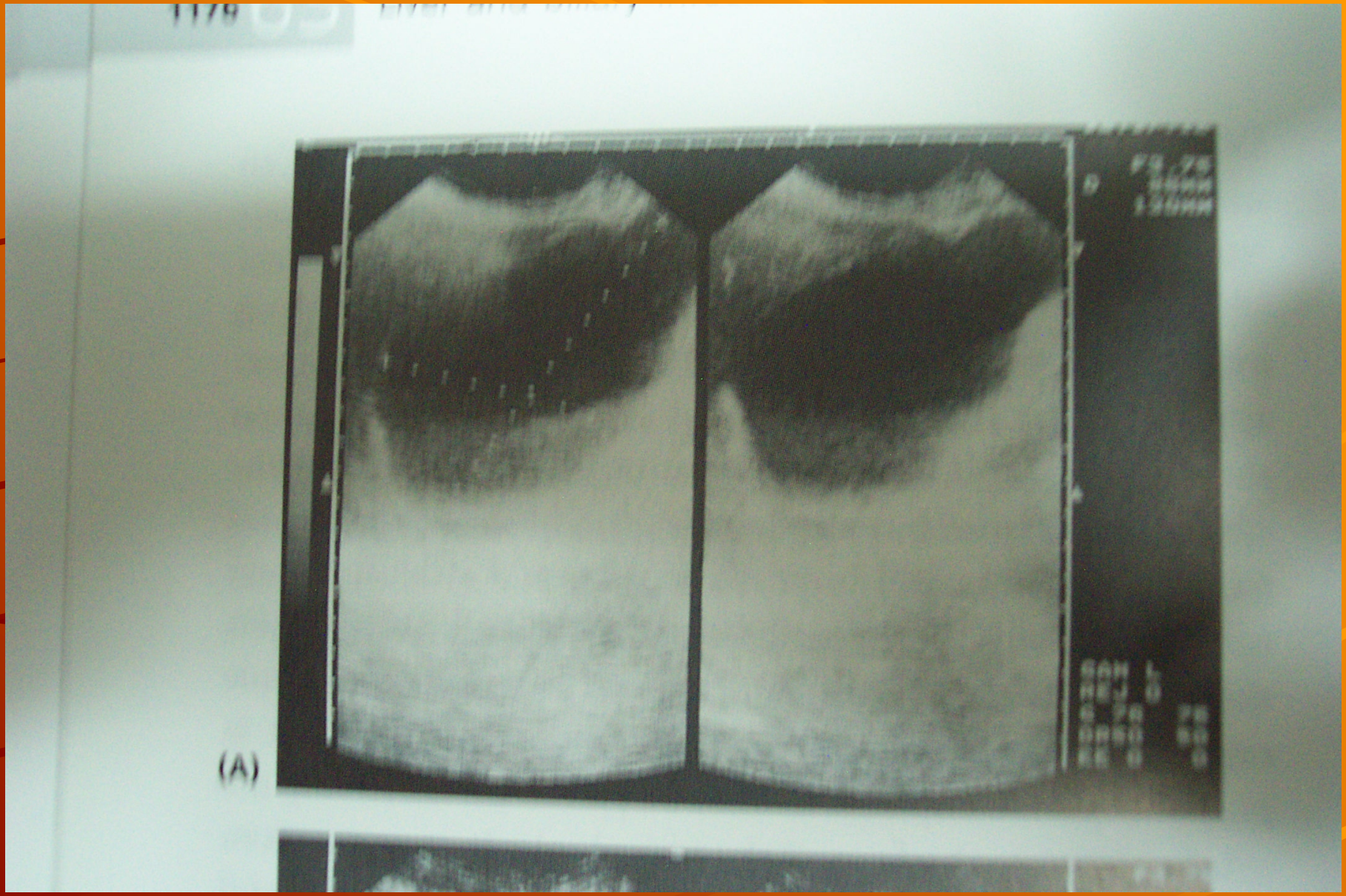
not used

arciform

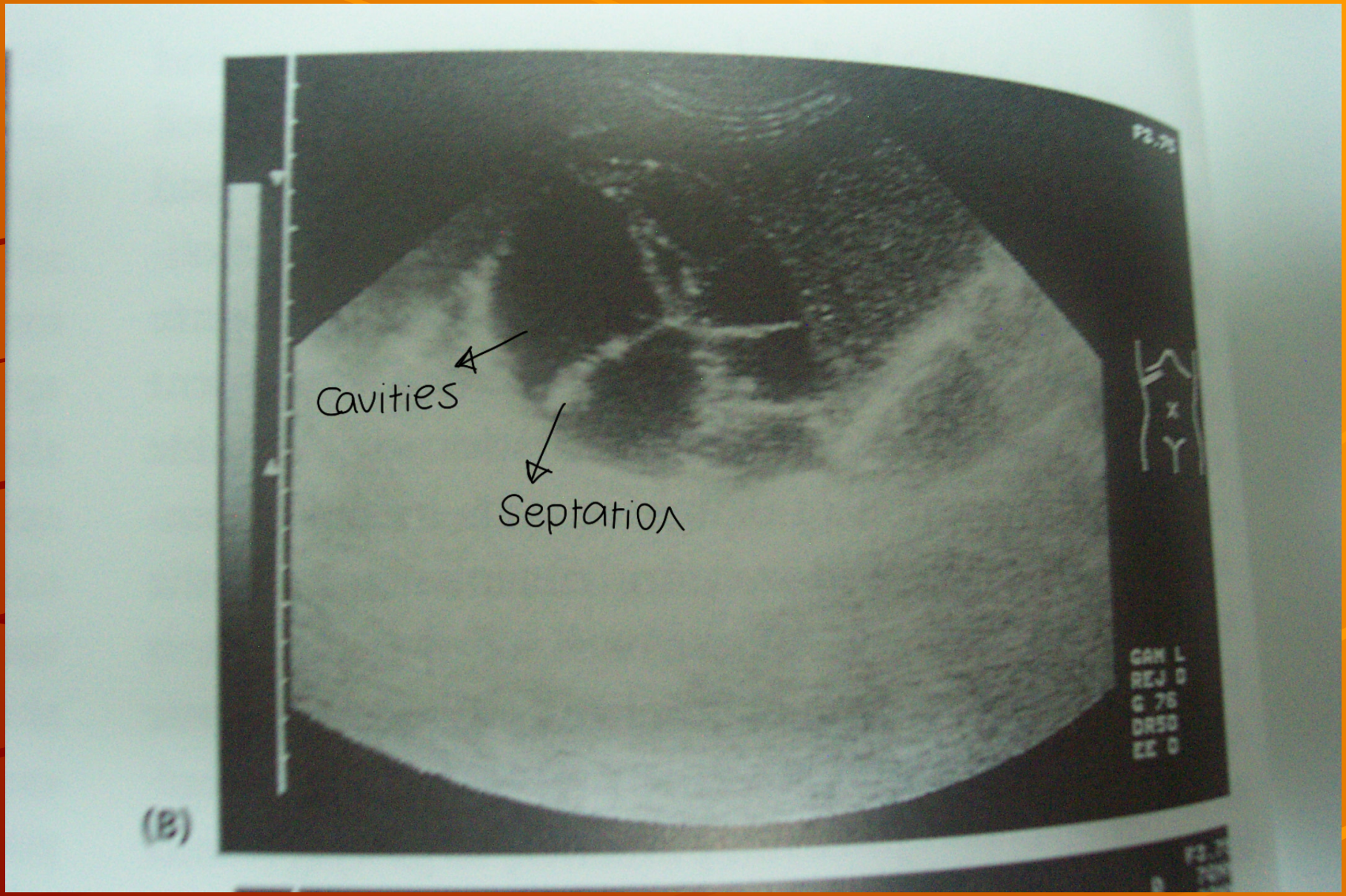
pathognomonic in abdominal cysts (lung hydatid cysts dont calcificate)

