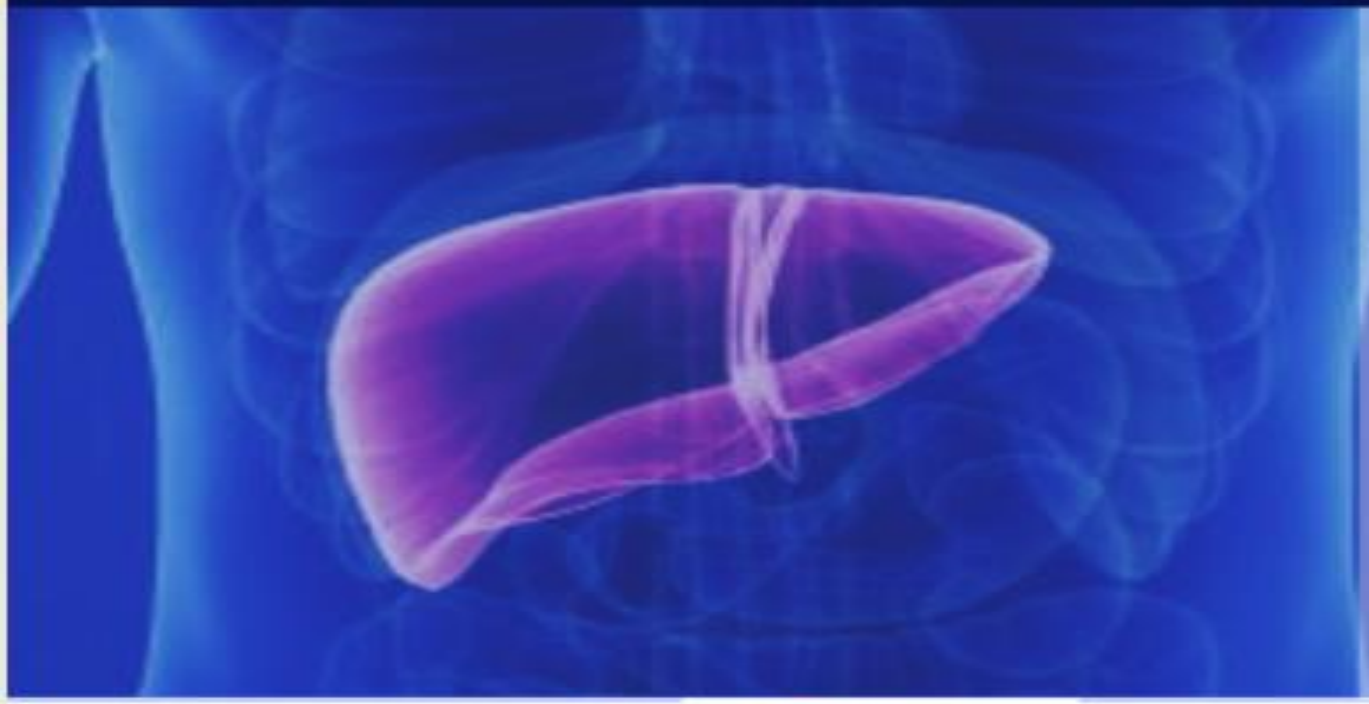
2019

Curso Anual de Hepatología en Red

Educación a distancia en Hepatología.



DIRECTOR

DR. FEDERICO VILLAMIL

MODALIDAD

TELECONFERENCIA / VIRTUAL

Hospital El Cruce
NÉSTOR CARLOS KIRCHNER

FUNDIEH

TELEMEDICINA

Como leer una resonancia magnética de hígado y vías biliares

Dr. José M. Bernal.
Médico especialista en Diagnóstico por imágenes

Contraindicaciones relativas

- Marcapasos. Desfibriladores automáticos implantables
- Clips vasculares

- Prótesis auditivas, oculares, endovasculares.
- Proyectiles
- Embarazo

www.mrisafety.com
www.radiology.upmc.edu/MRsafety

	TC	RM
Ventajas	1. *Alta resolución espacial* 2. *Evaluación anatómica* 3. ***Amplia disponibilidad y accesibilidad*** 4. ***Evaluación de múltiples órganos y sistemas***	1. *Mayor resolución de contraste* 2. *Método multiplanar* 3. ***Contraste ev más seguro*** 4. ***Contrastes específicos*** 5. ***Evaluación anatómica, metabólica y funcional***
Desventajas	1. *Dificultad o imposibilidad de caracterizar y determinar naturaleza de ciertas lesiones* 2. *Empleo de contraste yodado* 3. ***Radiación ionizante***	1. *Menor disponibilidad* 2. *Mayor tiempo de exploración* 3. ***Mayor costo*** 4. *Limitada aplicación en ciertas áreas* 5. *Menor reproducibilidad* 6. *Contraindicaciones*

Gadolinio-DTPA dimeglumina (Contraste extracelular)

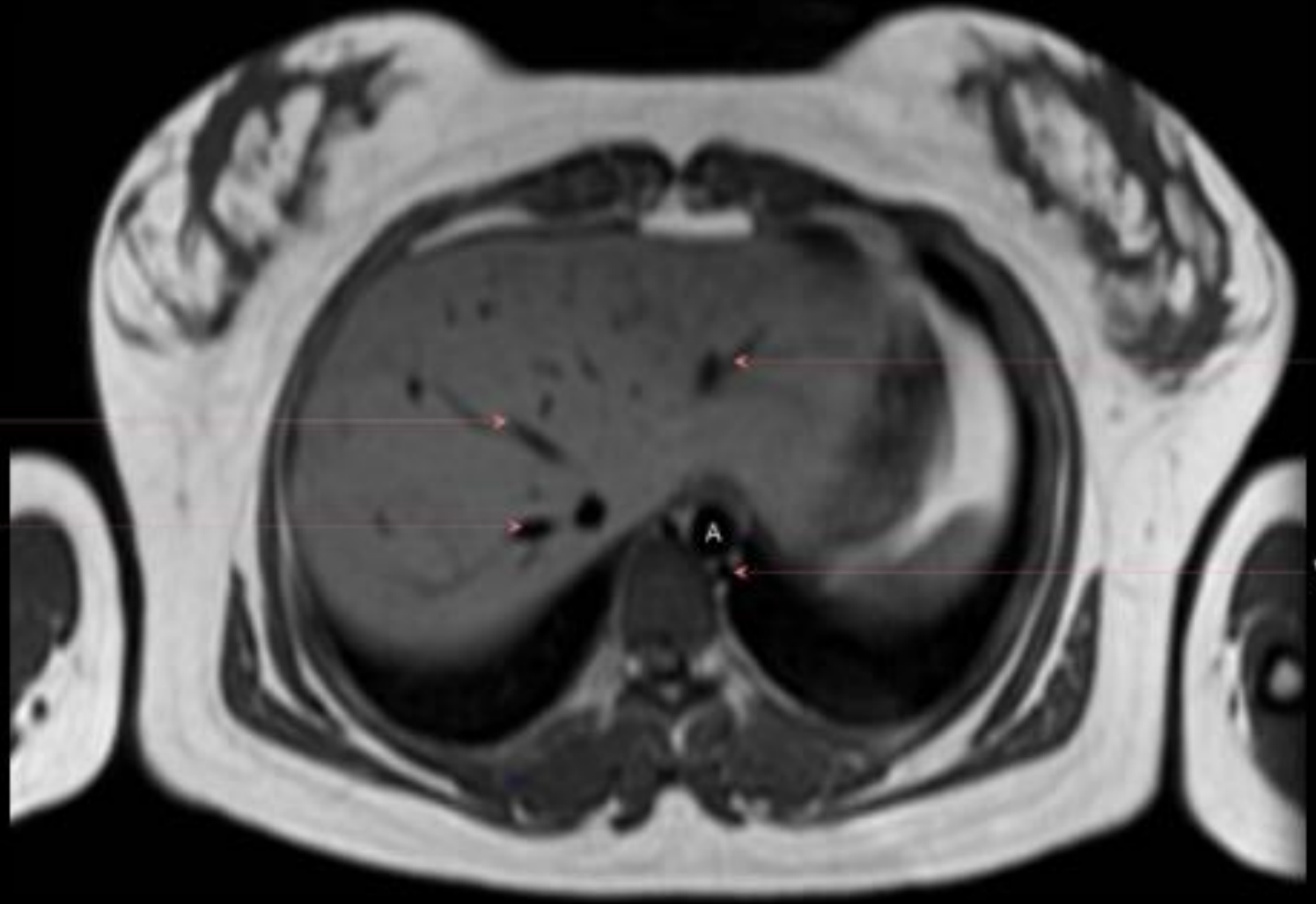
Dosis: 0,1 mMol/Kg de peso ó 0,2 ml/ kg de peso

Oxido de hierro: (Contraste del S.R.E)

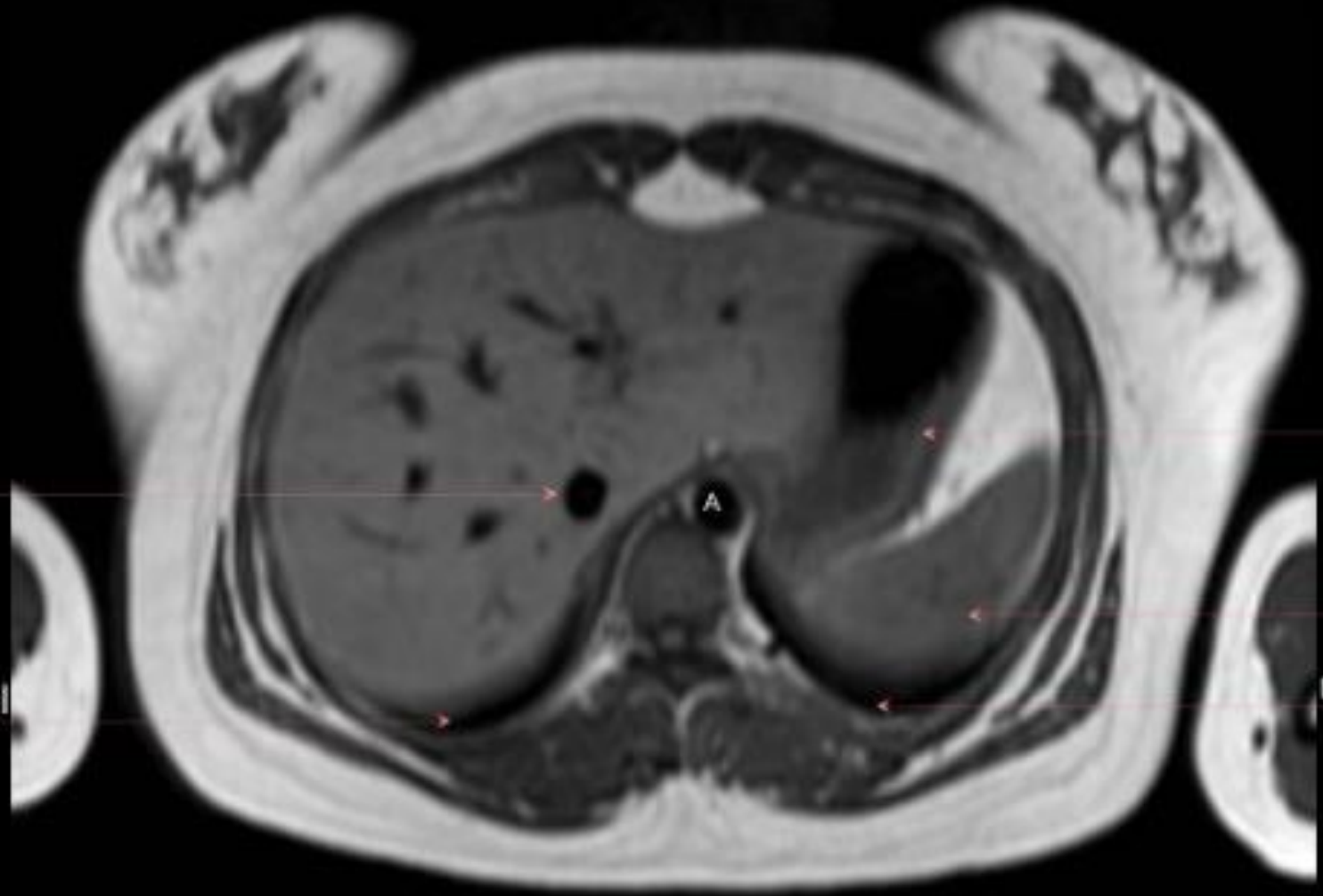
Contrastes hepatoespecíficos

Table 1: Characteristics of Hepatocyte-specific MR Contrast Agents

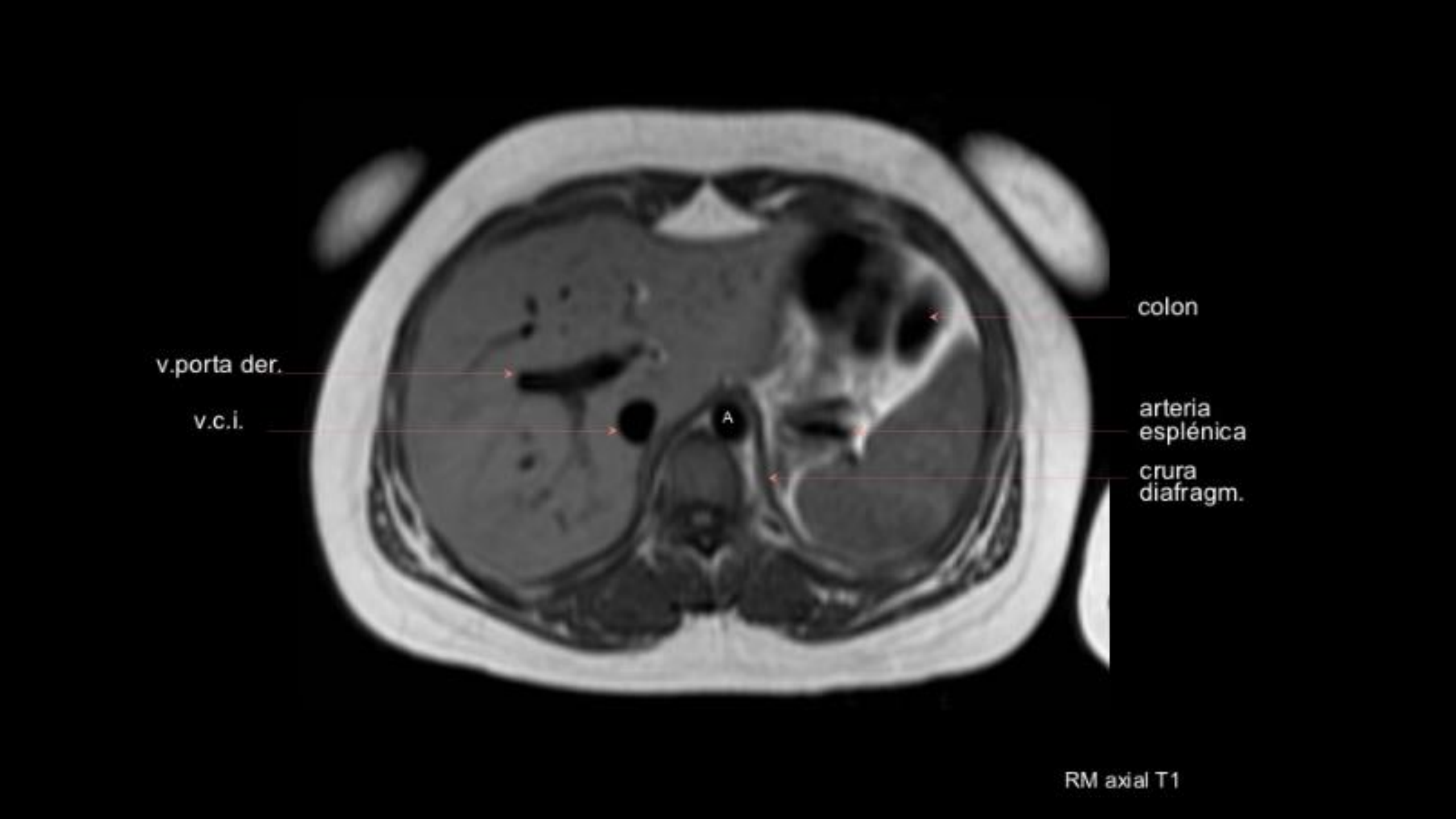
	Contrast Agent	
Characteristics	Gadobenate dimeglumine (Gd-BOPTA)	Gadoxetic acid (Gd-EOB-DTPA)
Trade name	MultiHance	Eovist/Primovist
Manufacturer	Bracco	Bayer
Dose (mmol/kg)	0.1	0.025
Excretion	95% renal, 3%–5% biliary	50% renal, 50% biliary
Delayed imaging time	1–2 h	10–60 min
Advantages	Better T1 relaxivity, greater enhancement during dynamic imaging	Better delineation of biliary tree

