

MRI in the diagnosis and follow-up of cystic echinococcosis

3rd Symposium Cystic Echinococcosis - Mediterranean

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Why talk about MRI in cystic echinococcosis?

- Easier to review and share in multidisciplinary meetings than CT
- High soft-tissue contrast for complex cystic lesions
- Few MRI-focused data are available in the literature
- Better depict specific complications

Classification WHO-IGWE



What is the difference between active vs inactive cysts ?

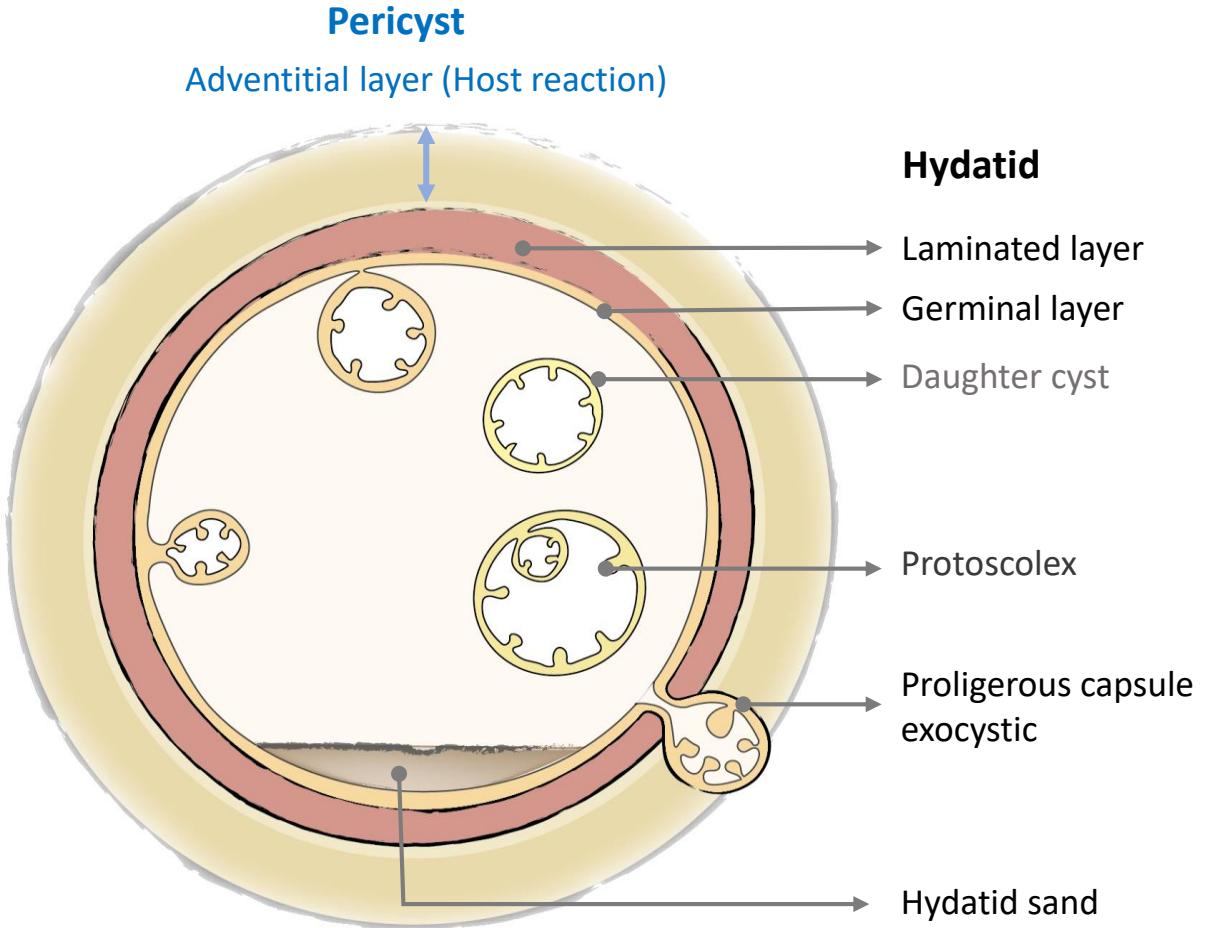
Classification WHO-IGWE



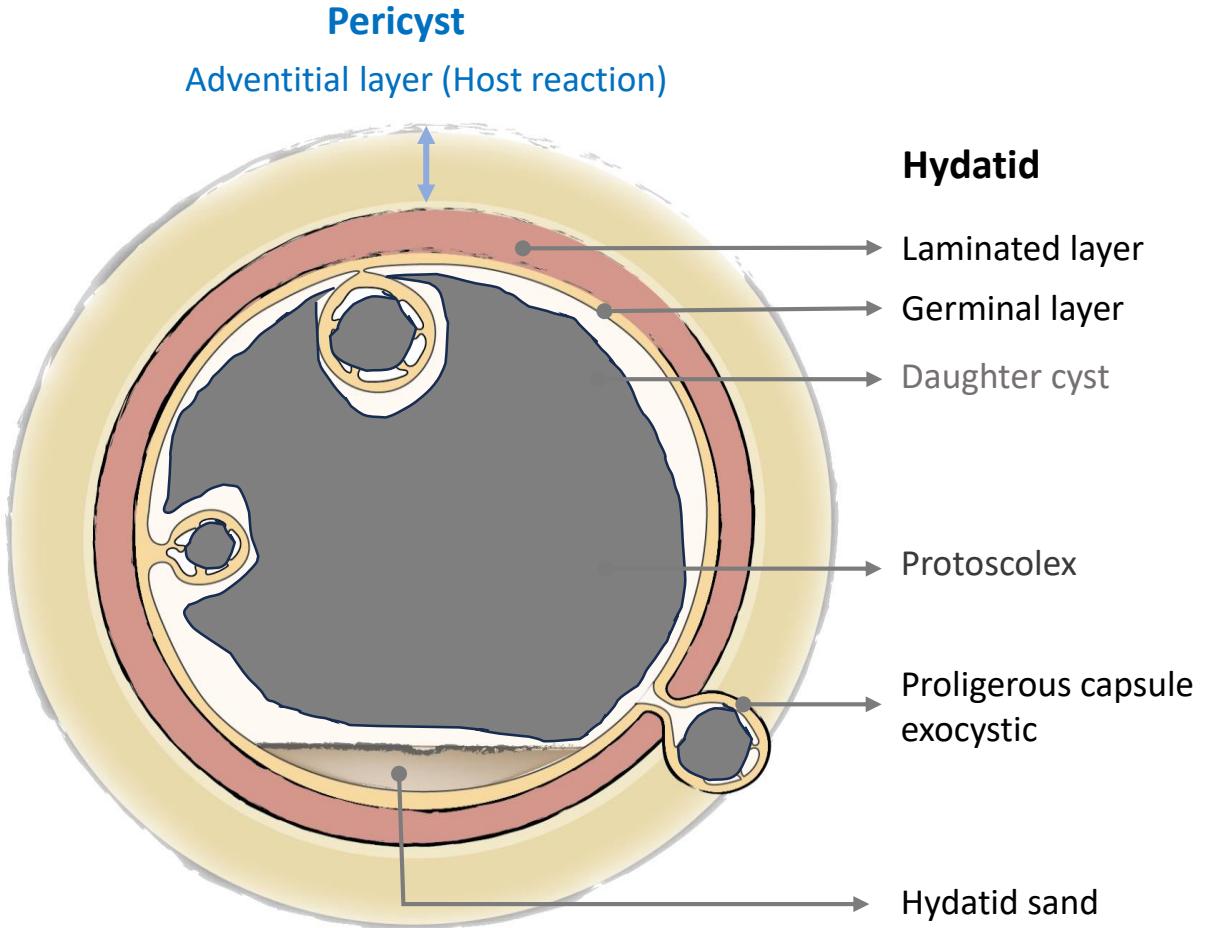
What is the difference between active vs inactive cysts ?

Liquid !

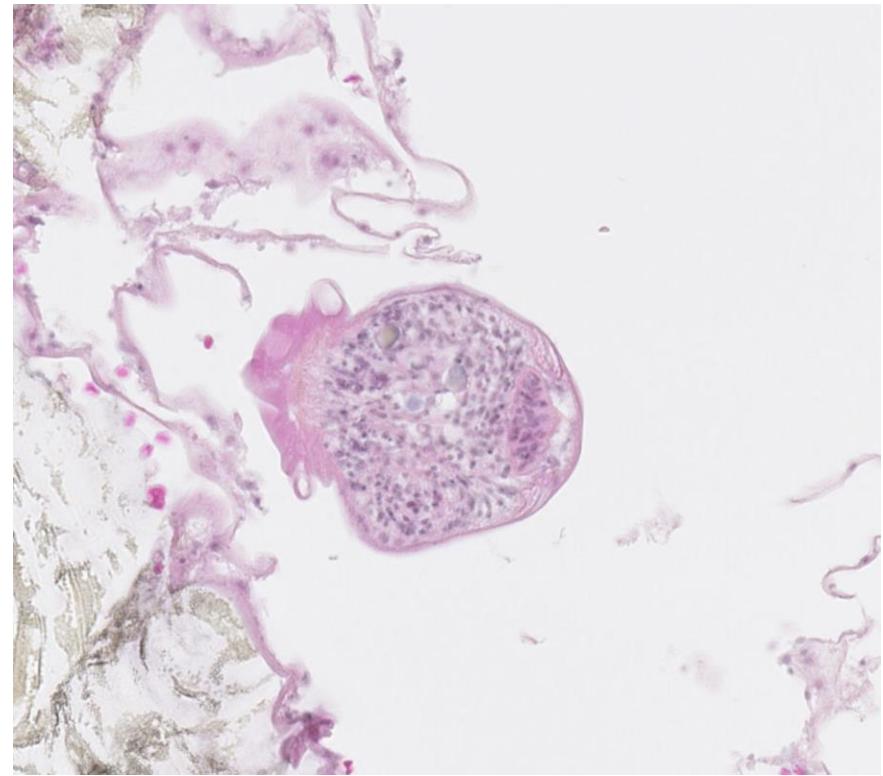
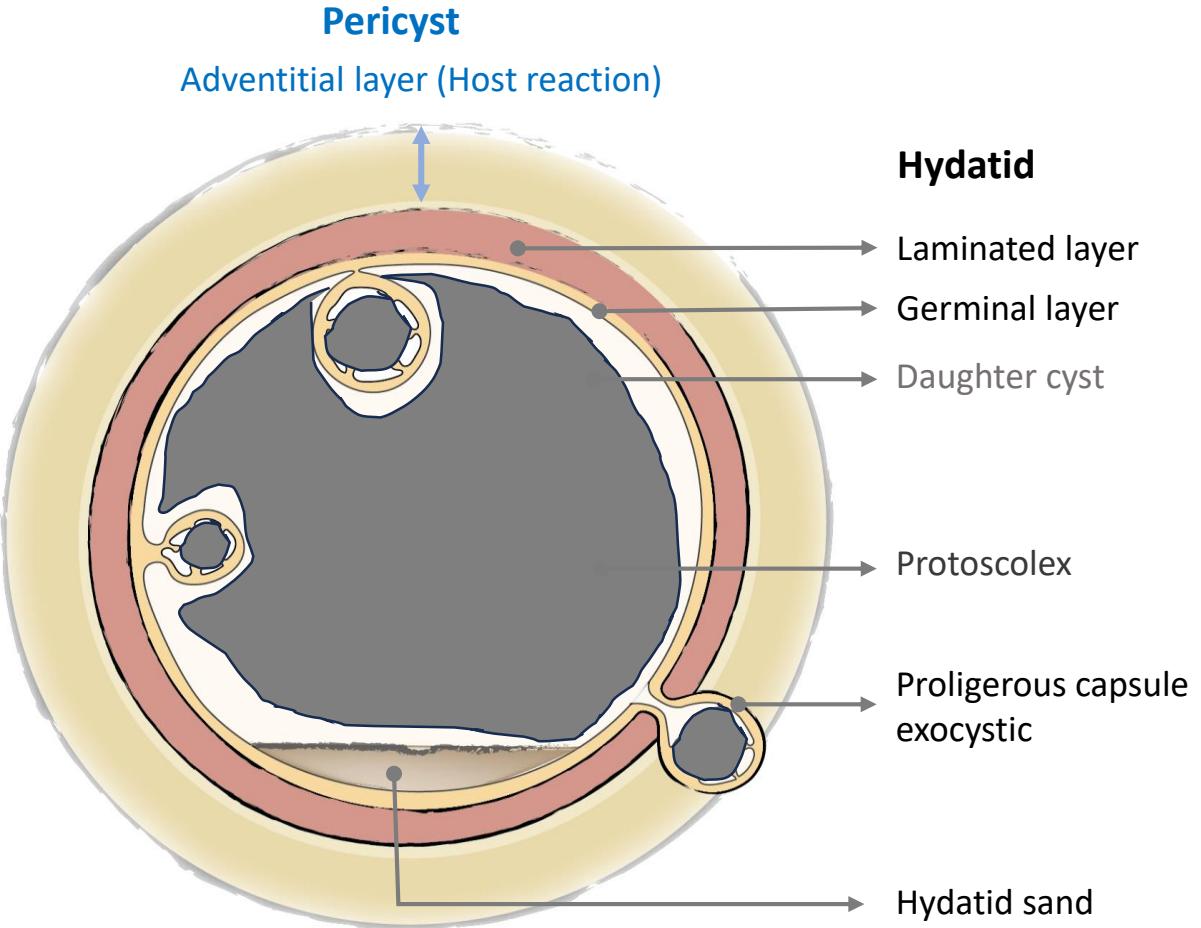
The parasite



The parasite



The parasite



Diagnosing liquid



CT is not so good



US ?

Diagnosing liquid

CT is not so good



US ?



Diagnosing liquid

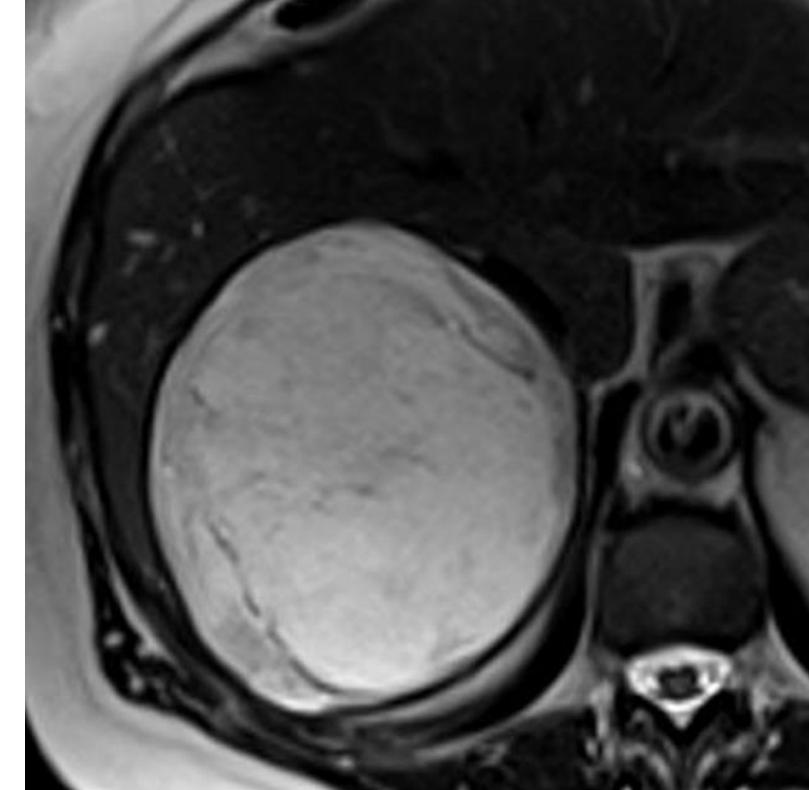
CT is not so good



US ?

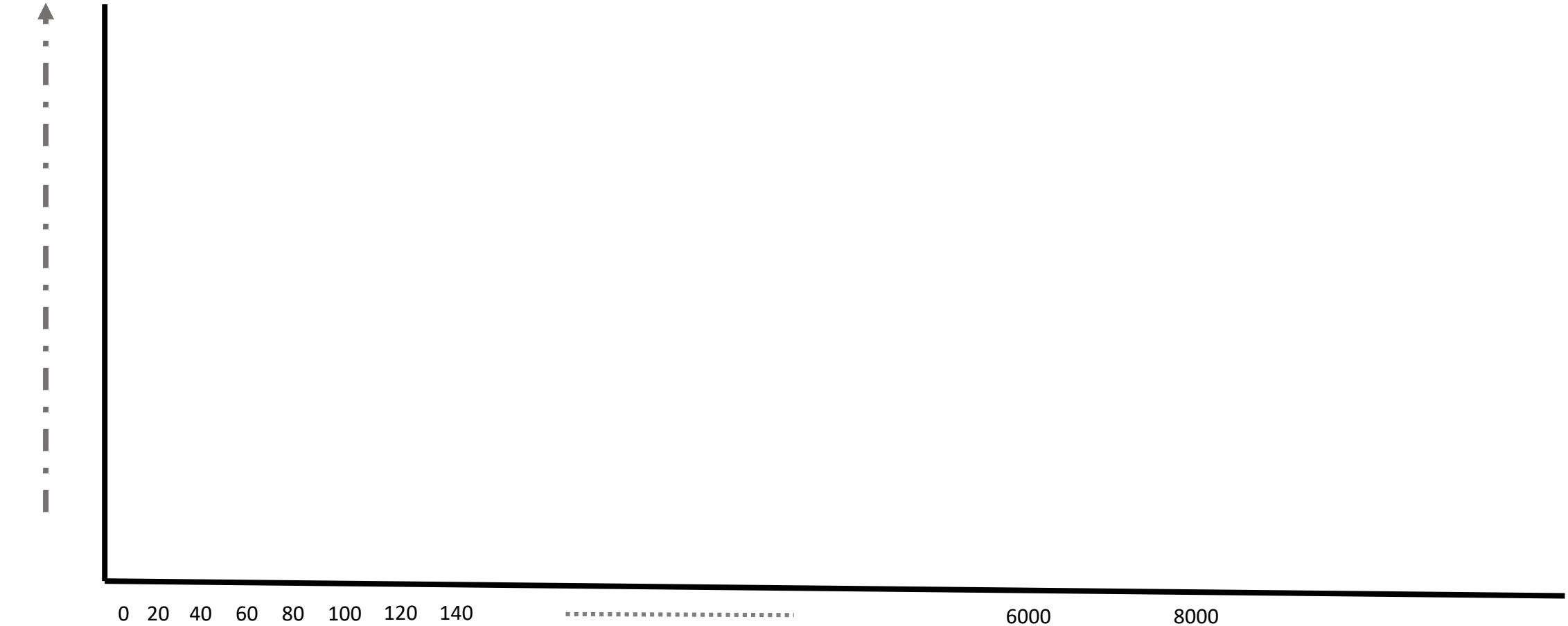


MRI ?