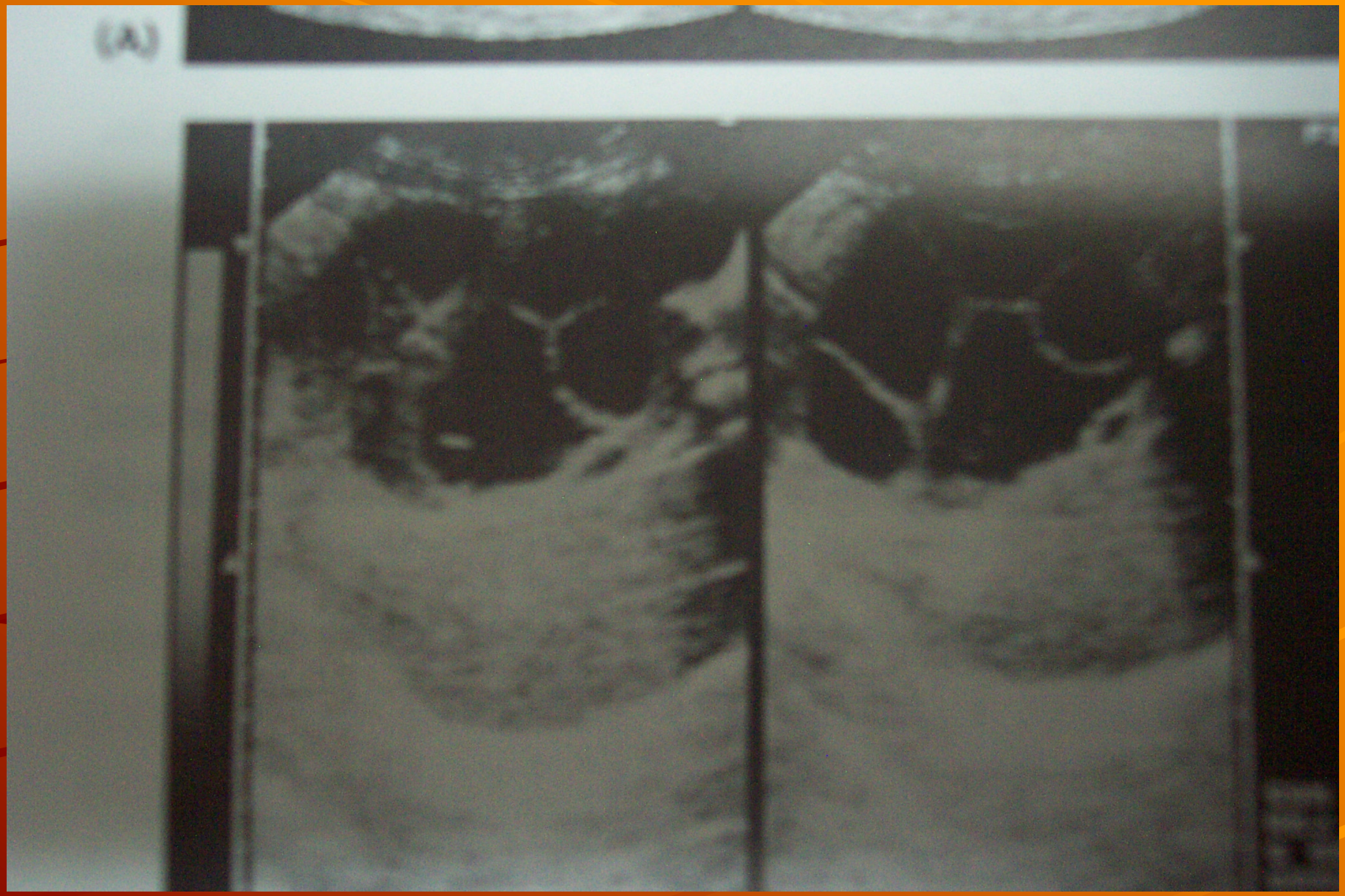
with hypo/hyper dense, hypo/hyper equic, calcifications

(active cyst)

