I SESIONES CLÍNICAS MULTIDISCIPLINARES

HEPATO-BILIO-PANCREÁTICA 2022-2023

OPTIMIZACIÓN DE CONTRASTES EN RM HEPÁTICA

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FEA RADIODIAGNÓSTICO
Sección Radiología Abdominal
CHUVI


O FIGADO
SE DA VIDA
ADICADO A
XAIME
QUINTANILLA ULLA
DOUTOR -
A O LONGO DA HISTORIA
O HOME PERSIGUEO
SANAR OS SEUS MALES
PARA AXUDARLLE
NESTE EMPEÑO
ESTAS A FACER
UN GRAN TRABALLO
NOSO AGRADECEMENTO/
BALON 1987
RPR - VISIONES DE FERROLTERRA

OBJETIVO

Recordar las principales aplicaciones del contraste hepato-específico y las recomendaciones del uso de contrastes en RM.

TIPOS DE CONTRASTE

Table 1
Extracellular Fluid Contrast Agents Used for Liver MR Imaging

Generic Name	Abbreviated Name	Trade Name	Manufacturer
Gadopentetate dimeglumine	Gd-DTPA	Magnevist	Berlex
Gadodiamide	Gd-DTPA-BMA	Omniscan	Nycomed Amersham
Gadoteridol	Gd-HP-DO3A	ProHance	Bracco
Gadoversetamide	Gd-DTPA-BMEA	Optimark	Mallinckrodt
Gadoterate meglumine	Gd-DOTA	Dotarem	Guerbet
Gadobutrol	Gd-BT-DO3A	Gadovist	Schering

Table 2
Hepatobiliary-specific Contrast Agents Used for Liver MR Imaging

Generic Name	Abbreviated Name	Trade Name	Manufacturer
Mangafodipir trisodium	Mn-DPDP	Teslascan	GE Healthcare
Gadobenate dimeglumine	Gd-BOPTA	MultiHance	Bracco
Gadoxetic acid (or gadoxetate disodium)	Gd-EOB-DTPA	Eovist (United States), Primovist (EU, Australia)	Bayer

Note.—EU = European Union.

- Seale MK, Catalano OA, Saini S, Hahn PF, Sahani DV. Hepatobiliary-specific MR contrast agents: role in imaging the liver and biliary tree. Radiographics [Internet]. 2009;29(6):1725–48. Disponible en: http://dx.doi.org/10.1148/rg.296095515

CONTRASTE EXTRACELULAR (CEC)

- CONTRASTE MÁS USADO
- DISTRIBUCIÓN VASCULAR
- ELIMINACIÓN RENAL

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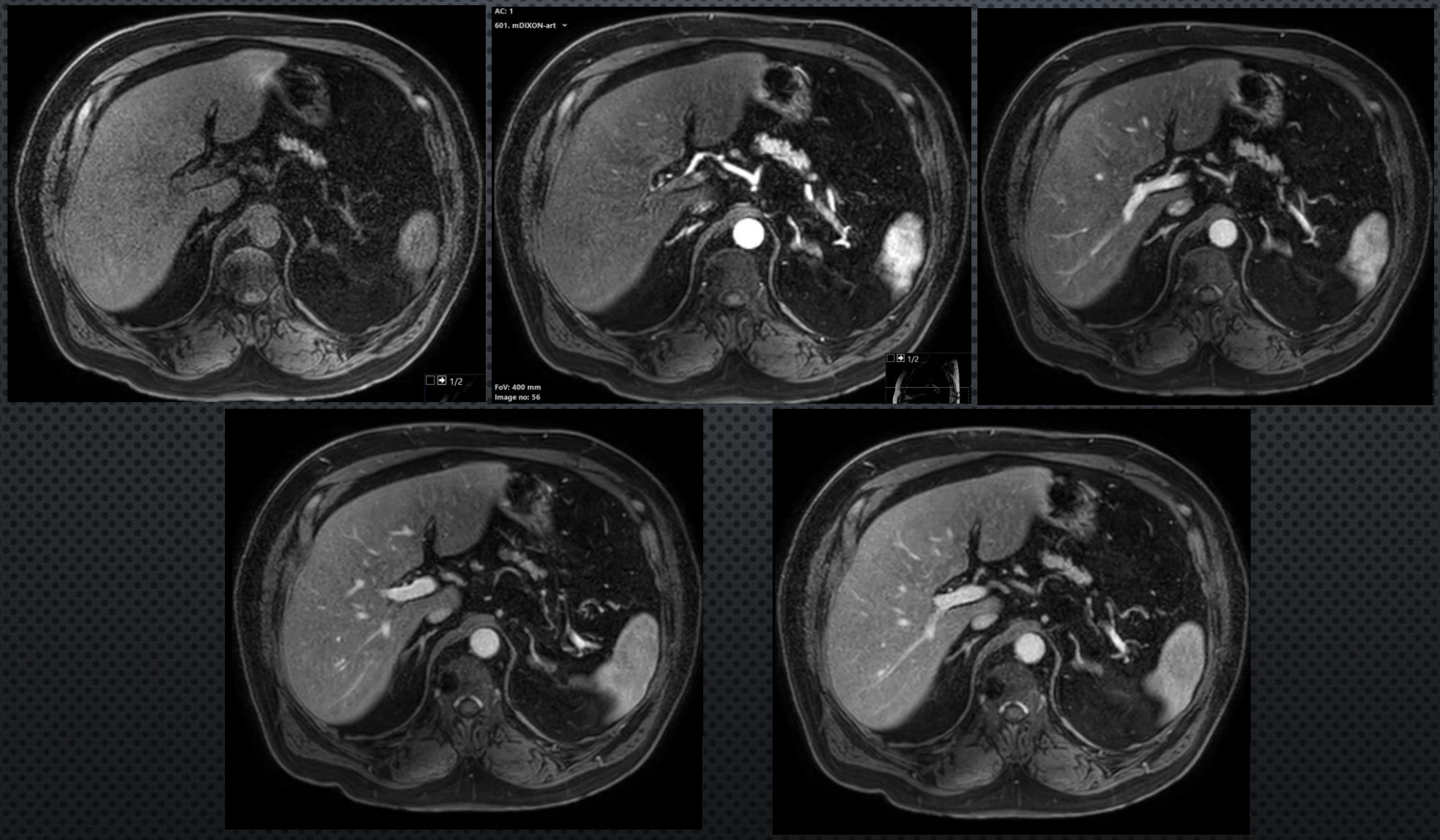