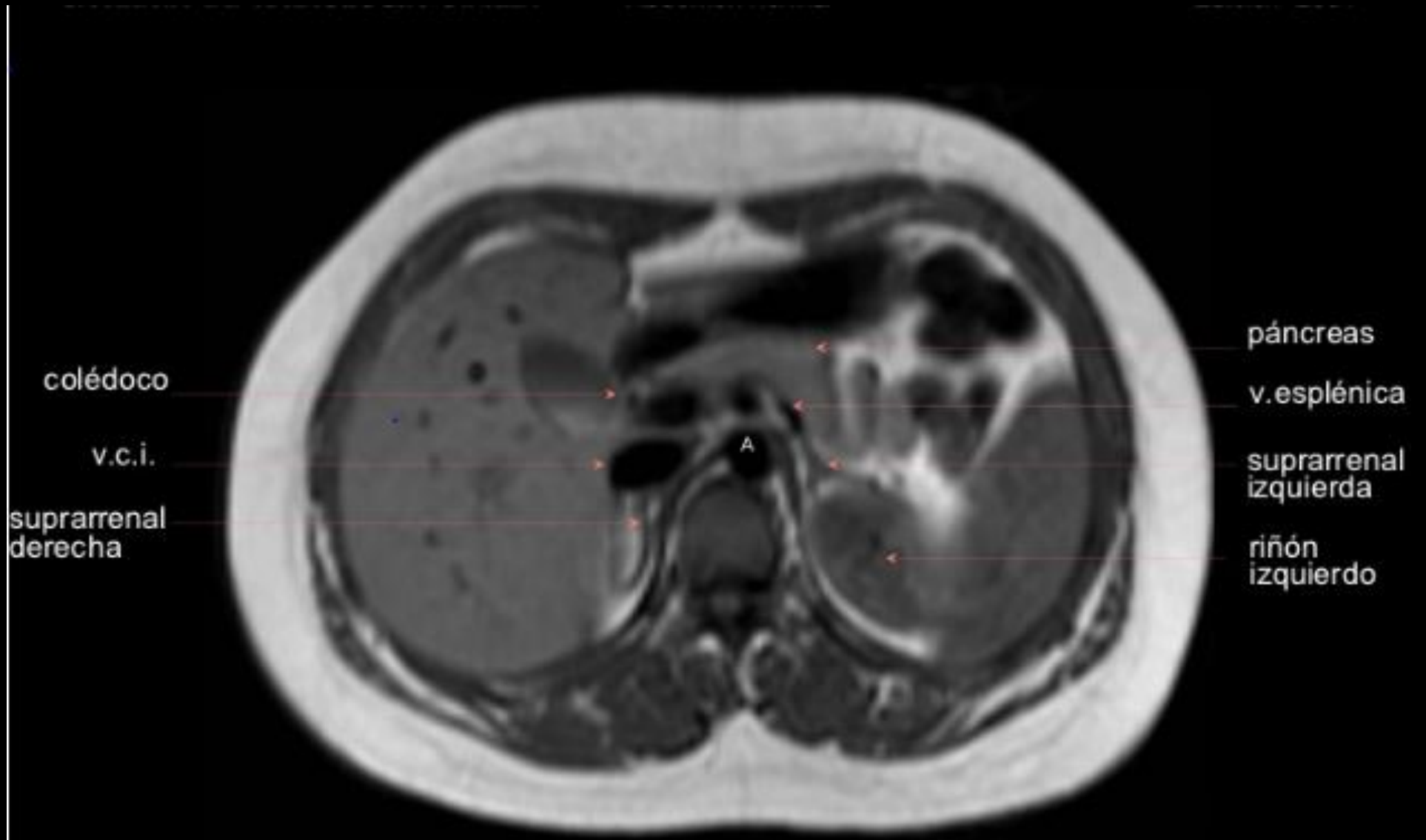

v. hepática media
v. hepática derecha
v.hepática izquierda
v. hemiácigos
A

RM axial T1

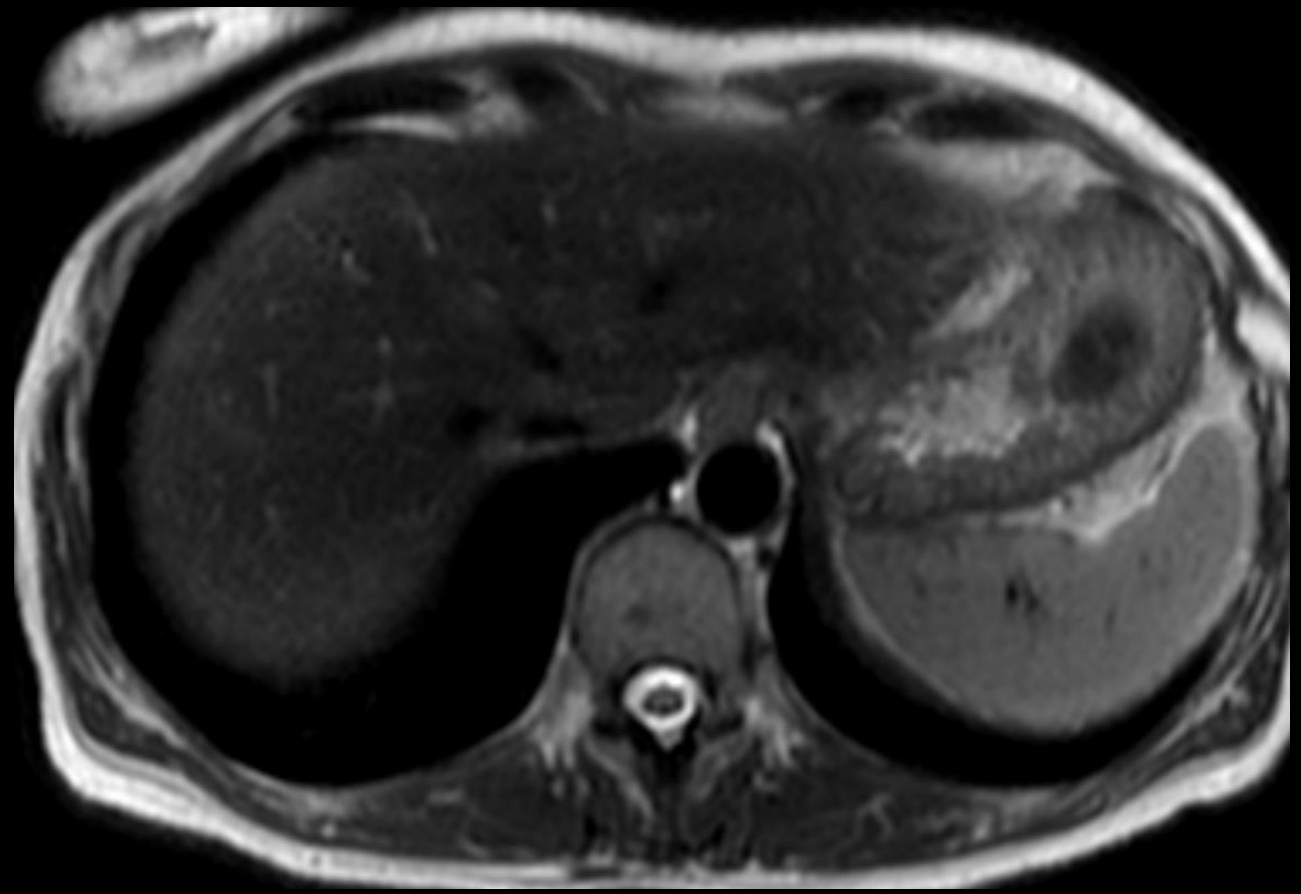

v.c.i.
receso pleural post. der.
estómago
bazo
receso pleural post. izq.
A

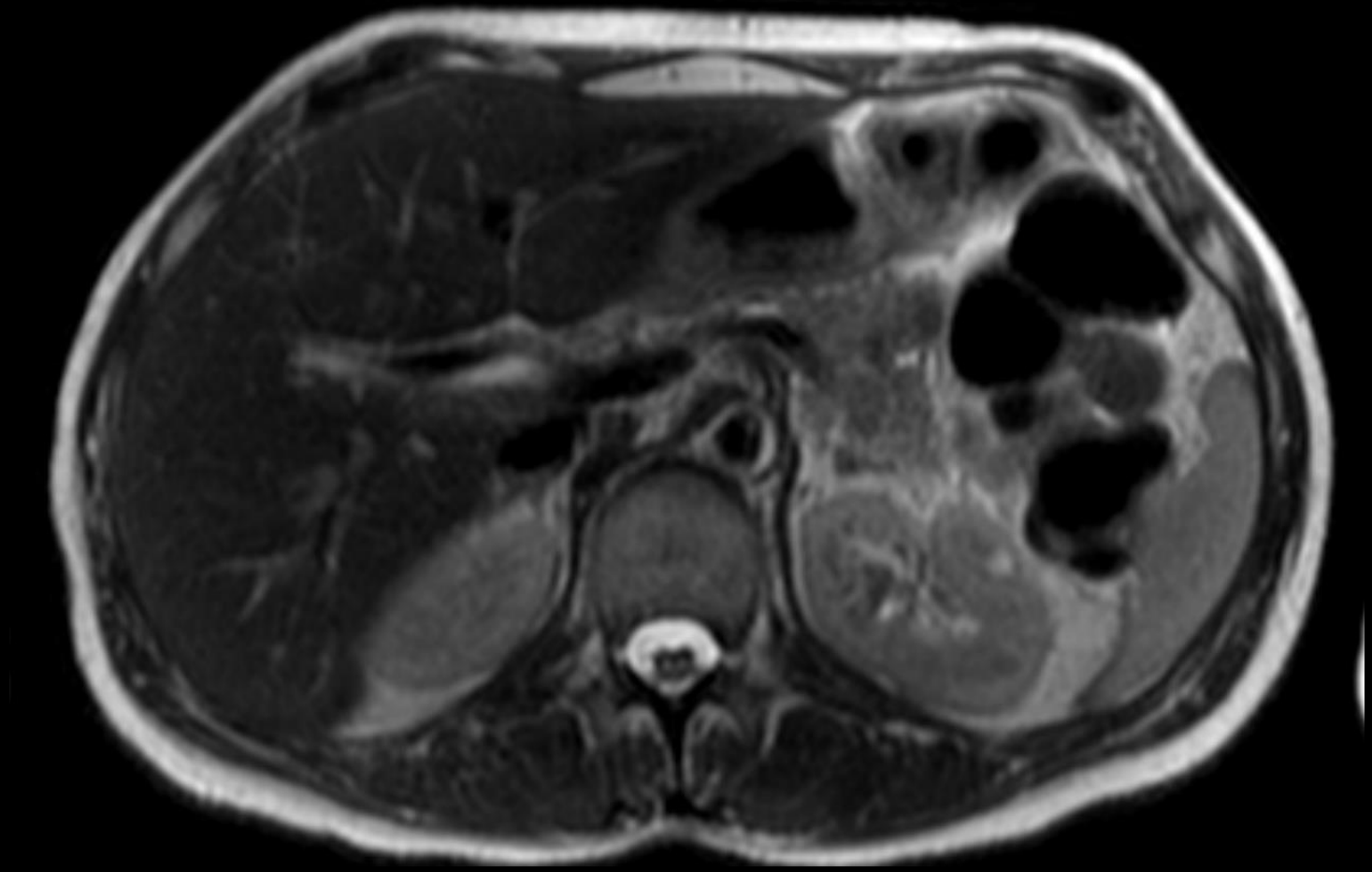
RM axial T1

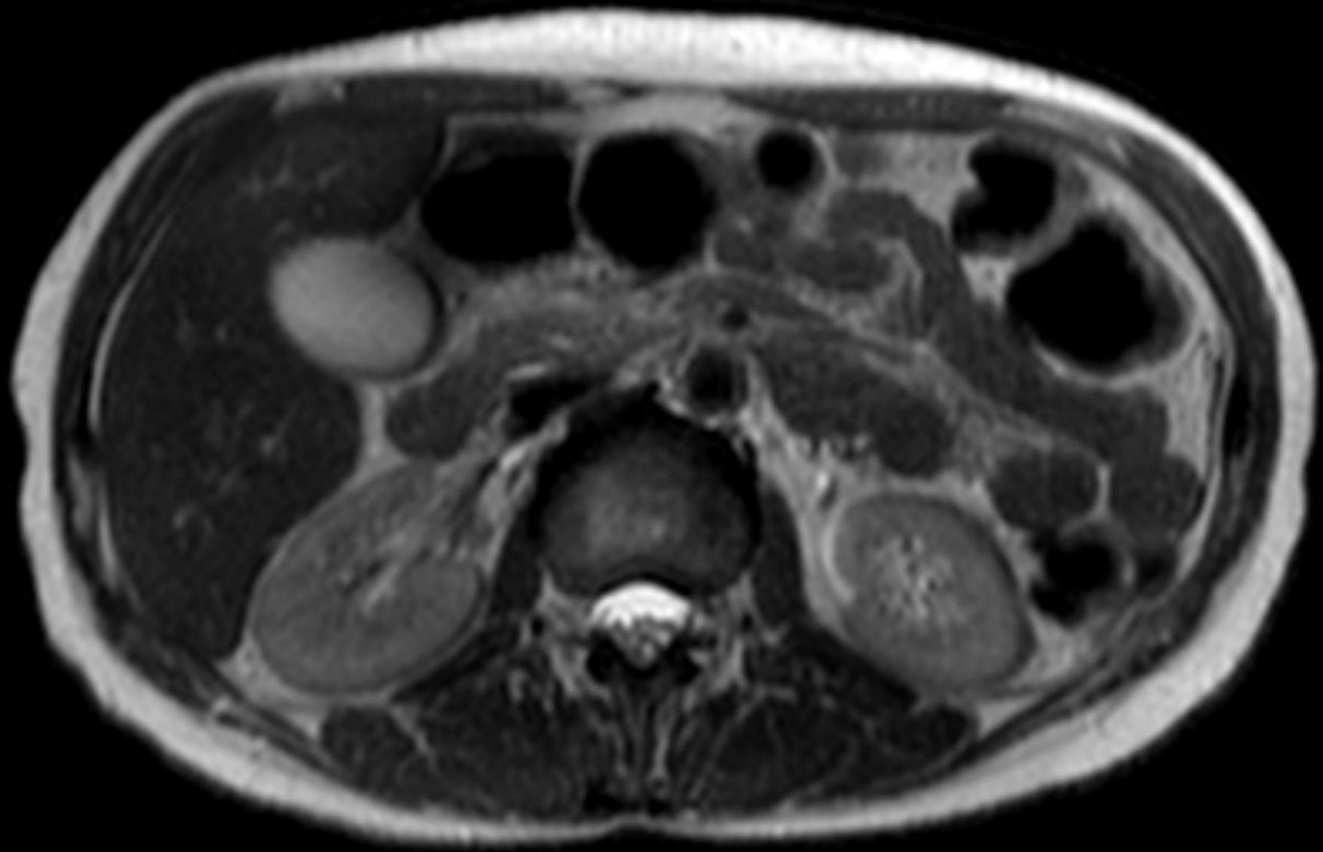

v.porta der.
v.c.i.
A
colon
arteria esplénica
crura diafragm.
RM axial T1

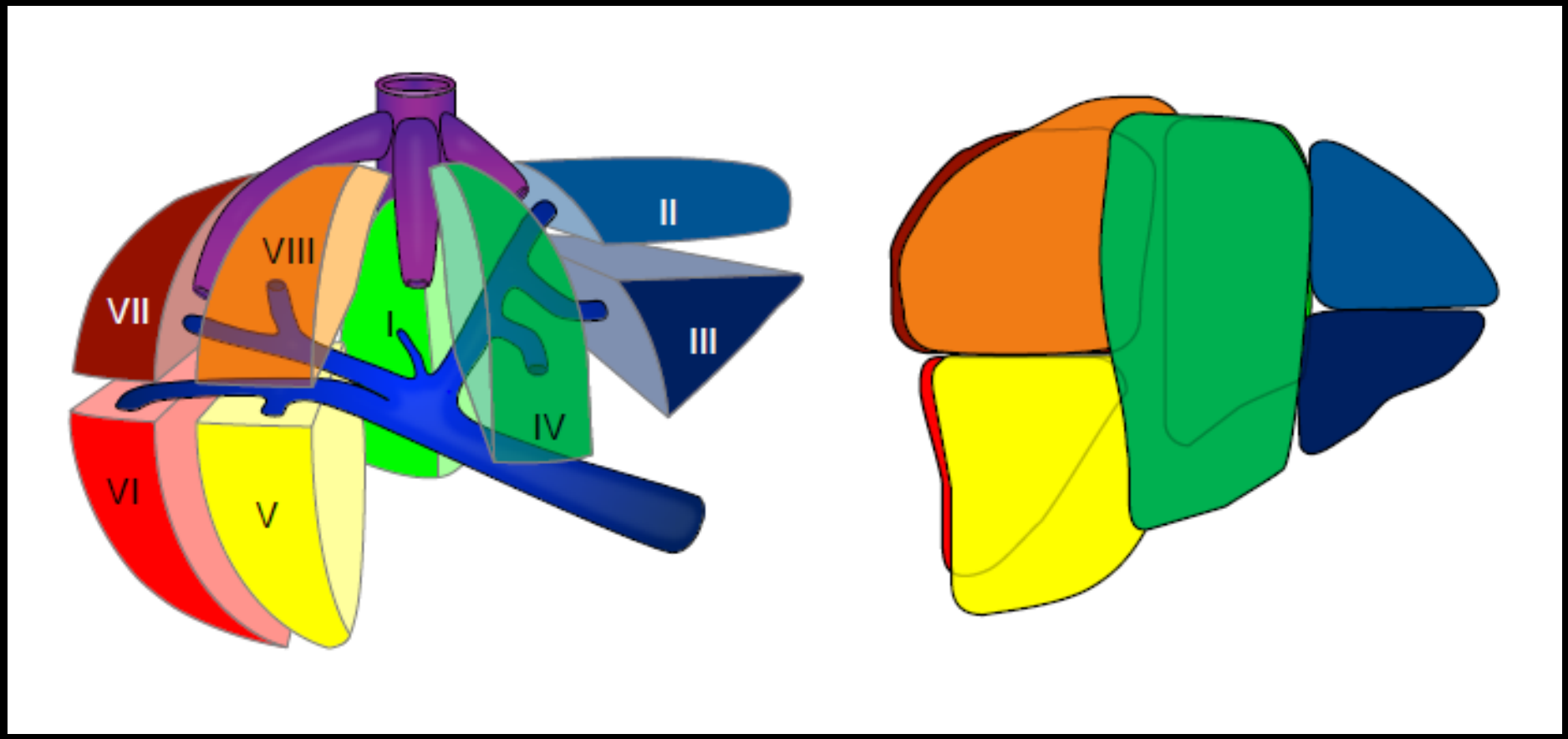

colédoco
v.c.i.
suprarrenal derecha
A
páncreas
v.esplénica
suprarrenal izquierda
riñón izquierdo

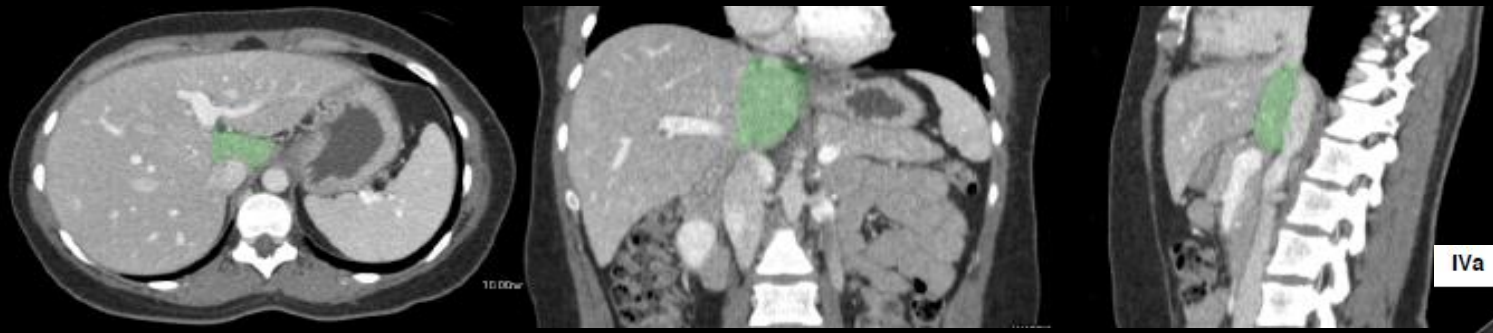
RM axial T1

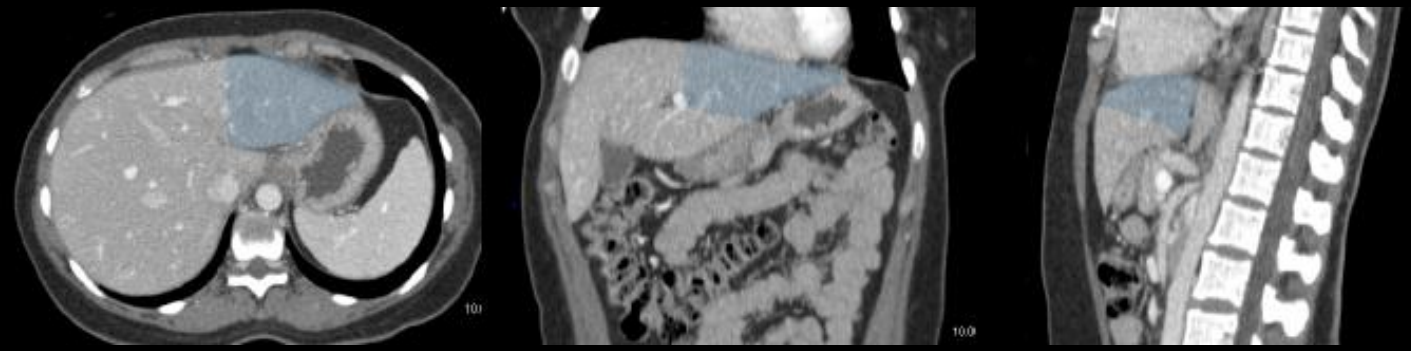


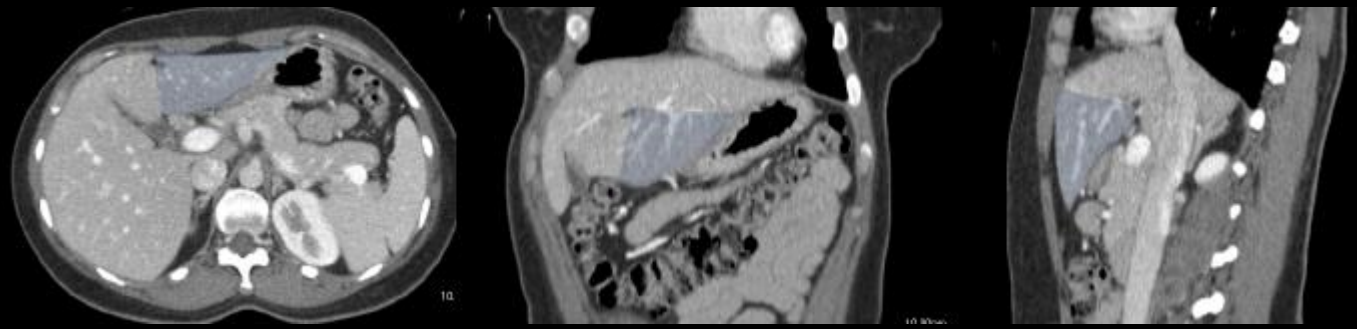




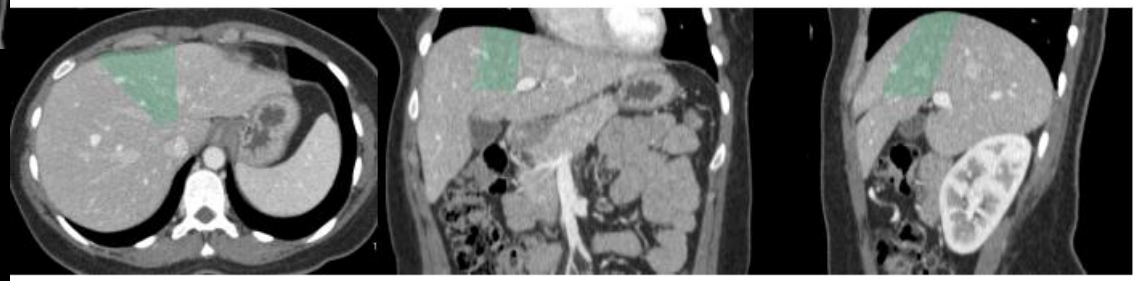

II
VIII
VII
I
III
IV
VI
V







IVa



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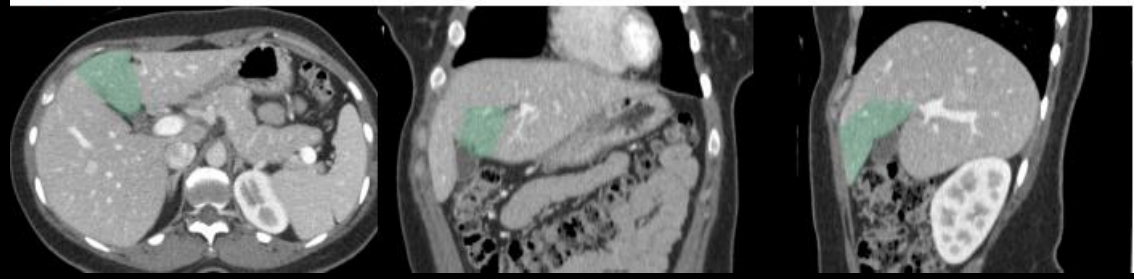
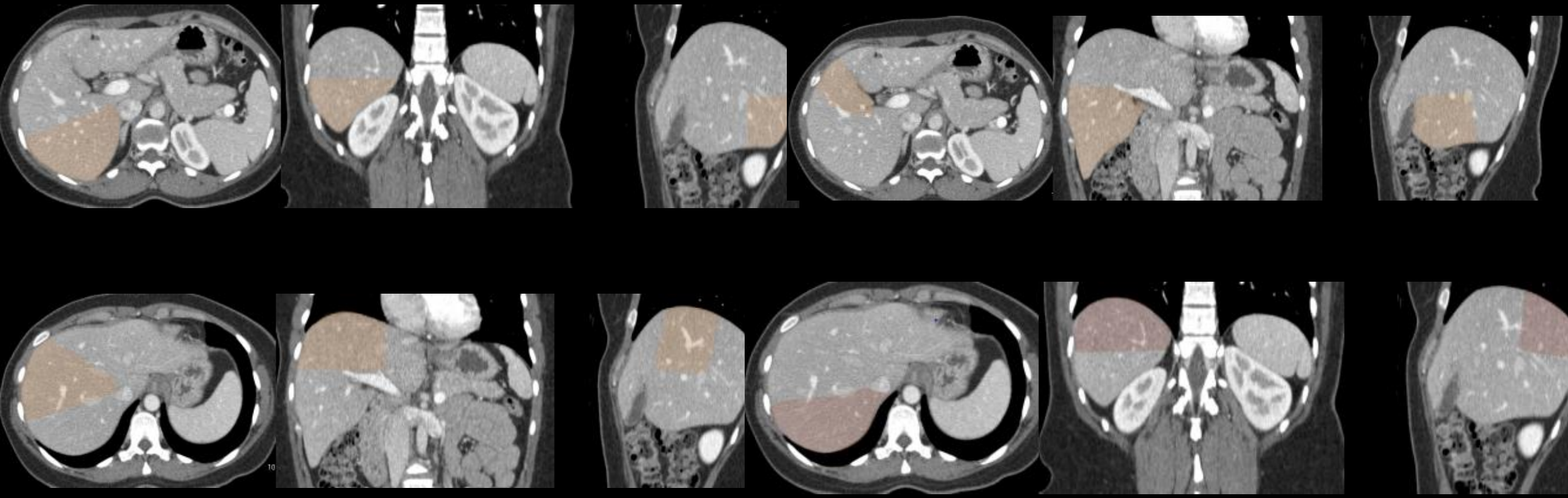
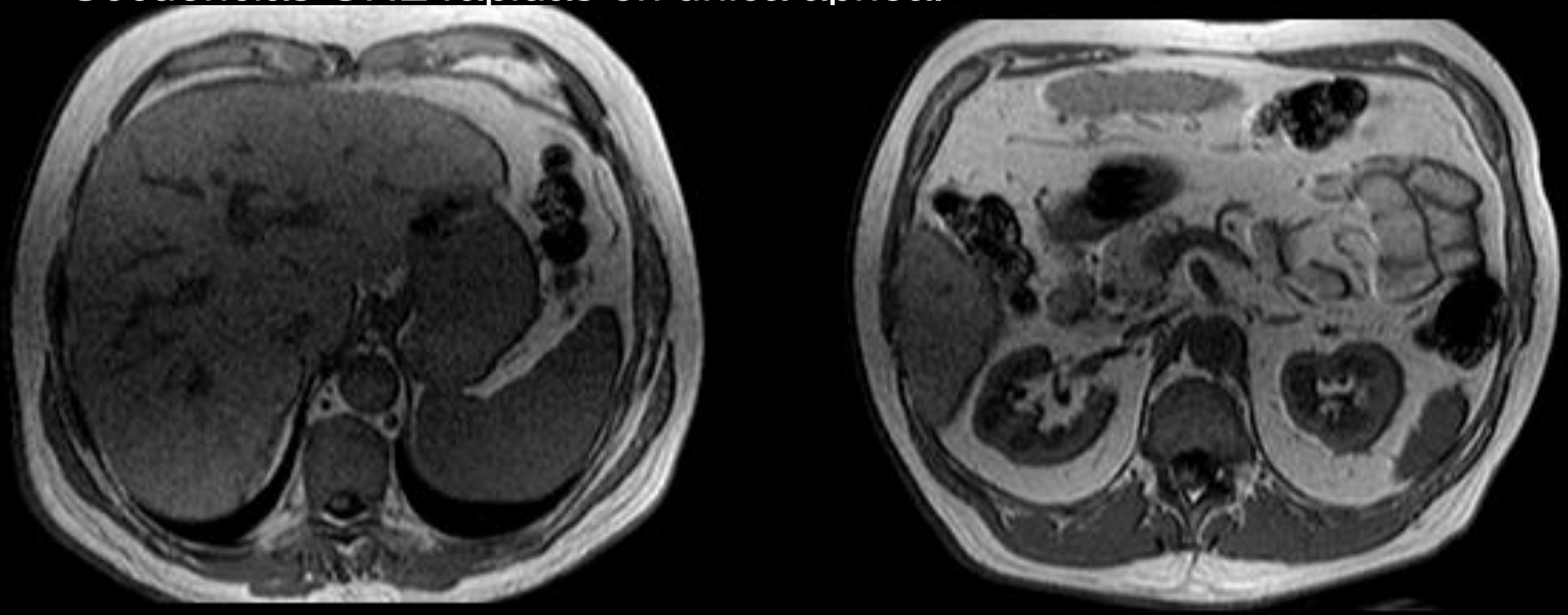