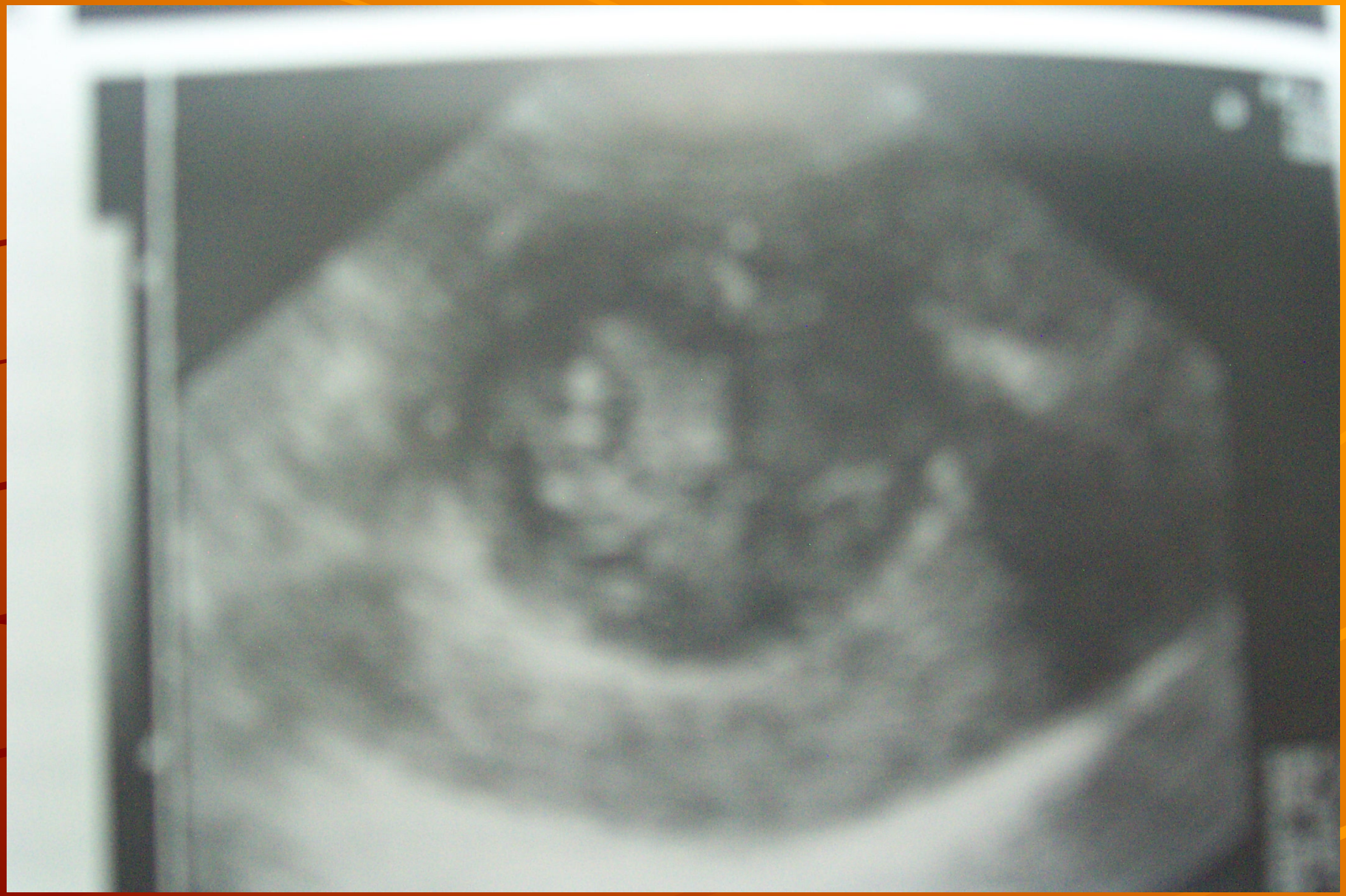

(A)