CONTRASTE HEPATO-ESPECÍFICOS (CHE)

- GADOBENATO DIMEGLUMINE (GD-BOPTA)
- GADOXETATO DISODIUM (GD-EOB-DTPA)

Table 2
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CONTRASTE HEPATO-ESPECÍFICOS (CHE)

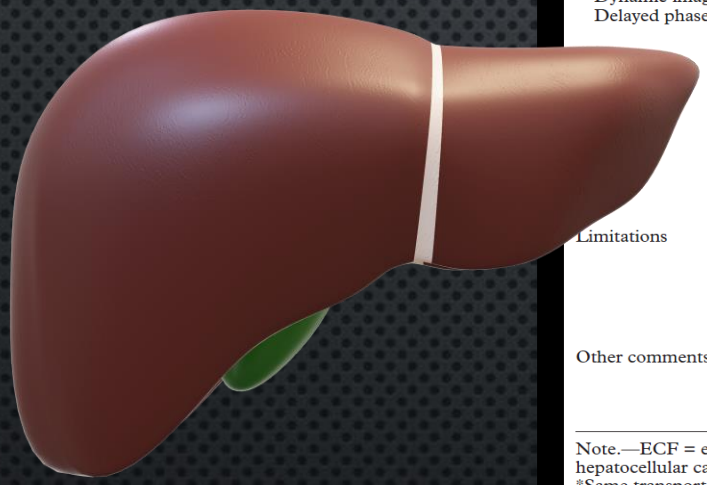
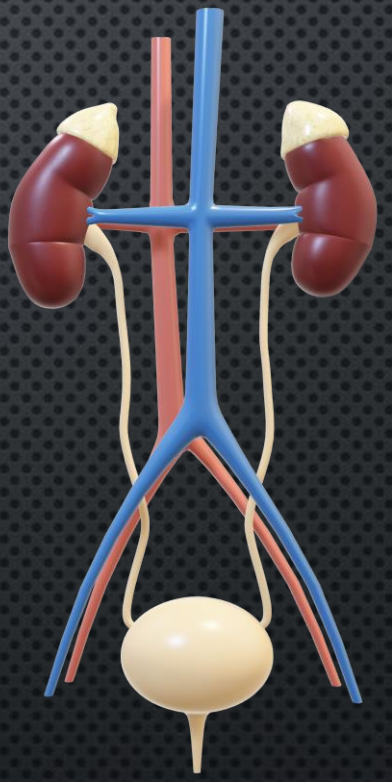


Table 3
Pharmacologic and Radiologic Features of Hepatobiliary-specific Contrast Agents

Feature	Mn-DPDP	Gd-BOPTA	Gd-EOB-DTPA
Uptake	Via vitamin B_0 receptors on hepatocytes	Via organic anion transporter on hepatocyte*	Via organic anion trans-
Excretion	>50% biliary; remainder, renal	3%–5% biliary, 95% renal	50% biliary, 50% renal
Method of administration	Slow infusion (1–2 minutes)	Bolus injection (2 mL/sec)	Bolus injection
Manufacturer's recommended dose	0.5 μmol/kg	0.1 mmol/kg	0.025 mmol/kg
Timing of imaging after start of contrast agent injection			
Dynamic imaging	Not applicable	As for ECF agents	As for ECF agents
Delayed phase	15 minutes to several hours	1–2 hours	10 minutes to hours
	Previously approved, no longer available in United States	Available in United States, EU, and Australia	Recently made available in United States, available in EU and Australia
	Mild (eg, flushing, nausea, dizziness, raised blood pressure and heart rate) (1,7)	Mild (eg, nausea, flushing, injection site pain, taste perversion) (8)†	Mild (eg, nausea, flushing, headache, injection site pain, taste perversion most commonly) (7)
Limitations	Cannot be used for dynamic imaging; possible paradoxic uptake in some metastases (9)	Hepatobiliary-specific phase is late compared with that of Gd-EOB-DTPA; possible uptake in well-differentiated HCC	Possible uptake in well-differentiated HCC
Other comments	Small amount of uptake in pancreas, renal cortex, and adrenal glands	T1 relaxivity double that of Gd-DTPA (7)	T1 relaxivity higher than that of Gd-DTPA but much smaller dose used

Note.—ECF = extracellular fluid, EU = European Union, FDA = Food and Drug Administration, HCC = hepatocellular carcinoma.
*Same transport protein as bilirubin.
†Mild side effects reported in less than 0.03% after 100,000 clinical doses; serious adverse events occurred in less than 0.005% (8).



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CONTRASTE HEPATO-ESPECÍFICOS (CHE)

- **Gd-BOPTA**
  - Captación hepatocitaria más lenta
  - Menor tasa de excreción biliar
  - Dosis 0,1mmol/kg
  - Estudio dinámico similar a CEC
- **GD-EOB-DTPA**
  - Captación hepatocitaria más rápida e intensa
  - Dosis 0,025mmol/kg