T1 GRE

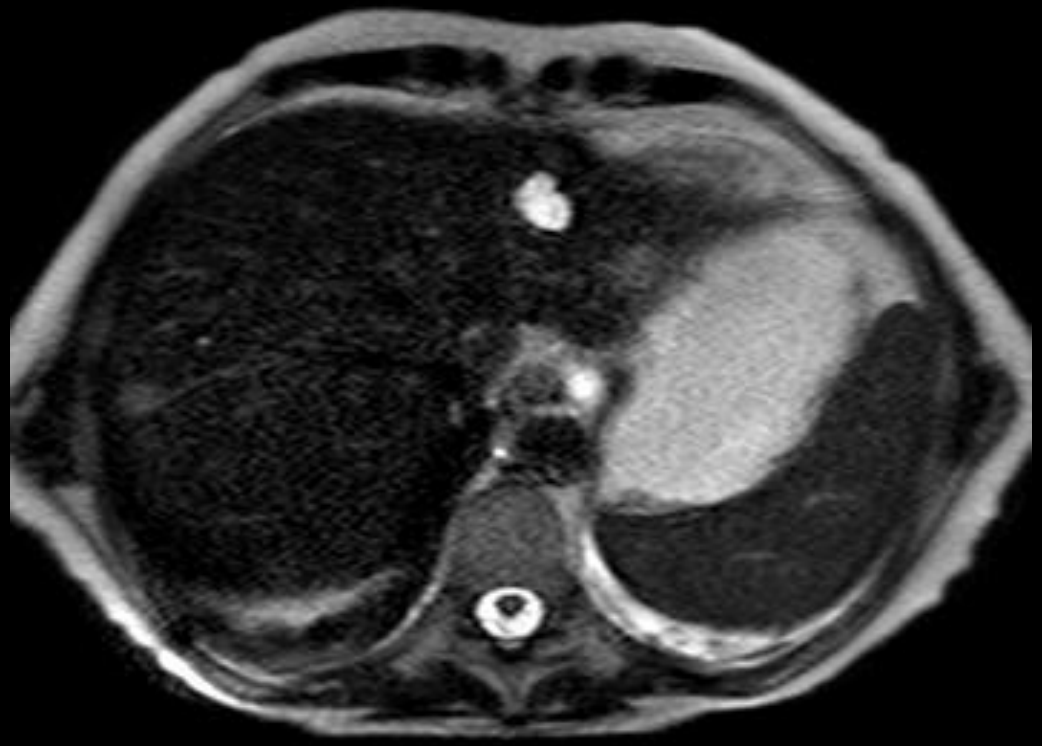
- Axial two-dimensional dual GRE sequence
- Secuencias GRE rápidas en única apnea.



Información T1
Detalle anatómico

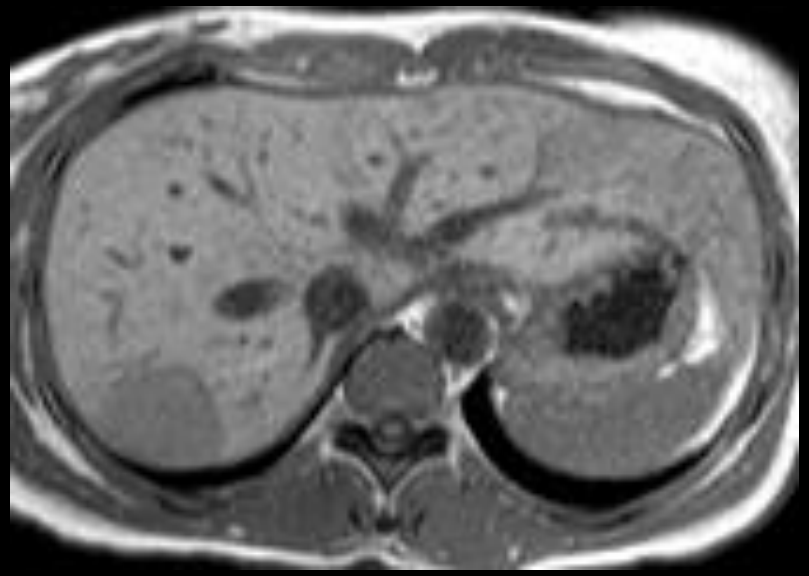
T2 AXIAL

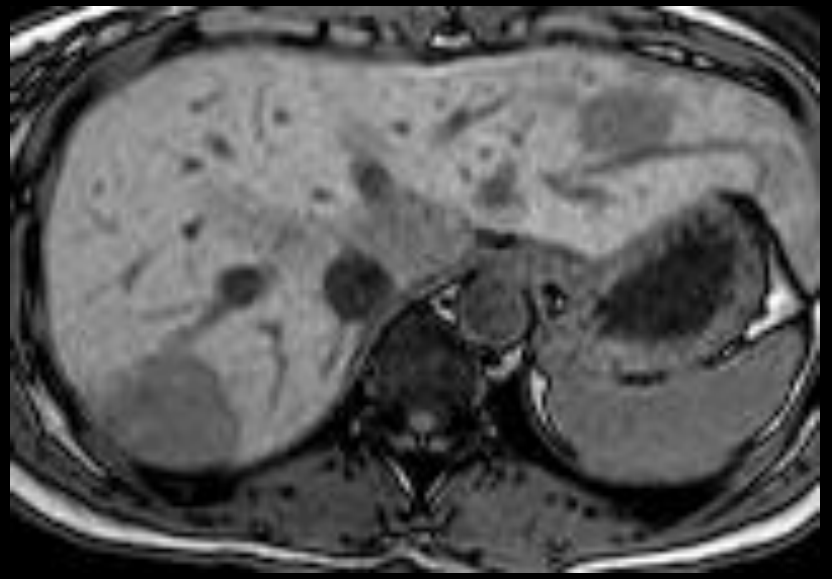
- SSTSE single-shot turbo o fast spin-echo :



Sensible al liquido.
Distingue sólido de líquido.
Edemas

T1 GRE DUAL: FASE Y FUERA DE FASE (Chemical Shift –Desplazamiento quimico)

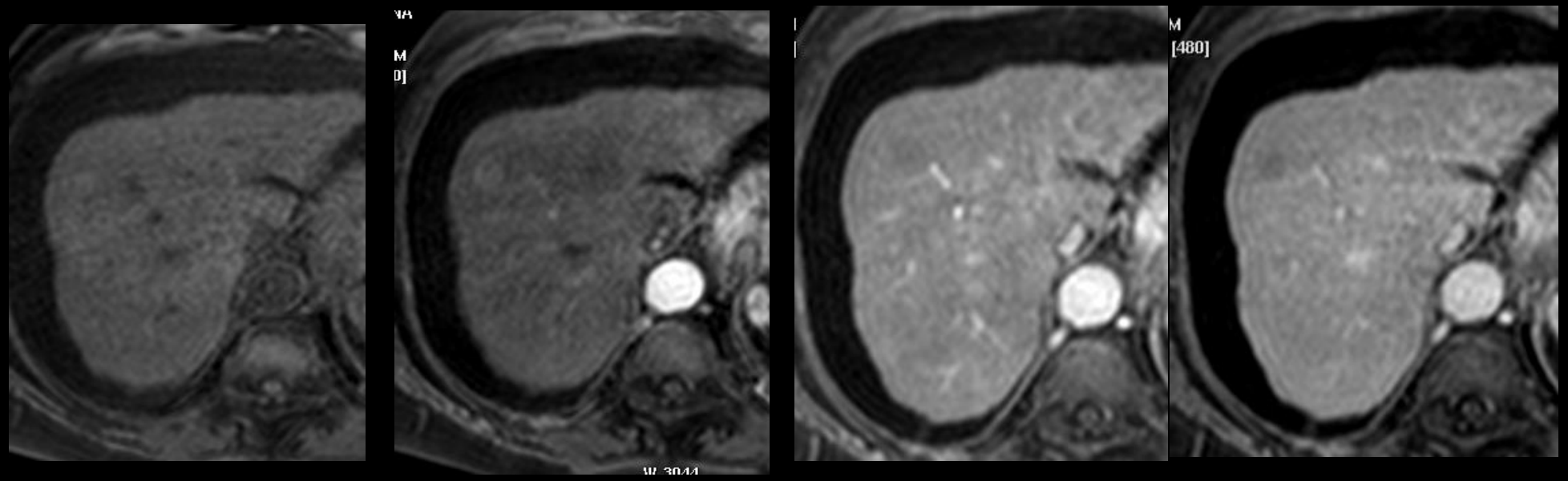




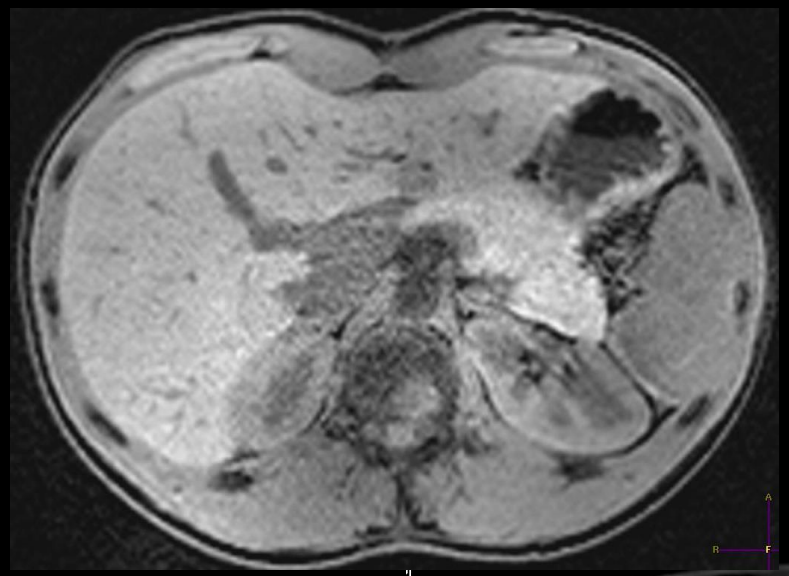
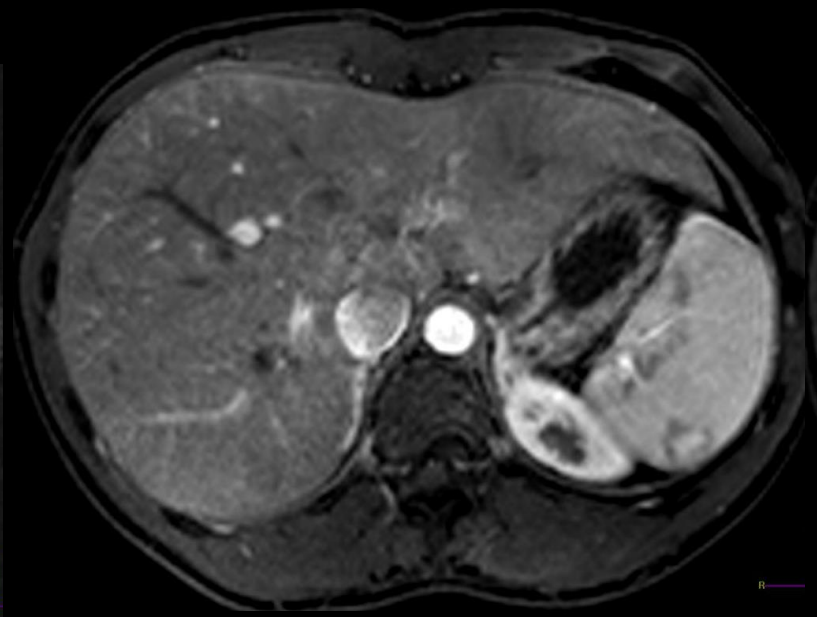
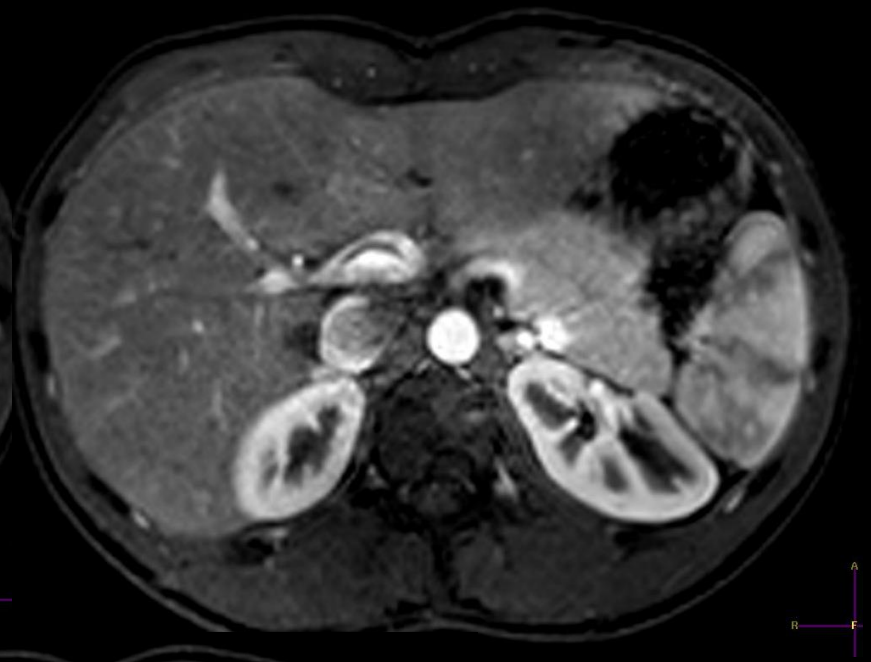
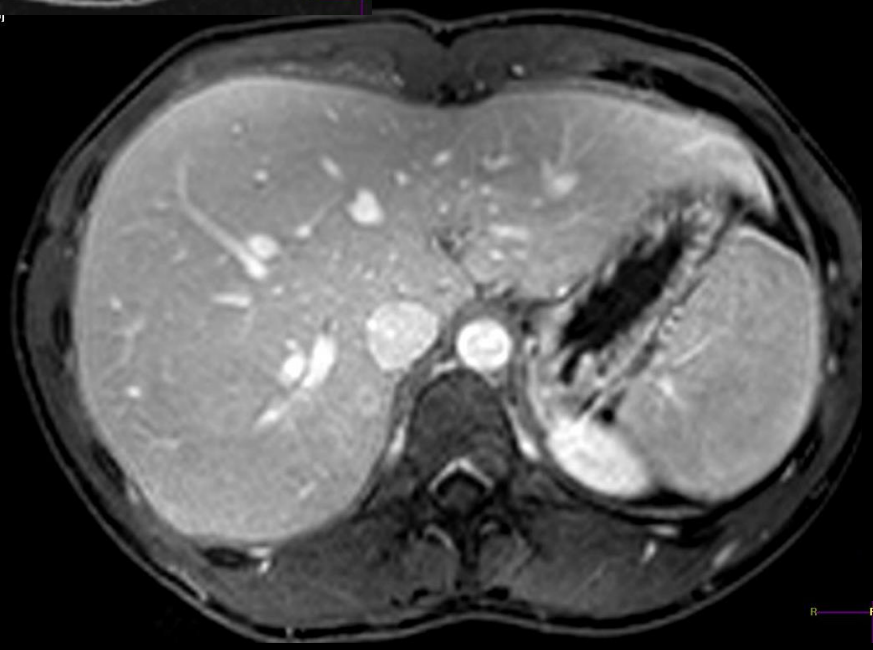
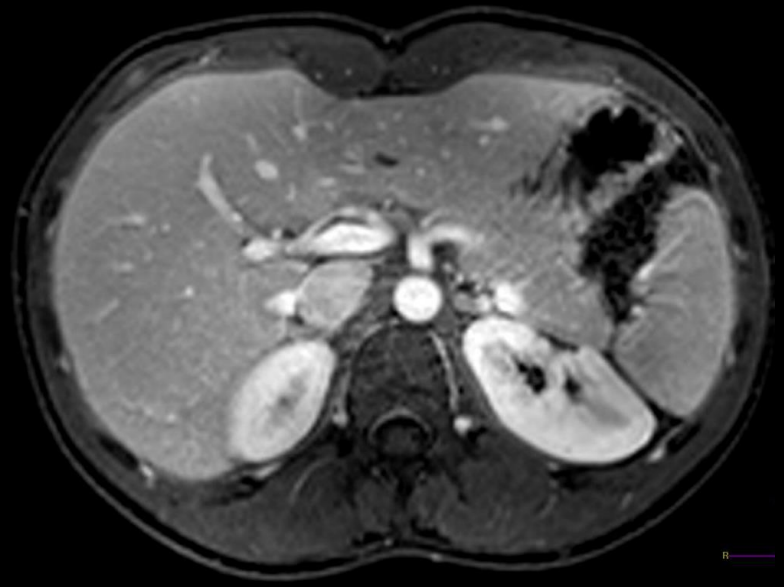
- Grasa intracelular mezclada con agua: detecta grasa intracel focal o difusa en los tumores o tejidos. (***Caída señal Fuera Fase)***
- Útil en la detección de hierro, metal, aire o calcio ***(Caída de señal en Fase)***
- Efecto de tinta china (pertenencia de lesiones a determinado órgano)

T1 AXIAL GRE SIN Y CON CONTRASTE Y SUPRESION GRASA Axial dynamic 3D fat-suppressed GRE sequence

- Siemens: VIBE [volume interpolated apnea examen)
- Philips: THRIVE [T1 de alta resolución isotrópica examinado, volumen)
- GE: LAVA [adquisición de hígado con aceleración de volumen)
- Fases arterial, venosa portal y tardias.

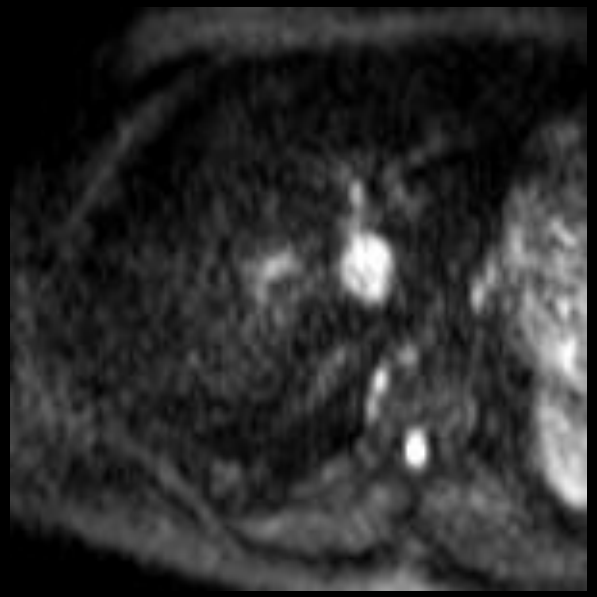
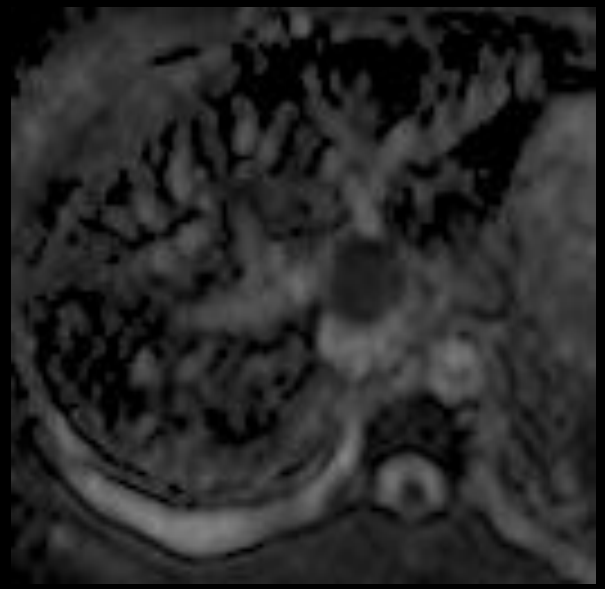


Caracterización de lesiones y sus patrones de realce
Fases sin contraste/arterial dominante/ venosa portal/tardíos
Secuencias post procesamiento: sustracción

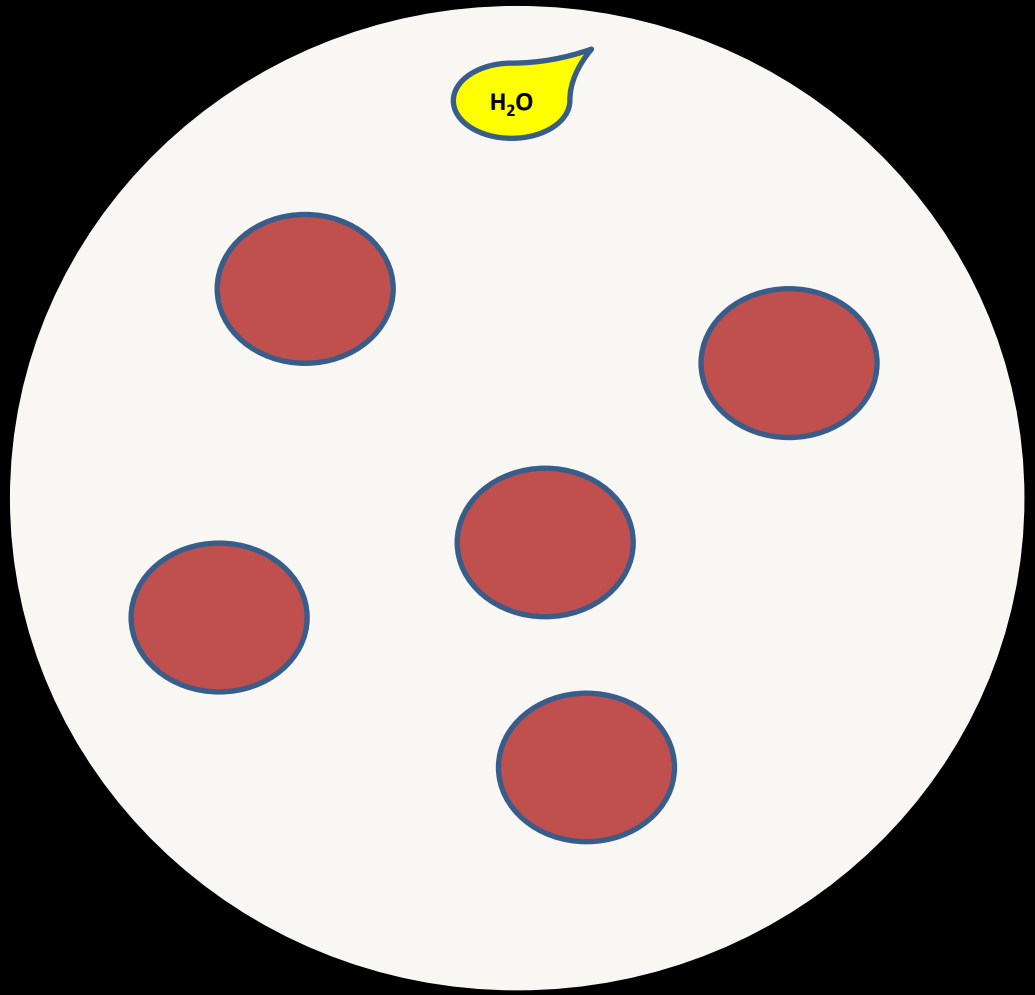
DIFUSION DWI

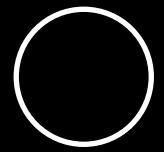
- Axial black-blood echoplanar T2-weighted imaging
  - Técnica rápida y no invasiva
  - Utilizar junto a las imágenes anatómicas

RESTRICCION: tumores, abscesos, edema citotóxico y fibrosis.