Diagnosing liquid

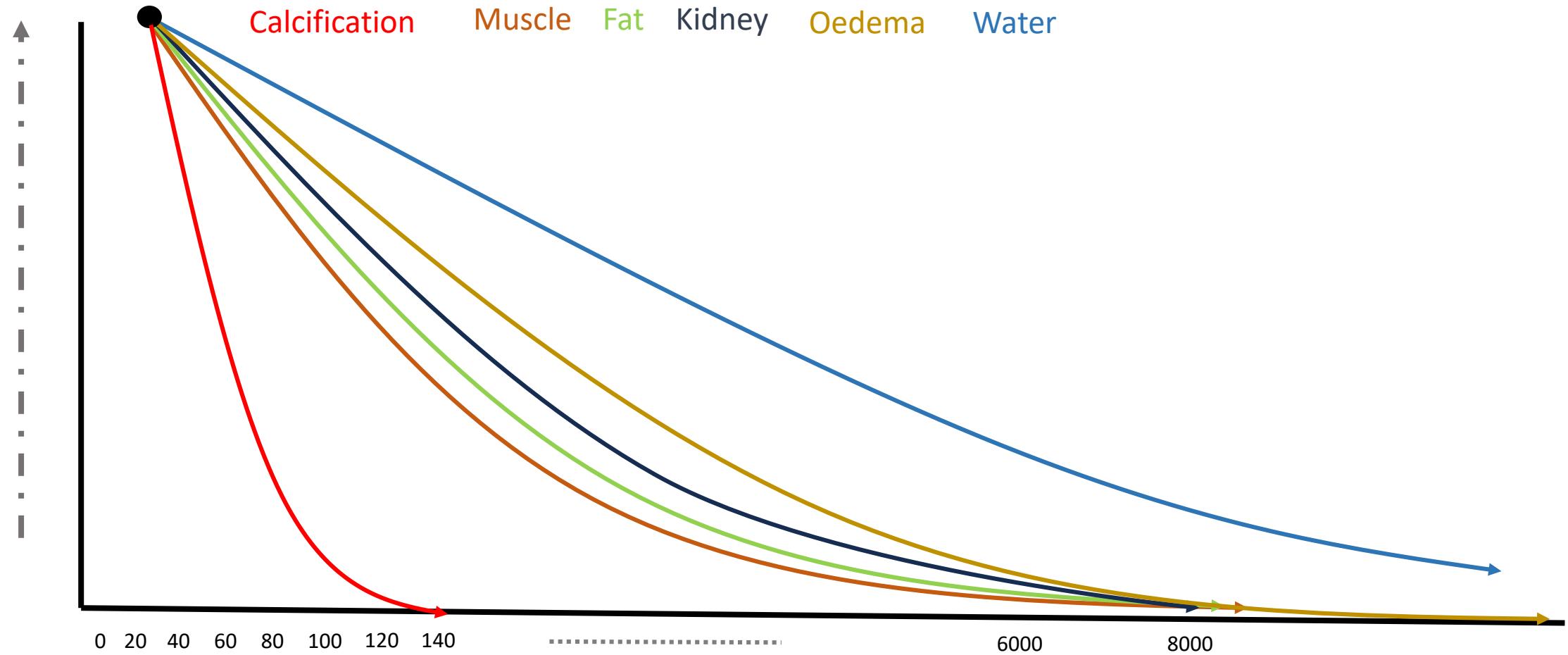
What is T2 weighted imaging ?



T2 weighted imaging = acquisition at a specific TE

Diagnosing liquid

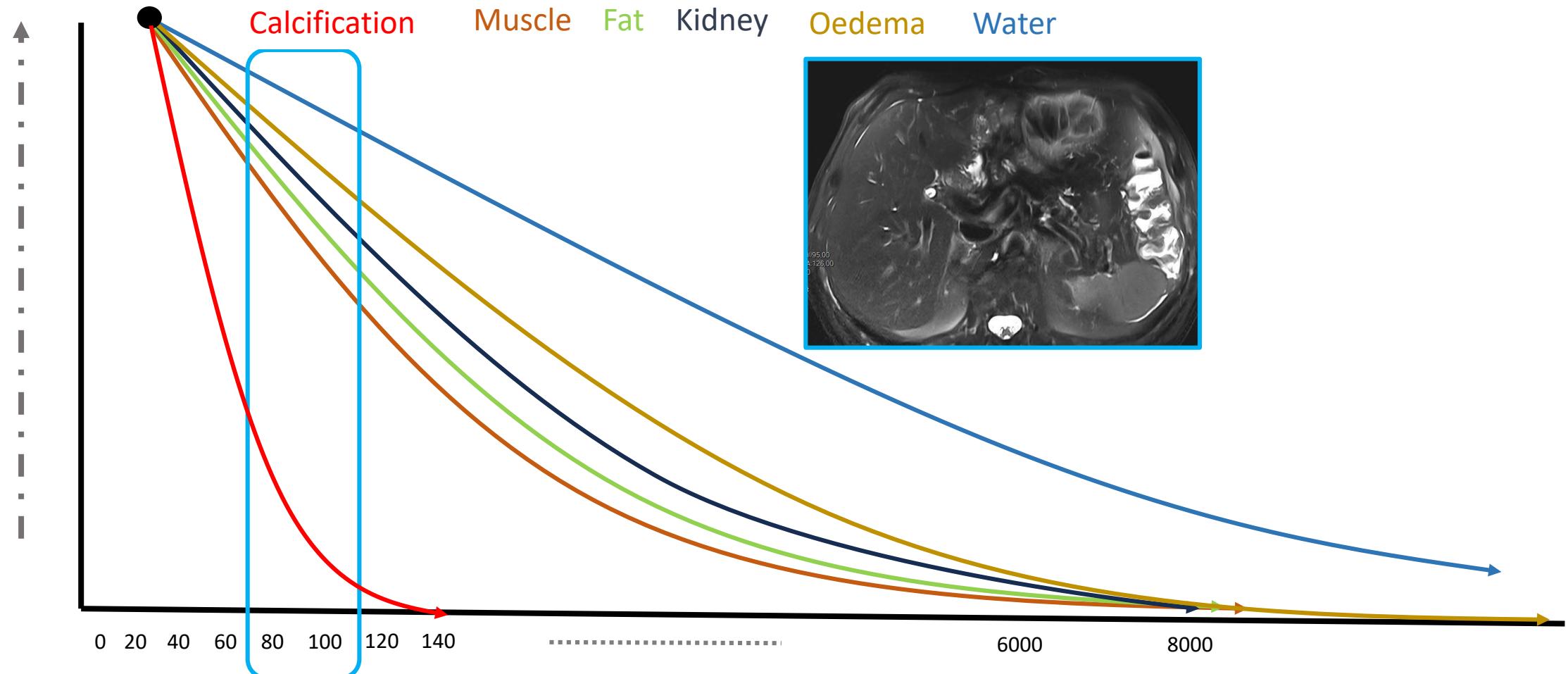
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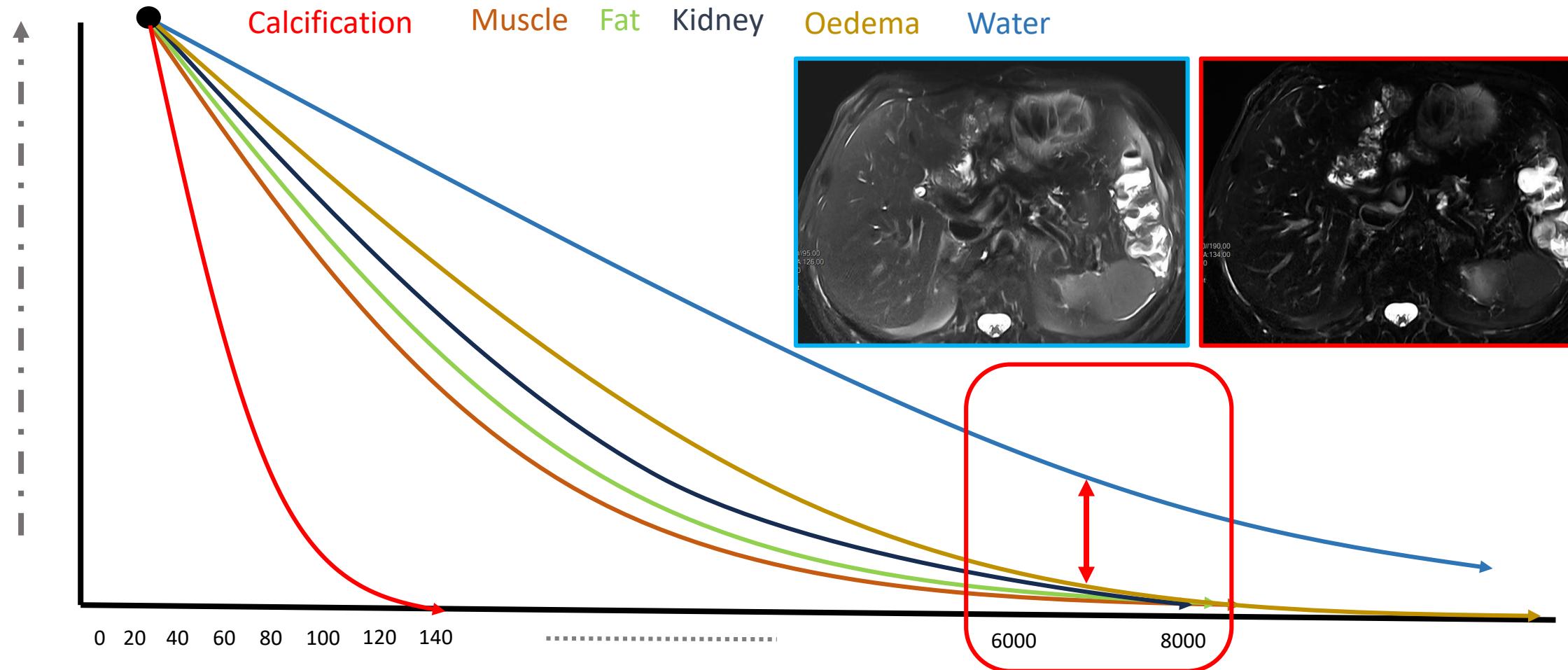
What is T2 weighted imaging ?



T2 weighted imaging = acquisition at a specific TE « Conventionnal » T2 weighted imaging

Diagnosing liquid

What is T2 weighted imaging ?



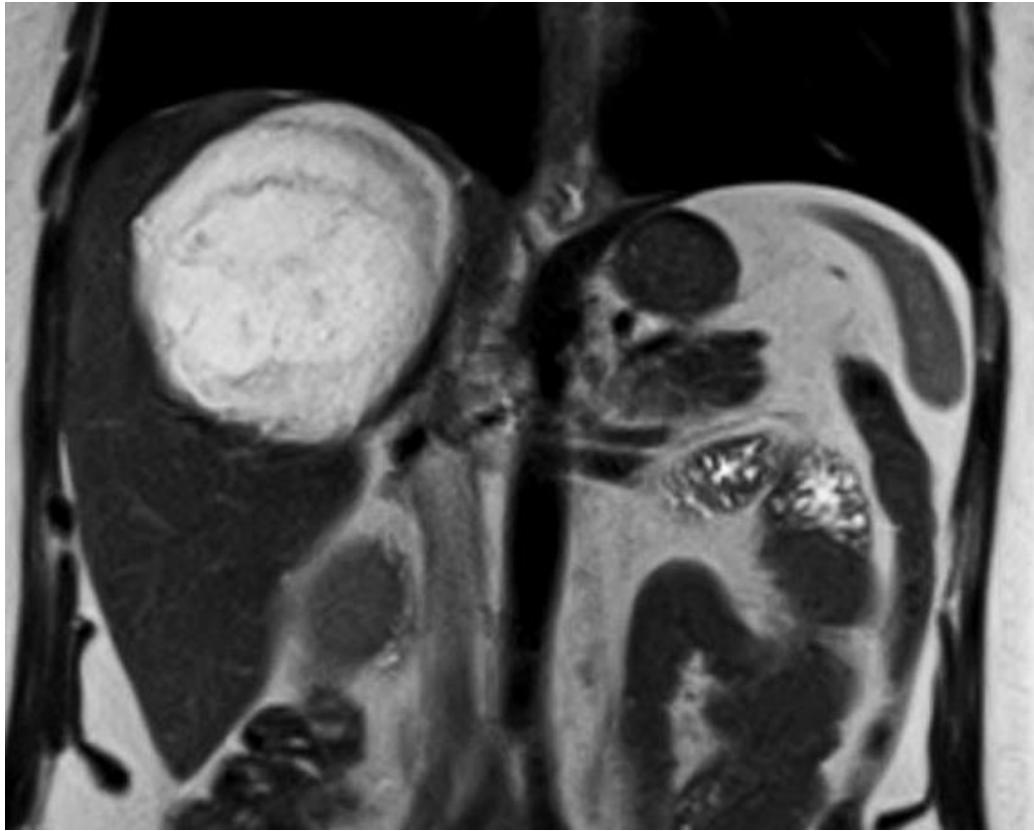
T2 weighted imaging = acquisition at a specific TE

« Conventionnal » T2 weighted imaging

Equivalent to MRCP

Diagnosing liquid

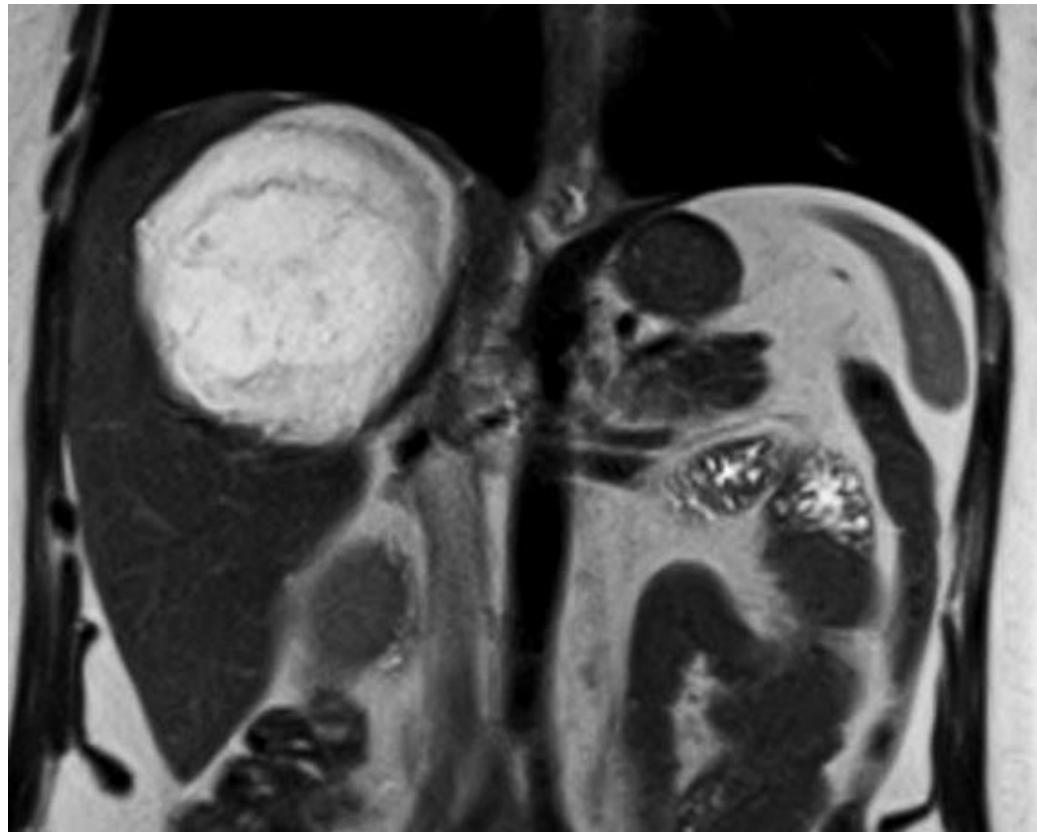
Active or inactive ?



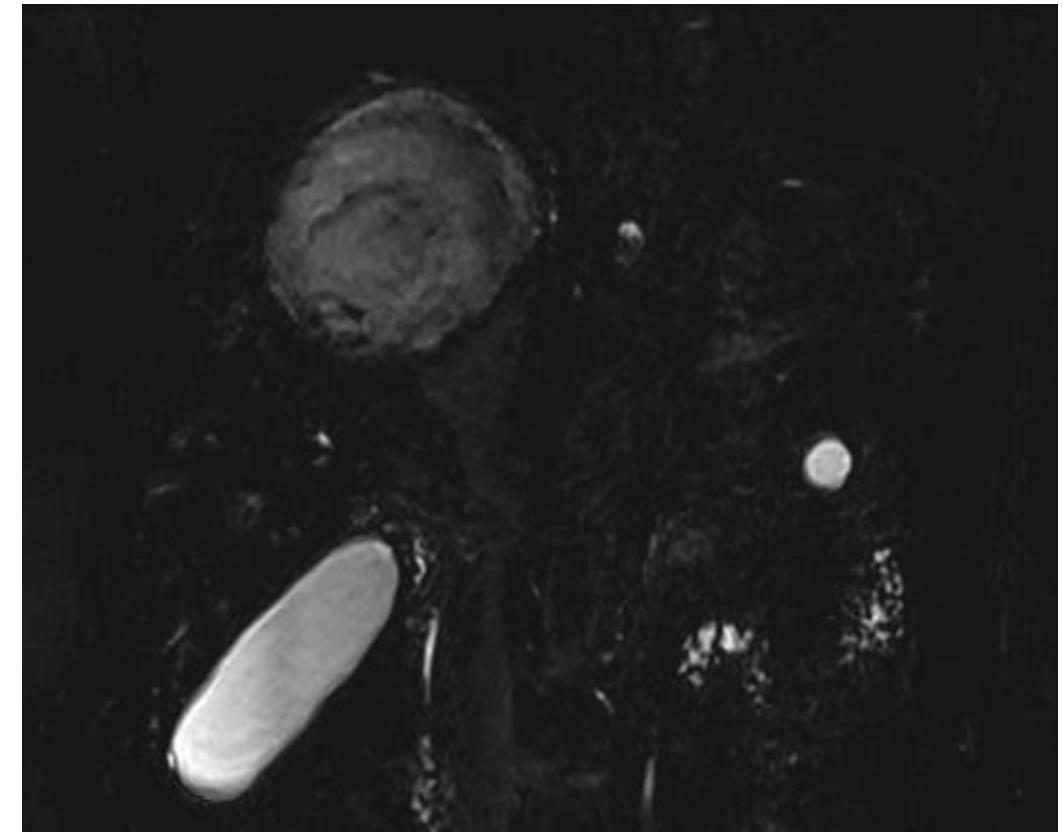
Coronal T2 weighted imaging

Diagnosing liquid

Active or inactive ?