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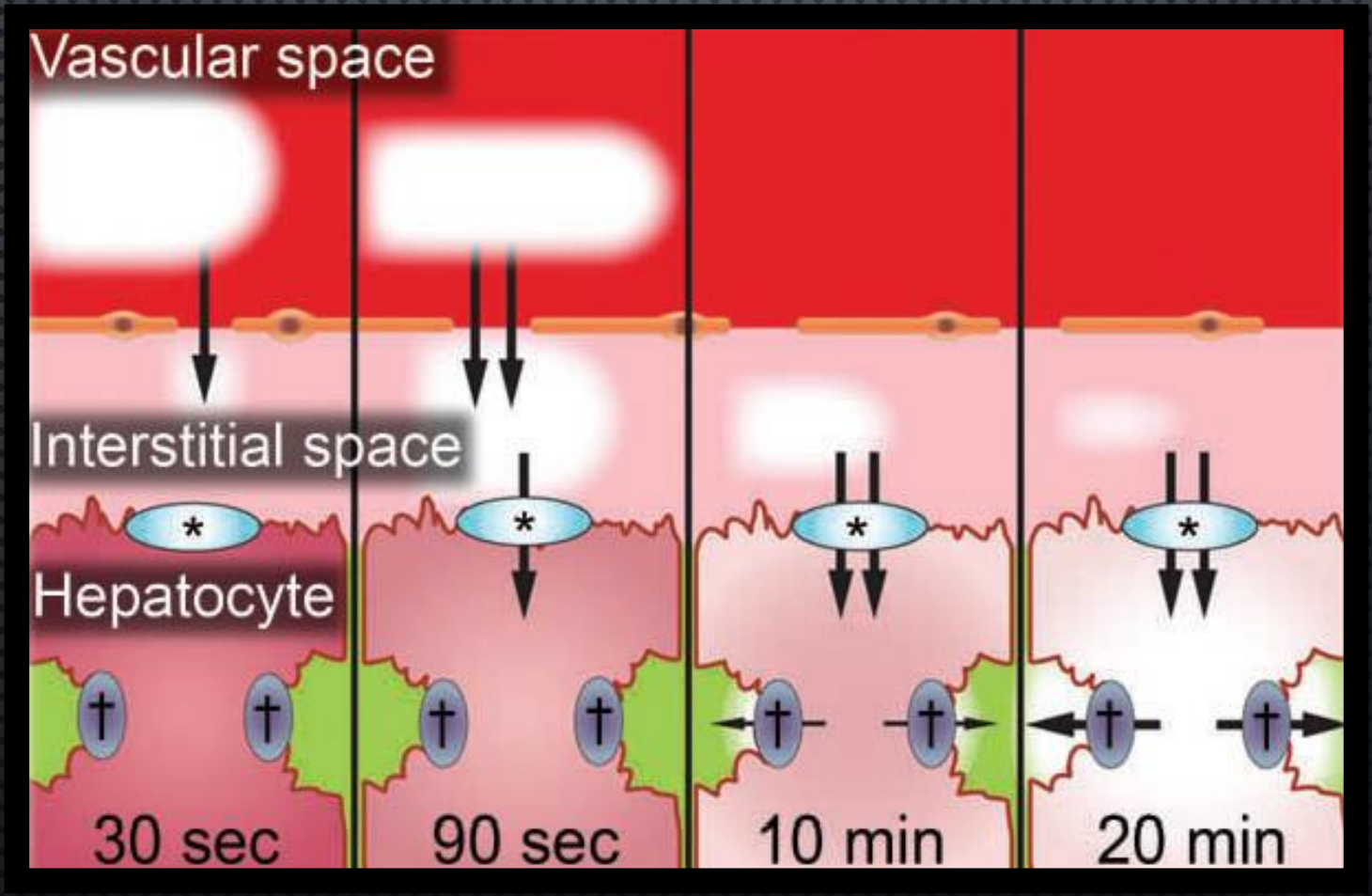

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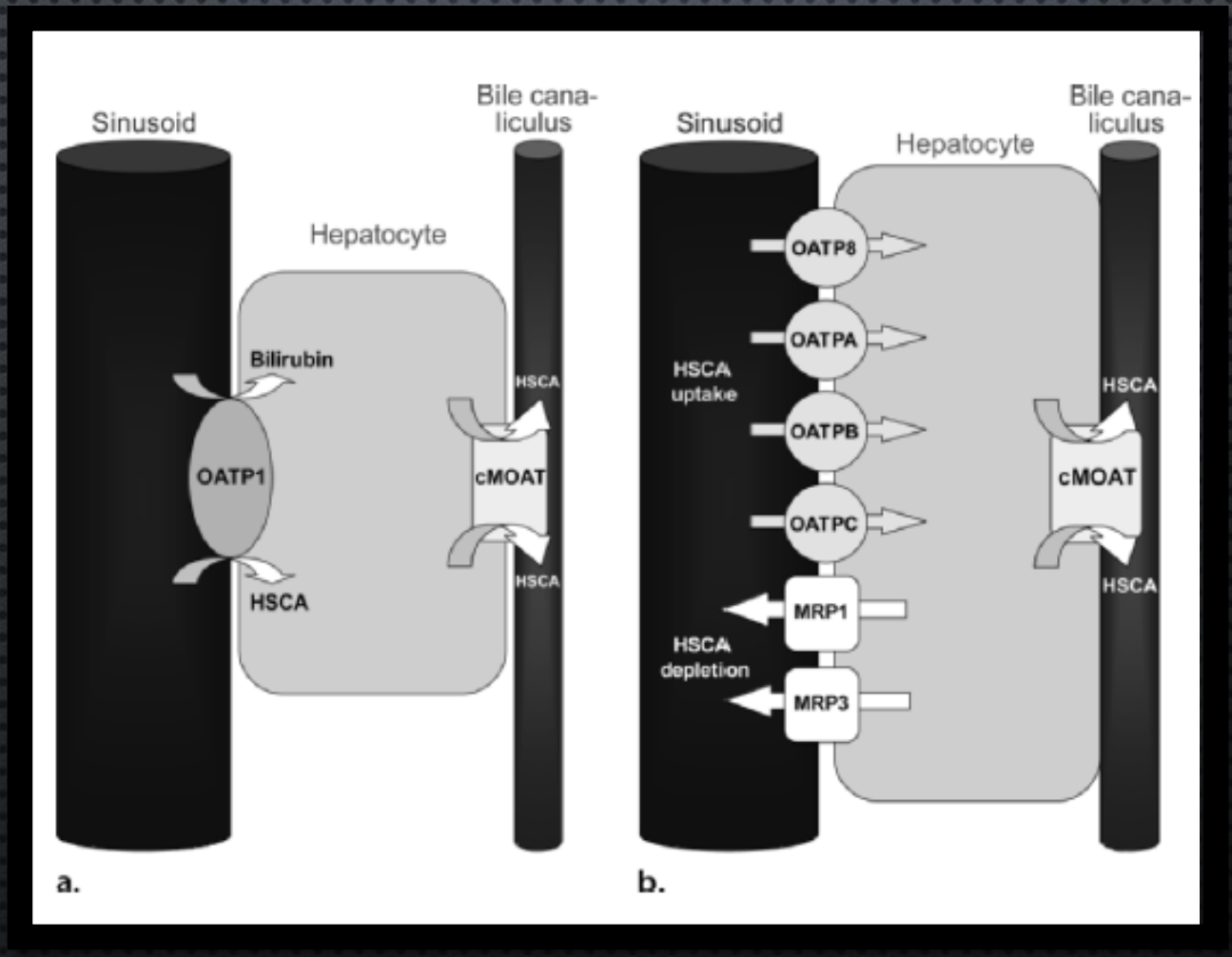