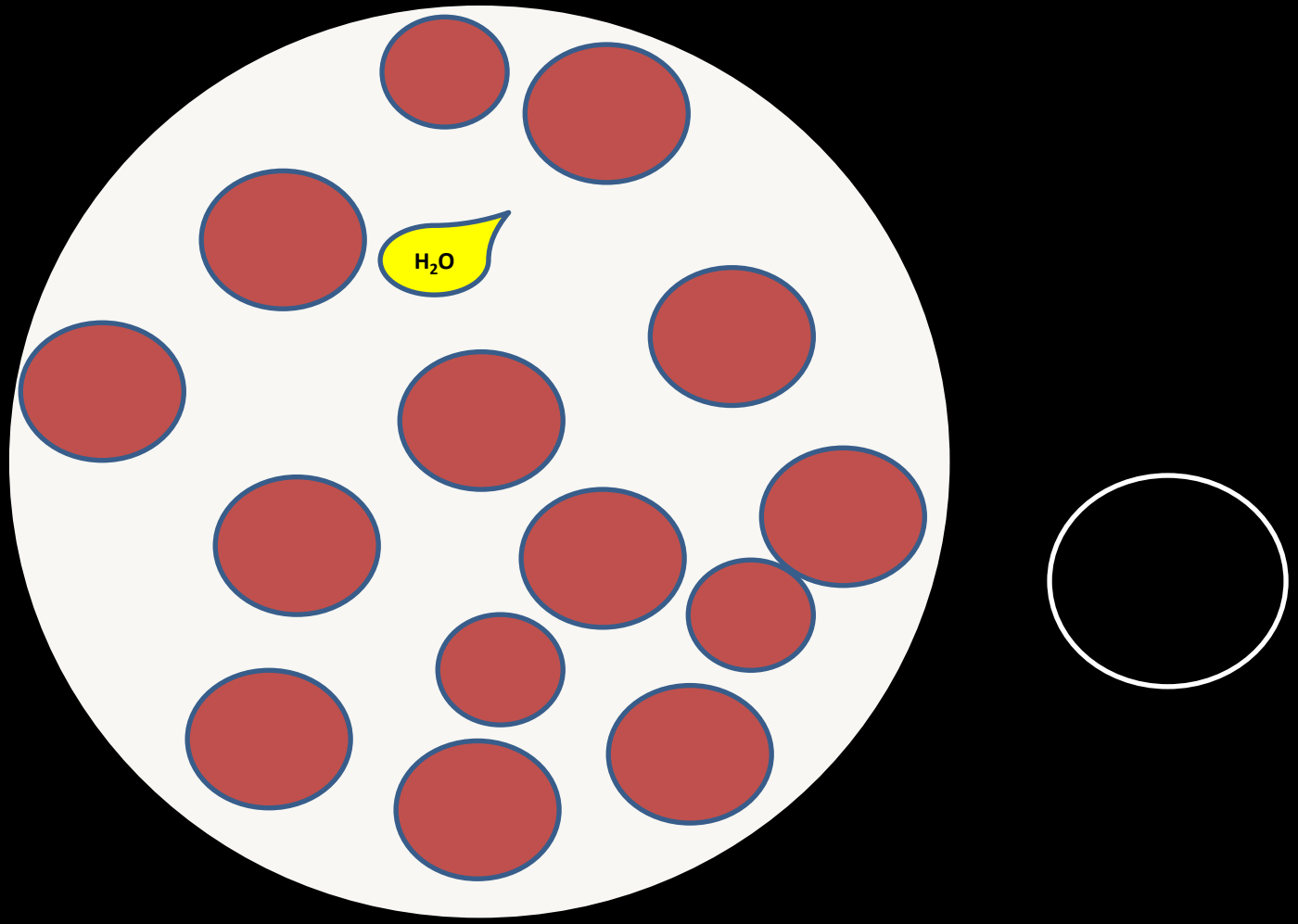
DIFUSIÓN EN TEJIDO SANO





Doob JL (1942). The Brownian movement and stochastic equations. Ann Math 43:351-369

DIFUSIÓN EN LESIÓN HIPERCELULAR



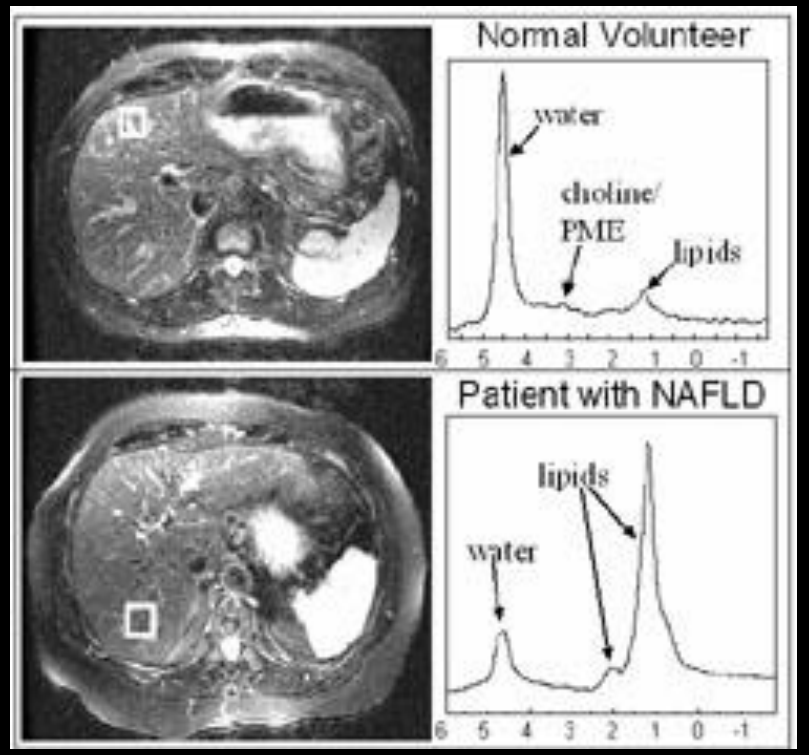
Clark CA, Le Bihan D (2000). Watter diffusion compartmentation and anisotropy at high b values in the human brain. Magn Reson Med Dec; 44 (6):852-859

ESPECTROSCOPIA

- Registro de metabolitos y productos químicos en los tejidos o tumores.
- ***Aplicación limitada aún***

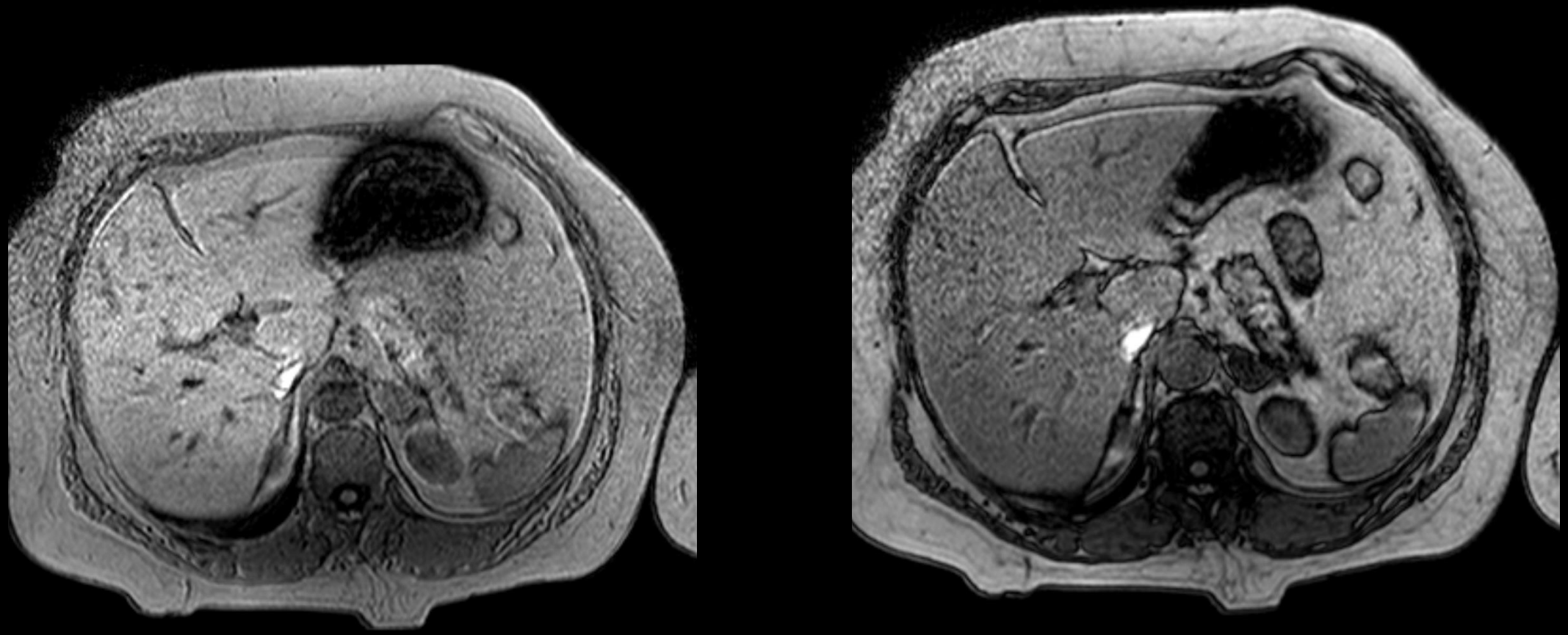
Metabolites Detected with Proton MR Spectroscopy

Metabolite	Resonance Frequency (ppm)
Water	4.26
Lipids	0.9–1.4
Lactate	1.3
Glutamine	2.2–2.4
Creatine	3.0
Choline	3.2
Alanine	1.48
Glucose	3.4, 3.8



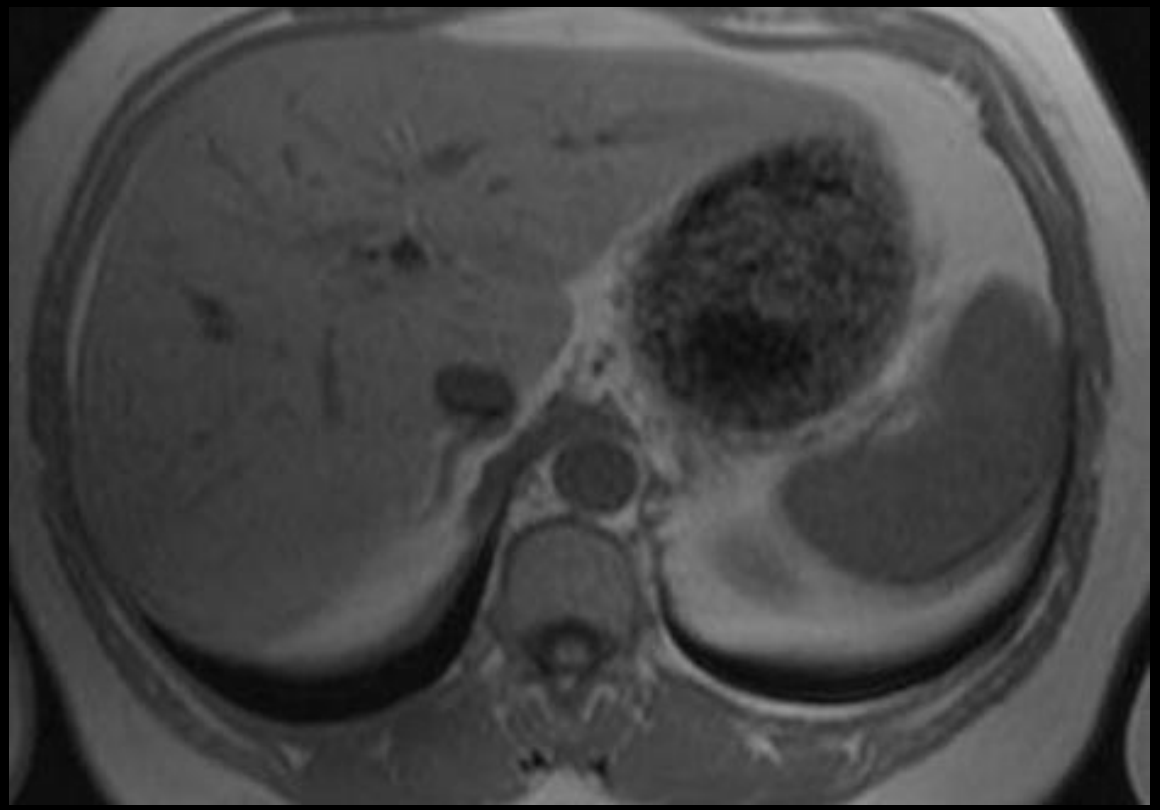
Cuantificación de la grasa, fibrosis, inflamación.
Valoración de tumores
Respuesta al tratamiento.