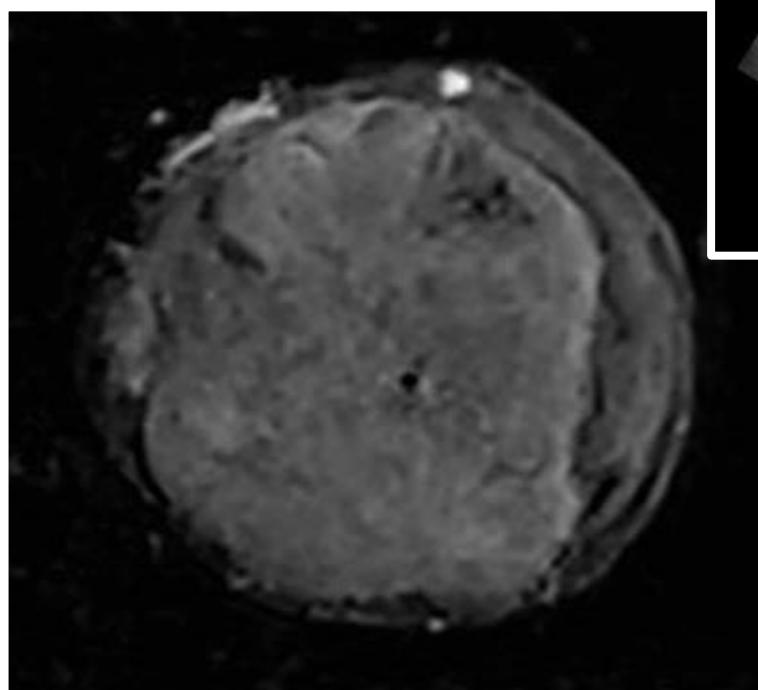
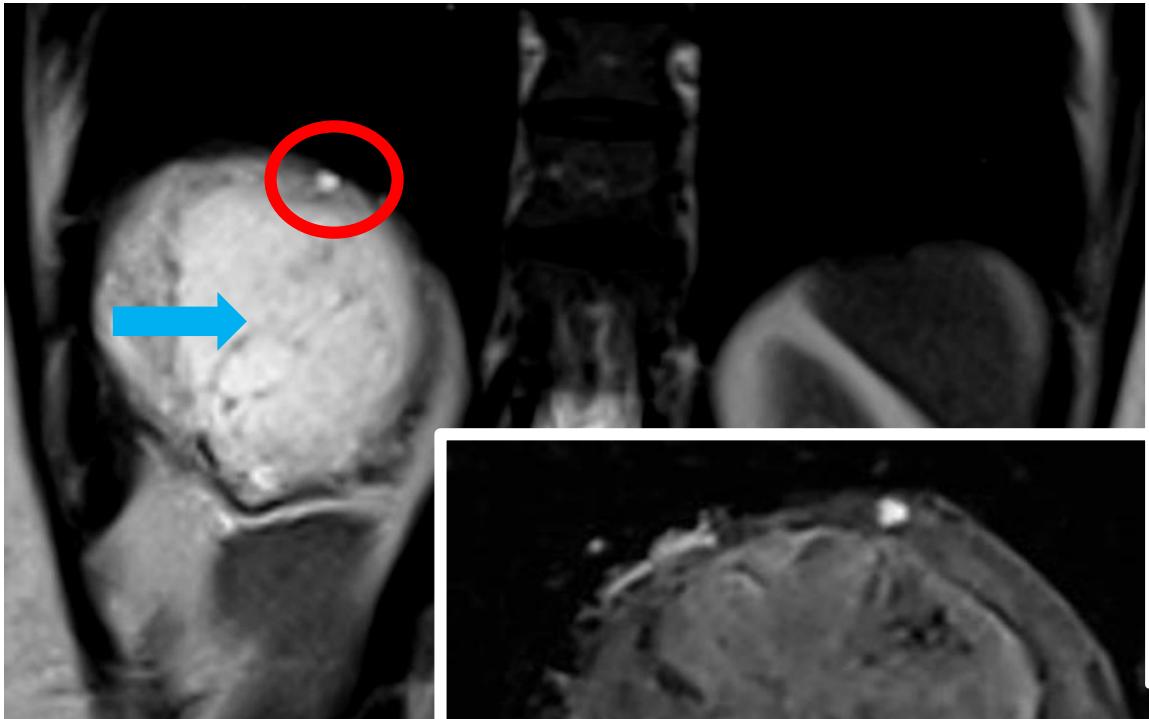


Coronal T2 weighted imaging



MRCP

Diagnosing liquid



Active or inactive ?



T2 weighted imaging protocol in cystic echinococcosis

At least two T2 acquisition

If possible, with different echo times (TE)

Question of systematic MRCP

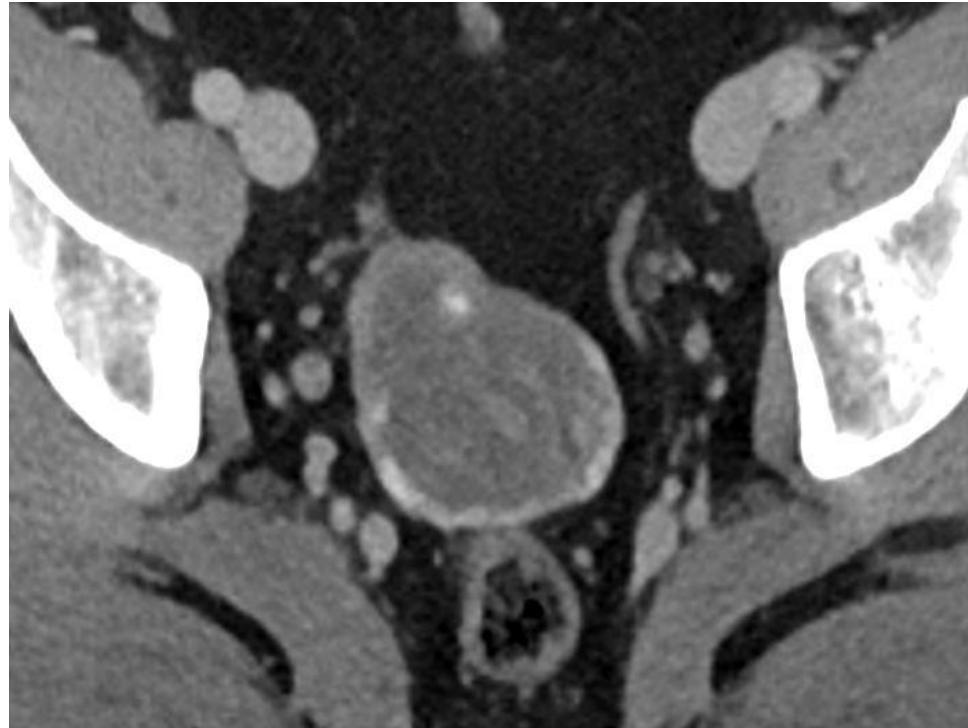
- Time consuming
- Almost never exhaustive

Matrix CE cysts analysis

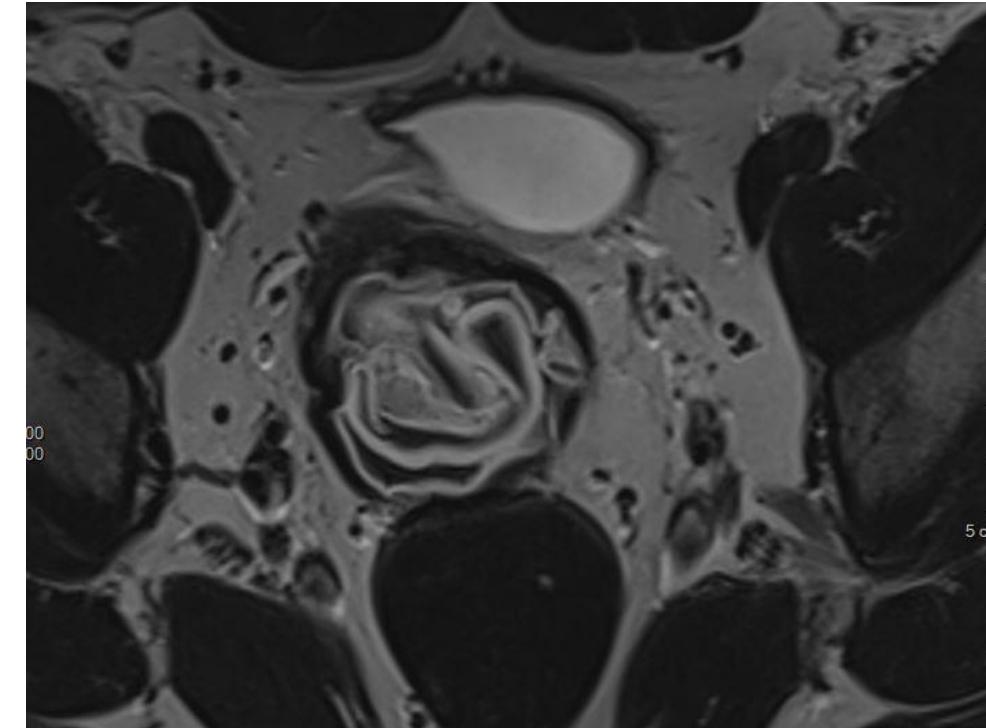


Matrix CE cysts analysis

Exploring inactive cysts

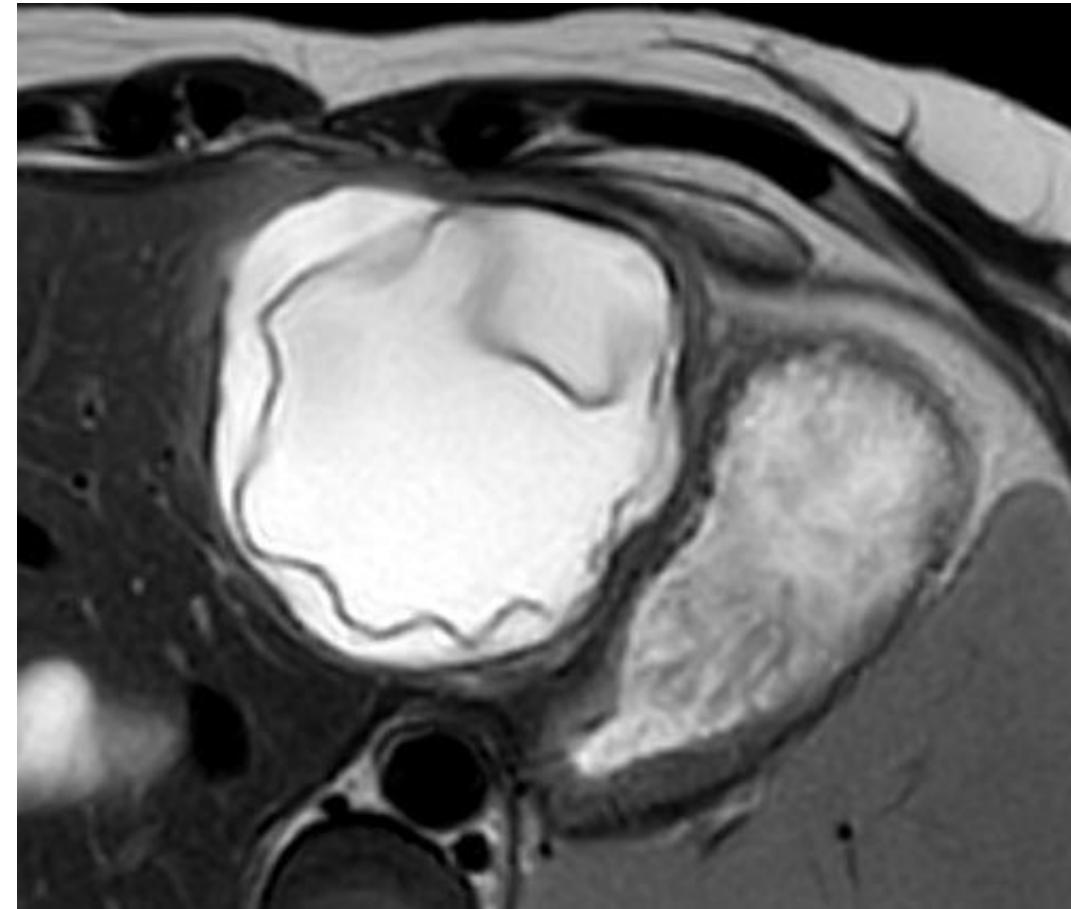
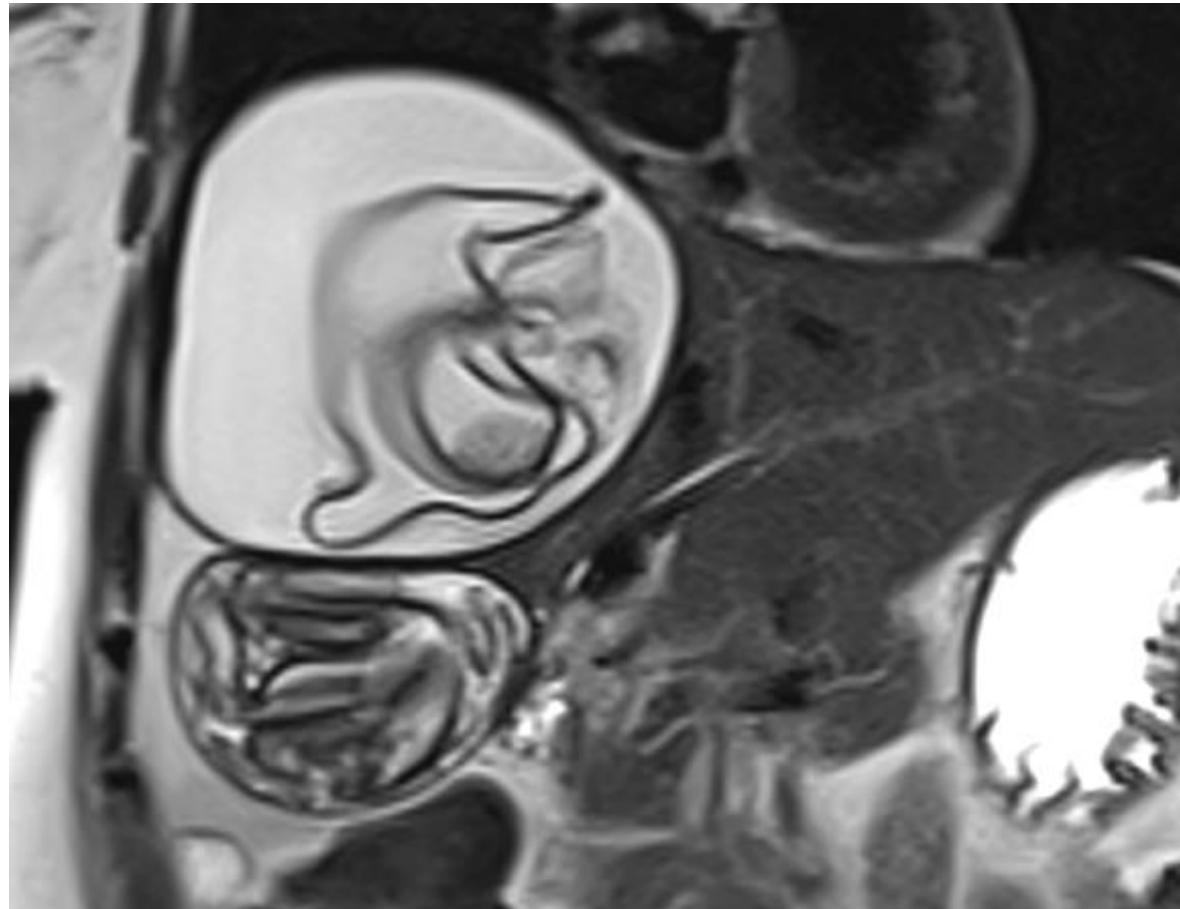