honey comb appearance

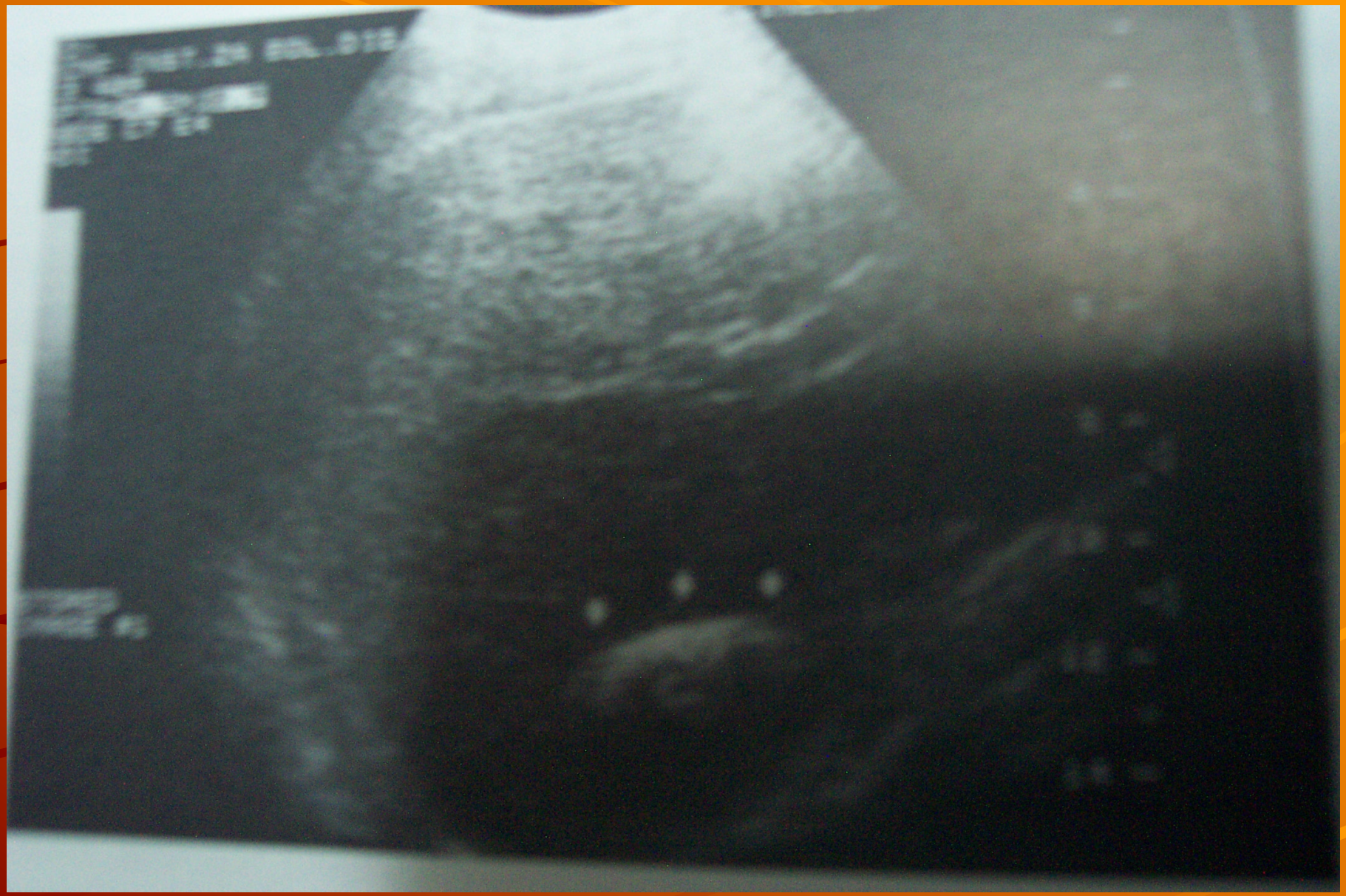


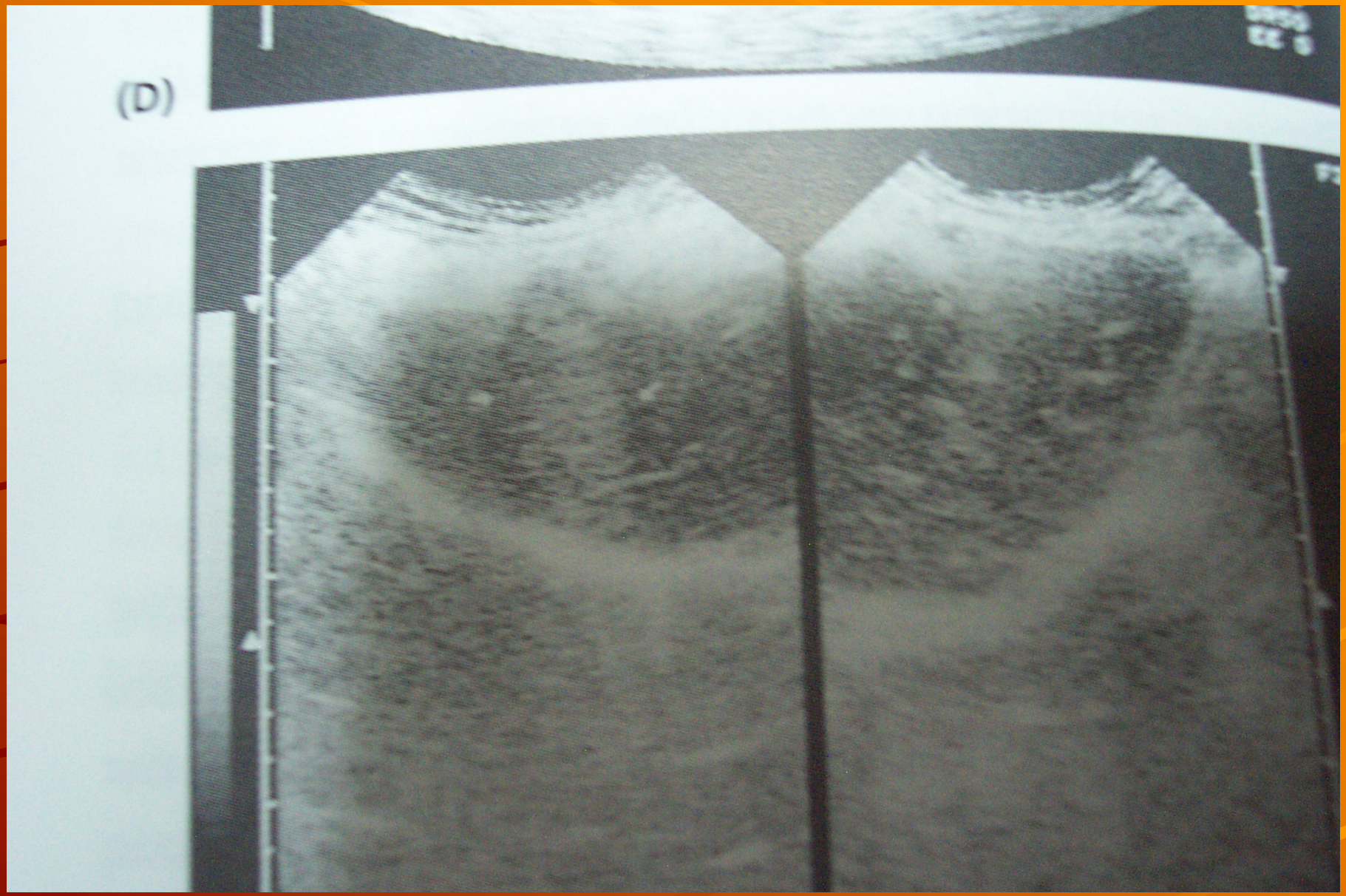

(A)

heterogenous



reflecting thick wall



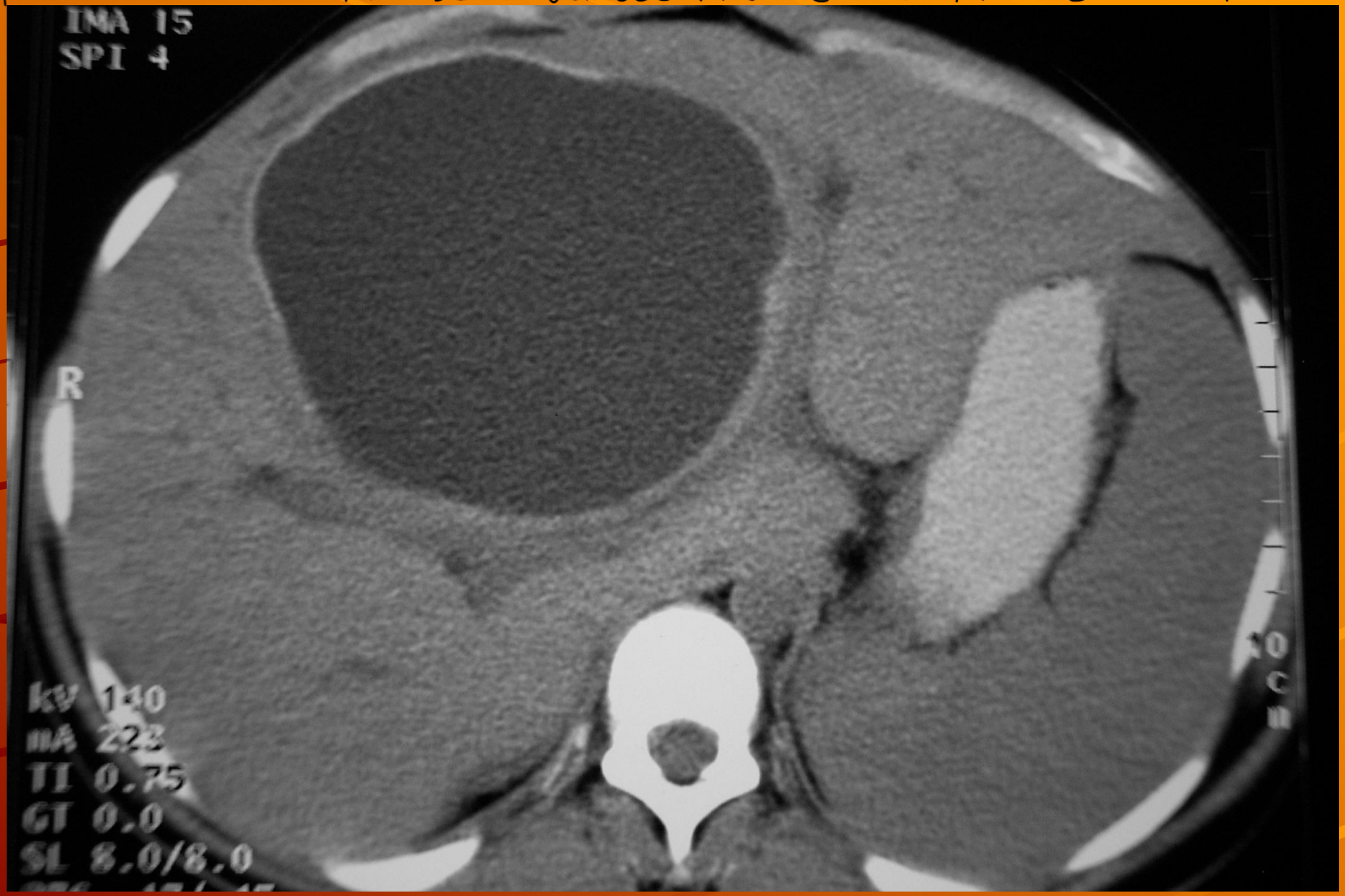

(D)