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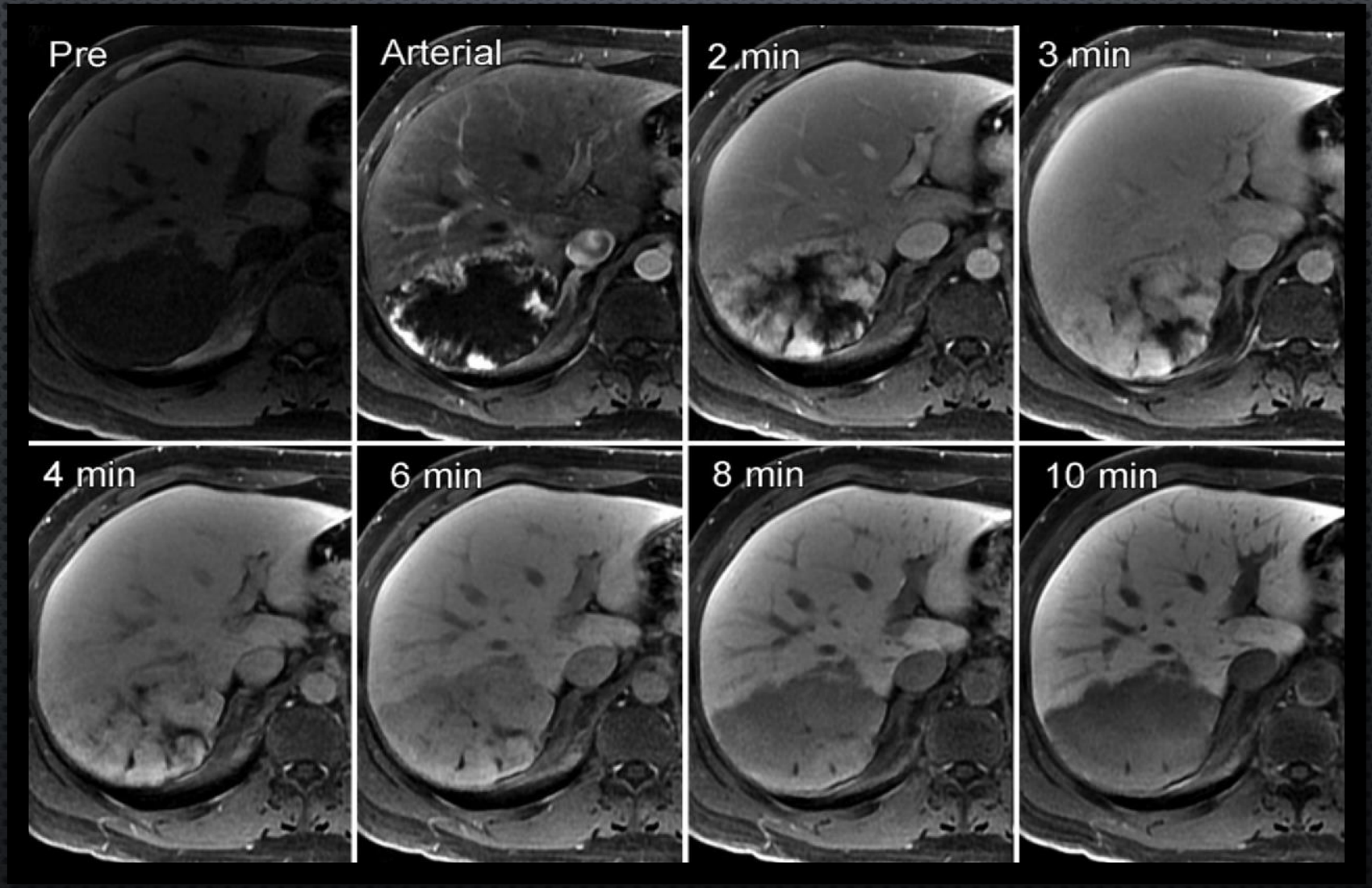

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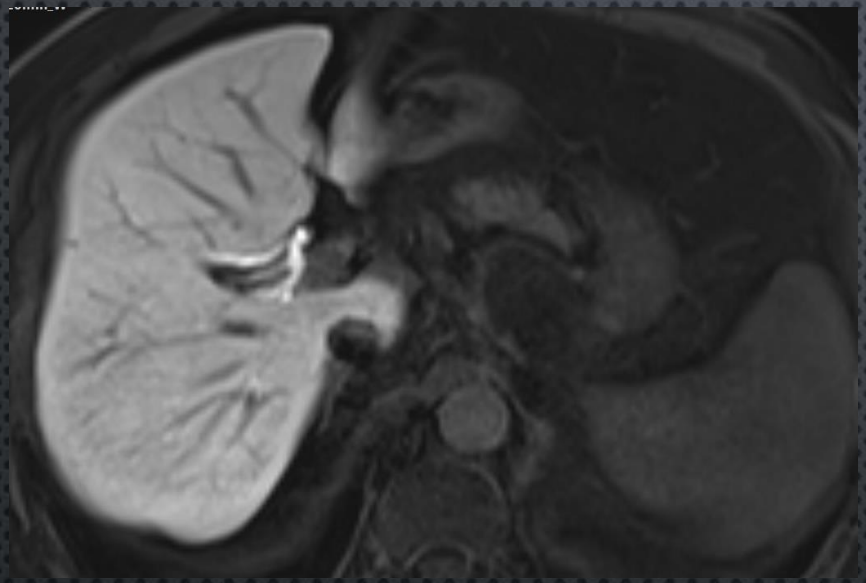

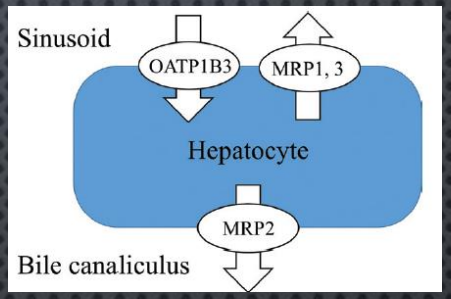

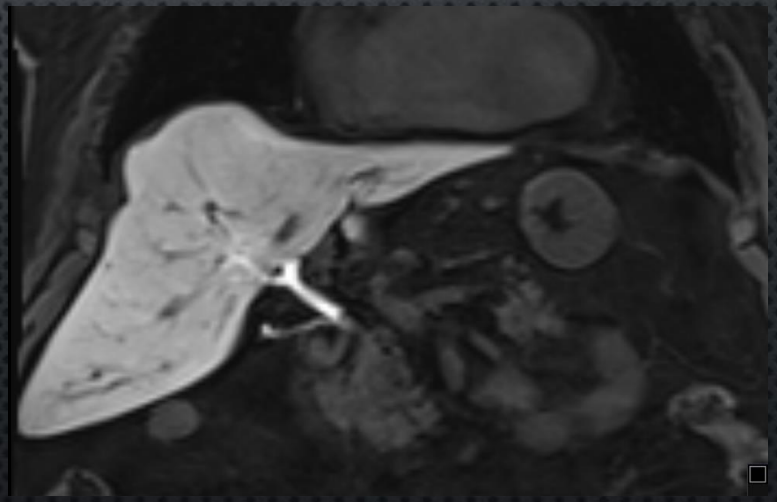

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CONTRASTE HEPATO-ESPECÍFICOS (CHE)