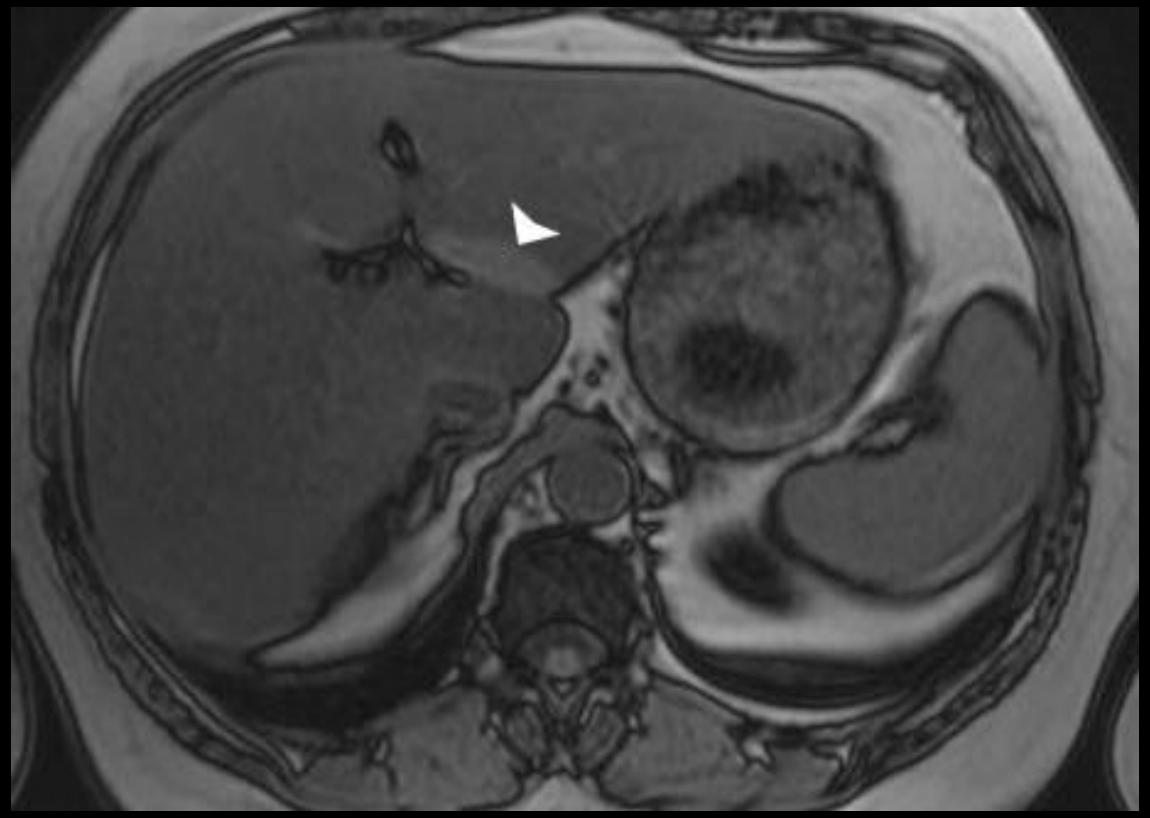
ADENOMA



T1 en fase y fuera de fase

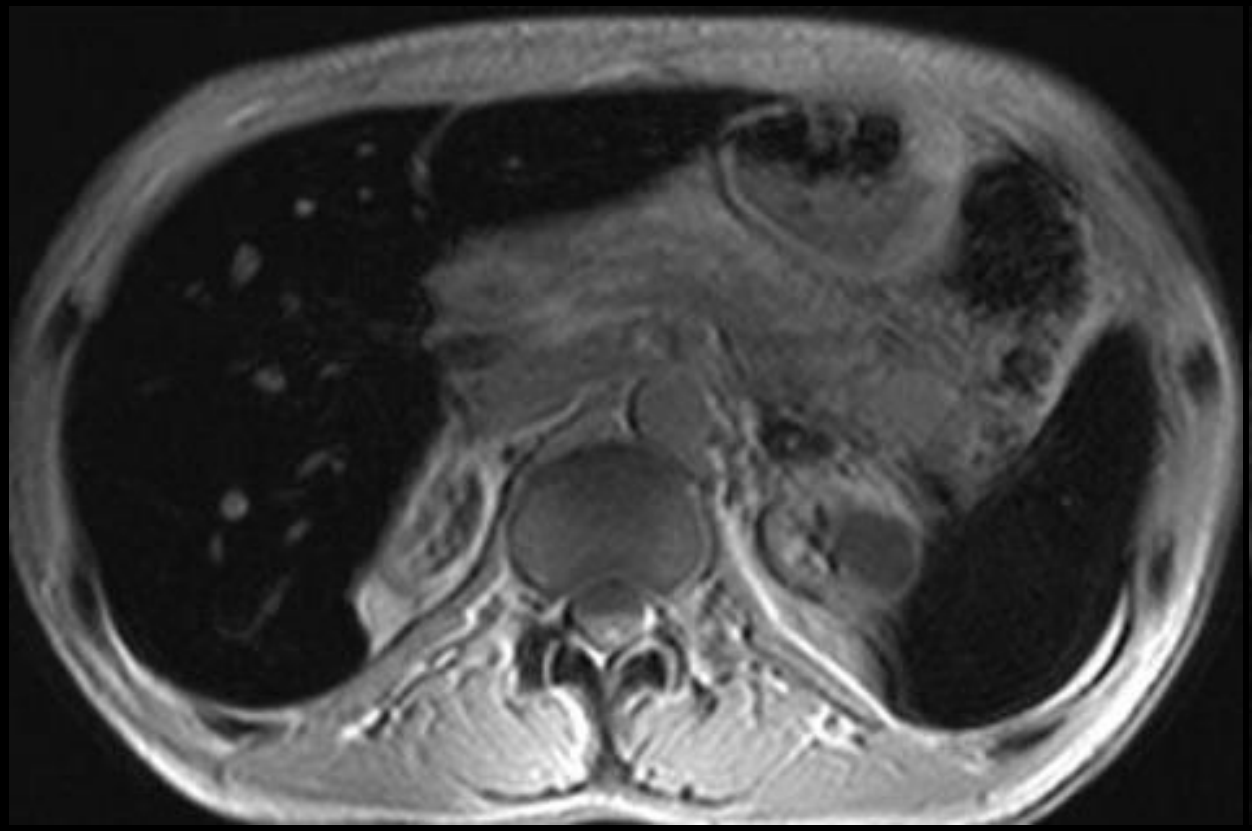
ESTEATOSIS DIFUSA CON ÁREA RESPETADA

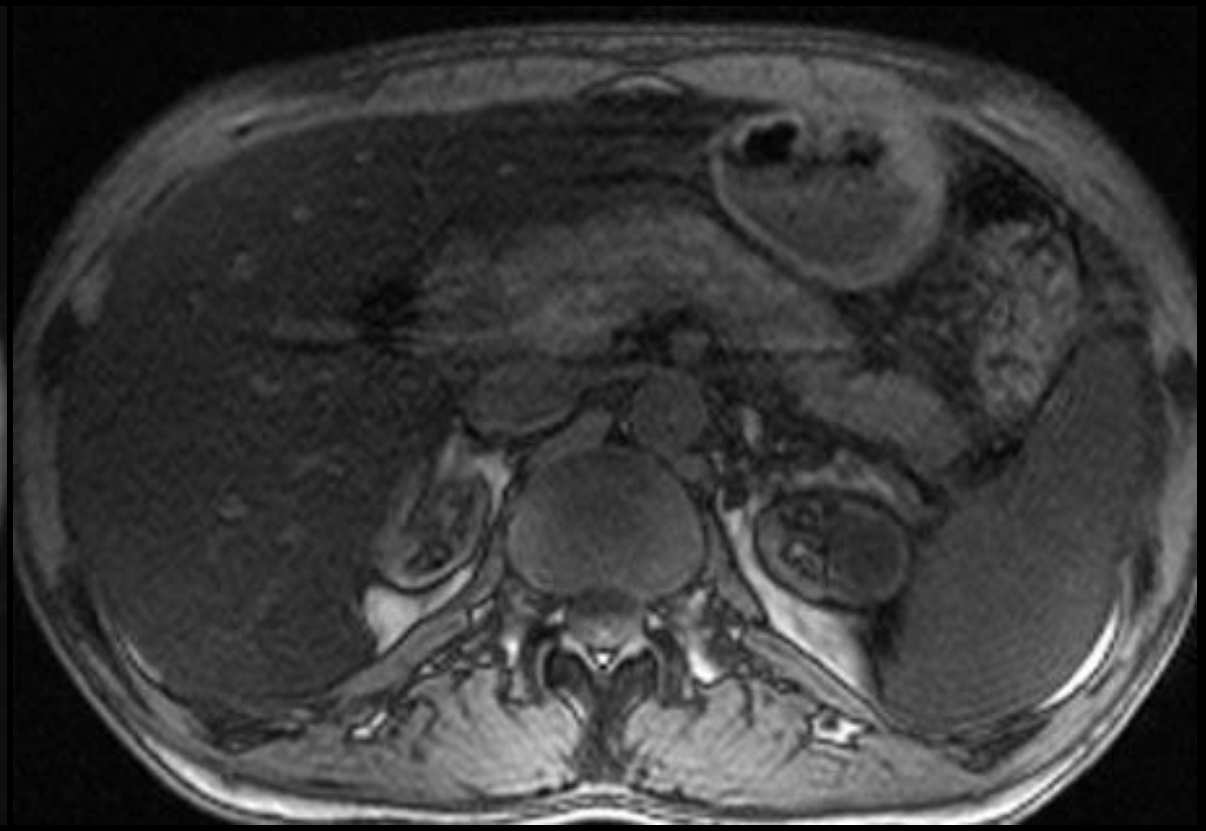




Caída de señal en fuera de fase

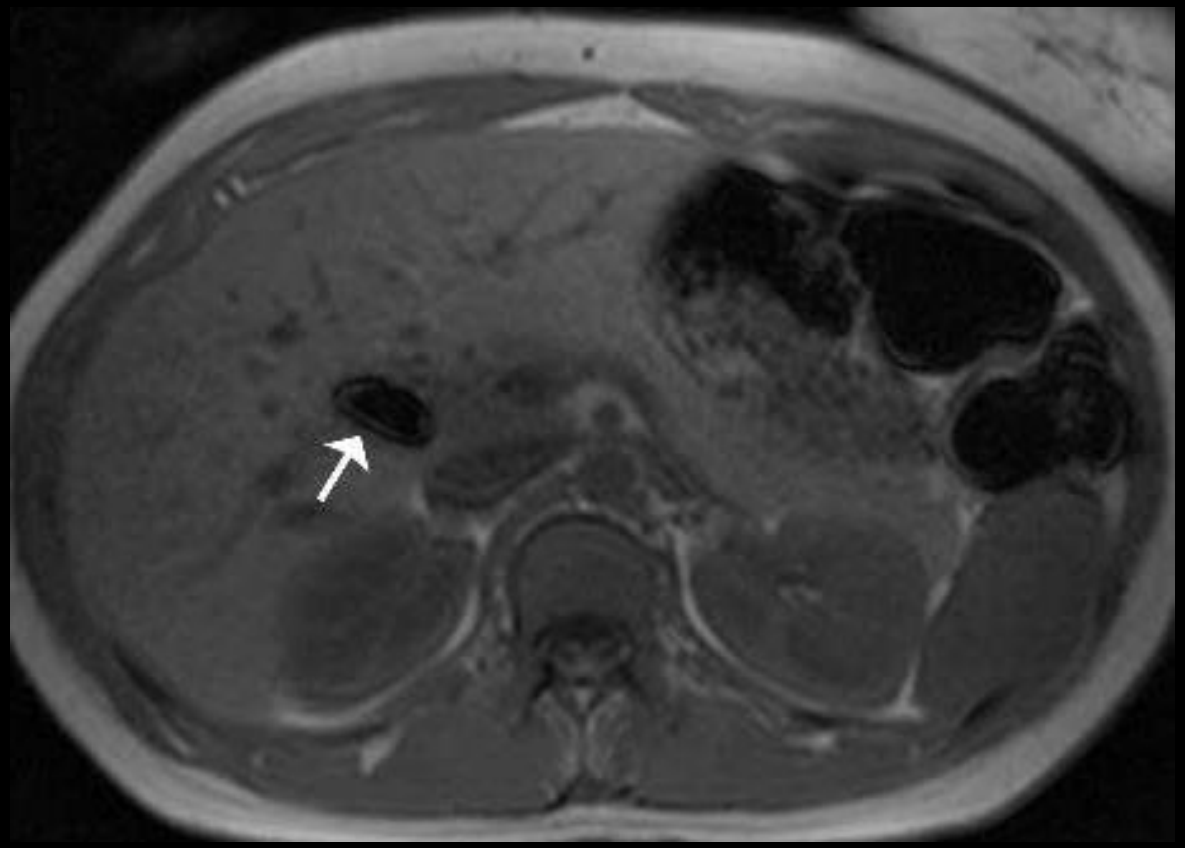
SOBRECARGA DE HIERRO

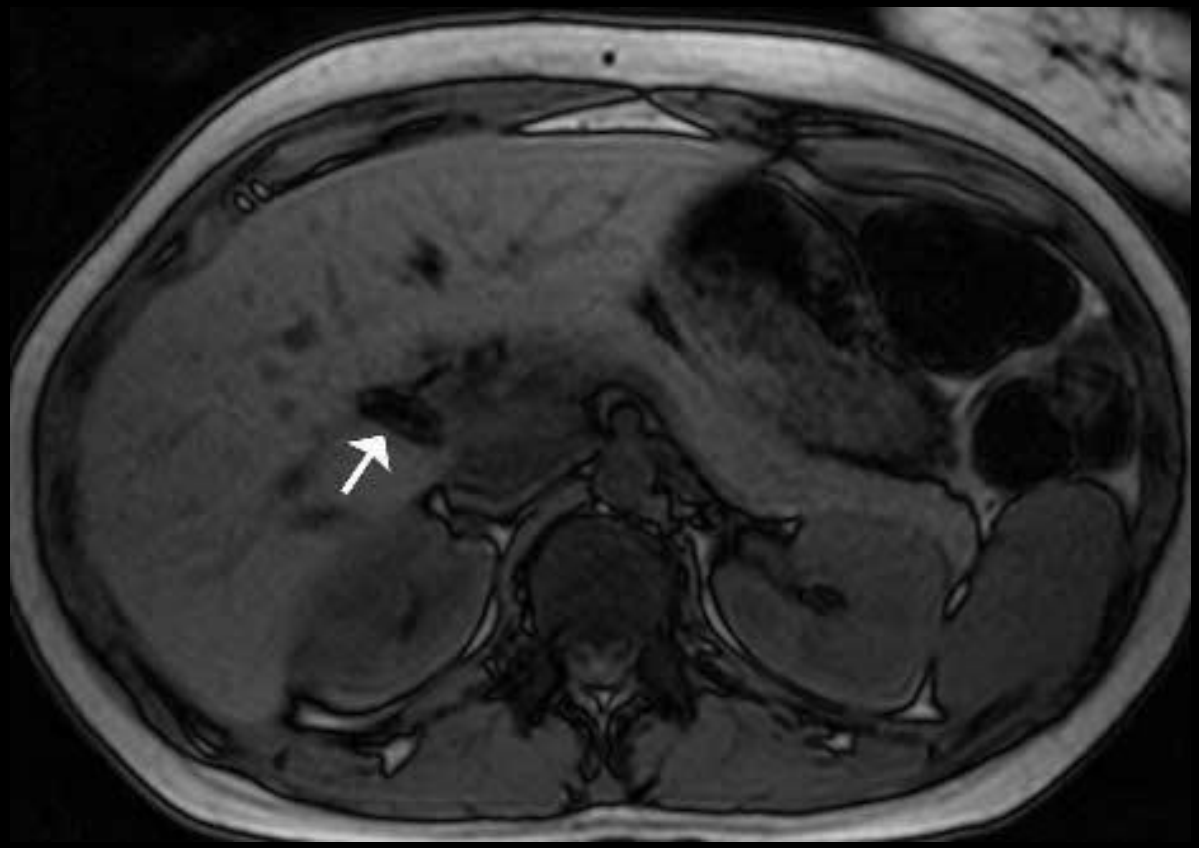




Caída de la señal en Fase

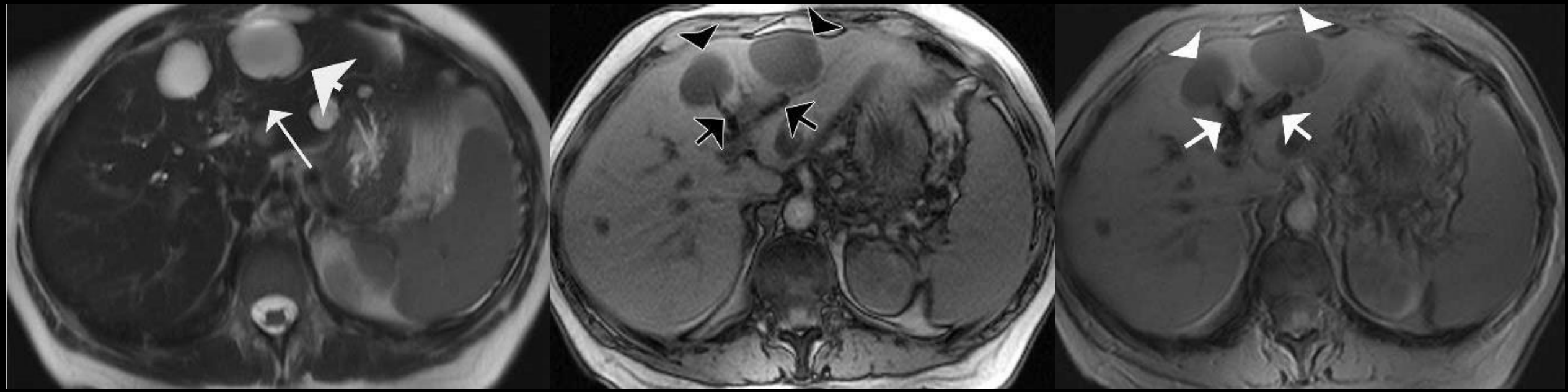
CLIPS DE COLECISTECTOMIA





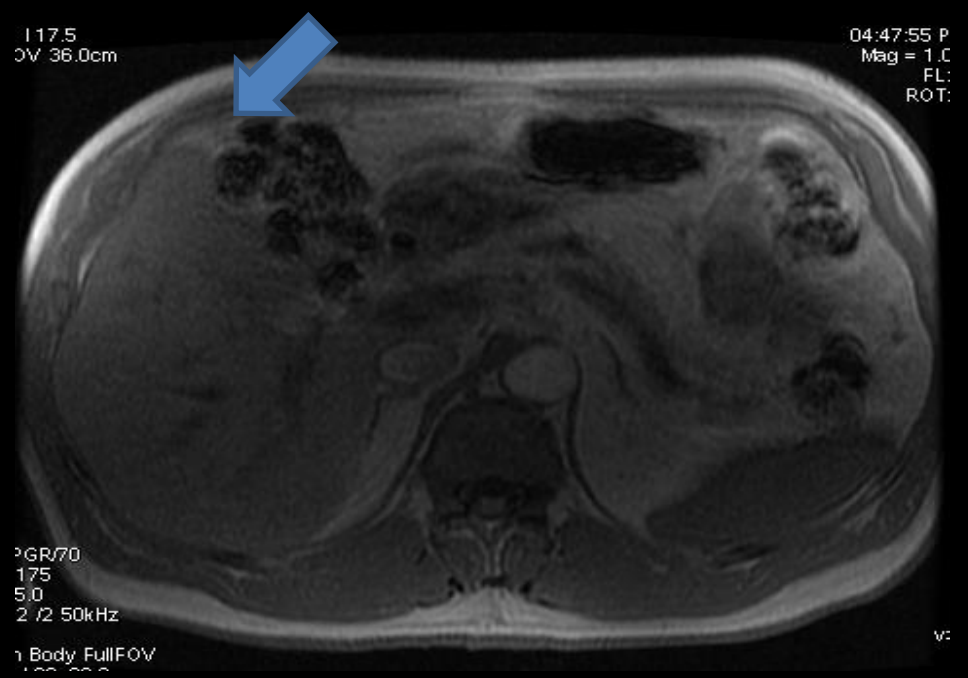
Artefacto de susceptibilidad magnética

AEROBILIA

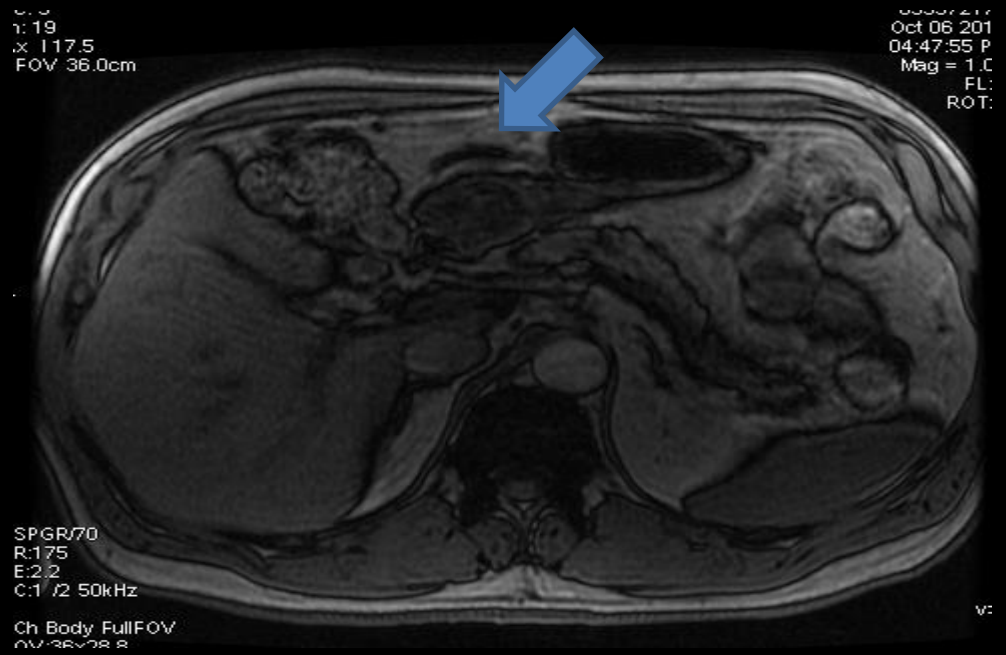


Artefacto de susceptibilidad magnética

GAS INTESTINAL

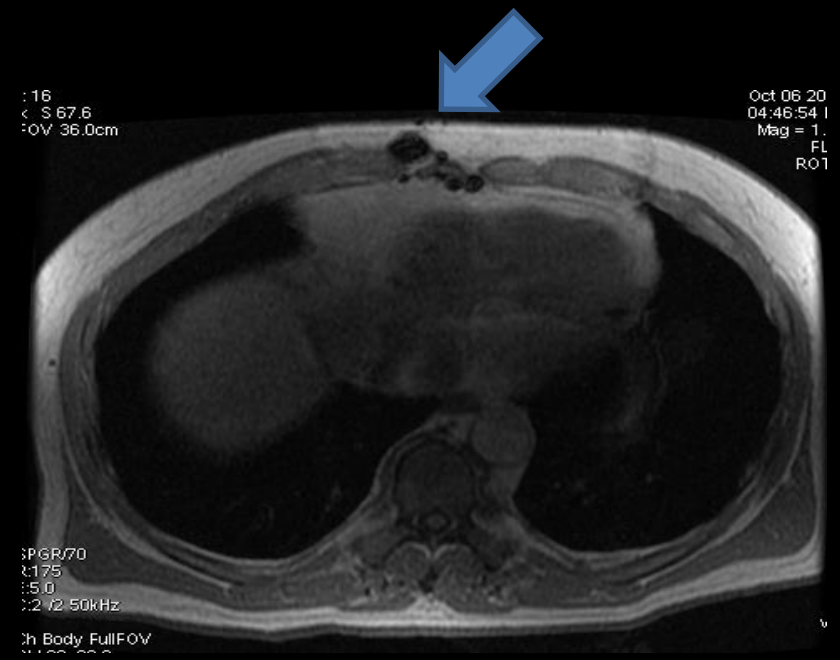


En Fase

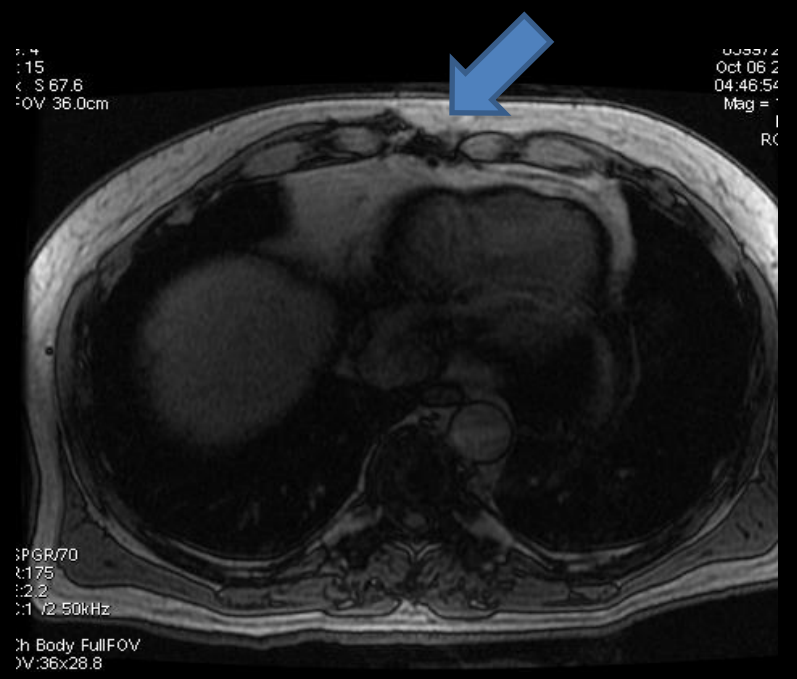


Fuera de fase

ARTEFACTO DE SUCEPTIBILIDAD MAGNETICA (METAL)