Diagnosis-Imaging

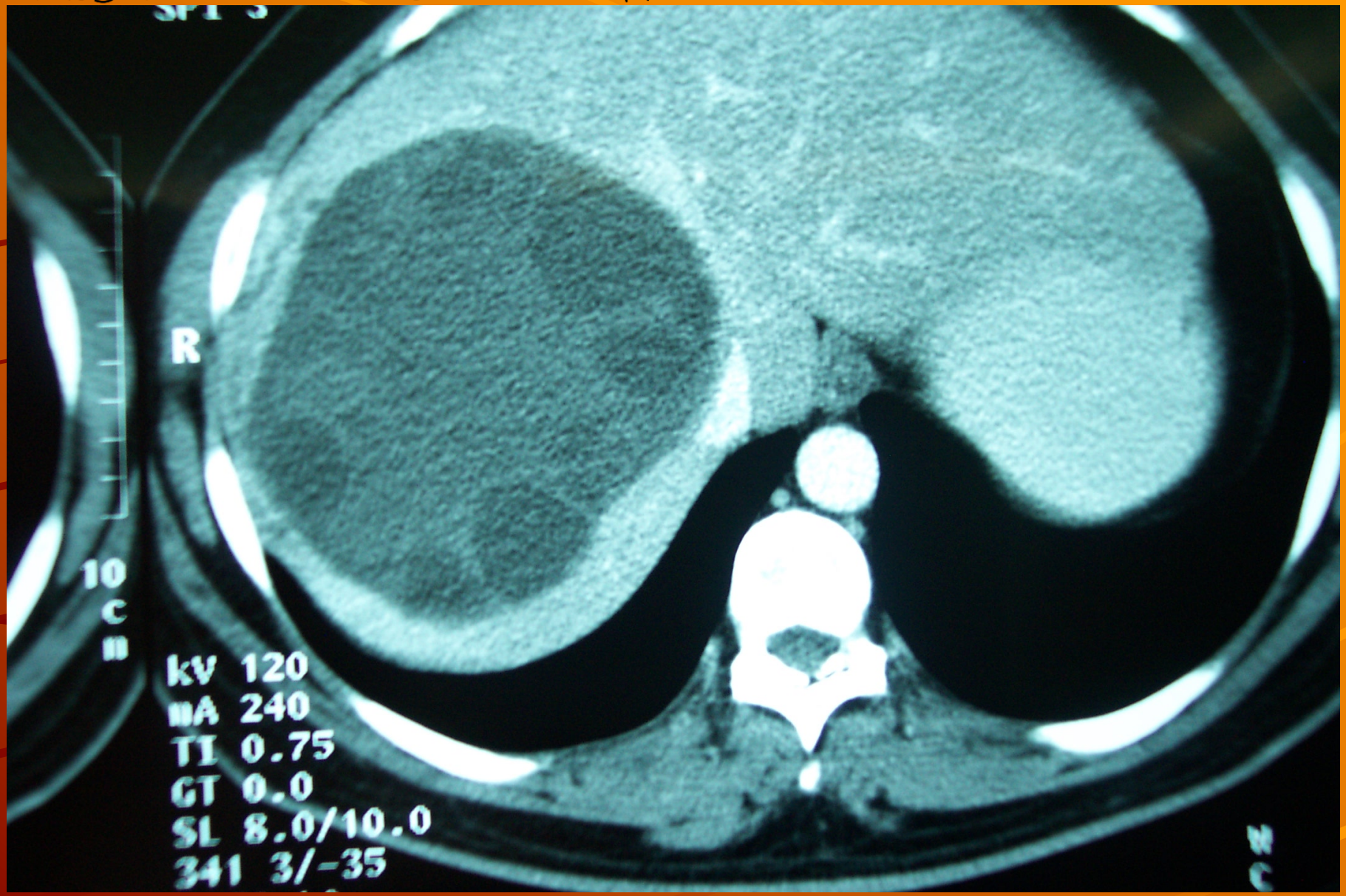
- CT SCAN: → typical, good to diagnose hypodense lesions, locate cyst, size, number, presence of daughter cysts & signs of rupture, nearest vessel & duct
- MRI. → MRCP detects rupture of biliary tree
- ERCP. → diagnostic & therapeutic in communicant duct (inject scolecidal agent then empty content)
- PTC.
- ANGIOGRAPHY.

→ not used

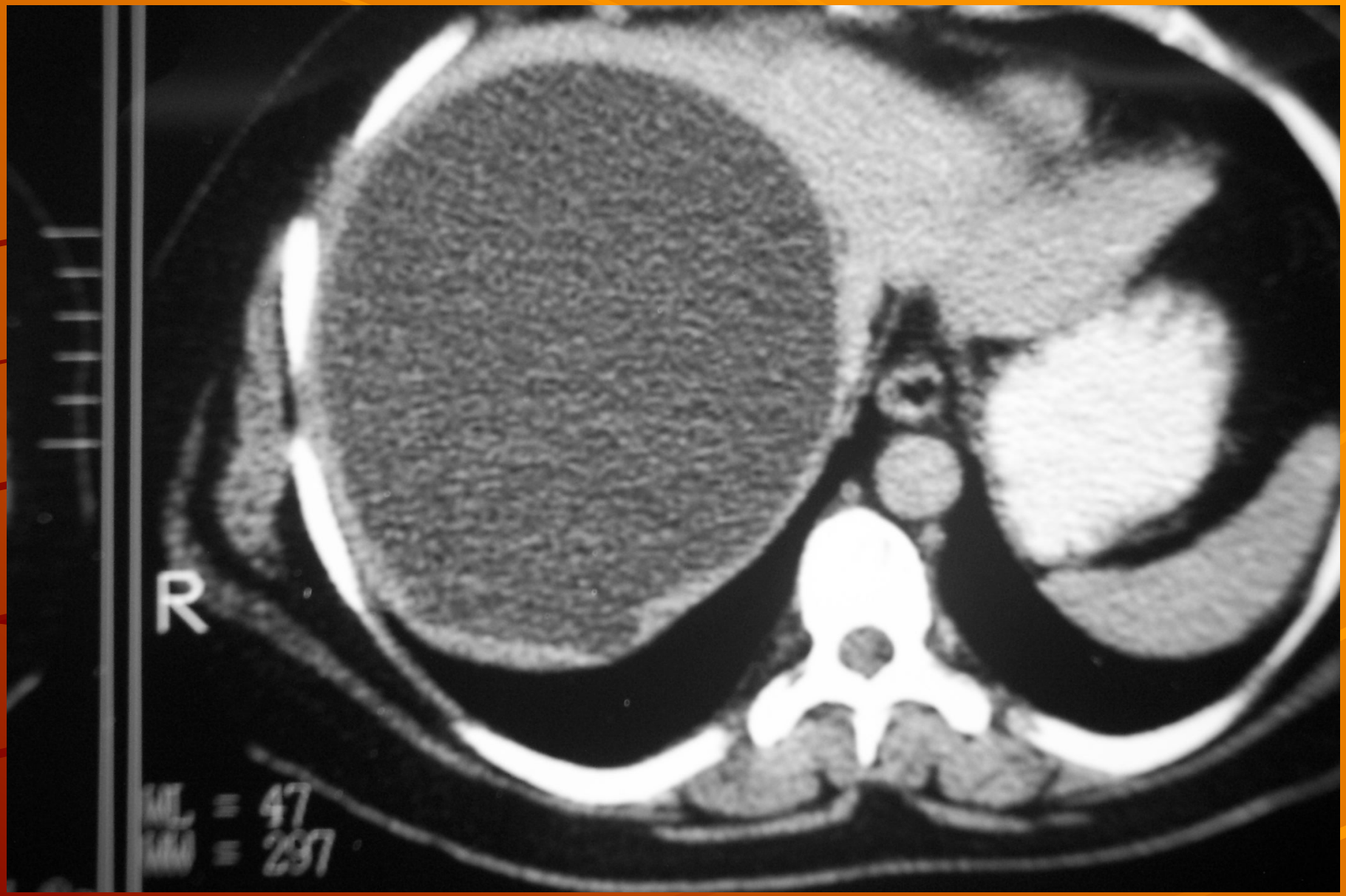
Simple cyst (unilocular, thick wall), compressing portal vein causing portal HTN & esophageal varices / homogenous / X daughter cyst