Abdominal CT



MRI T2 weighted imaging

Matrix CE cysts analysis



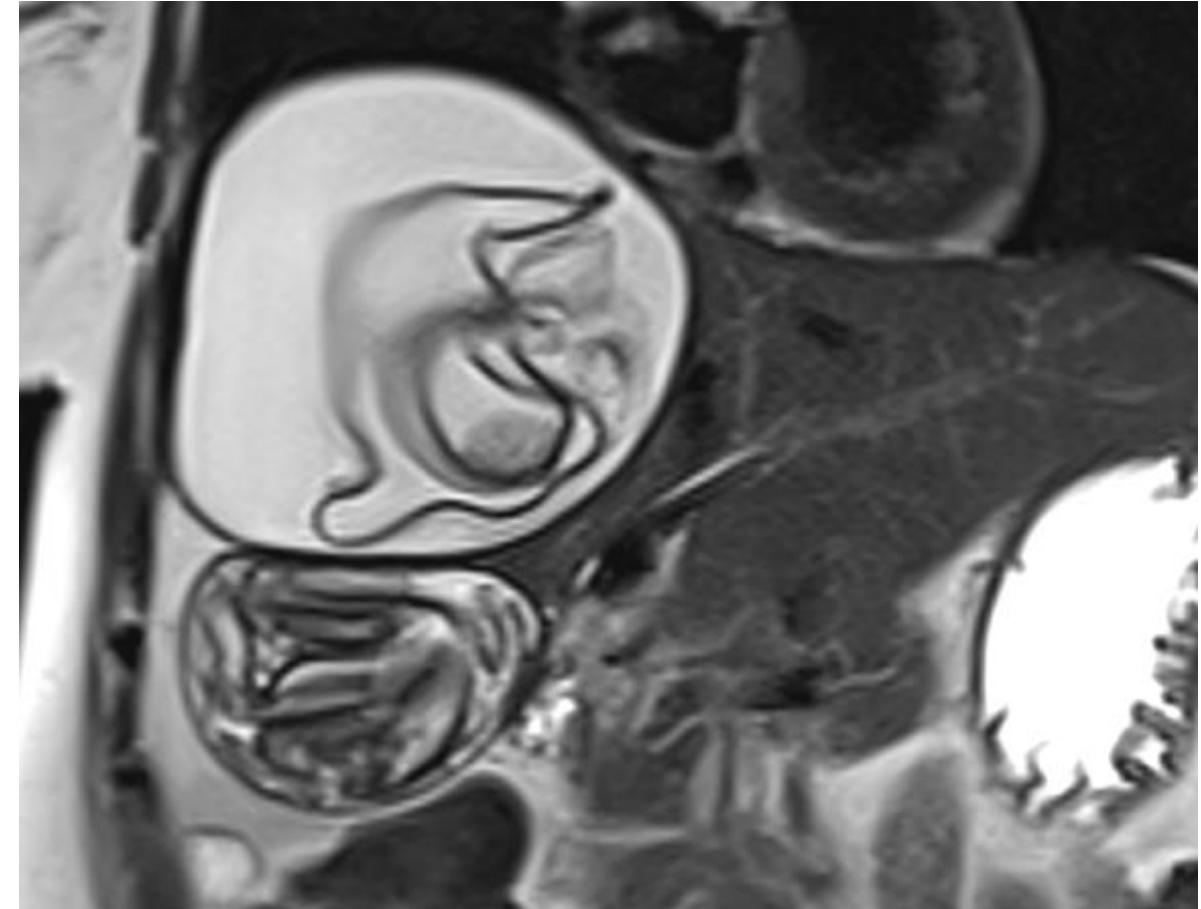
CE3a – transitionnal

Matrix CE cysts analysis

Exploring inactive cysts



Flip

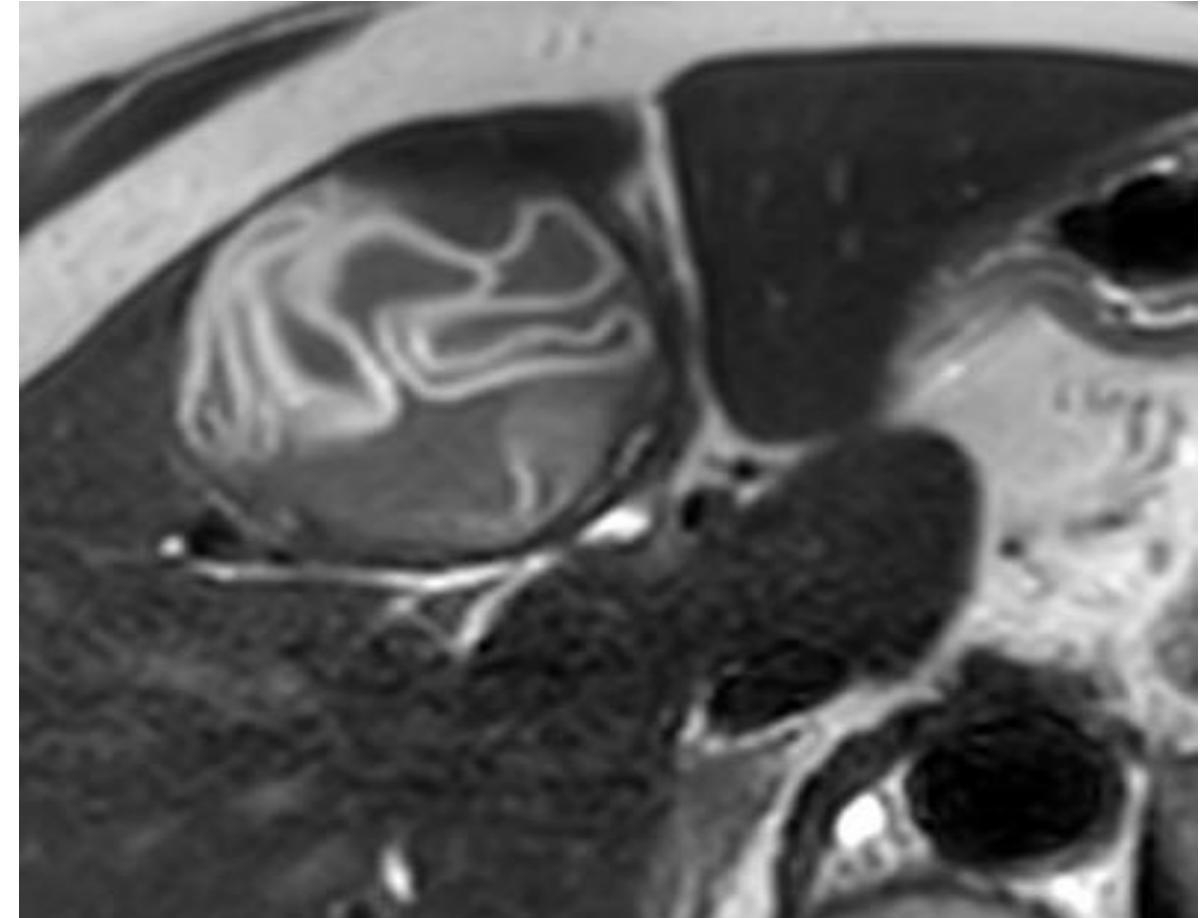


Matrix CE cysts analysis

Exploring inactive cysts

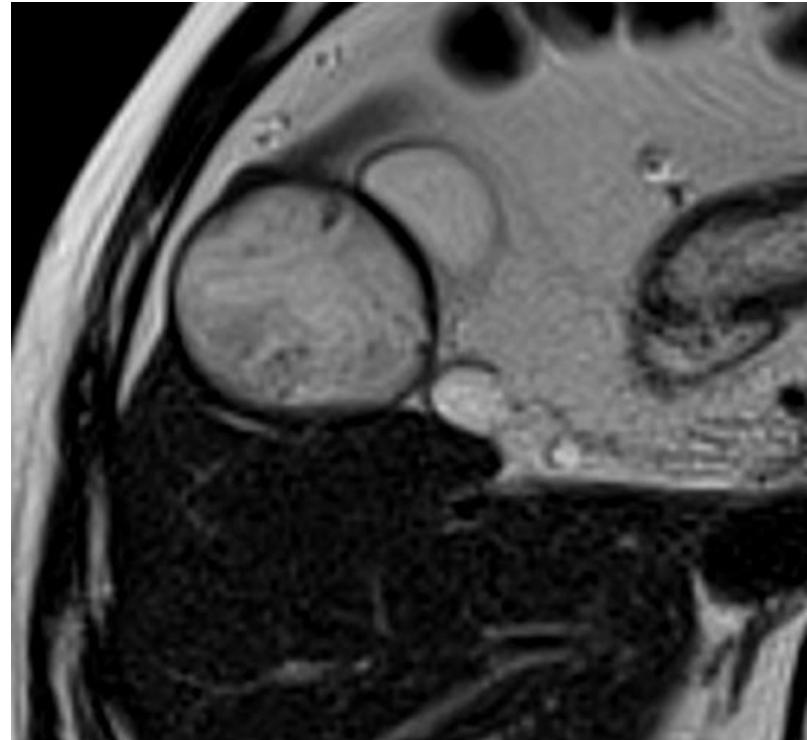
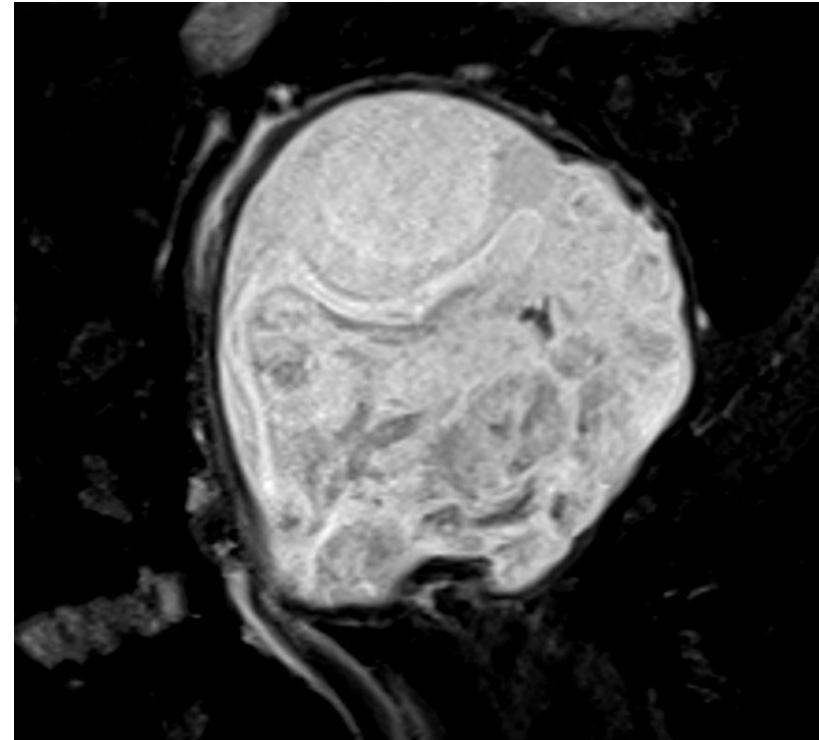


Flop



Matrix CE cysts analysis

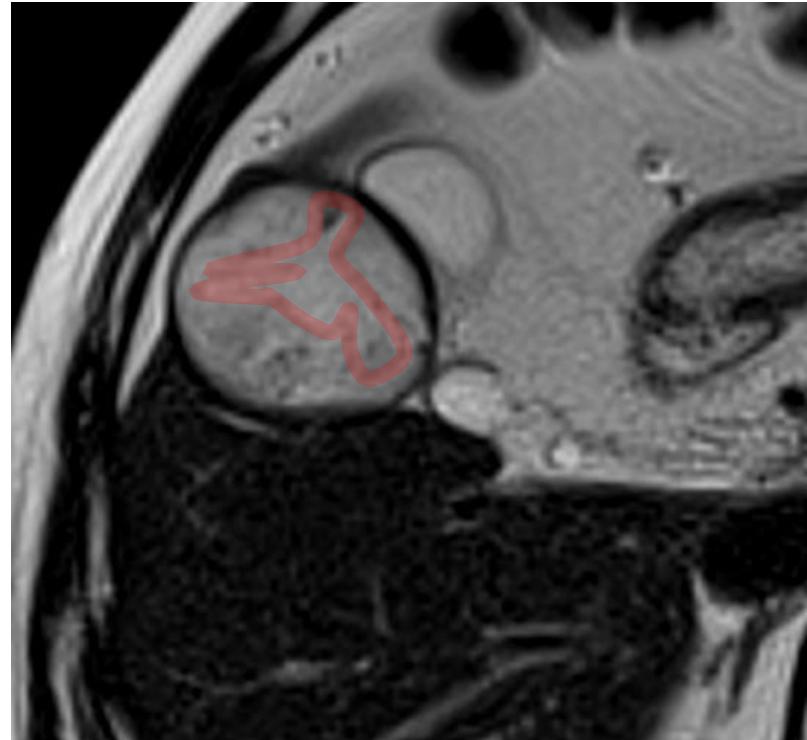
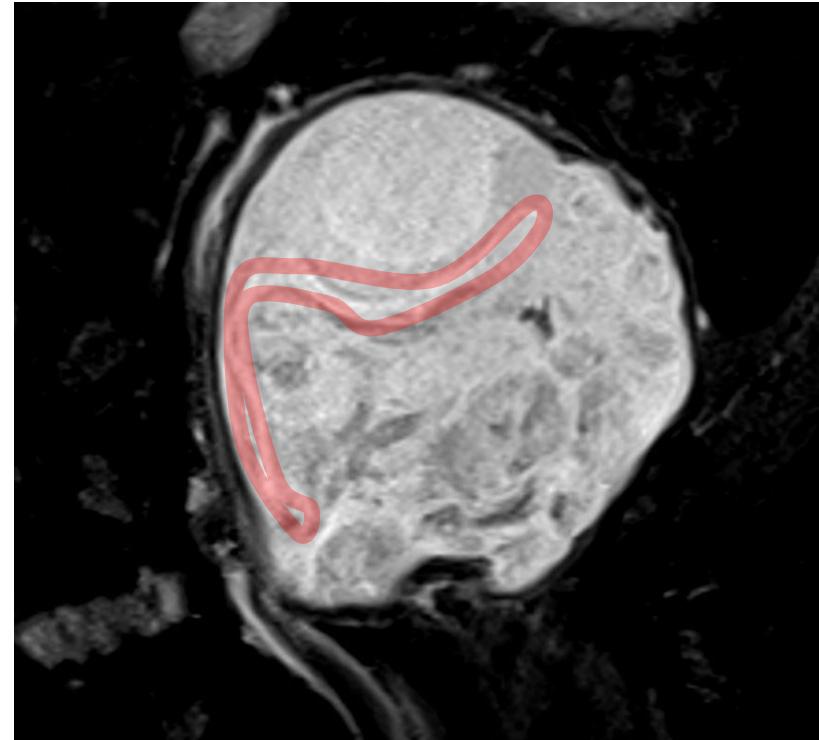
Exploring inactive cysts



Before the flip-flop... ?

Matrix CE cysts analysis

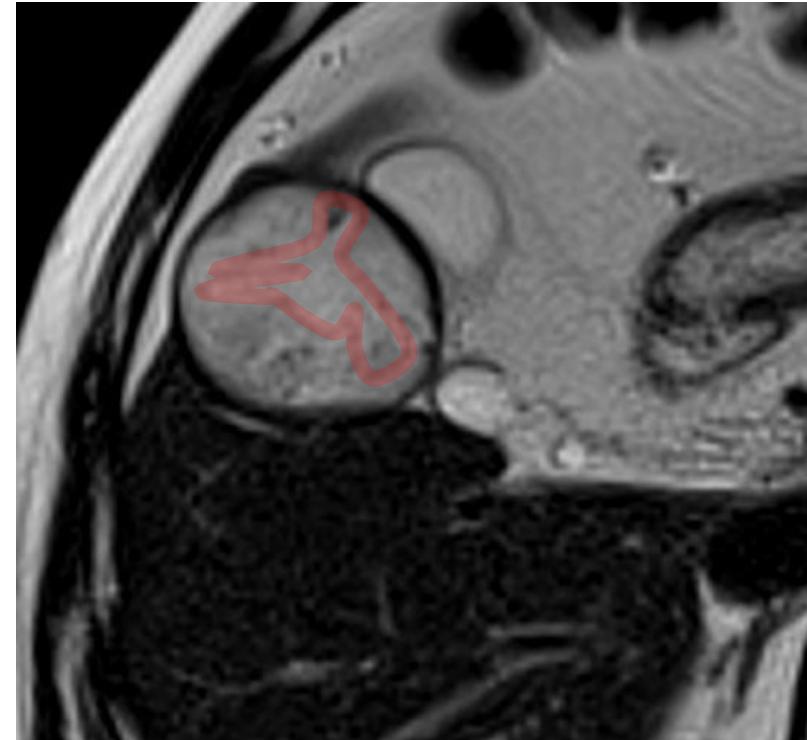
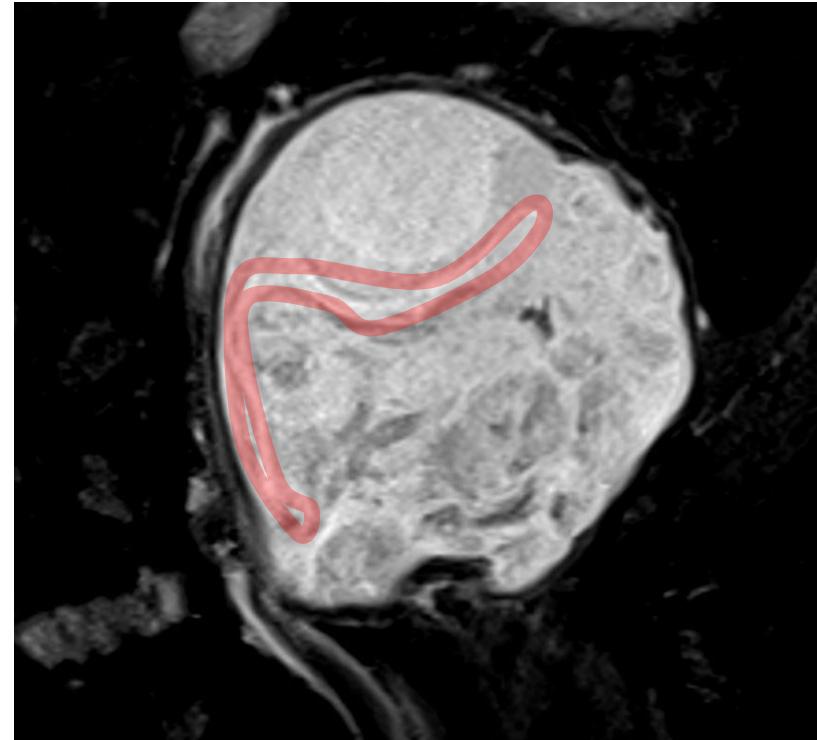
Exploring inactive cysts