DESVENTAJAS

- MENOR DOSIS
  - MENOR REALCE
  - PEOR VALORACIÓN DE FASE DE EQUILIBRIO

CONTRASTE HEPATO-ESPECÍFICOS (CHE)

DESVENTAJAS

- MENOR DOSIS
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  - PEOR VALORACIÓN DE FASE DE EQUILIBRIO
- ARTEFACTO DE MOVIMIENTO RESPIRATORIO
  - DISNEA TRANSITORIA EN FASE ARTERIAL

CONTRASTE HEPATO-ESPECÍFICOS (CHE)

MÁS FRECUENTE CON ÁCIDO GADOXÉTICO

GD-EOB-DTPA

CONTRASTE HEPATO-ESPECÍFICOS (CHE)

DESVENTAJAS

- MENOR DOSIS
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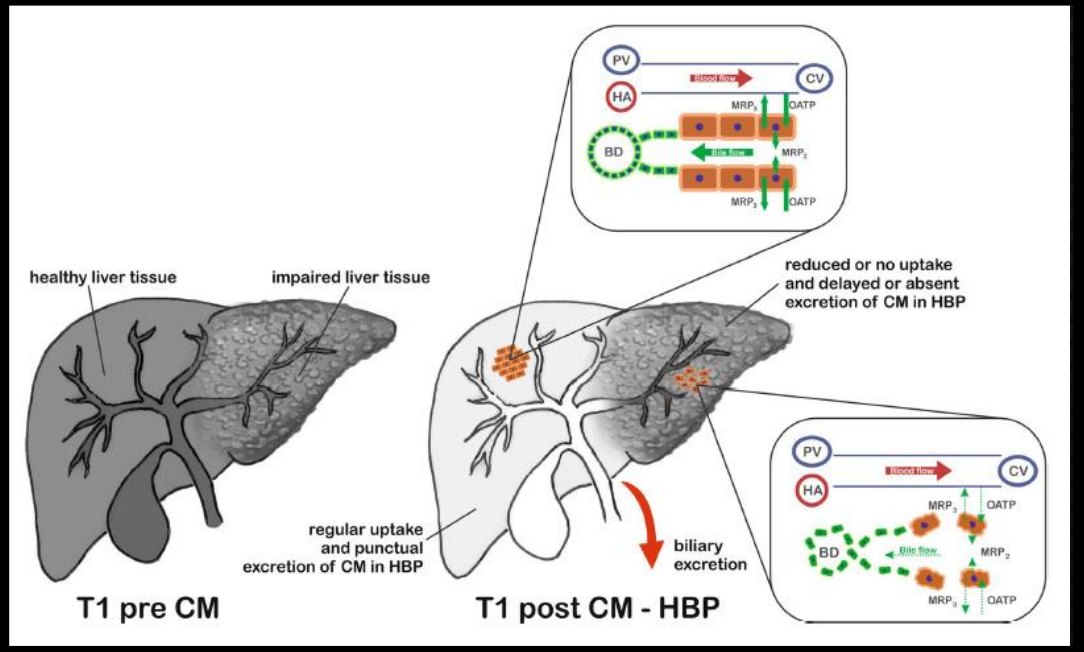

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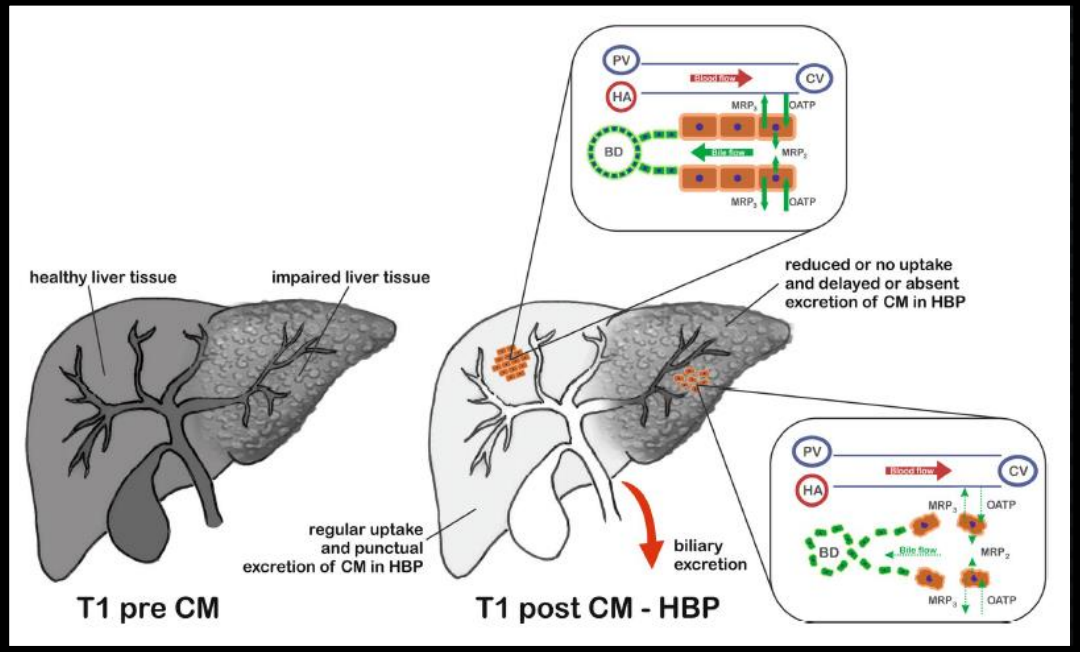
- ENFERMEDAD HEPÁTICA
- DURACIÓN DEL ESTUDIO