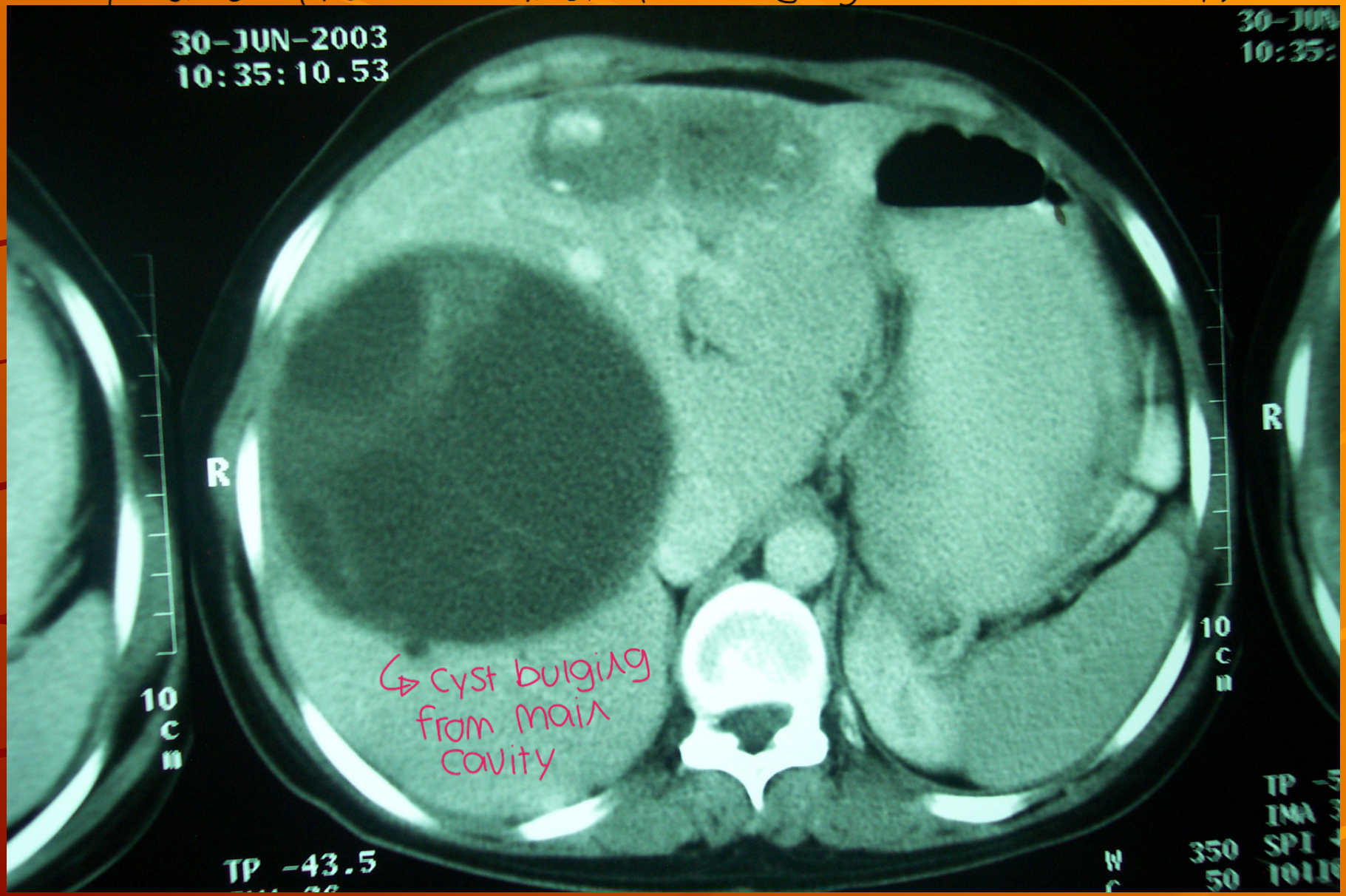
typical CT of hydatid cyst (big hypodense lesion with smaller daughter cysts (cog wheel appearance))



Simple Cyst occupying whole rt lobe



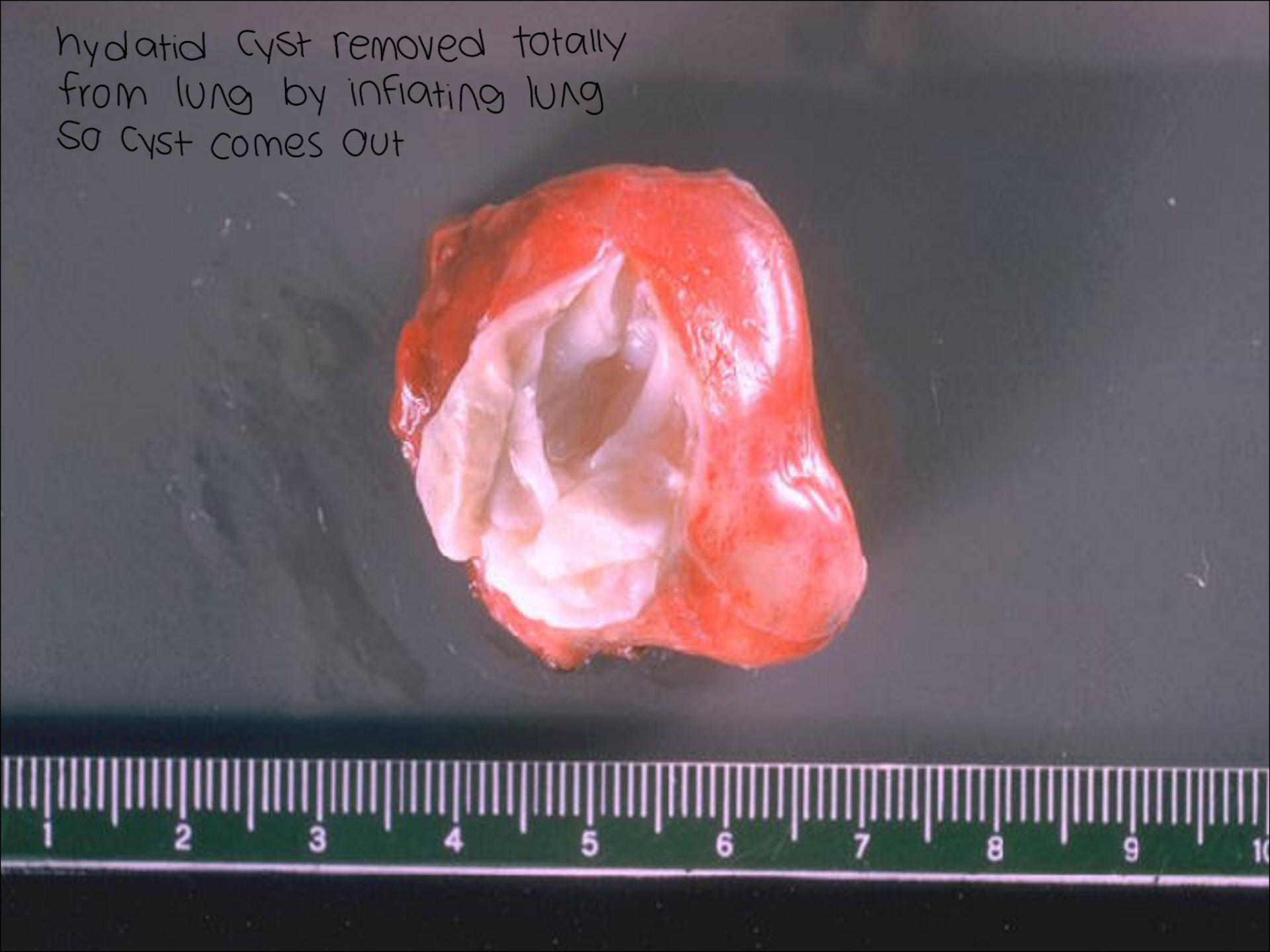
Multi hydatid cysts of liver with calcifications, septations, honey comb appearance & a cyst bulging from main cavity)



DIAGNOSIS- IMMUNOLOGY

- IHA.
- CFT.
- LA.
- IEF.
- CIE.
- ELISA. → Negative test doesn't exclude presence of hydatid cyst

We look for serum antibodies against echinococcus granulosus


hydatid cyst removed totally
from lung by infiating lung
So cyst comes out

Treatment of Hydatid Disease

Medical
Ideal: not yet completely efficient

Radiological
Selective

PAIRS

percutanous aspiration instillation reaspiration

(ideal for a deep cyst > 2cm deep)

risk of spillage & complications

SURGICAL

Attractive Laparoscopic
better vision, deal w/ biliary fistulae, access

Radical conventional

Medical treatment

- Antimony,Arsenic, Thymol derivatives, Iodides& Mercury.
- Mebendazole.
- Albendazole:10-14mg/kg/day, three 28 courses separated by 2 weeks rest.
- Praziquantel.