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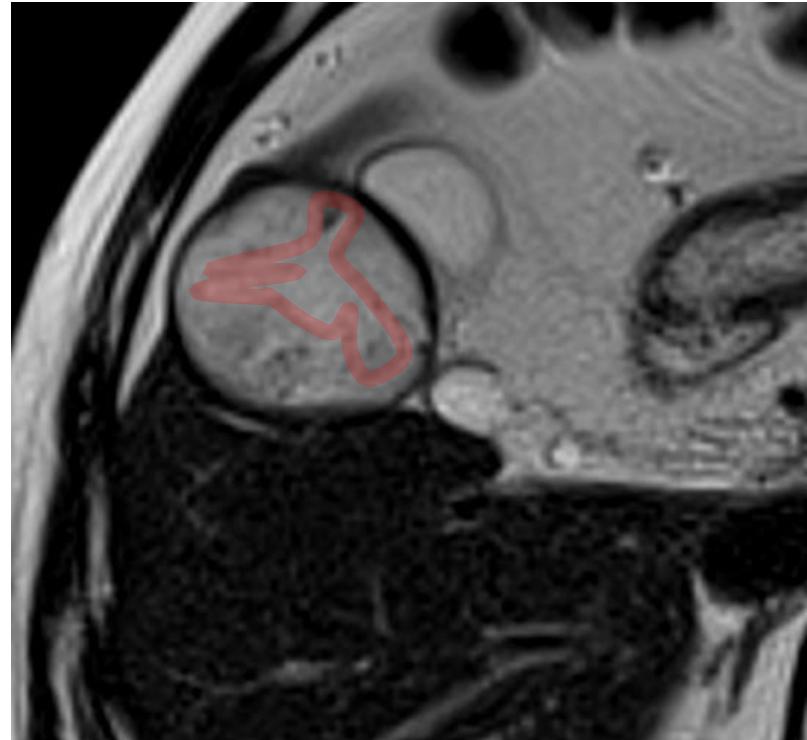
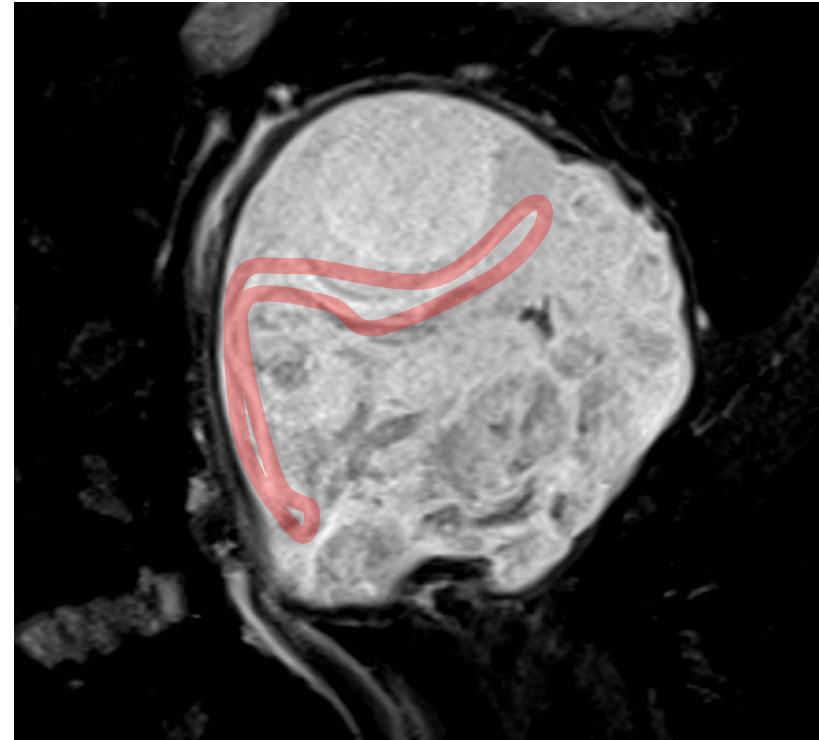
Exploring inactive cysts



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Matrix CE cysts analysis

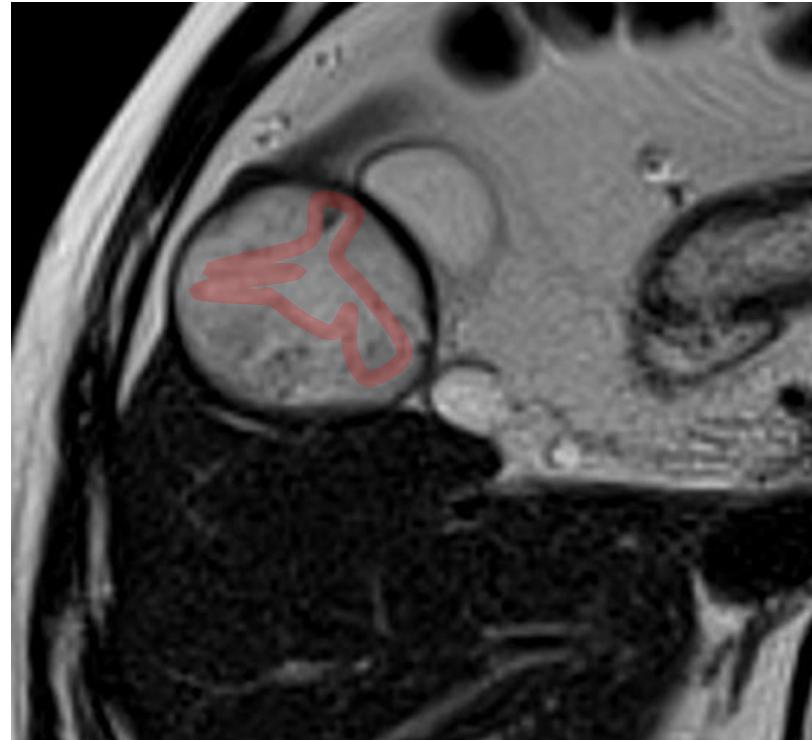
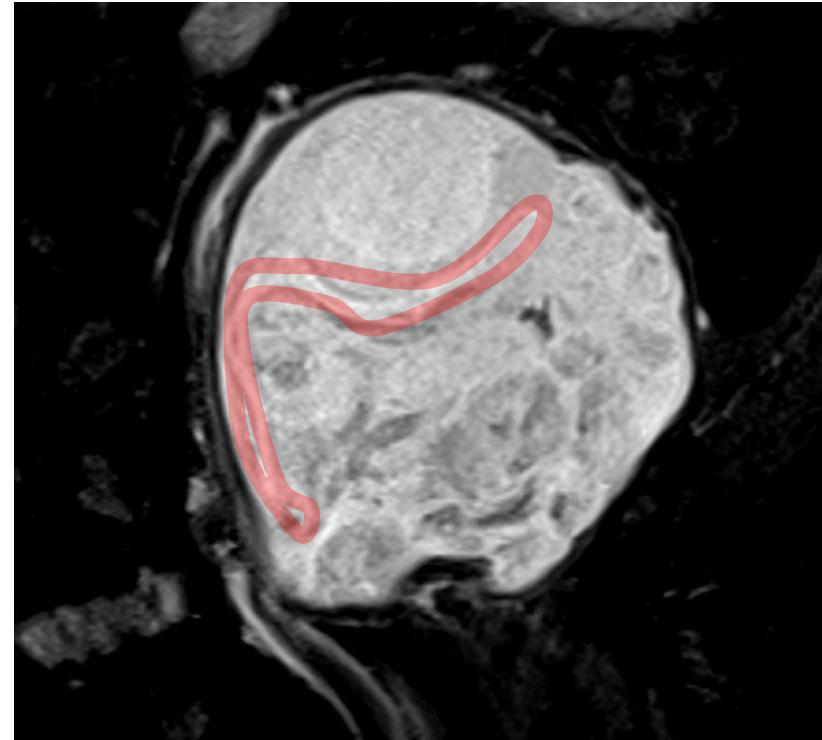
Exploring inactive cysts



Before the flip-flop... ?

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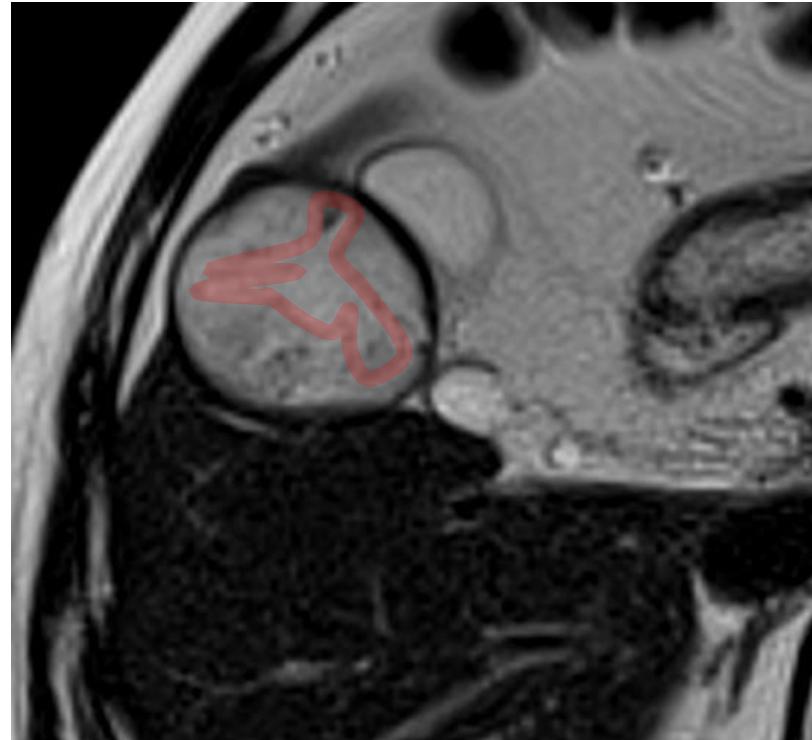
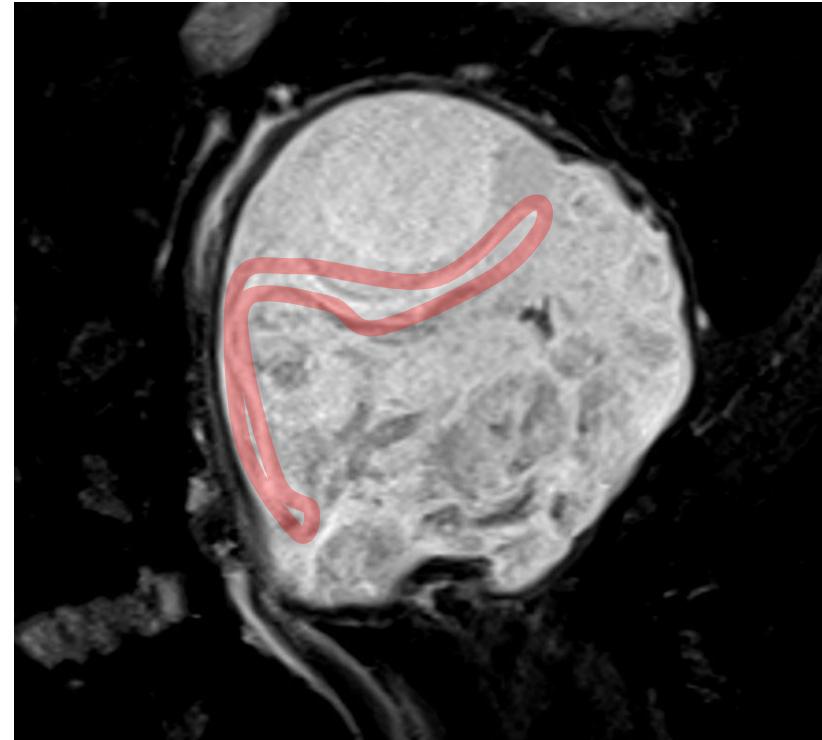
Exploring inactive cysts



Before the flip-flop... ?

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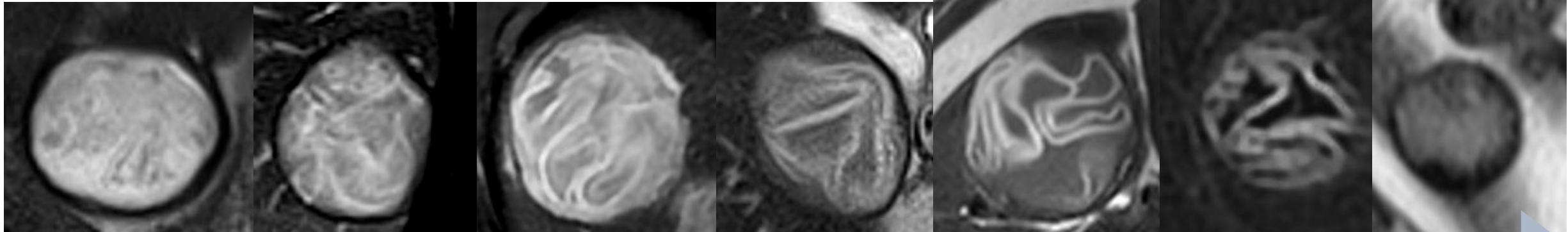
Exploring inactive cysts



Before the flip-flop... ?

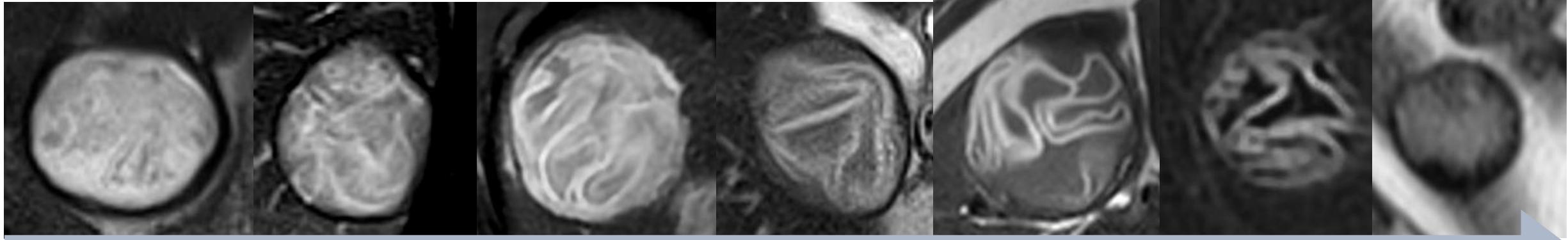
Matrix CE cysts analysis

Exploring inactive cysts



Matrix CE cysts analysis

Exploring inactive cysts



For inactives CE cysts, MRI can go further than US

It may help to refine management of inactive CE cysts with tailored follow-up

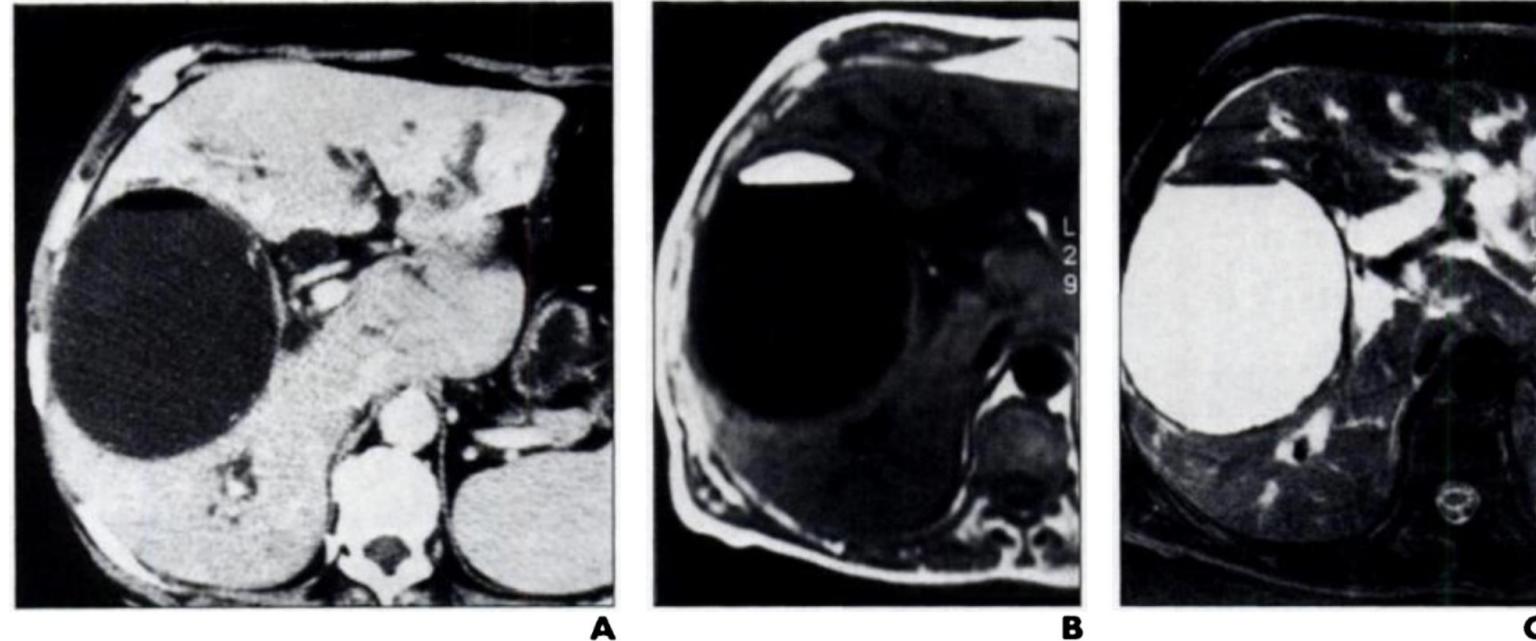
Matrix CE cysts analysis

What about the T1 weighted imaging ?