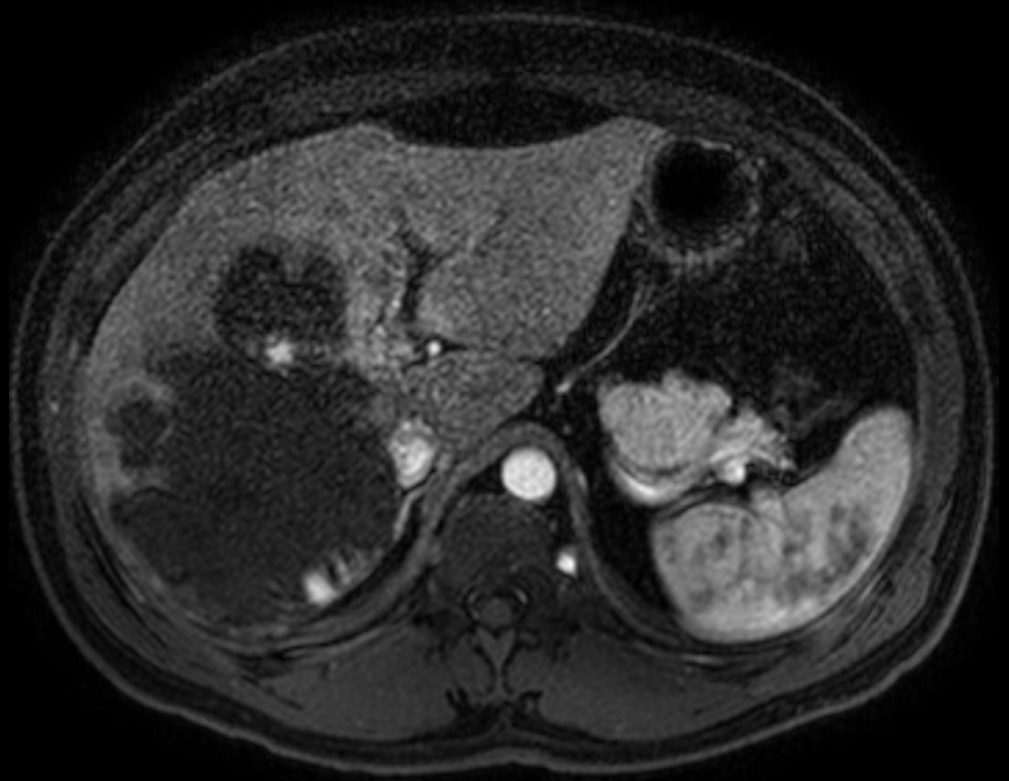


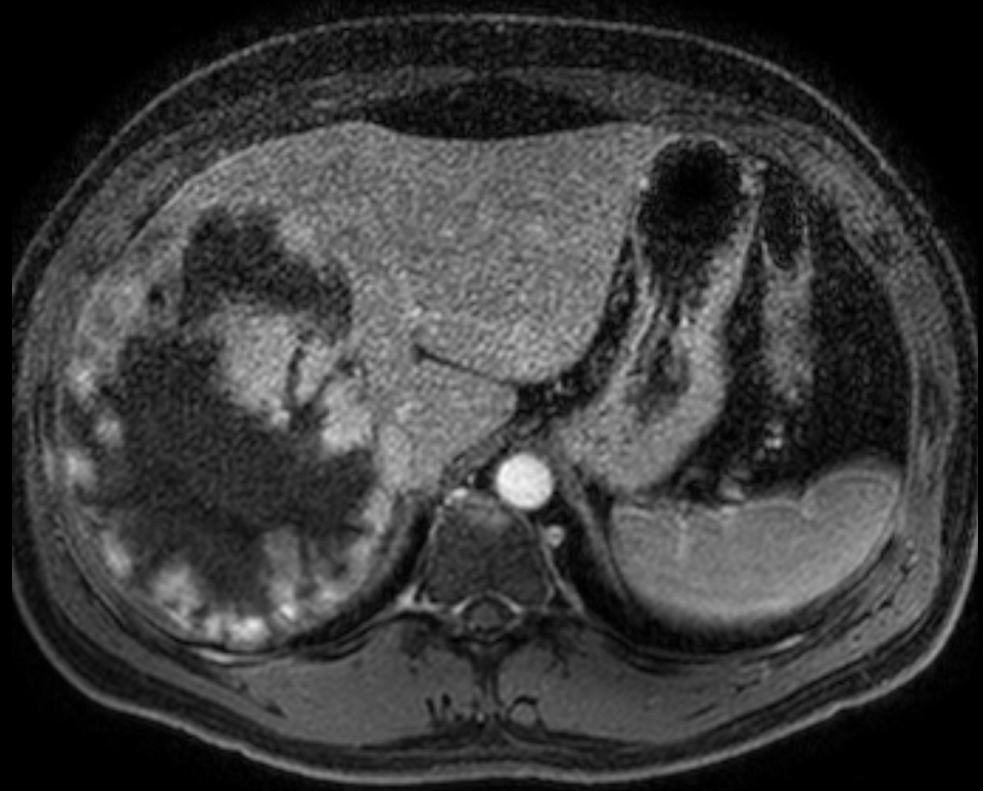
En Fase



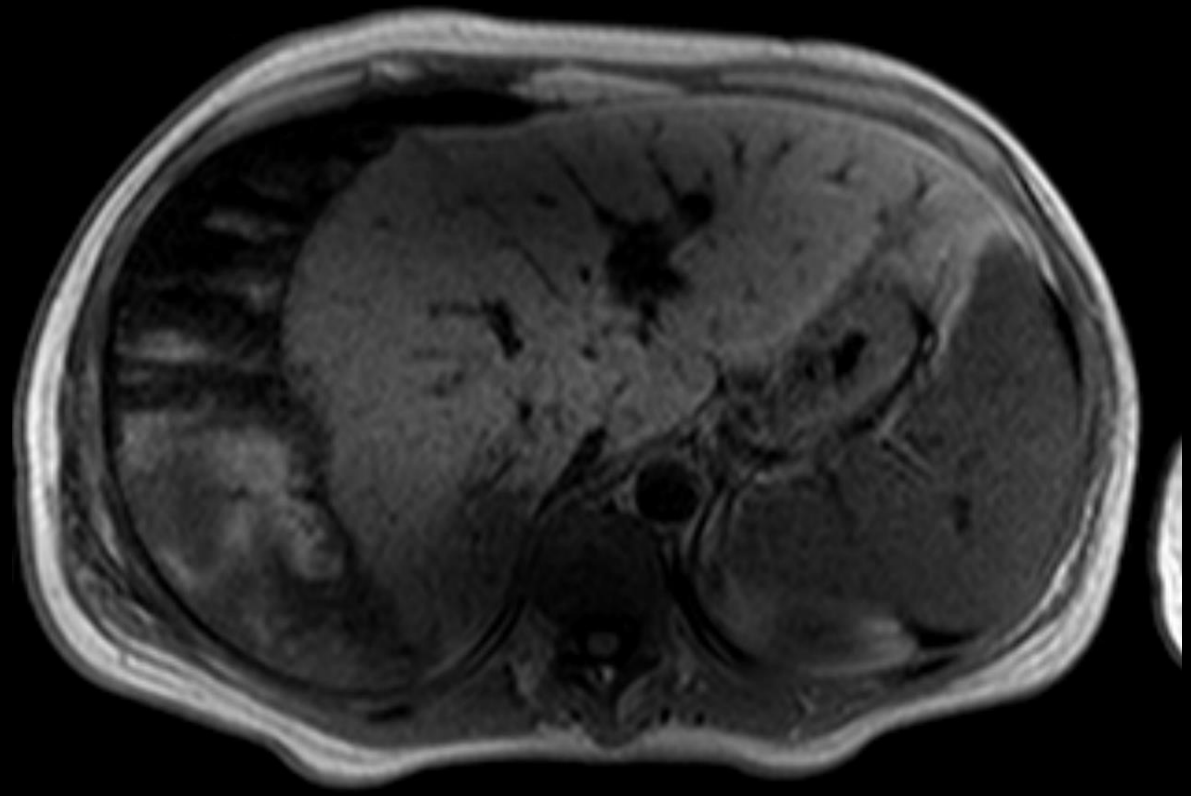
Fuera de fase

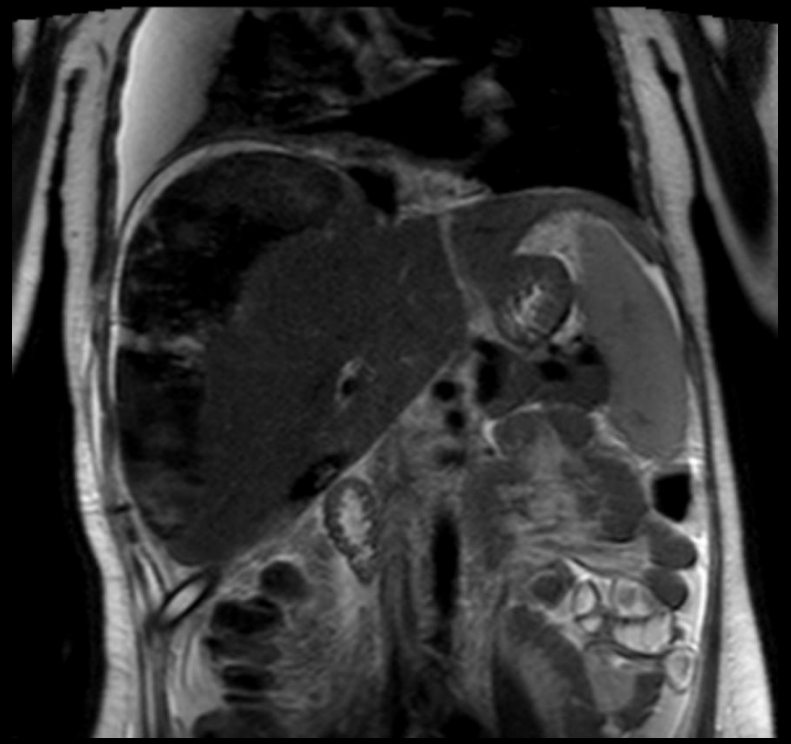
HEMANGIOMA GIGANTE



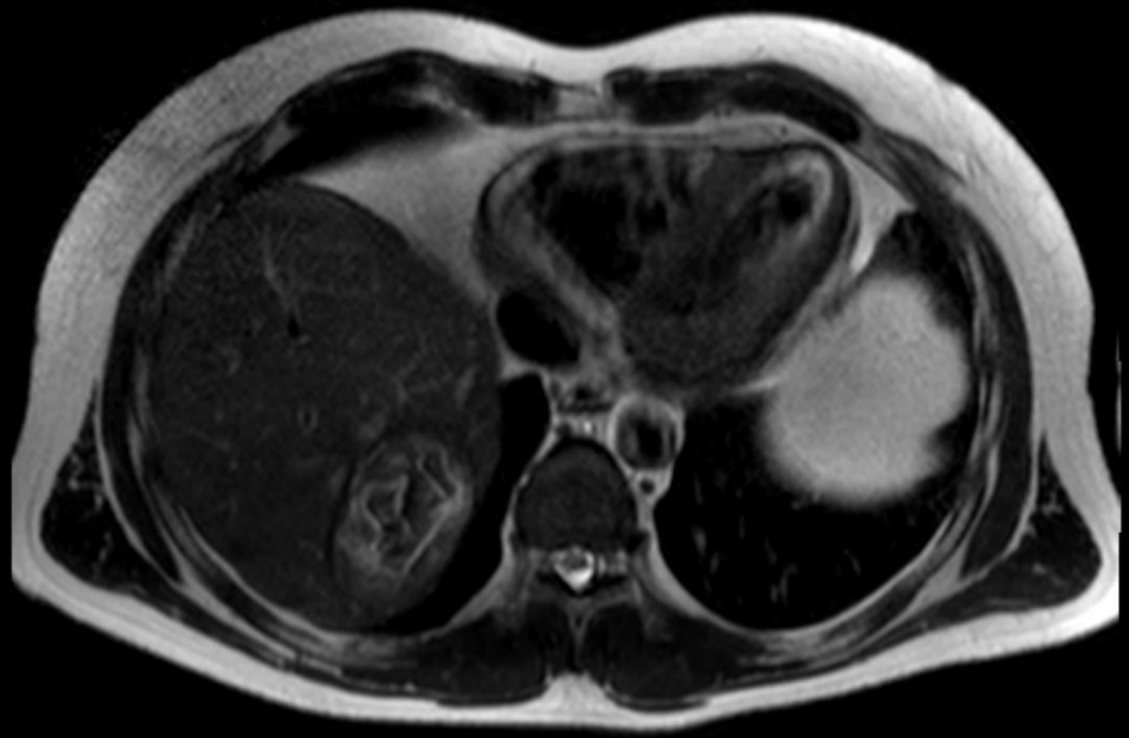


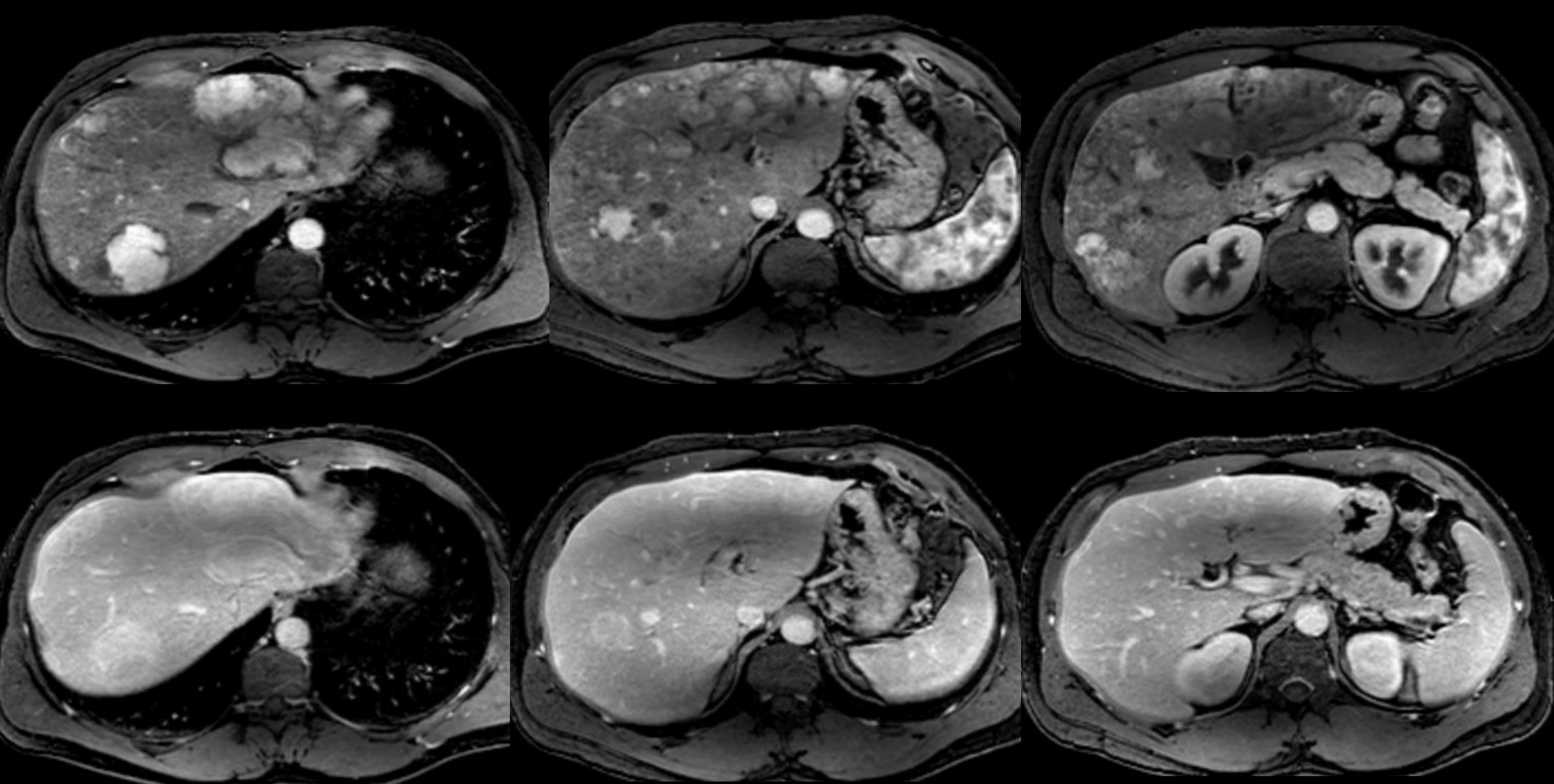
HEMATOMA SUBCAPSULAR





QUISTE HIDATÍDICO





ADENOMATOSIS MULTIPLE

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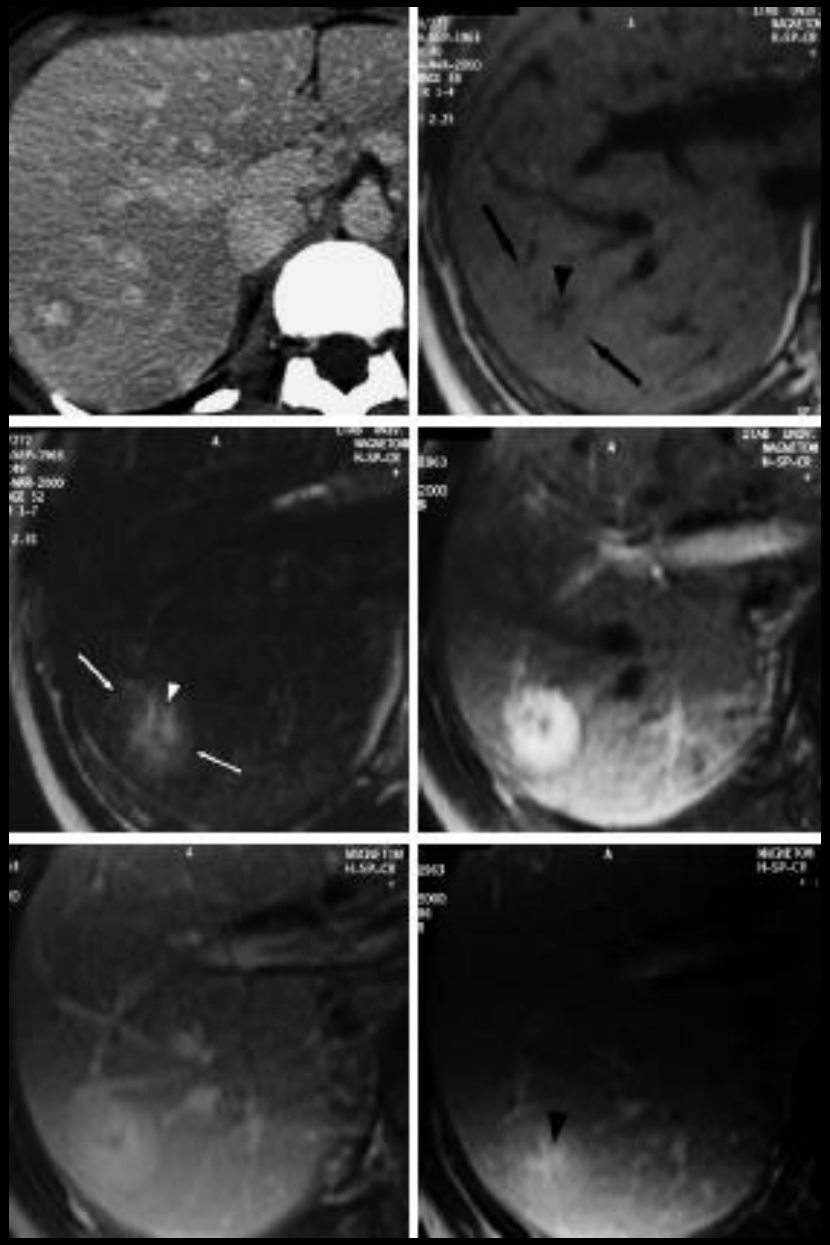

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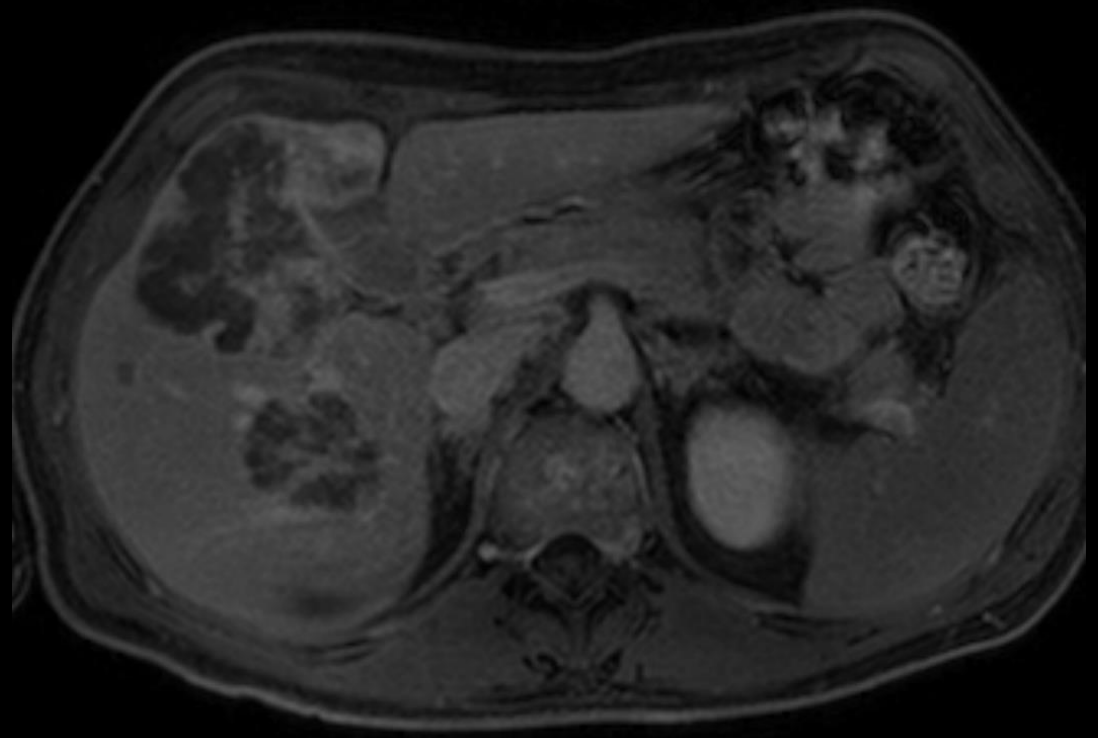

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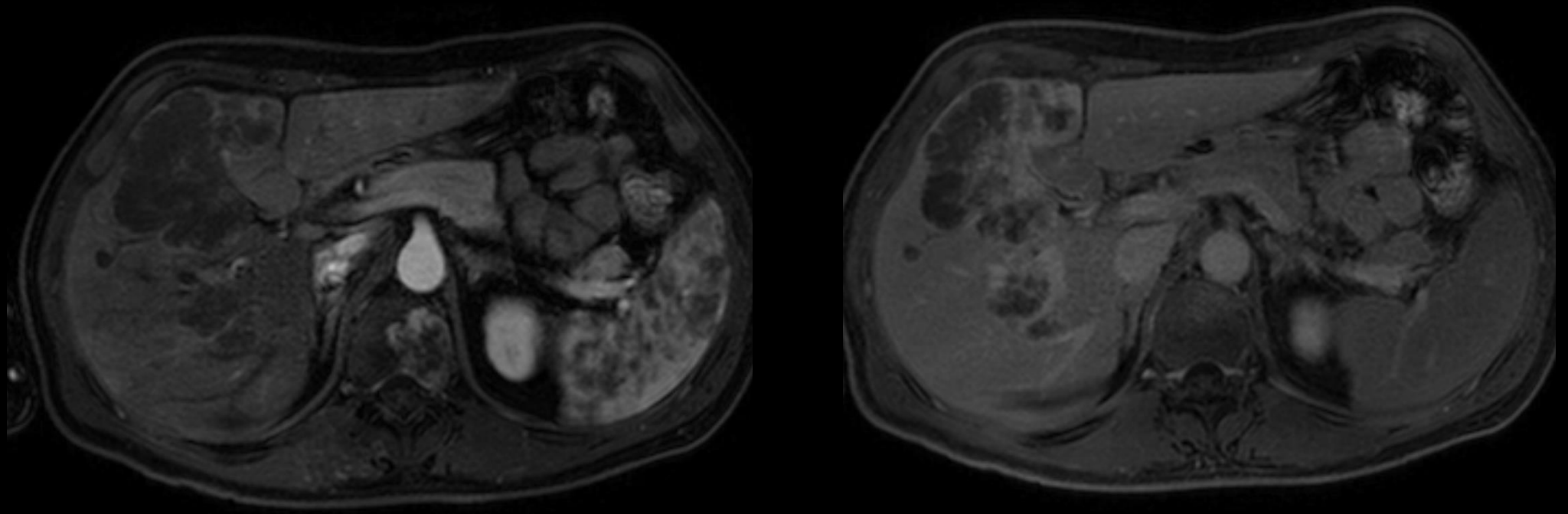

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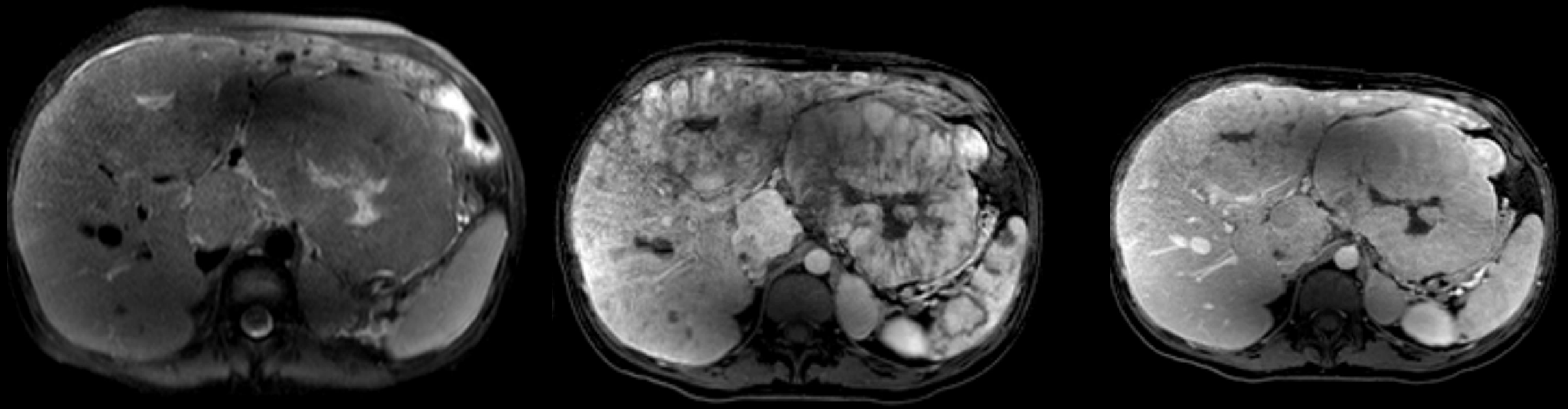