Albendazole Tx of hydatid diasease

author	yr.	no.	duration (mo)	cure	'success'
Nahmias	'94	68	4	41	57
Horton	89	253	1-12	29	
Davis	89	46	1-3	--	39
DeRosa	90	46	3	9	--
Todorov	92	35	4	--	43

success = marked improvement

albendazole Tx of hydatid disease (Italy)

Franchi, CID, 1999;29:304-9

- n = 323 patients
- Tx: 440 liver, 57 abdom., 143 lung cysts
- albendazole 10 mg/kg/d x 3-6 mo.
- assessment: degeneration by CXR, U/S, CT, MRI q 6-12 mo.
- f/u: 2 yrs. (1-14 yrs)

Long-term evaluation of albendazole Tx of hydatid disease: results (Franchi)

- Post Tx degeneration in:
  - 82% liver, 67%, abd. 88% lung
- long-term: + 22%
- 25% relapsed
- 78% relapses occurred < 2 yrs

CID 1999;29:304-9

albendazole + praziquantel vs. alb. alone

Cobo et al. Trop Med Int H 1998;3:462-66

- RT pre-op in Spain, x 1 month (no controls)
- groups: I (12) albendazole 10 mg/kg/d

  II (14) albendazole 10 mg/kg/d

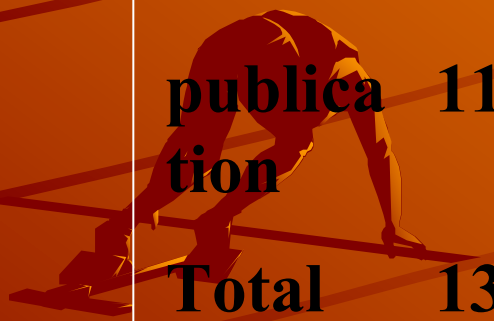
  III (21) alb. (10 mg/kg) + praz. 25 mg/kg
- viability: supravital staining,

Table2. Cyst response to Albendazol(Adrien,MD) World J.Surg.25(1)2001.

Data source	Evaluable cysts	Cure	Improved	No change	Worse
European data	435	160(35.2%)	187(41%)	102(22.4%)	6(1.3%)
Publication	2912	663(22.8%)	1418(48.7%)	831(28.5%)	
Total	3347	823(24.6%)	1605(48%)	919	

Table1. Clinical response to Albendazol(Adrien G.Saimot MD) World J.Surg.25(1)2001

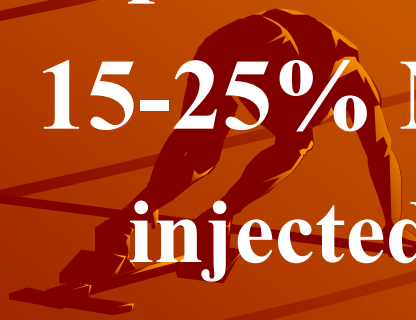
Data source	No of patients	Cured	Improved	No change	Worse
European data	253	72(28.5%)	129(51%)	46(18%)	6(2.4%)
publication	1116	372(33.5%)	469(42%)	275(24.6%)	
Total	1369	444(32.4%)	598(43.7%)	327(23.9%)	



Techniques used for PAIR

1. **Percutaneous puncture:** + aspiration & injection

- **18 g Seldinger needle**
- **aspirate 25-35% est. volume**
- **15-25% NaCl = ~10% aspirated vol. injected. (kill in 5 min,)**
- **wait (10 min.) for pericyst separation**
- **reaspirate**



Techniques used for PAIR

2. Catheterization:

leave it for 24 hrs to empty content then inject scolecidal agent

- as above
- 6F catheter inserted
- wash out with hypertonic saline
- drain x 24 hrs. (<10 cc/24 hr = no bile connection)
- cystogram
- 95% alcohol (25-35% vol.)
- reaspirate & withdraw catheter

Percutaneous (PAIR) Tx of liver cysts

Akhan, Eur J Radiol 1999;32:76-85

1. **Hydatid liver disease:** 14 studies
   - 13 studies (641 cysts) 1 Chinese study (996 cysts)
   - 1,637 cysts in 1,000 pts
   - instillation of alcohol or hypertonic saline
   - f/u 1-3 years ($\overline{1}$ yr)

1. Liver hydatid disease: results

- cure or significant change: 90-100%
- recurrence 0 - 4%
- complications: ~ 10%
  - biliary fistula: ~ 5-10% (7 studies)
  - fever, urticaria: 10-20%
  - cyst cavity infection: ~ 3%
  - death: 0.1 - 0.2%

PAIR: In a literature review
Table3: review of recent experience(1994-1998).(Iskende Sayek)

Finding	Surgically treated	Percutaneously drained
Total	46(37%)	79(63%)
Solitary cysts	29	55
Types	III-V:34(74%)	I-III:65(82%)
Complicatios: Minor	2	11
Complications: Major	6	9
Cavity infection	5	8

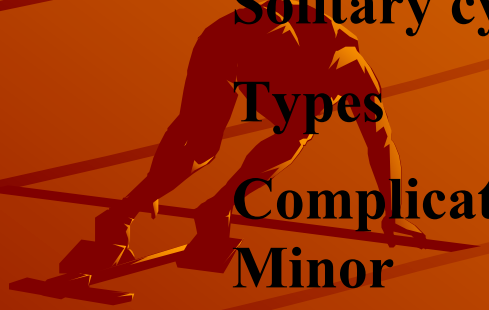
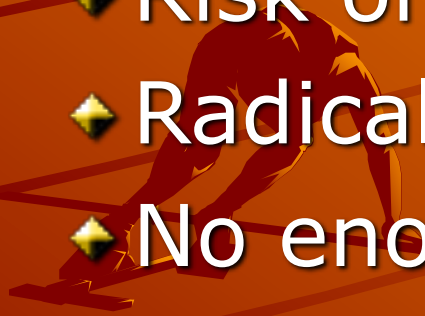


Table3….. continue

Finding	Surgically treated	Percutaneously drained
Biliary drainage	1	1
Wound infection	2	-
Patients requiring surgery	-	2

Laparoscopic

- Minimal invasive.
- Stands in the midway between PAIR&conventional surgery.
- Risk of spillage.
- Radicality?
- No enough randomized studies to come up with a conclusion.



decrease risk by sterilizing cyst by medical treatment before surgery or put a gauze (ผ้าก๊อซ) w/ scolecidal agent around cyst before removing it

Types of surgery

- Marsupialization. (old technique, suture edges of cyst to skin)
- Cystectomy plus.
  - Pericystectomy- partial → resect apparent part → empty → deal w/ residual
  - Pericystectomy- subtotal.
  - Pericystectomy- Total. → can cause bleeding, fistulization, biliary tree injury, difficult for multi cysts
- Resection: segmental, lobar, total+transplantation.