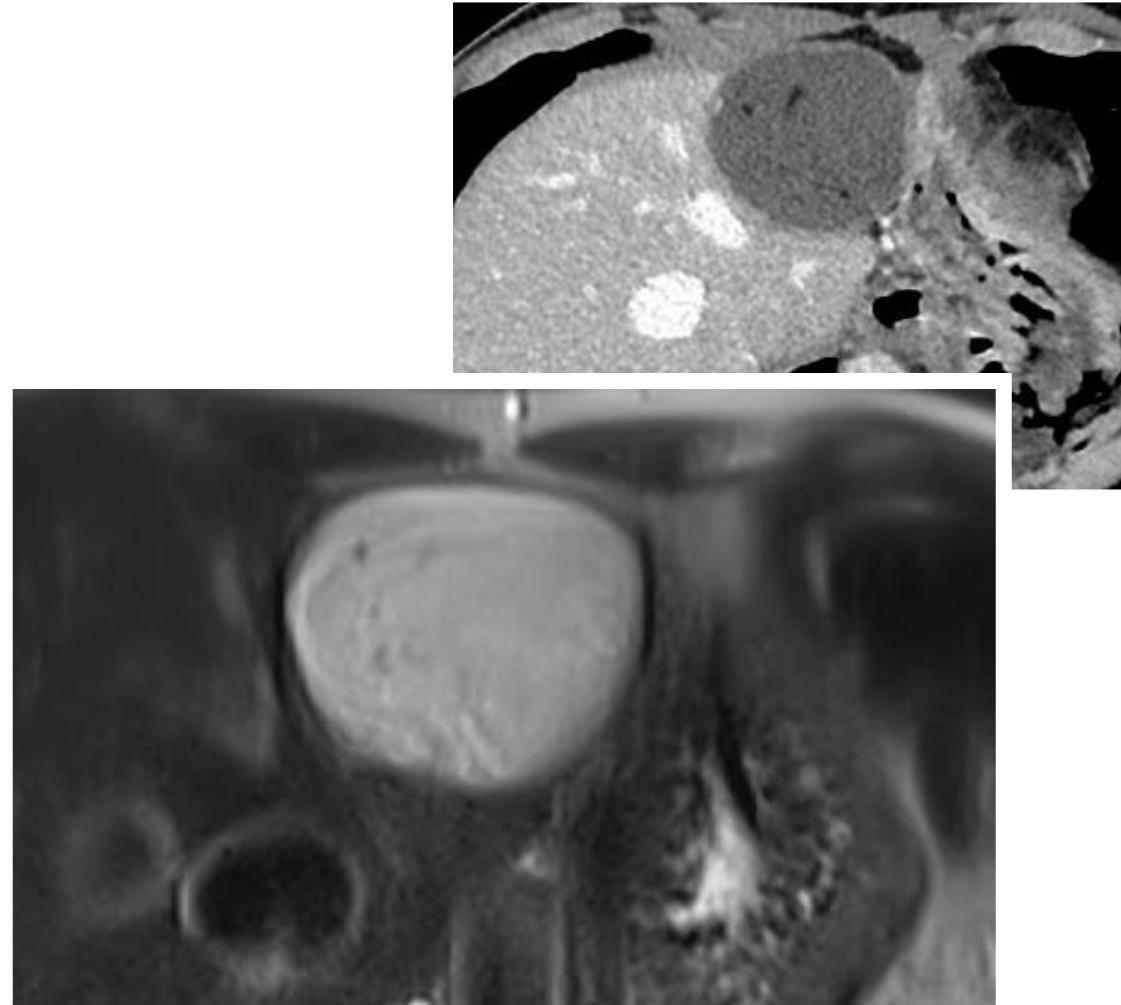
Fat–Fluid Level in Hepatic Hydatid Cyst: A New Sign of Rupture into the Biliary Tree?

J. V. Mendez Montero¹
J. Arrazola Garcia
J. Lopez Lafuente
J. Antela Lopez
R. Mendez Fernandez
A. Saiz Ayala

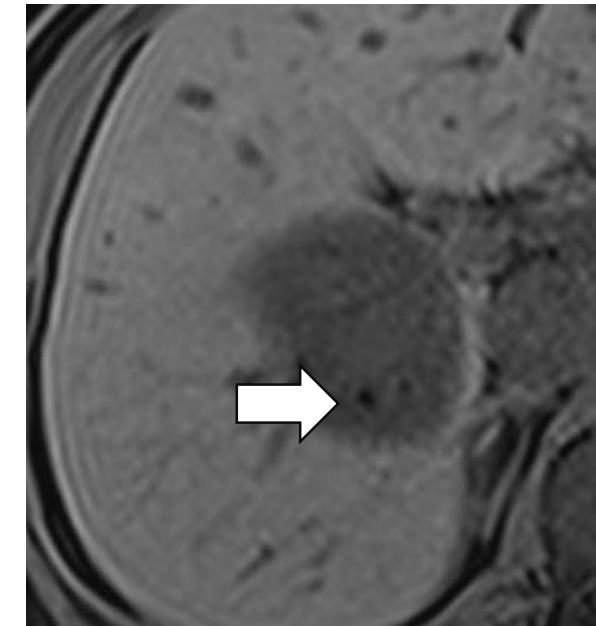
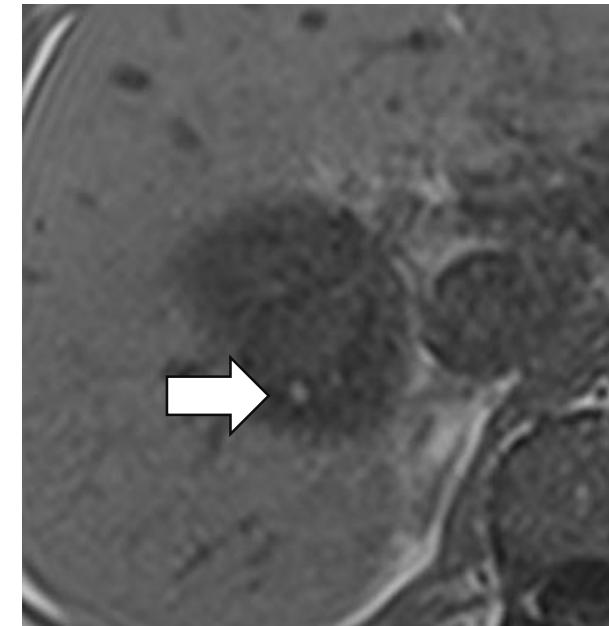


2 patients > one with communication and one without

Matrix CE cysts analysis



What about the T1 weighted imaging ?



Small fatty focus
Signal drop in T1 opposition phase

Matrix CE cysts analysis

What about the T1 weighted imaging ?

Fatty foci

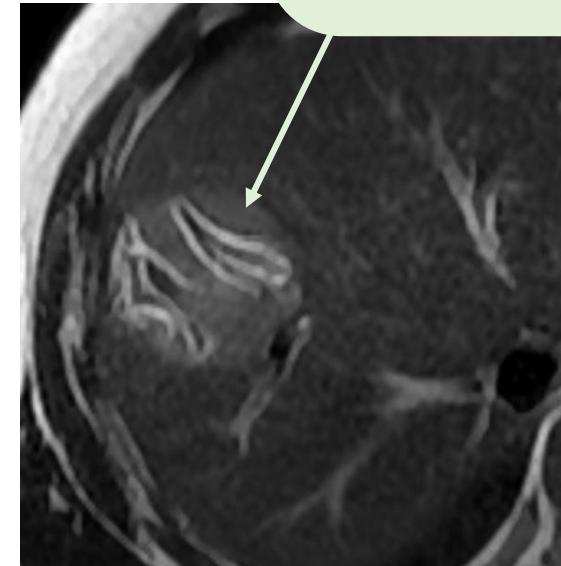


Coronal abdominal CT



Axial abdominal CT

Flip-flop matrix sign



T2 weighted imaging



Ultrasound

Matrix CE cysts analysis

What about the T1 weighted imaging ?

In our 174 cysts of cystic echinococcosis database

In our 174 cysts of cystic echinococcosis database

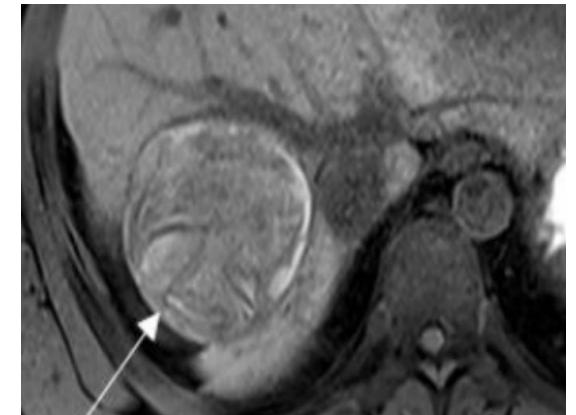
	CE1 N=17 (10)	CE2 N=10 (6)	CE3a N=12 (7)	CE3b N=38 (22)	CE4 N=75 (43)	CE5 N=22 (13)	P value
T1 weighted imaging							
Fatty hypersignal	0 (0)	0 (0)	0 (0)	2 (5)	18 (24)	2 (9)	0.006
Non-fatty hypersignal	0 (0)	0 (0)	0 (0)	3 (8)	5 (7)	1 (4.5)	0.69
Isosignal	1 (6)	2 (20)	5 (42)	38 (100)	69 (92)	19 (86)	<0.001
Hyposignal	17 (100)	10 (100)	12 (100)	36 (95)	73 (97)	22 (100)	<0.001
T2 weighted imaging							
Fluid hypersignal	17 (100)	10 (100)	12 (100)	38 (100)	0 (0)	0 (0)	<0.001
Non-fluid hypersignal	0 (0)	0 (0)	3 (25)	37 (97)	74 (99)	16 (72)	<0.001
Isosignal	0 (0)	0 (0)	1 (8)	36 (95)	70 (93)	19 (86)	<0.001
Hyposignal	0 (0)	0 (0)	0 (0)	35 (92)	65 (87)	21 (95)	<0.001
Matrix flip-flop sign	0 (0)	0 (0)	0 (0)	2 (5)	51 (68)	10 (45)	<0.001
Calcifications							
External membrane Calcifications	1 (6)	4 (40)	3 (25)	20 (53)	48 (64)	18 (81)	<0.001
Endocyst membranes calcifications	0 (0)	0 (0)	1 (8)	0 (0)	12 (16)	10 (45)	<0.001
Matrix calcifications	0 (0)	0 (0)	0 (0)	2 (5)	28 (37)	18 (81)	<0.001

Matrix CE cysts analysis

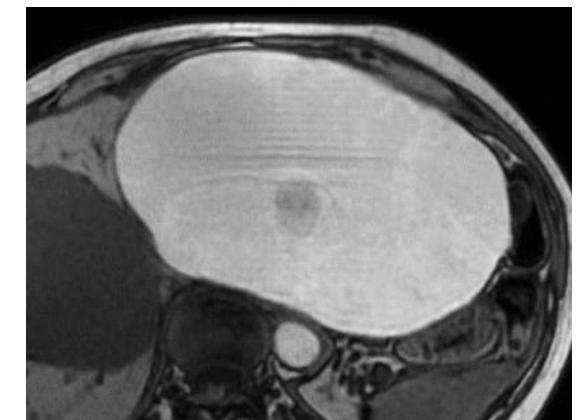
What about the T1 weighted imaging ?

Cystic Echinococcosis n=174	Differential Diagnosis n=30	P value
T1 weighted imaging		
Fatty hypersignal	22 (13)	0 (0)
Non-fatty hypersignal	10 (6)	23 (77)
Isosignal	133 (76)	21 (70)
Hyposignal	170 (98)	19 (63)
T2 weighted imaging		
Fluid hypersignal	77 (44)	26 (87)
Non-fluid hypersignal	129 (74)	17 (57)
Isosignal	126 (72)	21 (70)
Hyposignal	122 (70)	7 (23)
CT features		
Parietal Calcifications	94 (54)	16 (59)
Internal calcifications	56 (32)	2 (7)

This is rare



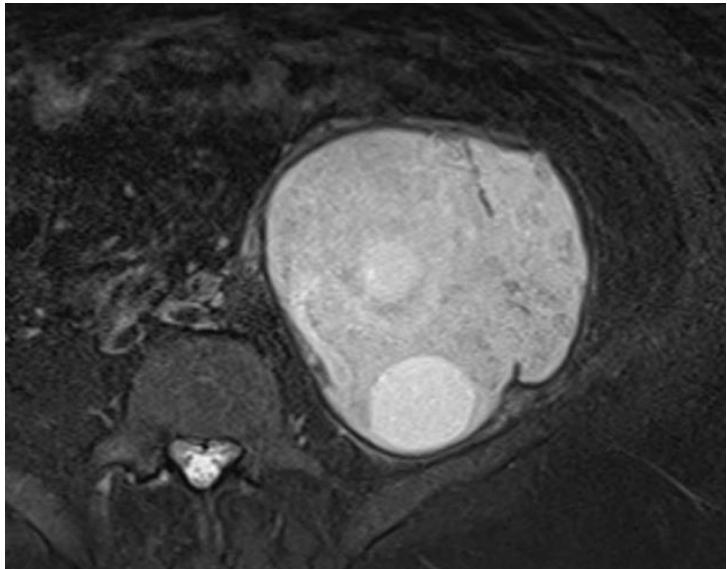
This is unlikely



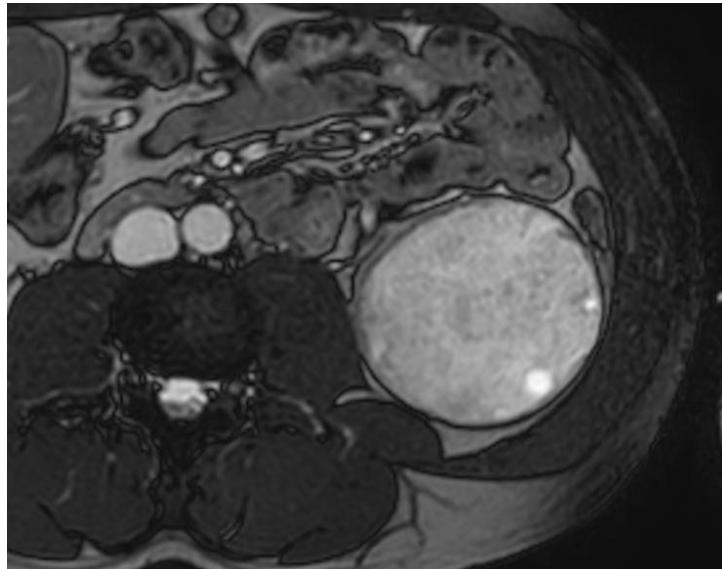
Data unpublished

Extrahepatic locations

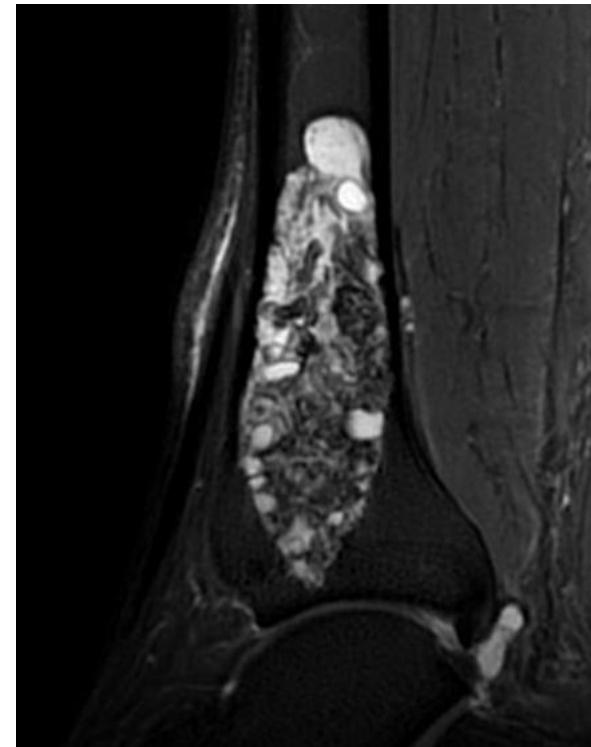
Same MRI findings
Same T1 & T2 signal
Smallest daughters size



Muscle CE



Kidney CE



Bone CE

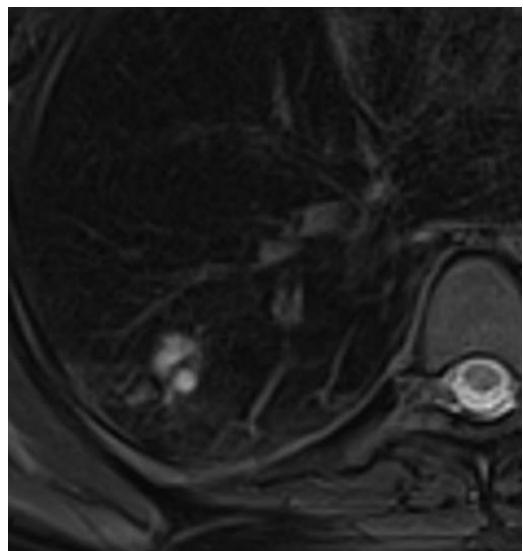


Extrahepatic locations

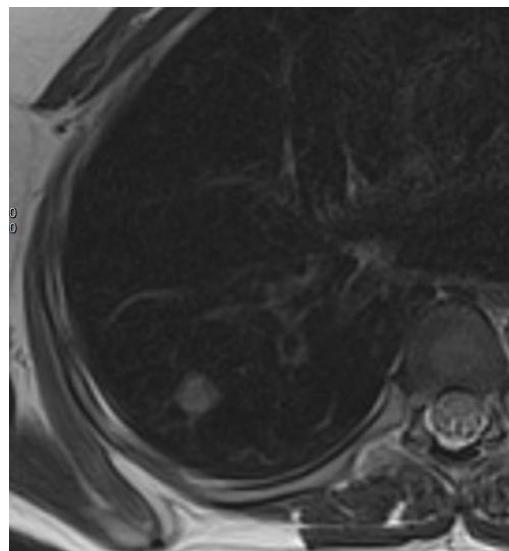
Lung locations

Frequently affects children where ultrasound is useless

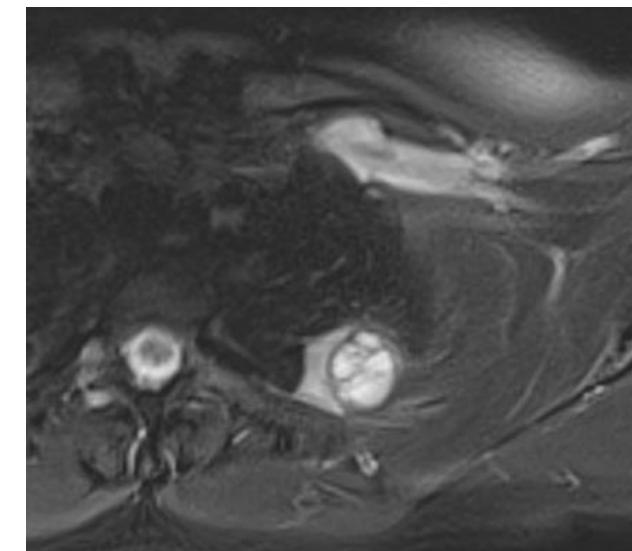
Children are highly radiosensitive
Higher cumulative-exposure risk