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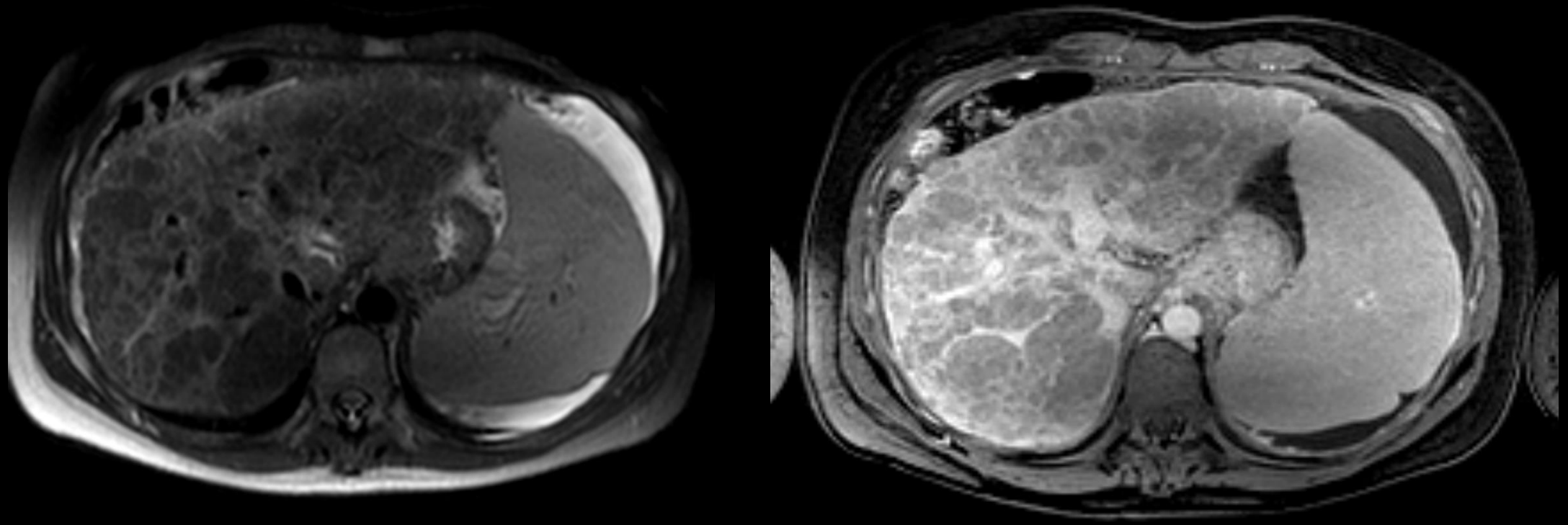

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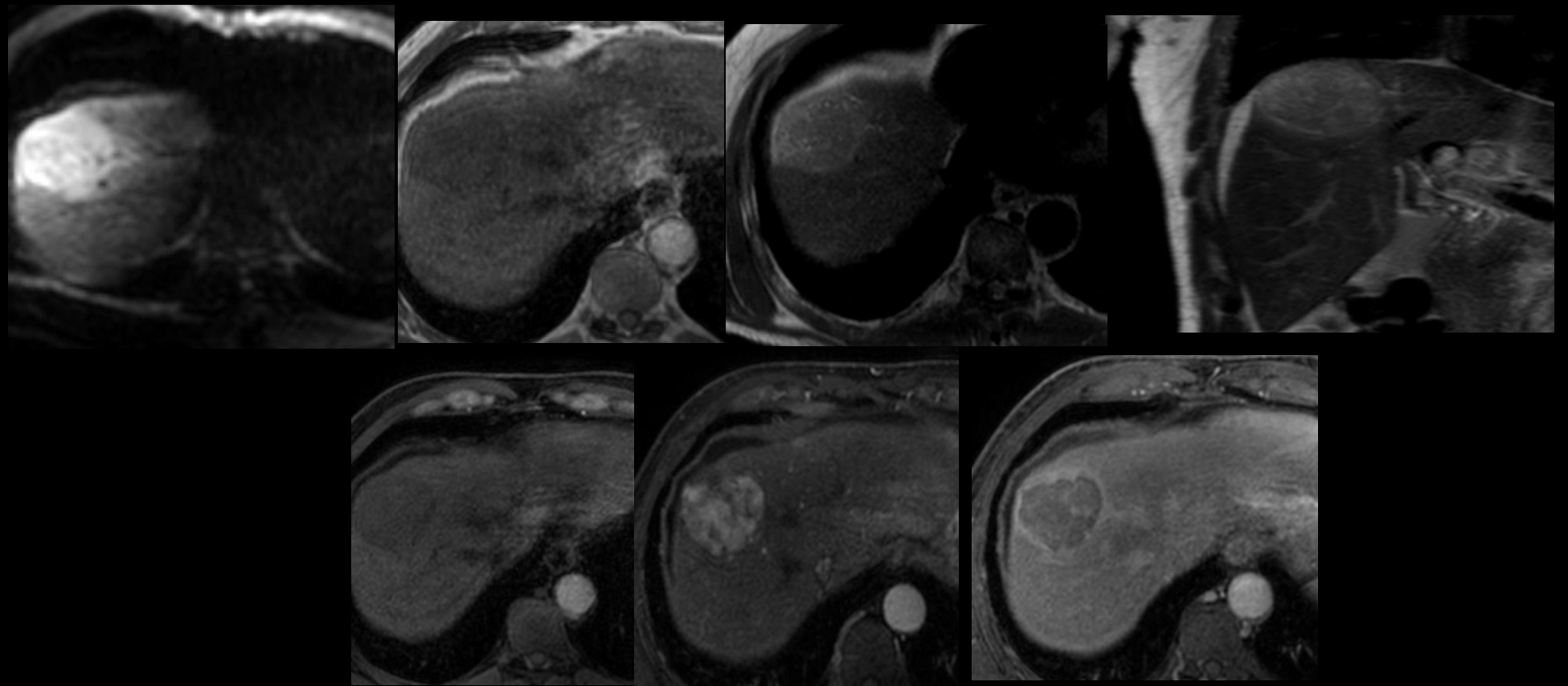

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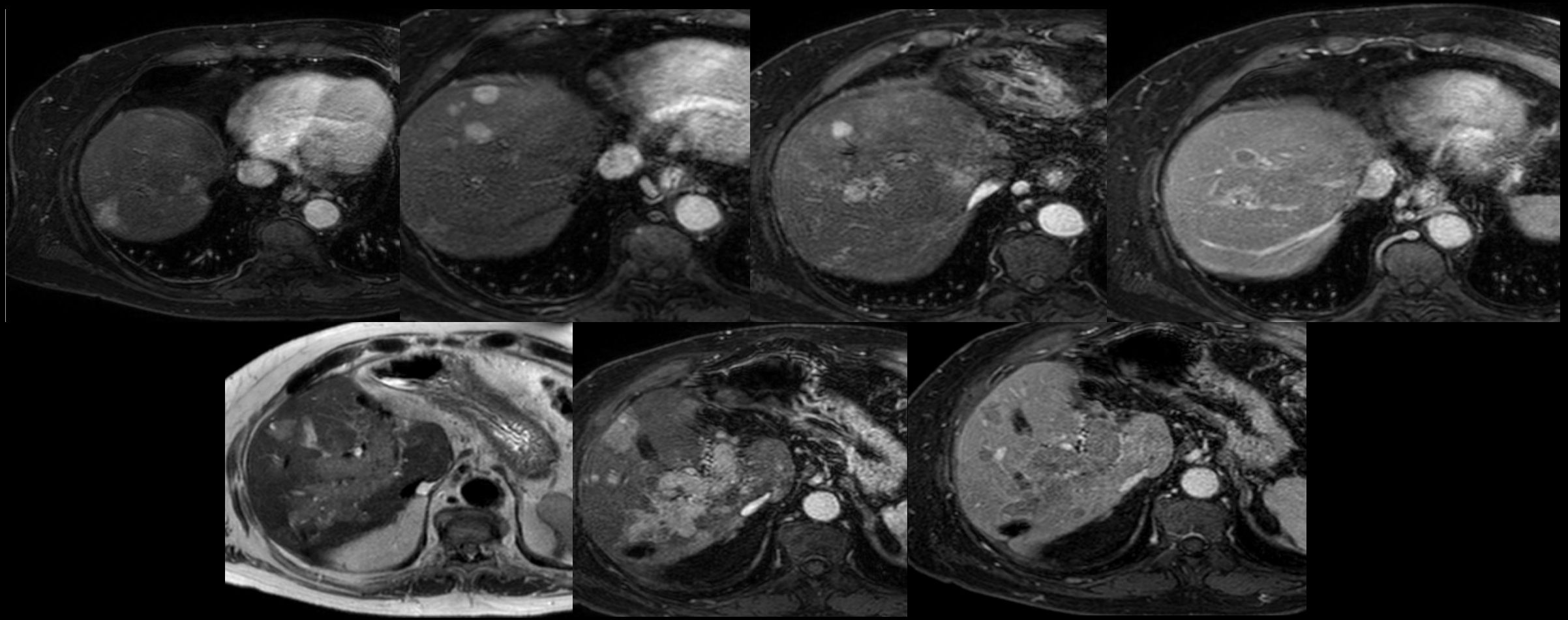

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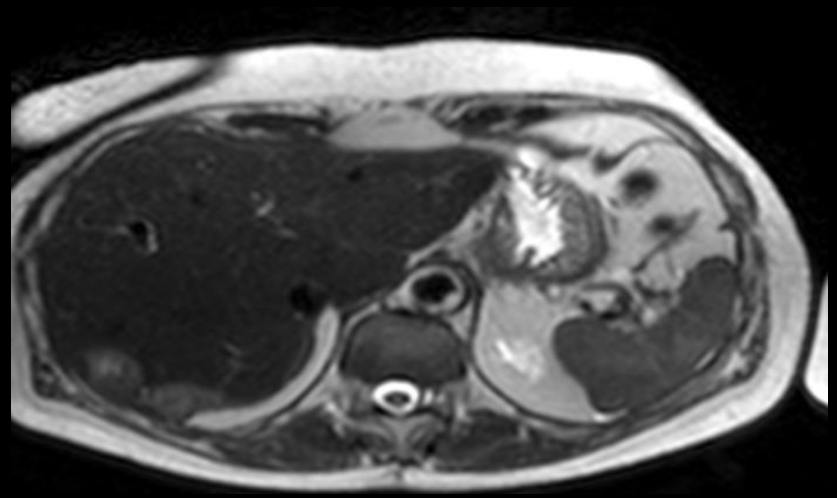
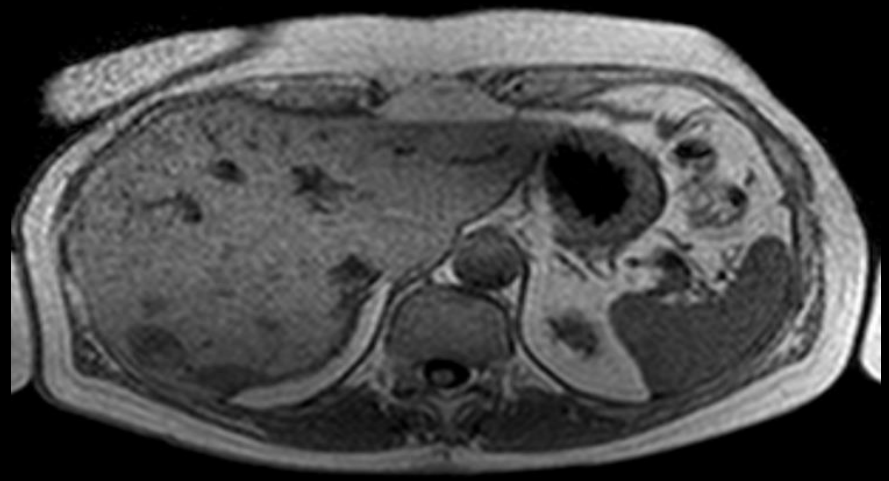
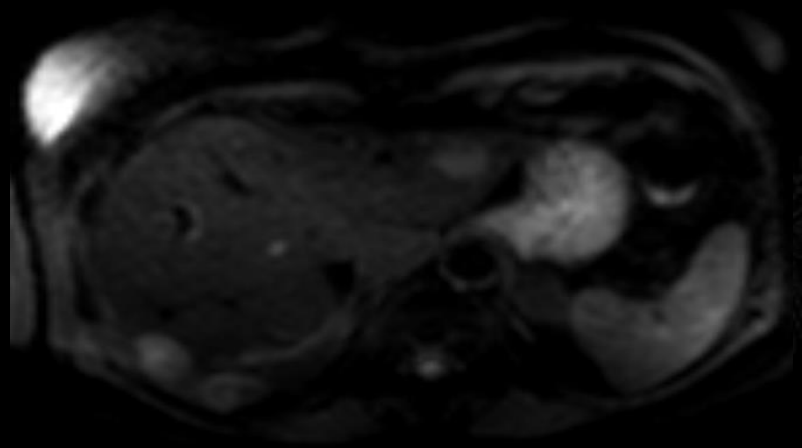
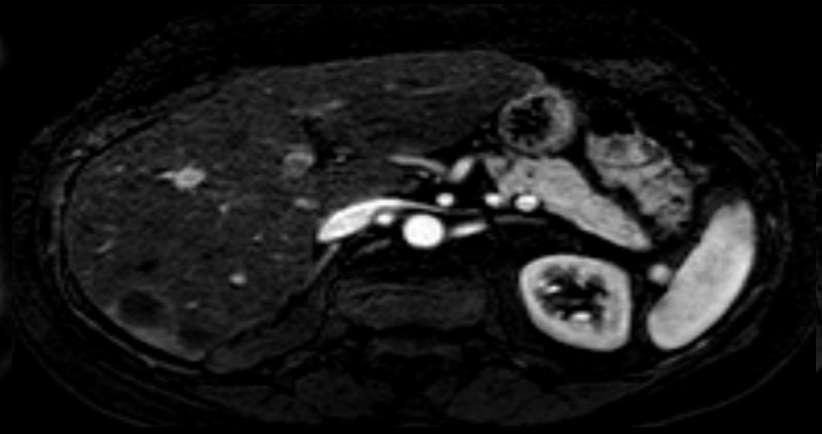
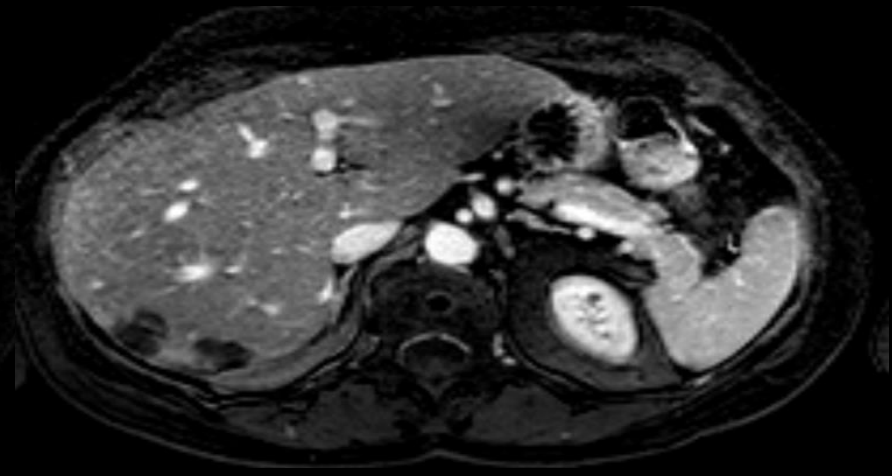








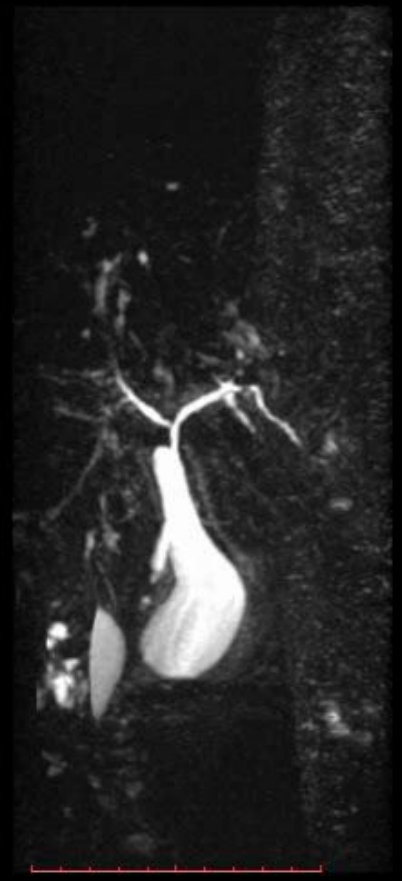


ColangioPancreato RM (Spin Eco T2 – Tren de eco 2D – 3D). 2 Métodos

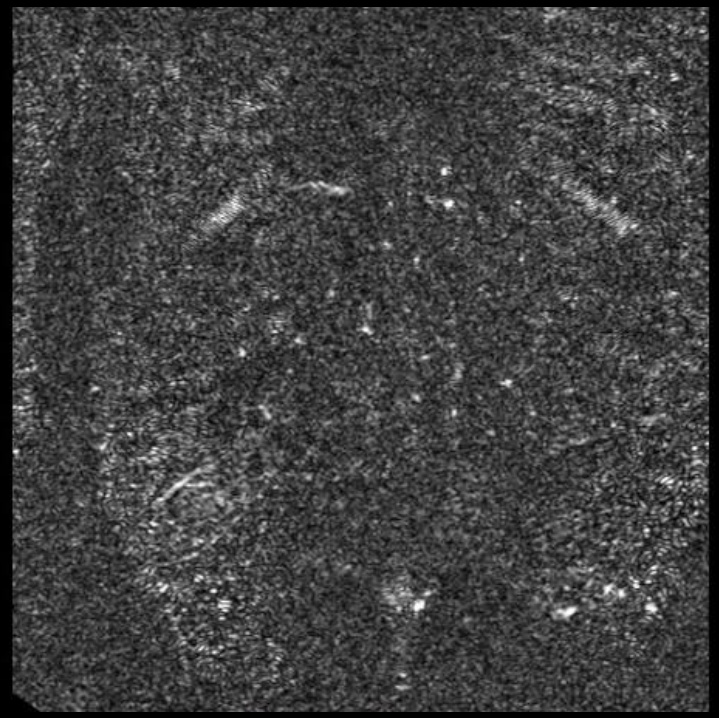
(T2 PESADOS)

Se basa en la ponderación extrema en T2 con disminución de la señal de los tejidos de fondo y supresión grasa para conseguir la visualización de líquidos estacionarios o de movimiento lento.