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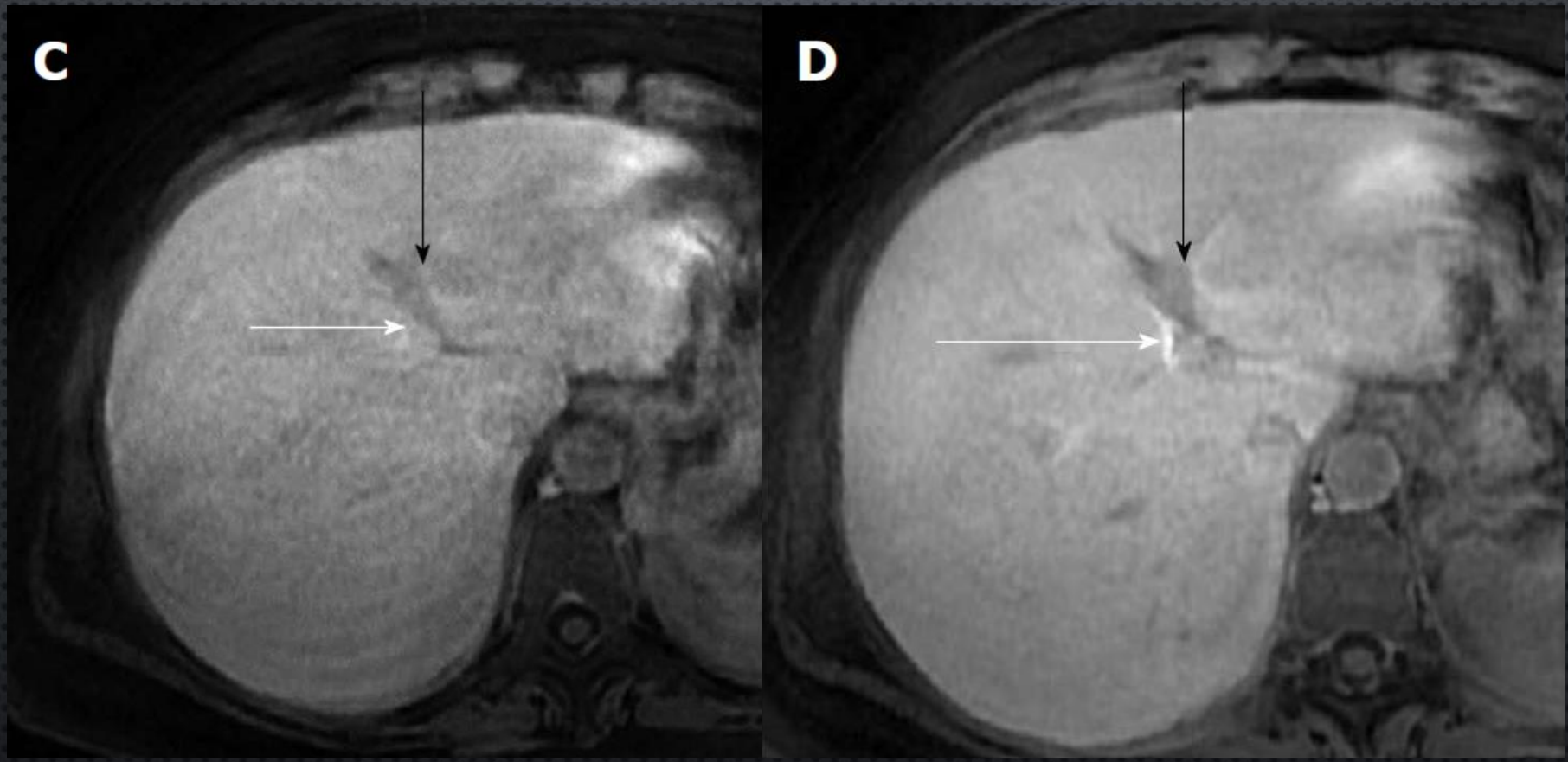

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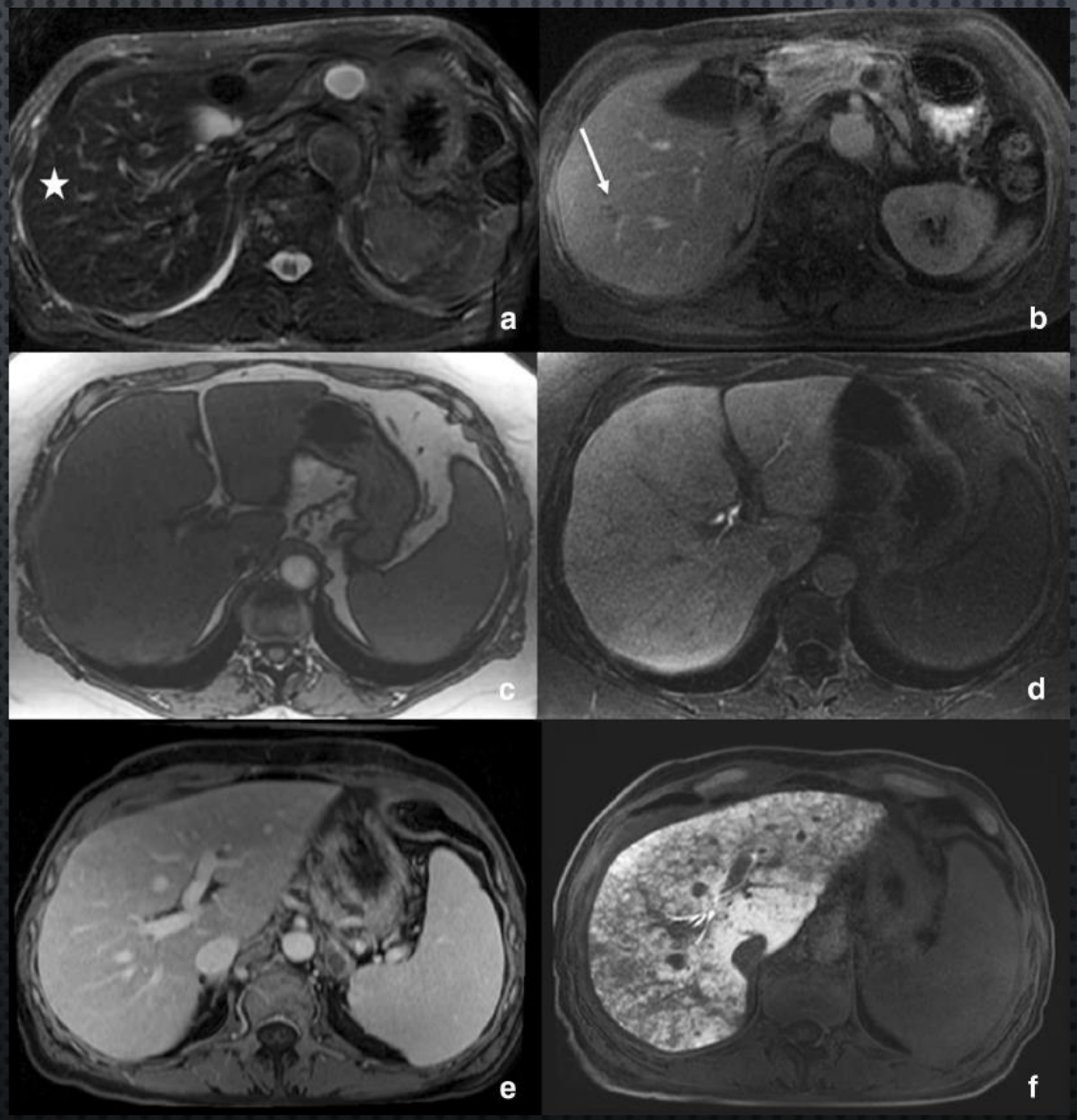