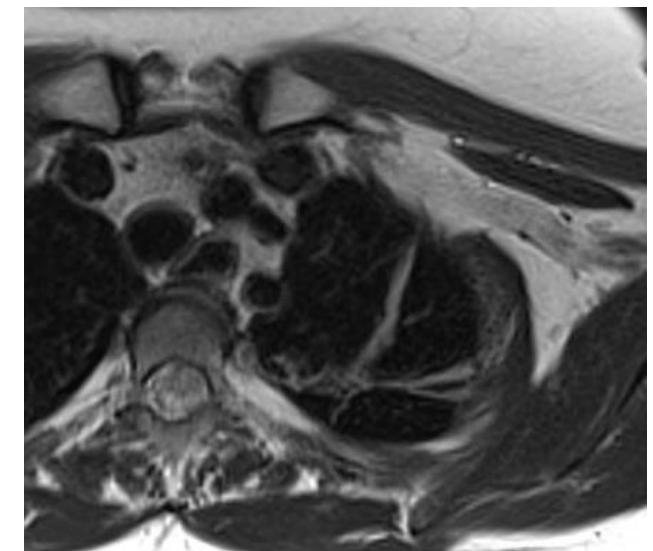
At diagnosis



After medical treatment



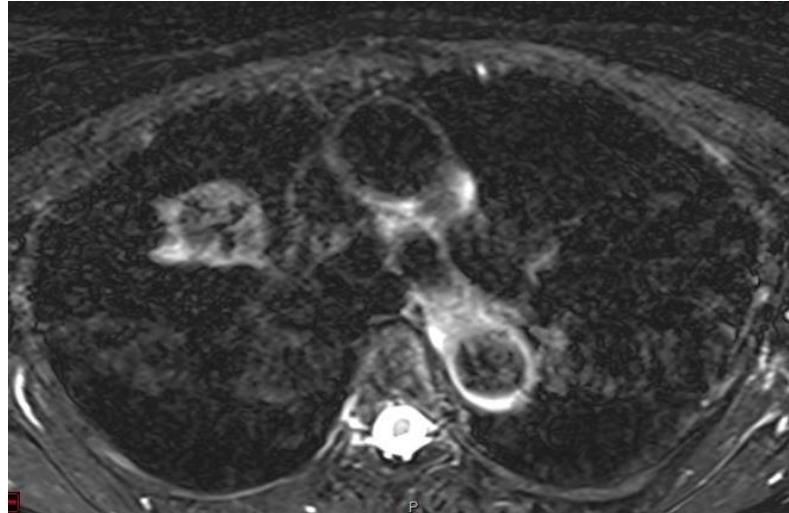
At diagnosis



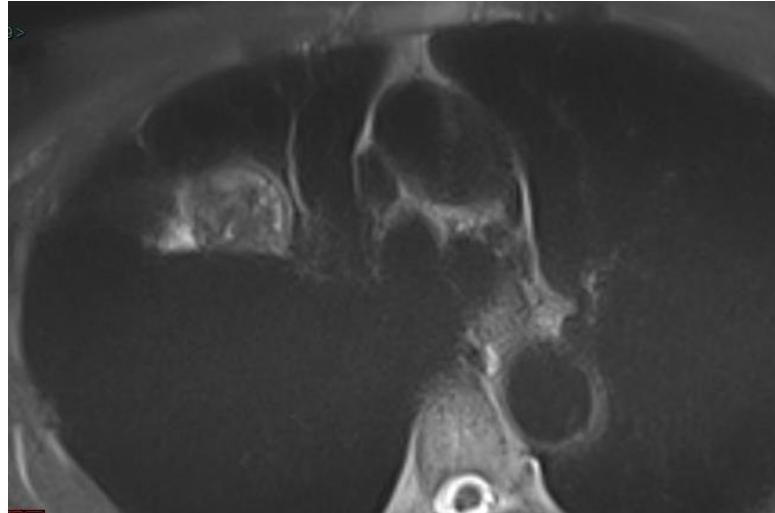
After surgical treatment

Extrahepatic locations

Lung locations



T2 DIXON

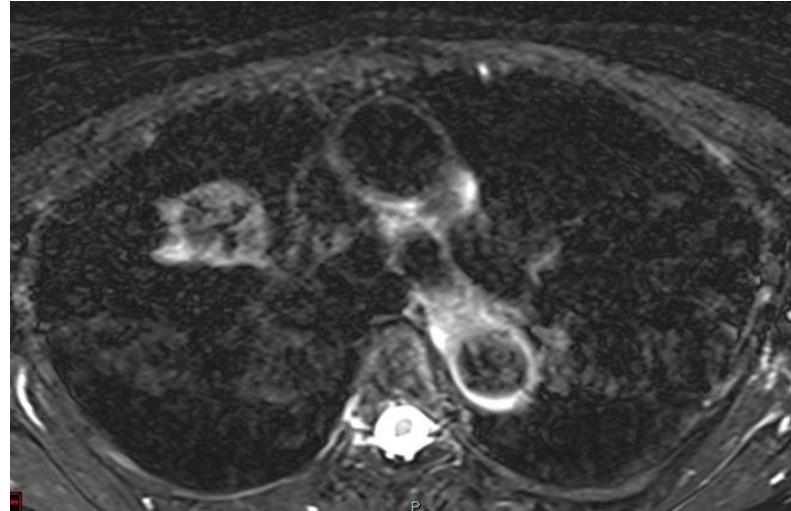


T2 HASTE

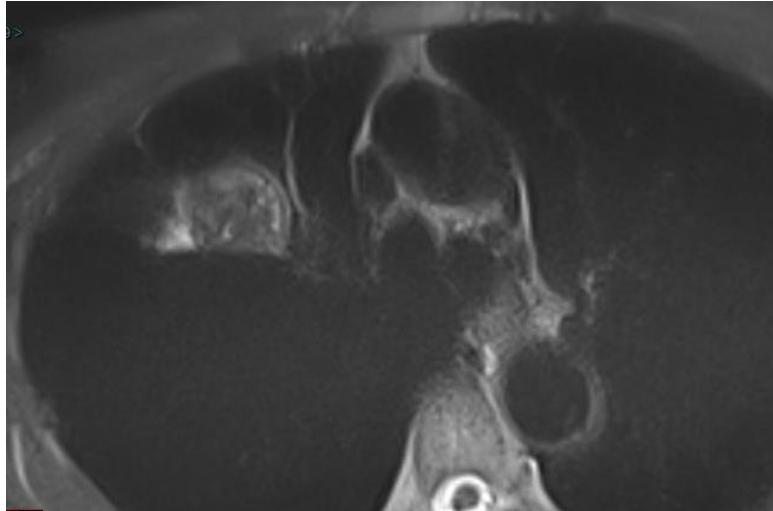
Can be difficult

Extrahepatic locations

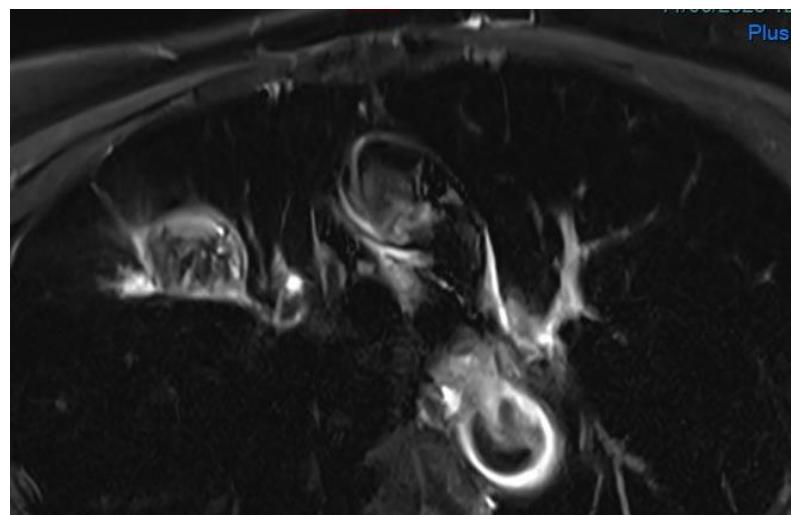
Lung locations



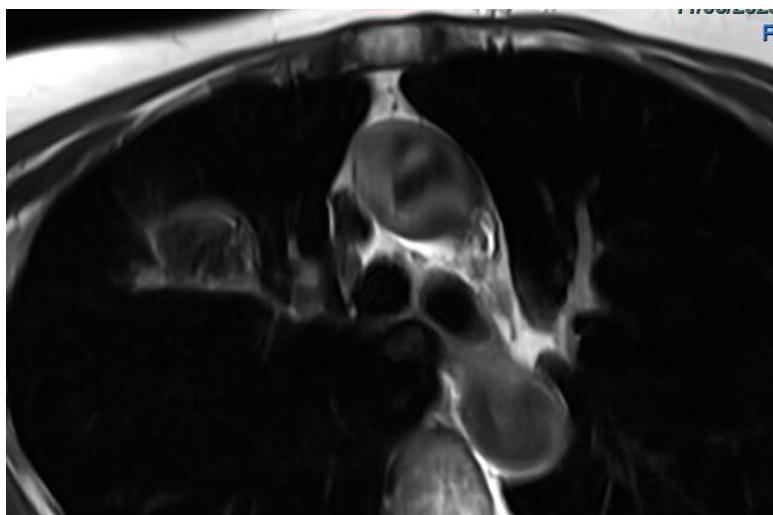
T2 DIXON



T2 HASTE



T2 FAT SAT HASTE



T2 HASTE

Can be difficult
Can be improved

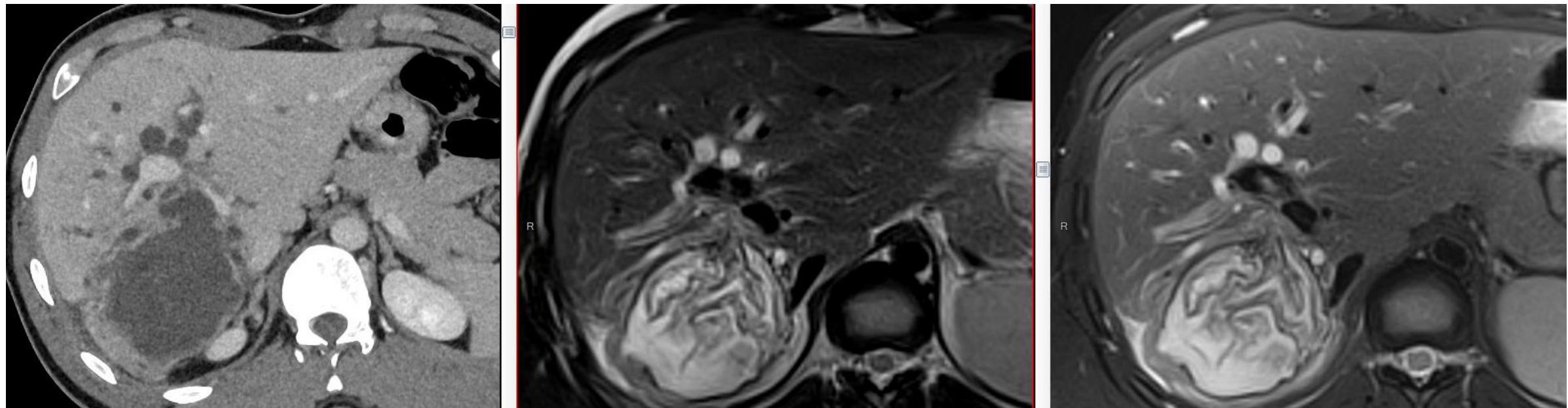
Should be preferred
over CT in follow-up

Complications

Diagnosis biliary tract communication

MRI is the best modality to diagnose biliary communication

Case of a 35-years-old women
Acute cholangitis

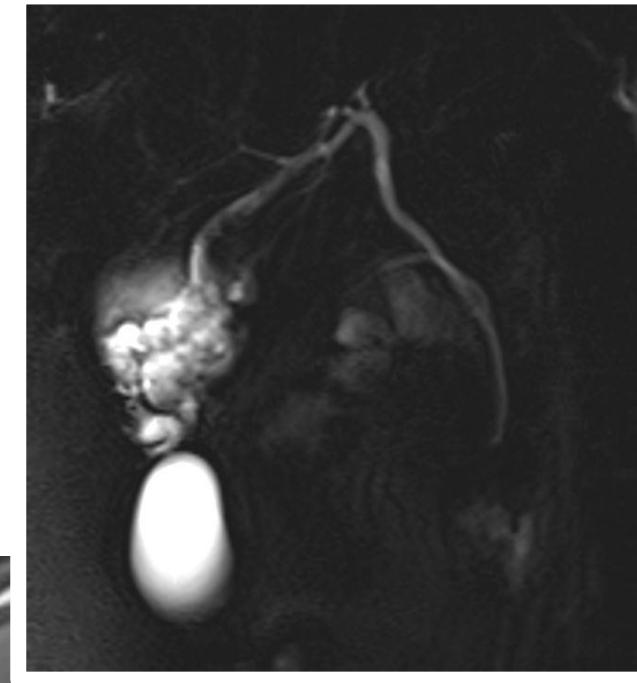
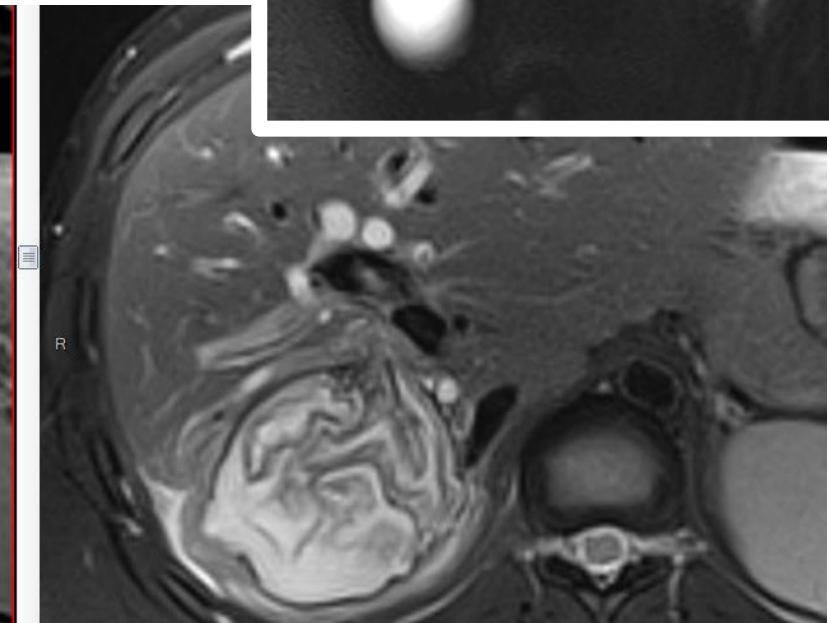
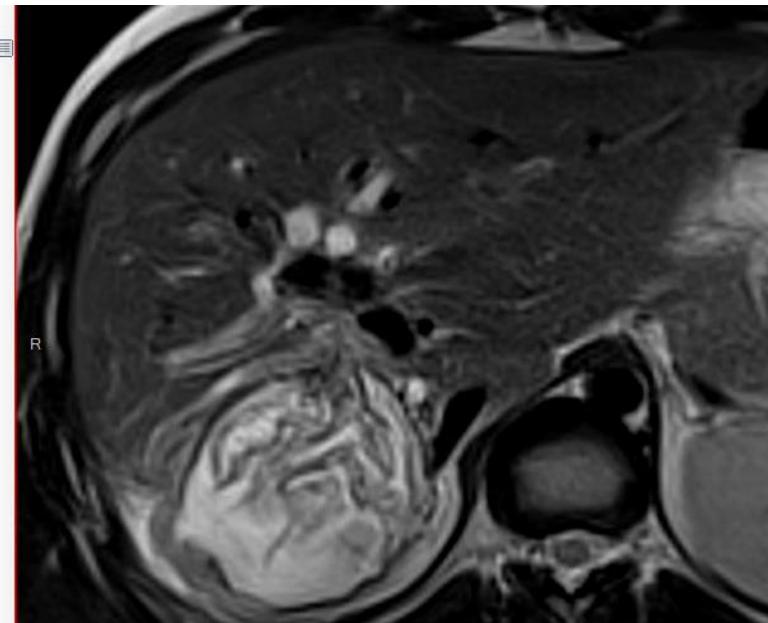
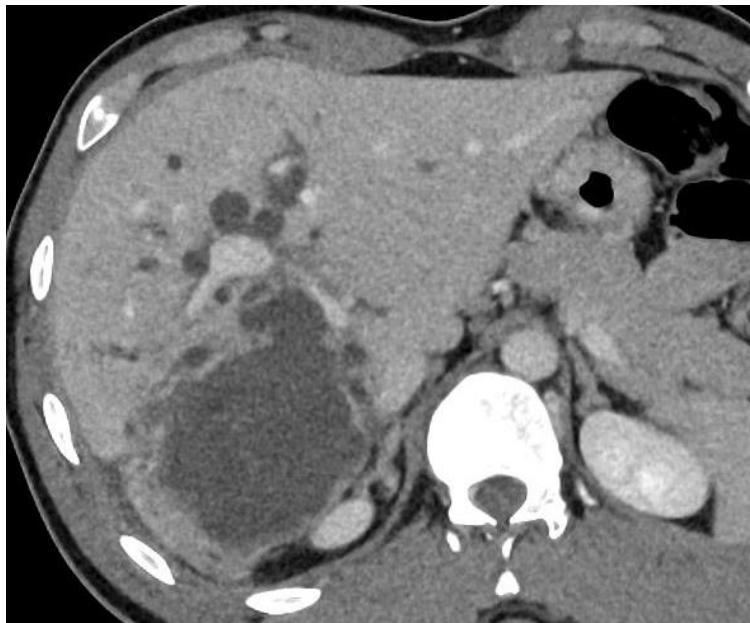


Complications

Diagnosis biliary tract communication

MRI is the best modality to diagnose biliary communication

Case of a 35-years-old women
Acute cholangitis





27-year-old patient from Vesoul

Incidental discovery of a hepatic lesion

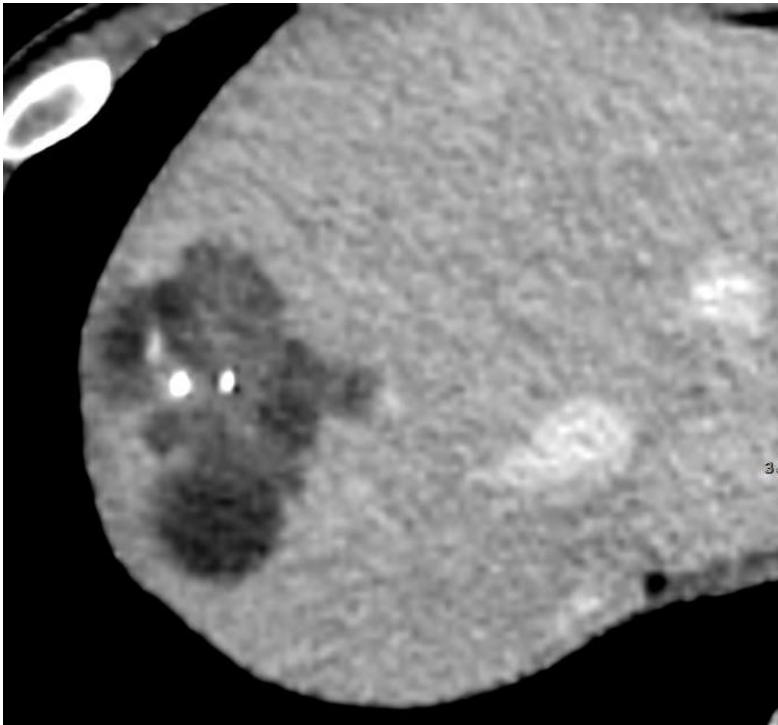
Positive serology for echinococcosis (hemagglutination with band 7)