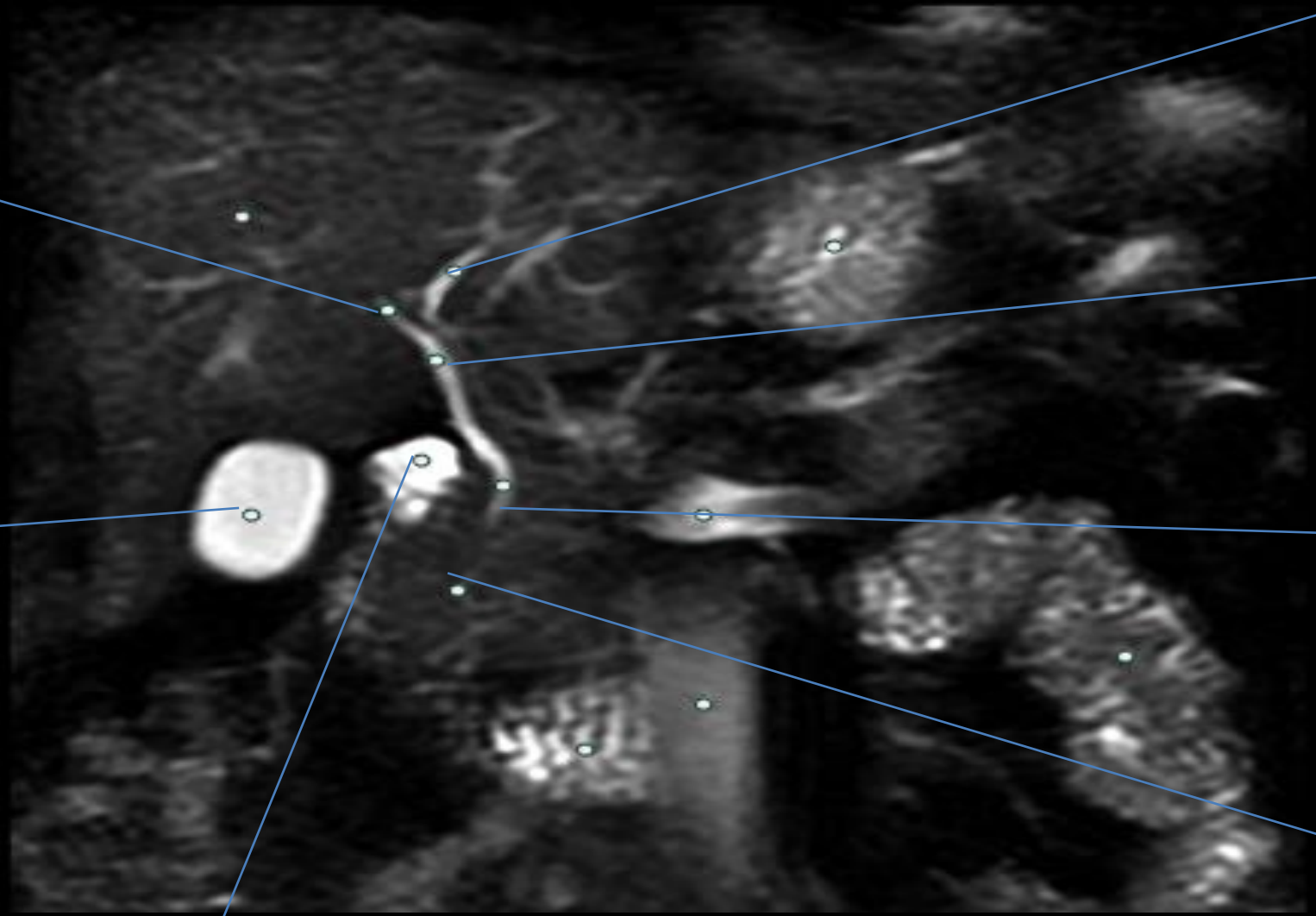
Cortes con colimación gruesa

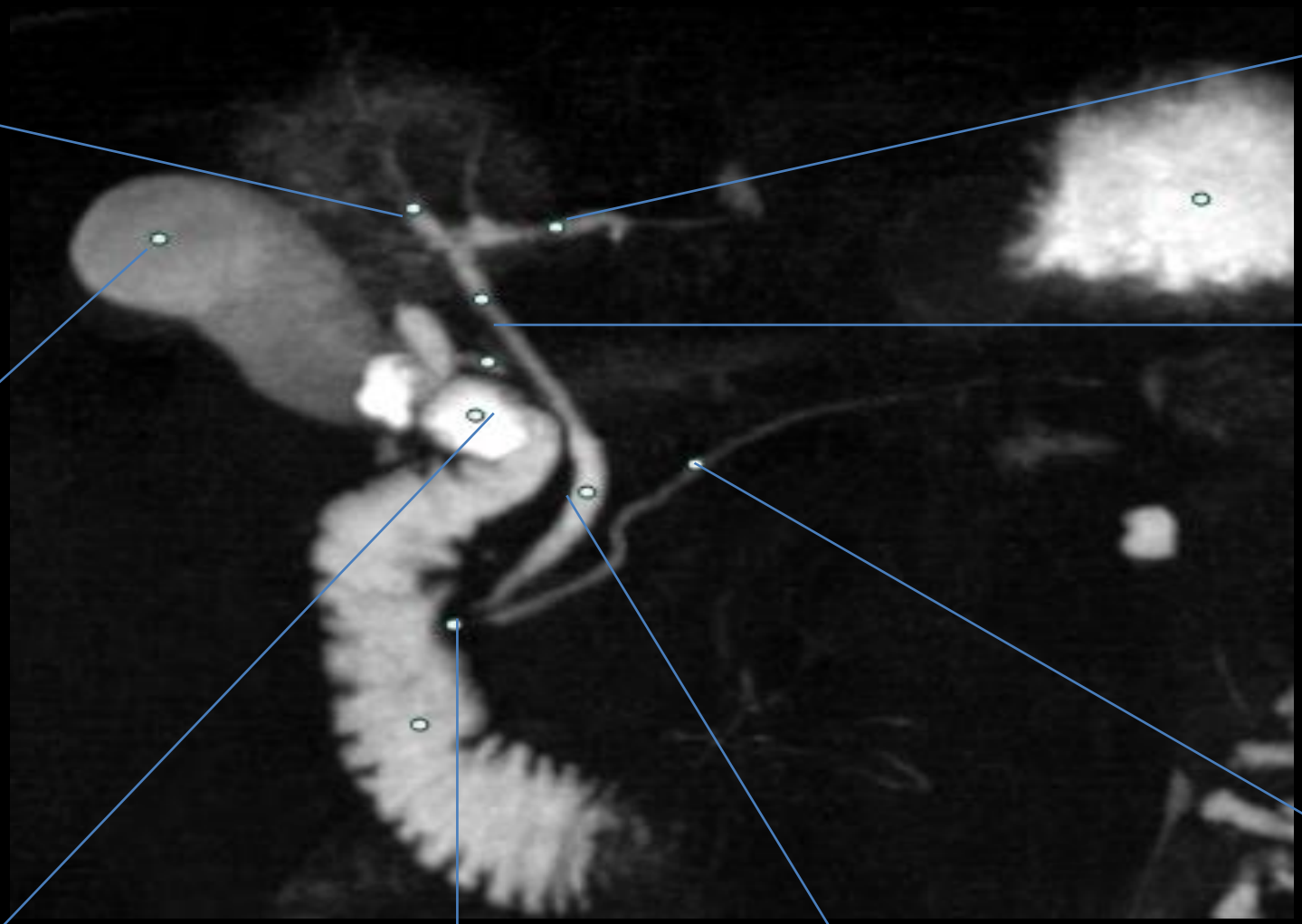


Cortes con colimación fina



Permite realizar post procesamiento
Reconstrucciones MIP


CONDUCTO HEPATICO DER
CONDUCTO HEPATICO IZQ
CONDUCTO HEPATICO COMUN
VESICULA BILIAR
COLEDOCO
CABEZA DEL PANCREAS
BULBO DUODENAL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CONDUCTO HEPATICO COMUN
VESICULA BILIAR
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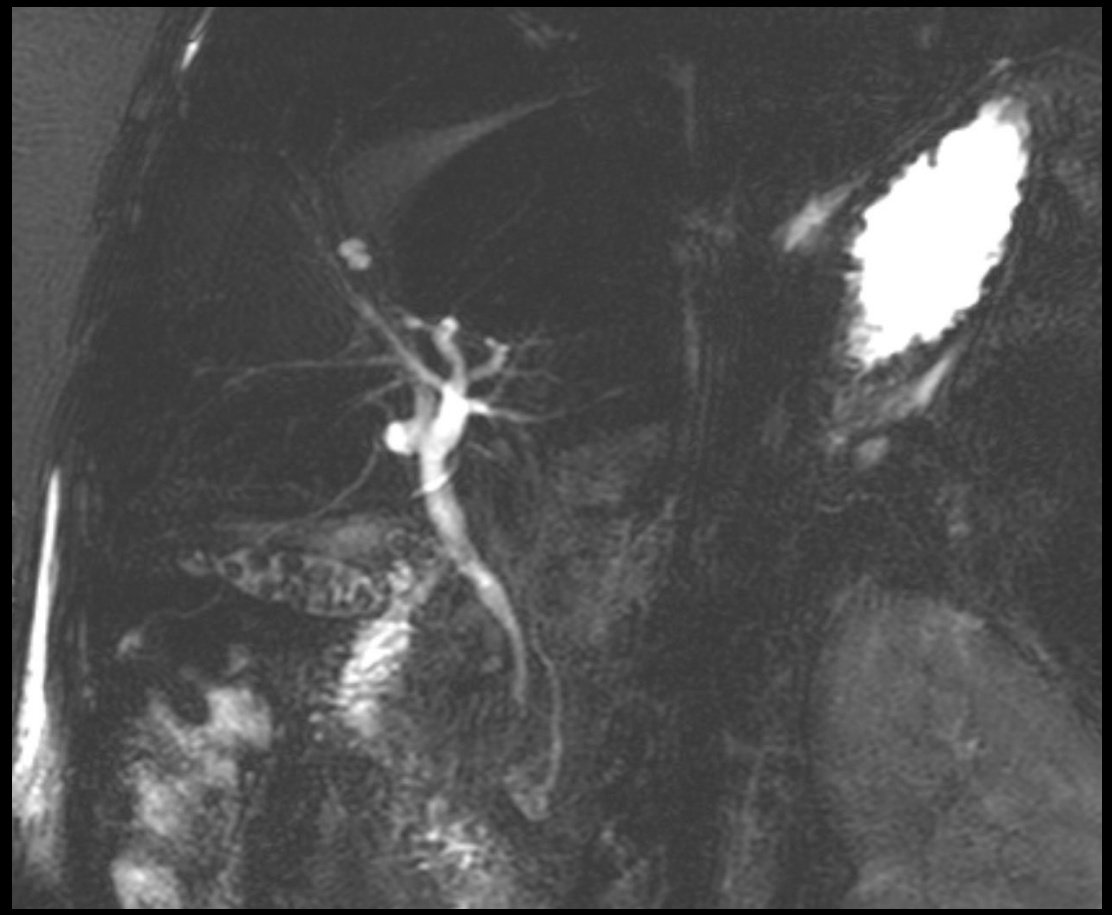
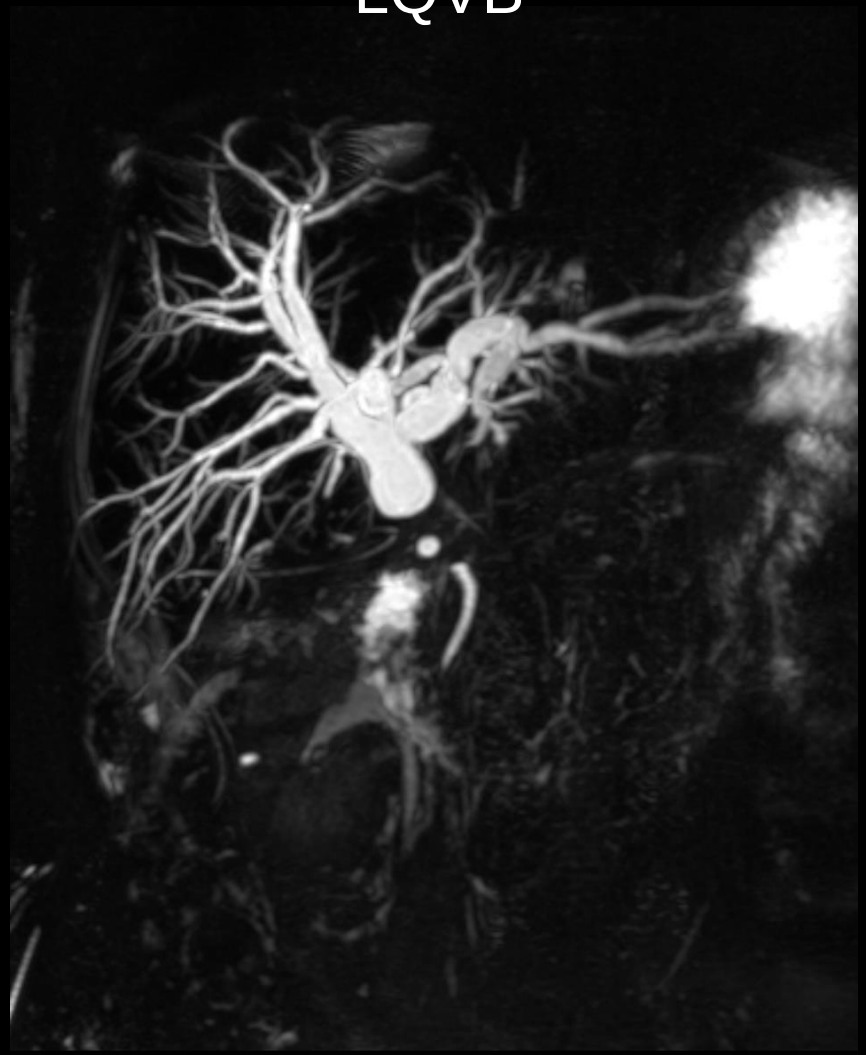
BULBO DUODENAL
PAPILA DUODENAL
COLEDOCO

LITIASIS COLEDOCIANA

LITIASIS VESICULAR



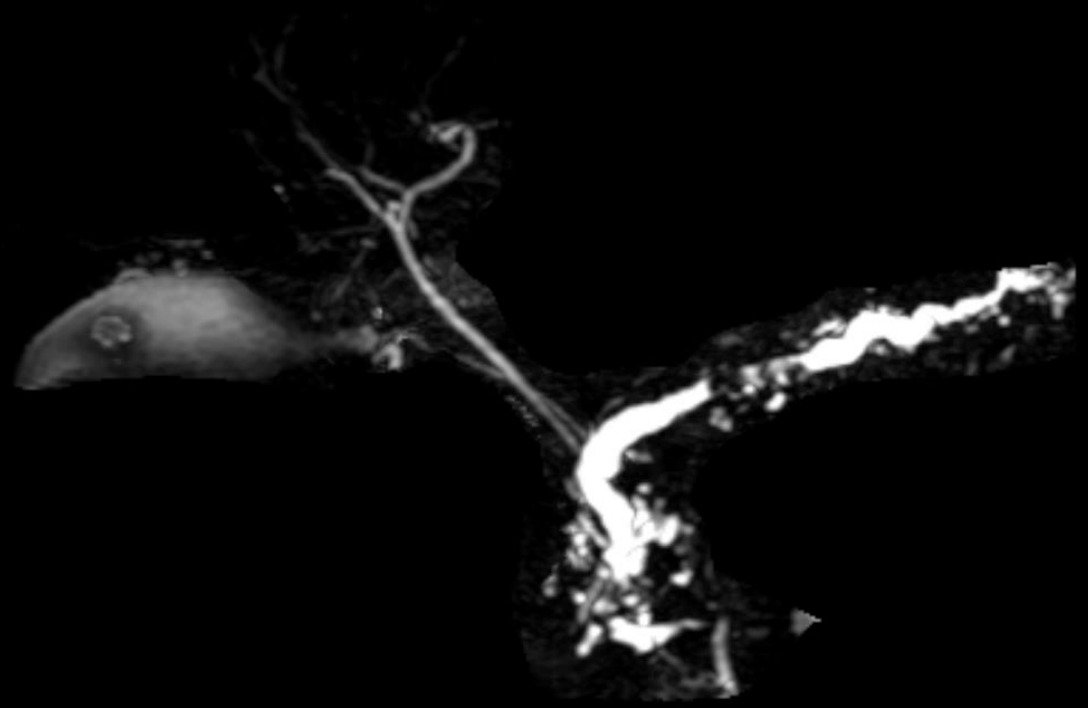
LQVB



QUISTE DE TODANI

CEP

PANCREATITIS CRONICA



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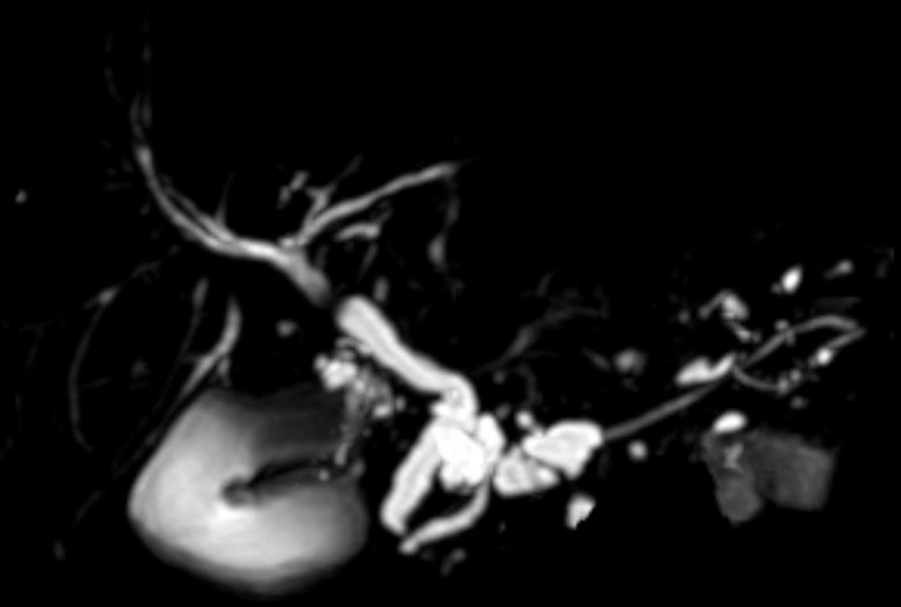
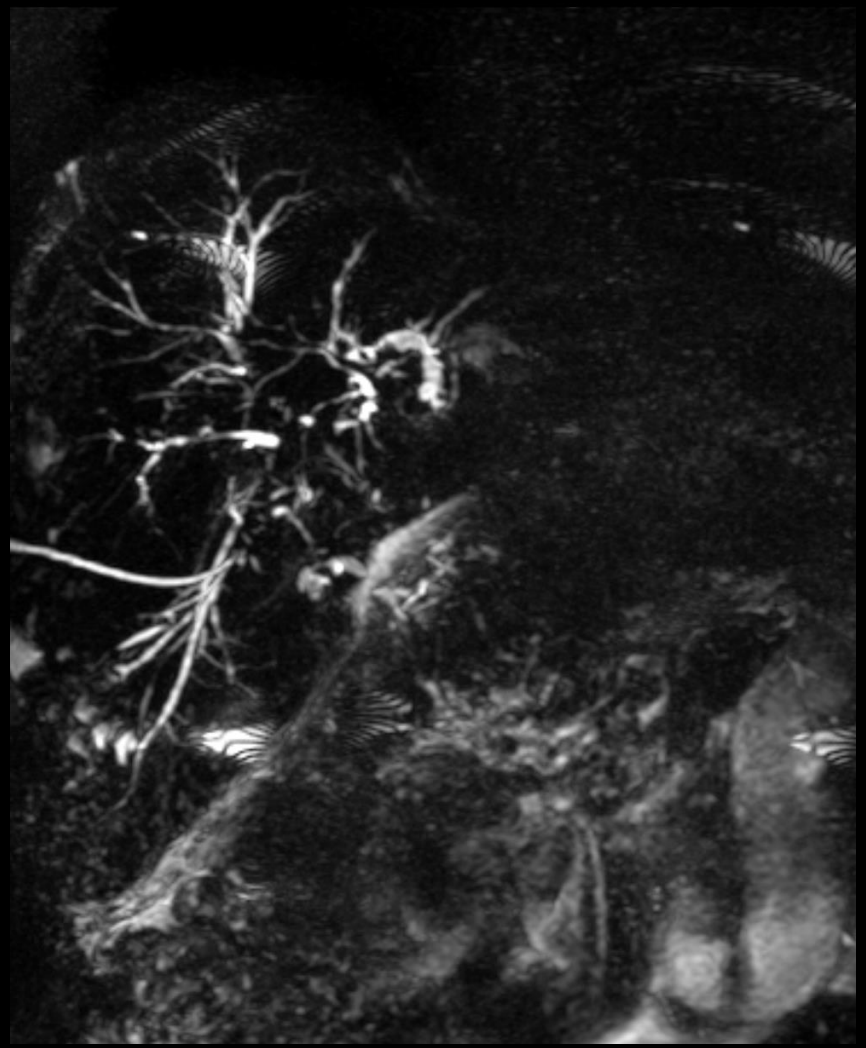
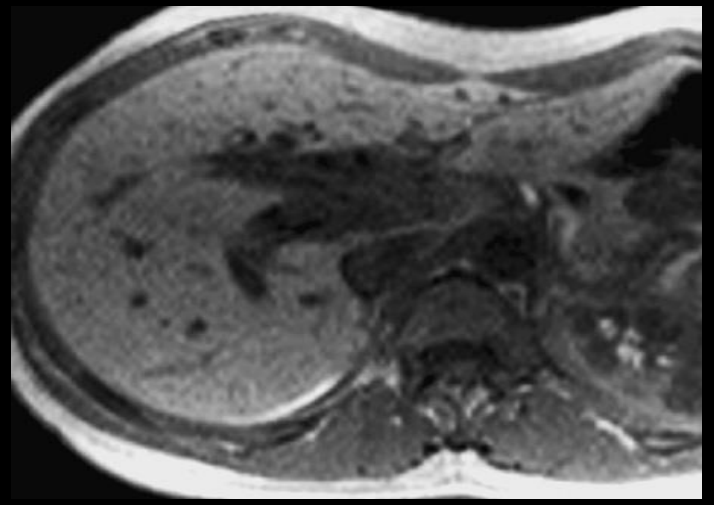
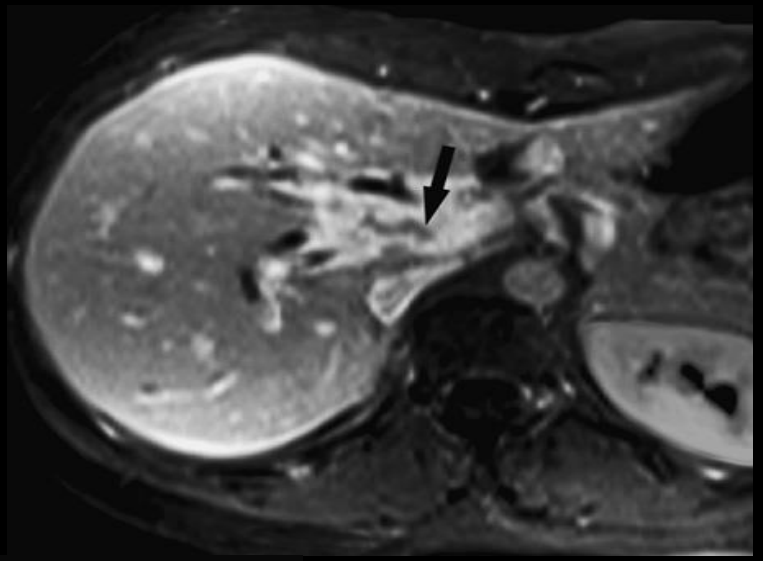
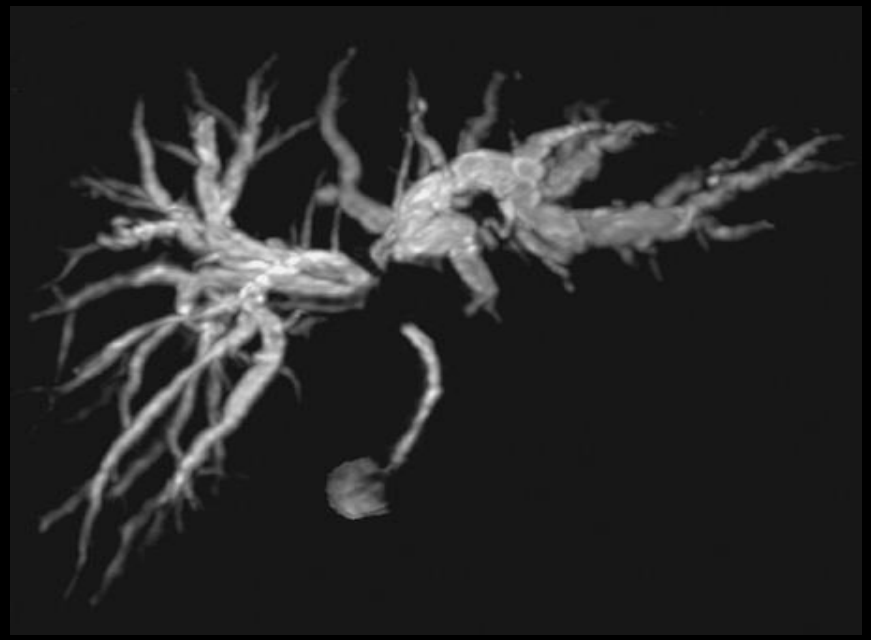


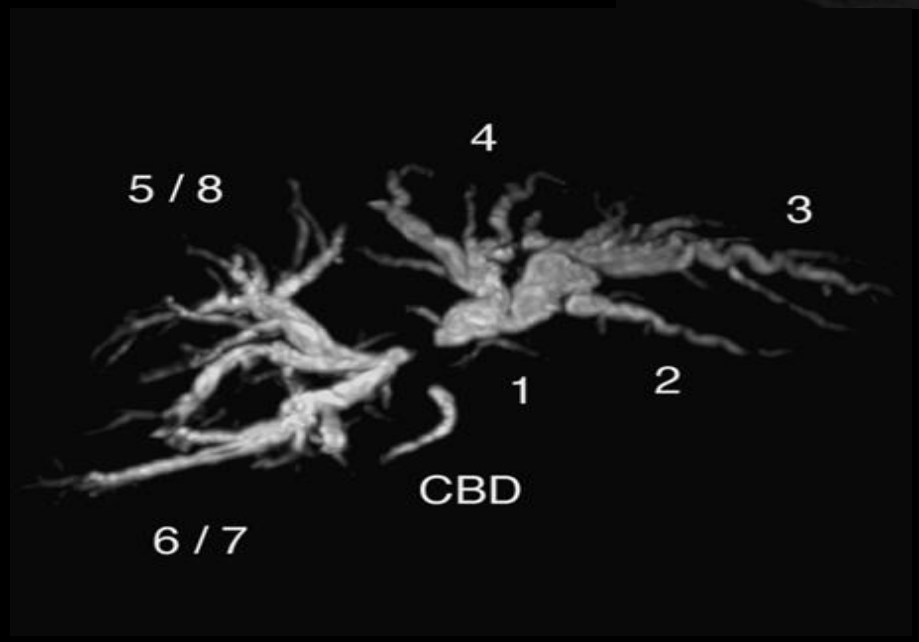
KLATSKIN







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5 / 8
3
1
2
CBD
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RESUMEN

SECUENCIAS	UTILIDAD
T2 coronal	Programador – anatomía - Fluidos
T2 axial	Líquidos
T2 supresión o Stir	Líquidos, Nódulos, edema, ganglios
T2 80-120	Quiste vs Sólidos Quiste vs Hemangioma
T1 gre axial	Evaluación T1
T1 fase –fuera fase	Grasa intracelular- evaluación T1
DIXON	Valoración de lesiones con grasa
T1 Ctre supresión grasa	Patrones de realce de las lesiones
Sustracción	Determinar realces
Difusión	Lesiones tumorales celulares-abscesos-fibrosis-edema
Espectroscopia	Valoración metabólica
CPRM	Valoración vía biliar y pancreática
URO RM	Valoración vía excretora

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