- Welle CL, Guglielmo FF, Venkatesh SK. MRI of the liver: choosing the right contrast agent. Abdom Radiol (NY) [Internet]. 2020;45(2):384–92. Disponible en: http://dx.doi.org/10.1007/s00261-019-02162-5

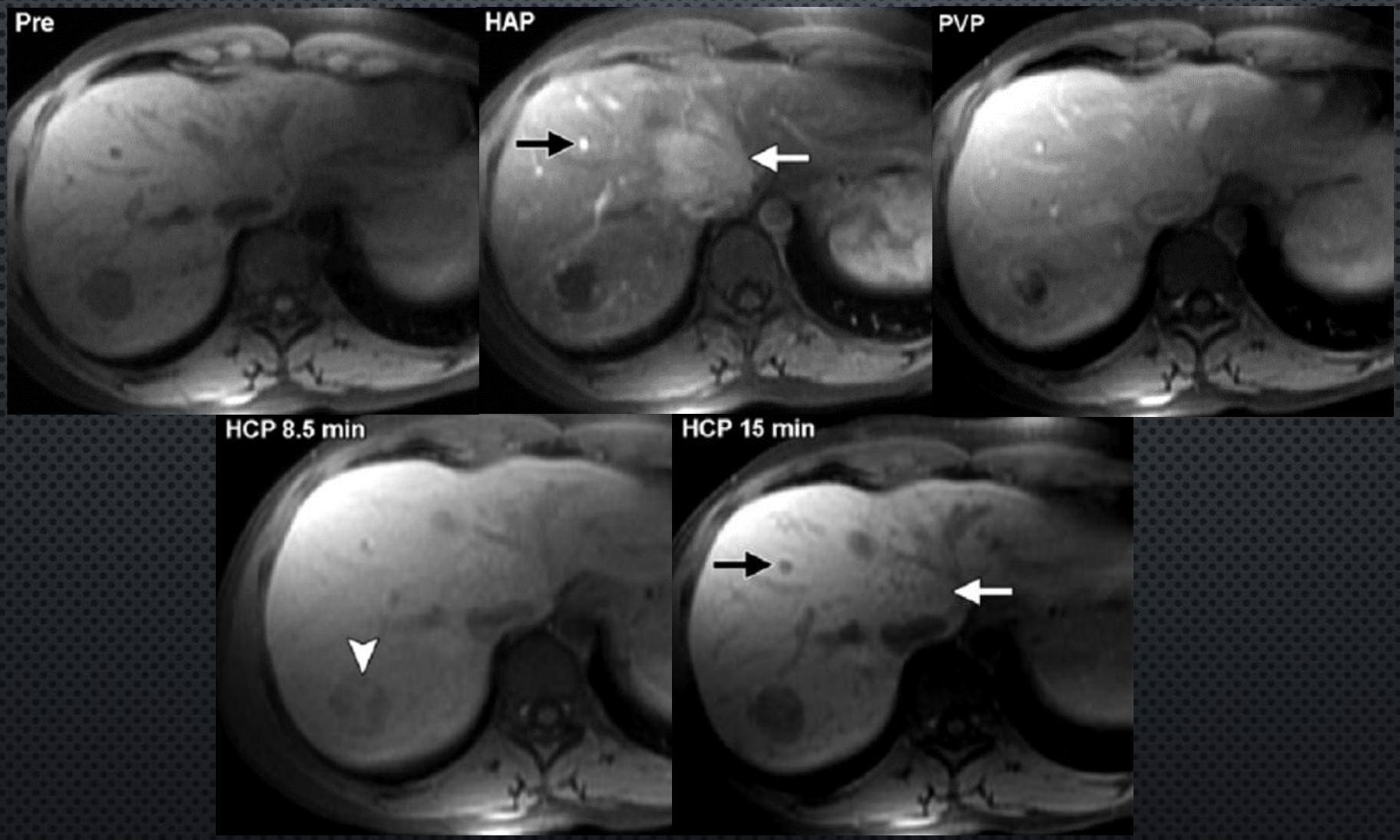
APLICACIONES

- Caracterización de lesiones
- Aplicación en paciente oncológico
- Manejo de lesiones en el paciente cirrótico
- Colangiografia

CARACTERIZACIÓN DE LESIONES

- Preferible **CEC**
- **CHE → Lesiones hepatocitarias funcionantes**
- Hiperplasia Nodular Focal (HNF) vs Adenoma