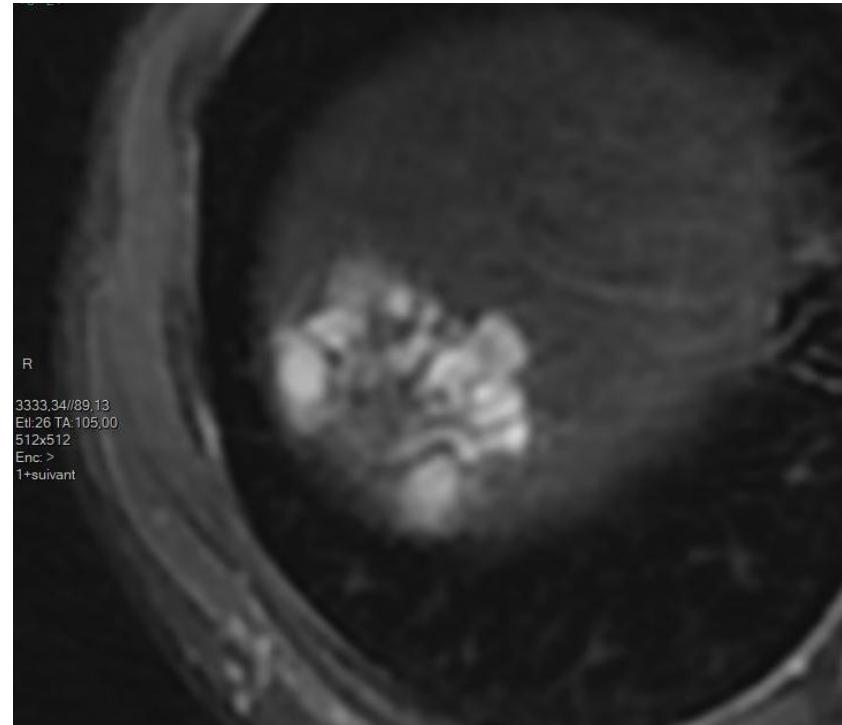
27-year-old patient from Vesoul

Incidental discovery of a hepatic lesion

Positive serology for echinococcosis (hemagglutination with band 7)



Abdominal CT



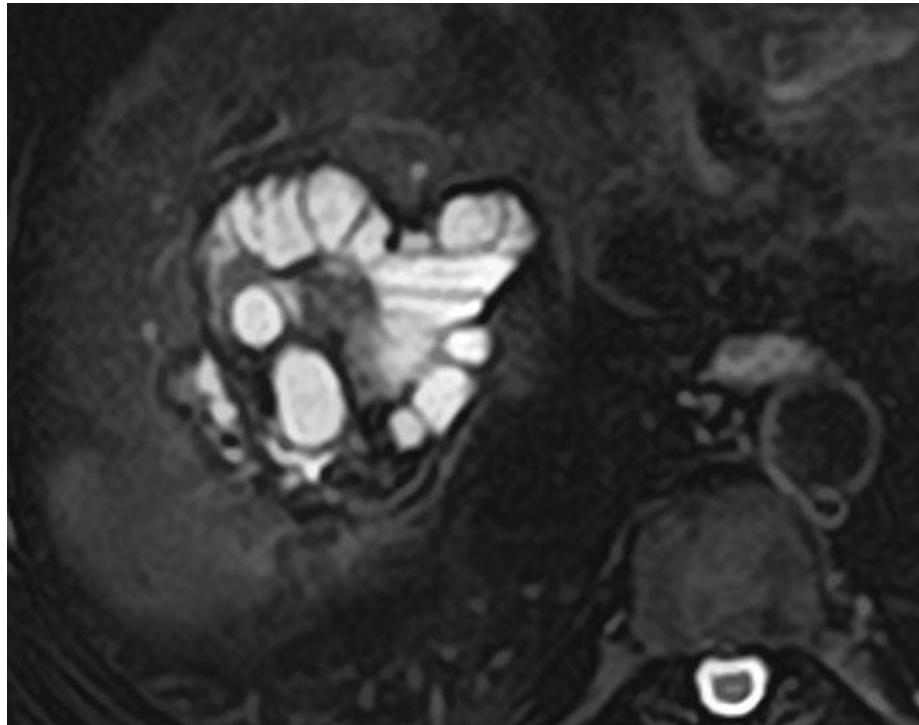
T2 FAT SAT



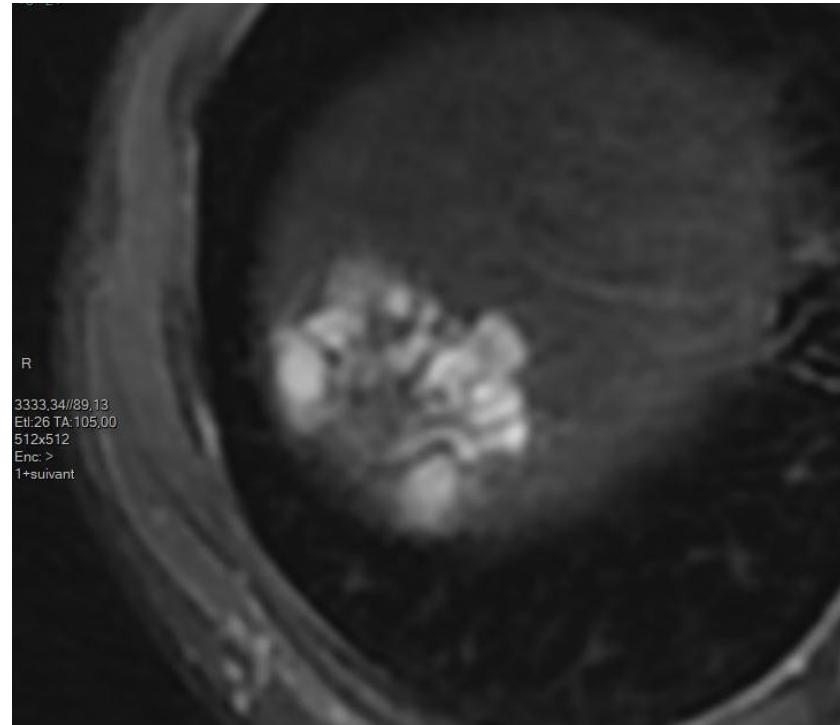
27-year-old patient from Vesoul

Incidental discovery of a hepatic lesion

Positive serology for echinococcosis (hemagglutination with band 7)



Cystic



Alveolar

Differential diagnosis

Case N°2

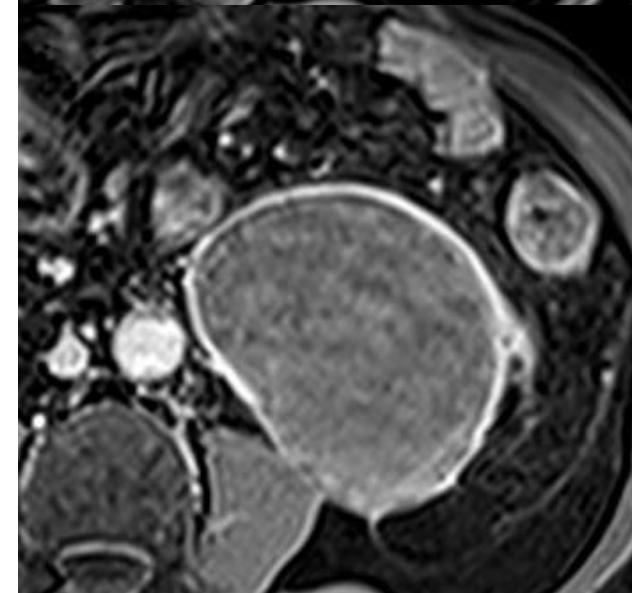
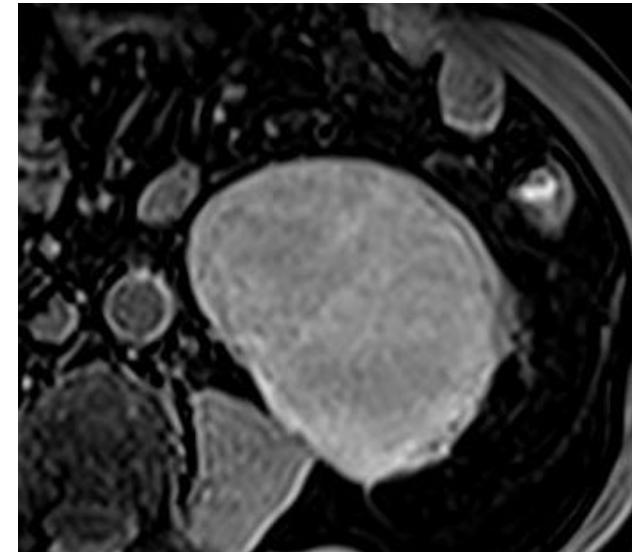
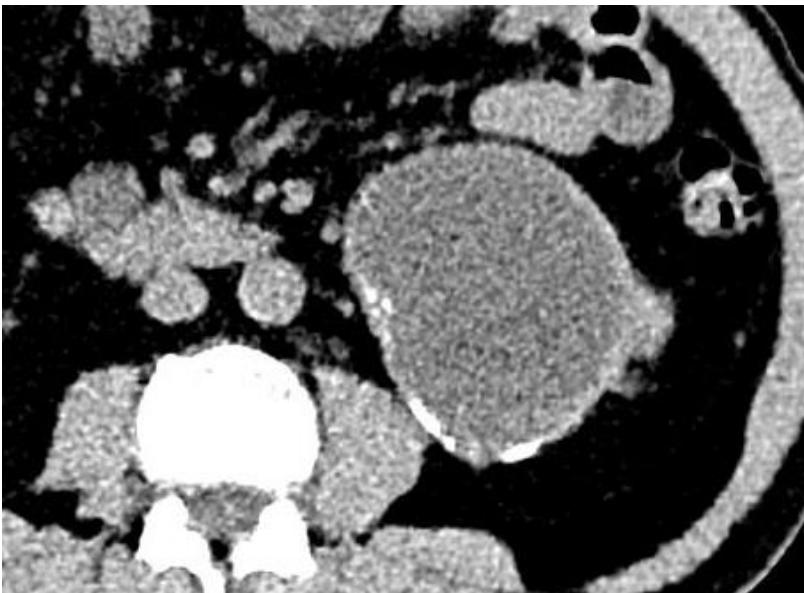
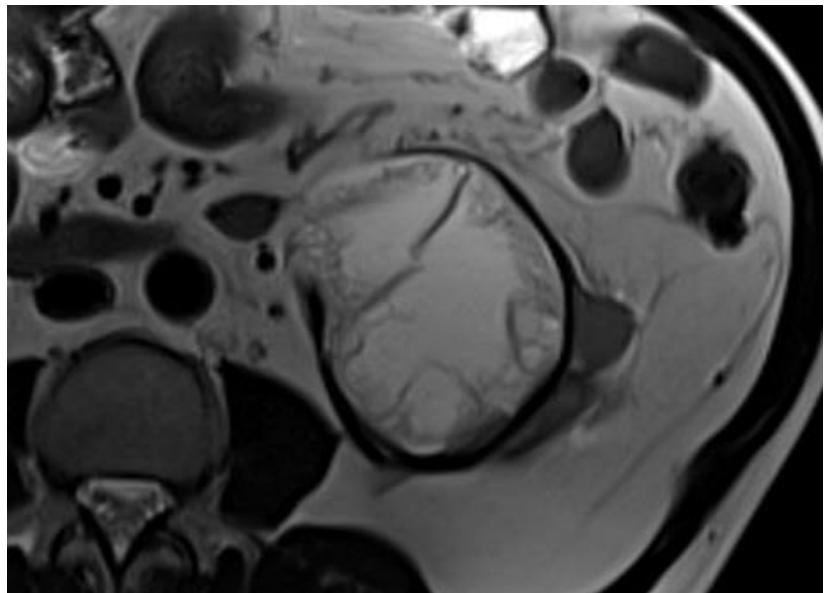
65-year-old patient

North African origin

Incidental discovery of a cyst in the lower pole of the right kidney

Suspected diagnosis of cystic echinococcosis

Negative serology



Differential diagnosis

Case N°2

Hemorrhagic cysts

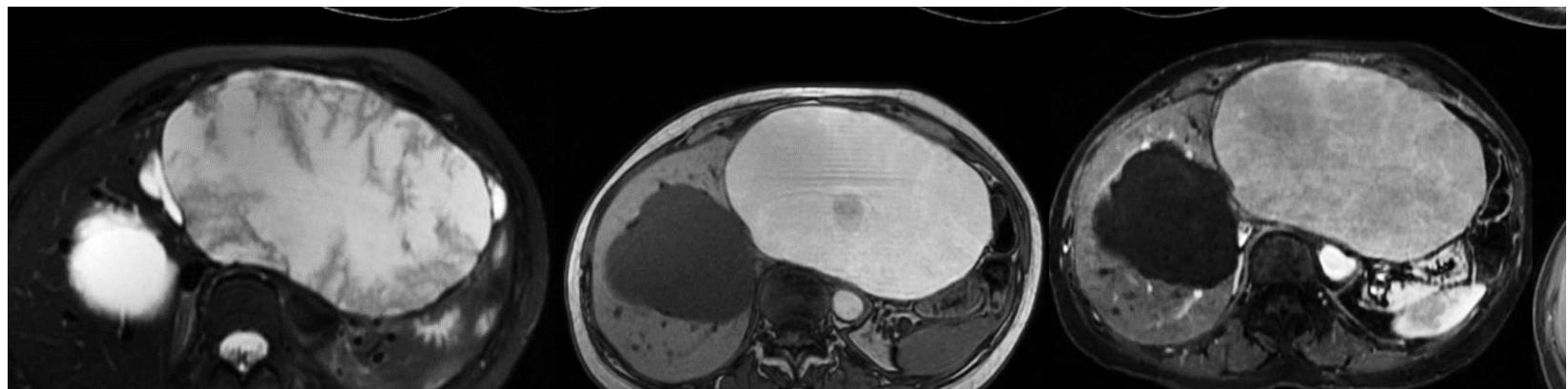
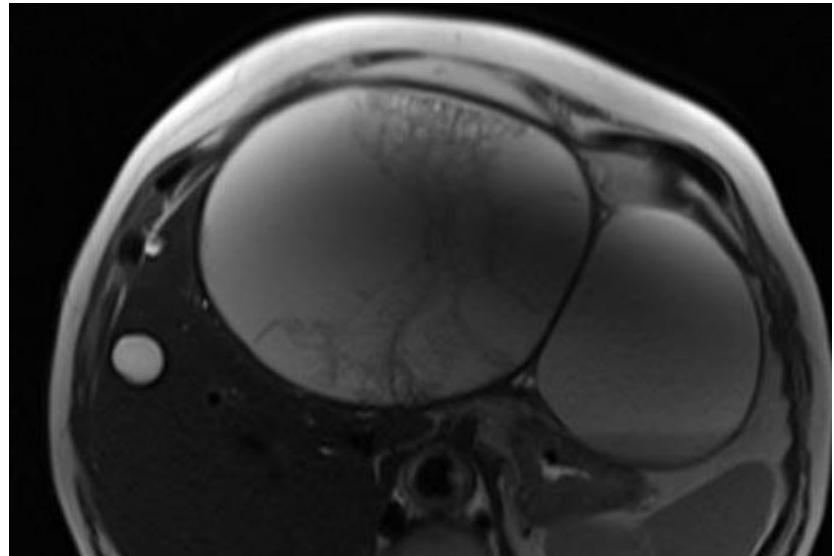
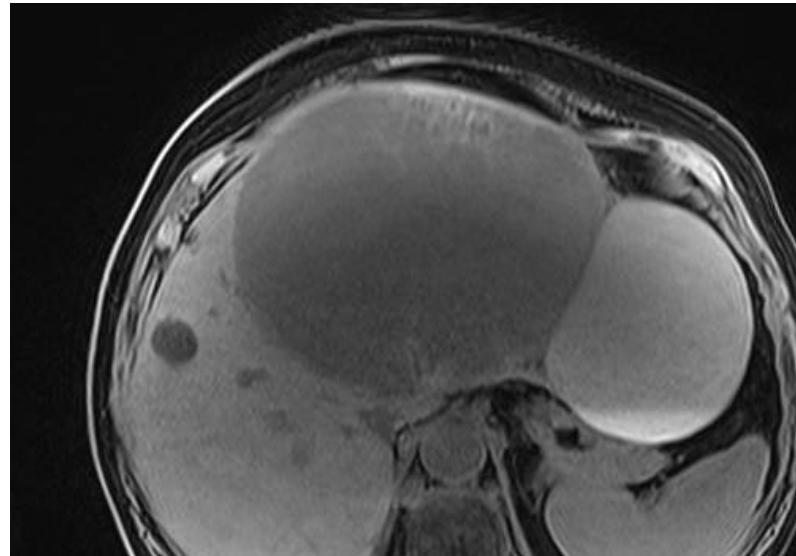
Cystic echinococcosis frequently suspected

Fibrin septa on T2

May mimic internal daughter cysts

However, their signal intensity is identical to the rest of the cyst

Most often associated with a characteristic T1 hyperintensity



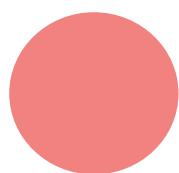
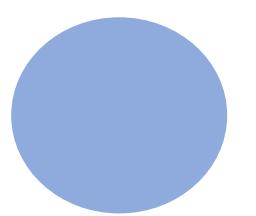
MRI is a modality of choice in cystic echinococcosis

T2 weighted imaging
Seeking liquid for activity

Cyst matrix analysis help to:

- Determine activity in difficult cases
- Differential diagnosis

Lung MRI should be deployed
Particularly in child's



Thank you for your attention

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