→ not preferred since it's a benign disease (get rid of parasite & liver will be normal)

Remaining cavity

- Primary closure. not used
- Simple drainage.
- Capitonnage. (ligating walls)
- Introflexion. (suturing edges inside (not used)
- Omentoplasty.
  - ↳ fill it w/ omentum (most significant & used)

↳ accumulation of blood & bile in it leads to infxn & abcess or deep suppuration so we need to deal w/ remaining cavity

* internal drainage (suture cavity to small bowel or stomach to drain it there) → maximizes surgery without a different outcome

Ahmet et al in a study of 304 cases concluded that:”For management of hydatid cyst of the liver . Capitonnage , omentoplasty, cyst excision,cystenterostomy are all superior to tube drainage.”

Source: *Arch.Surg.vol 134 Feb.1999.*

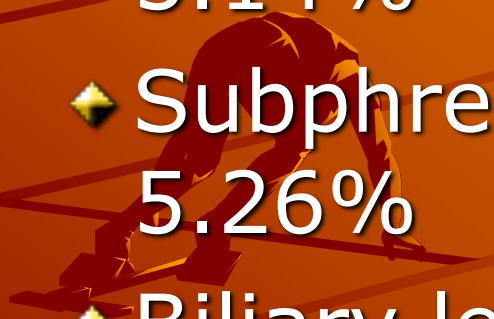
N.B:However 35/122 patients with tube drainage had infected cysts.

Cysto-Biliary Cmmunication: 171cases Milicevic

- Suture 115 67.25%
- Suture+T-tube 15 8.77%
- T tube only 16 9.34%
- Roux-en-y jej. 4 2.34%
- Intracavitary reconstruction 2 1.17%

Post-operative complications

- Wound infection 111
  13.5%
- Chest problems 42
  5.14%
- Subphrenic abscess 43
  5.26%
- Biliary leakage 40
  4.89%
- Liver abscess 20
  2.45%



Results of surgical treatment

- Def.of recurrence: controversy.
- Amir Jahed 1975: 0.9%
- Dugalic 1982: 1.7%
- Pitt 1986: 10%
- Magistrelli 1991: 10.8%
- Little 1988 : 22%

Table4. Postoperative morbidity & mortality in a series of 298 patients.(Anaceleto Cirenei,MD, Innocenzo Bertoldi MD)

Treatment	No.	Morbidity	Mortality
Conservative methods	134	12(12.6%)*	8(5.9%)**
Marsupialization	20	8(40%)	6(30%)
Partial cystopericystectomy	114	9(7.9%)	2(1.7%)
Resection of pericyst &subtotal pericystectomy	85	6(7.1%)	2(2.3%)
By peeling the pericystium	29	3(10.3%)	--

Table4. …. Continue
World J.Surg25(1) 2001.

Treatment	No	Morbidity	Mortality
Radical methods	164	9(5.5%)	3(1.8%)
Total pericystectomy	132	5(3.7%)	3(2.2%)
Liver resection	32	4(12.5%)	--
Total	298	26(8.7%)	11(3.6%)

P*<0.05,
P=NS.**

hydatid cyst of the liver with a large biliocystic fistula.(Abeljelil Zaouche et al) World J.Surg 25 (1)2001.

Procedure	No
Radical treatment	24(9.8%)
Left lobectomy	7
Pericystectomy	17
Conservative treatment	220(90.2%)
Internal transfistulary drainage	52
Deroofing procedure	140

Table 5…..continue

Procedure	No
Respected fistula	20
External drainage	**10**
External drainage +omentoplasty	8
External drainage +capitonnage	2
Sutured fistula	*93*
External drainage	49

Table 5. …. continue

Procedure	No
External drainage+omentoplasty	28
External drainage +capitonnage	16
Direct fistulization	**27**
Transcholedochal evacuation	**28**

Personal experience(1993-2000)

- Number of cases: 82
- males: 36(43.9%), Females:46(56.1%).
- **Anatomical distribution**:
- RT lobe: 35 (42.6%).
- LT lobe: 23 (28%).
- Both lobes: 22 (26.8%).
- Central : 2 (2.4%).
- Involvement of other organs: (12.1%).
- Associated pathology: Pregnancy(2), Cirrhosis(2).

Technique

Standard surgical principles were applied:

- Complete isolation of the operative field.
- Two powerful suctions.
- Aspiration- Suction(after stopping breathing)infusion-Reaspiration.
- Opening of the cyst, evacuation & Irrigation-suction.(scolicidal agent).
- Unfoldindg of the pericyst.
- Mobbing of the cavity.
- Dealing with cystobiliary communication if present.
- *Abdominal approach was exclusively used.Scolicidal agent:Sterimide0.5%-1%.*

Surgical procedures Adopted

- The procedure of choice was:Cystectomy+(partial/subtotal) pericystectomy+ Drainage of the remaining cavity: 69 cases(84.1%).
- Other procedure, Capitonnage, Omentoplasty, Hepatectomy, Exploration of CBD, Transduodenal sphincteroplasty&total pericystectomy.
- Cholecystectomy performed in 22 patients(26.8%).

Management of cysto-Biliary Communication:32/82(39%)

- **Simple fistula 22/32:** Respected+drainage, Cannulation with small tubes,Draining the cavity, direct suturing of the fistula.
- **Frank Rupture 10/32:** Daughter cyst in CBD 8/10, Preoperative **EPST+**intraoperative trans duodenal sphincteroplasy+ T-tube drainage of CBD. 5/10 , Internal transfistulary drainage of CBD+Postoperative **EPST**. 3/10.
- **Fistula> 5mm** - Internal transfistulary drainage. 2/10 . **Noticeably:** In the same patient- Multiple cysts tend to have communication with the biliary tree, regardless to their number or size.

Results

- **Operative Mortality: 0/82**
- **Mortality rate: 2/82 (2.4%)**multiple infected cyst(1),biliary peritonitis(1)
- **Infection of the remaining 8 cavity: 7/82(8.5%)**
- **Persistent bile leakage through the drain: 3/82(3.6%)**
- **Encysted bile collection: 1/82**
- **Simple liver cyst: 1/82**

Follow-up

- **Clinically : OPD.**
- **Radiological : U/S, CT Scan.**
- **Serological: ELISA, IHA.**

to make sure there is no recurrence

echinococcus titer may persist for months

CONCLUSION

- **Treatment of liver hydatid cyst is not as simple as just draining a cysts.**
- **Calcified cysts(partially/Totally)should be approached very carefully.**
- **Central cysts(portahepatis) with biliary involvement more difficult to deal with.**
- **With more experience in liver & biliary surgery it's easier to deal with complicated hydatid cyst.**
- **Treatment of Hydatid cyst of the liver should be a multidisciplinary approach.**
(surgeon,gastroenterologist,radiologist,parasitologist,immunologist)