CARACTERIZACIÓN DE LESIONES



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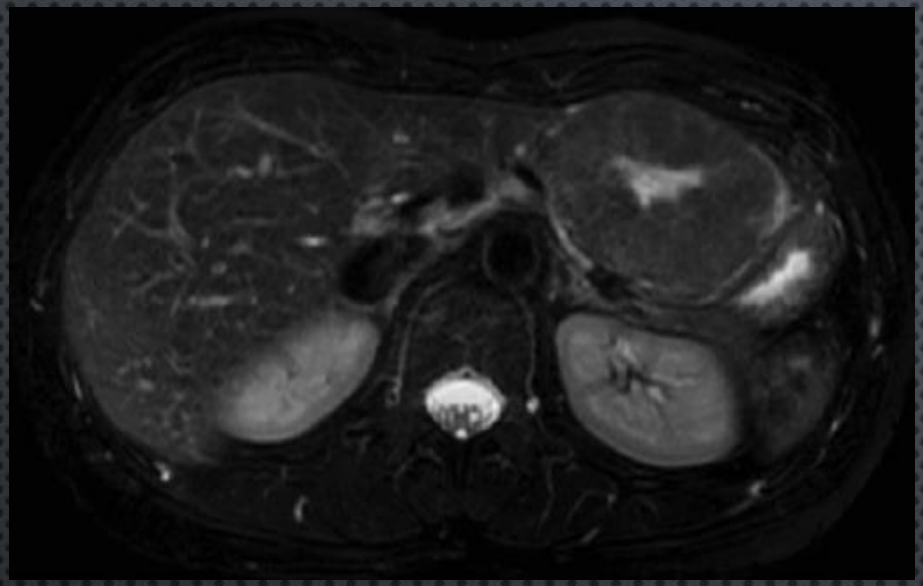

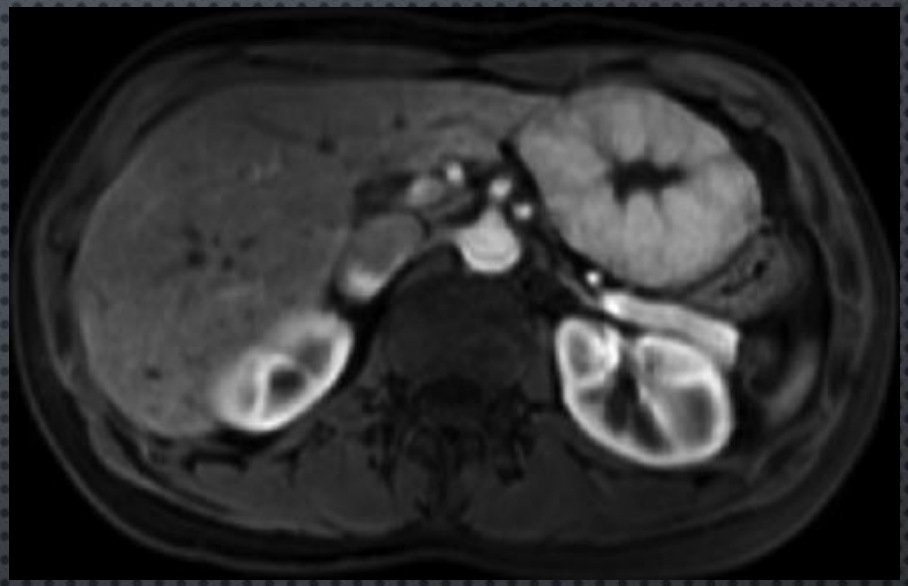

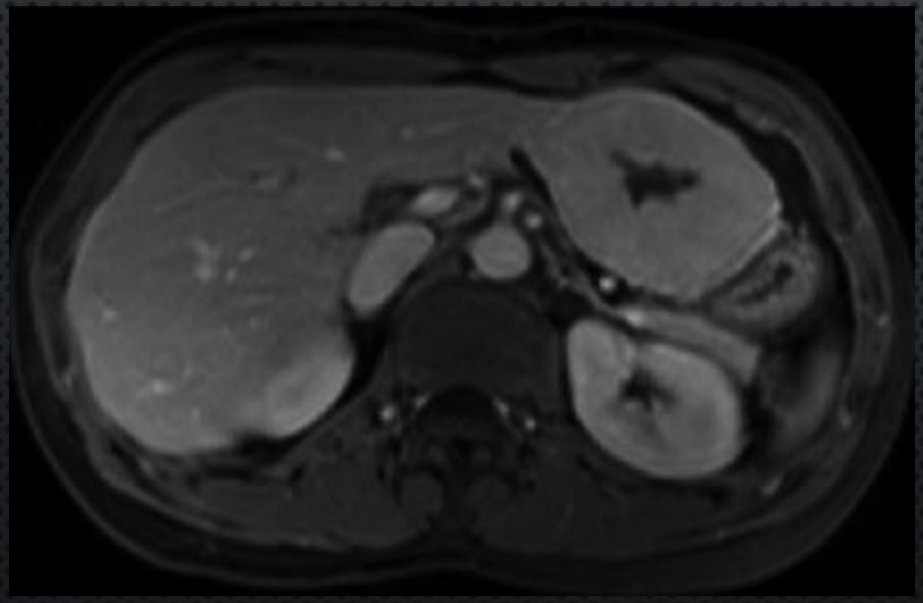

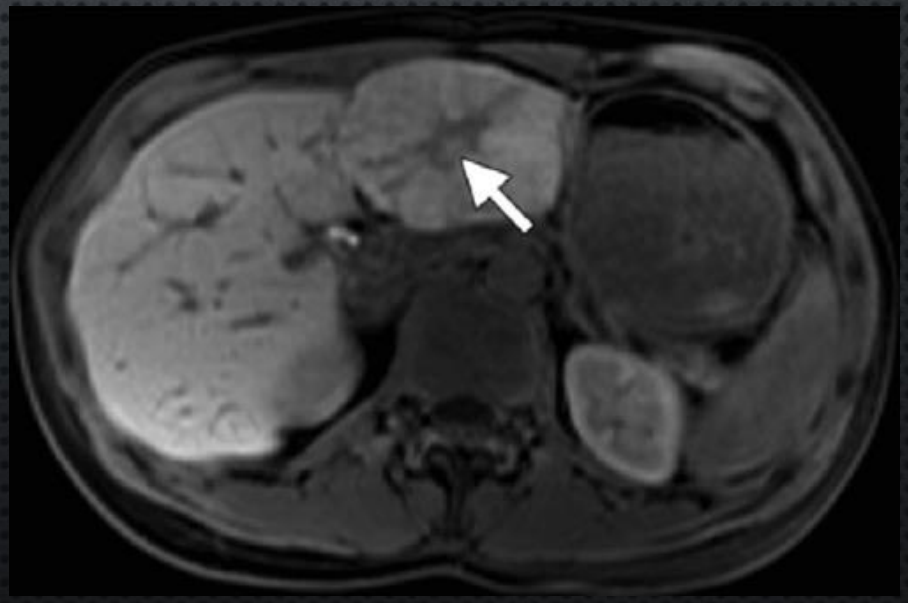

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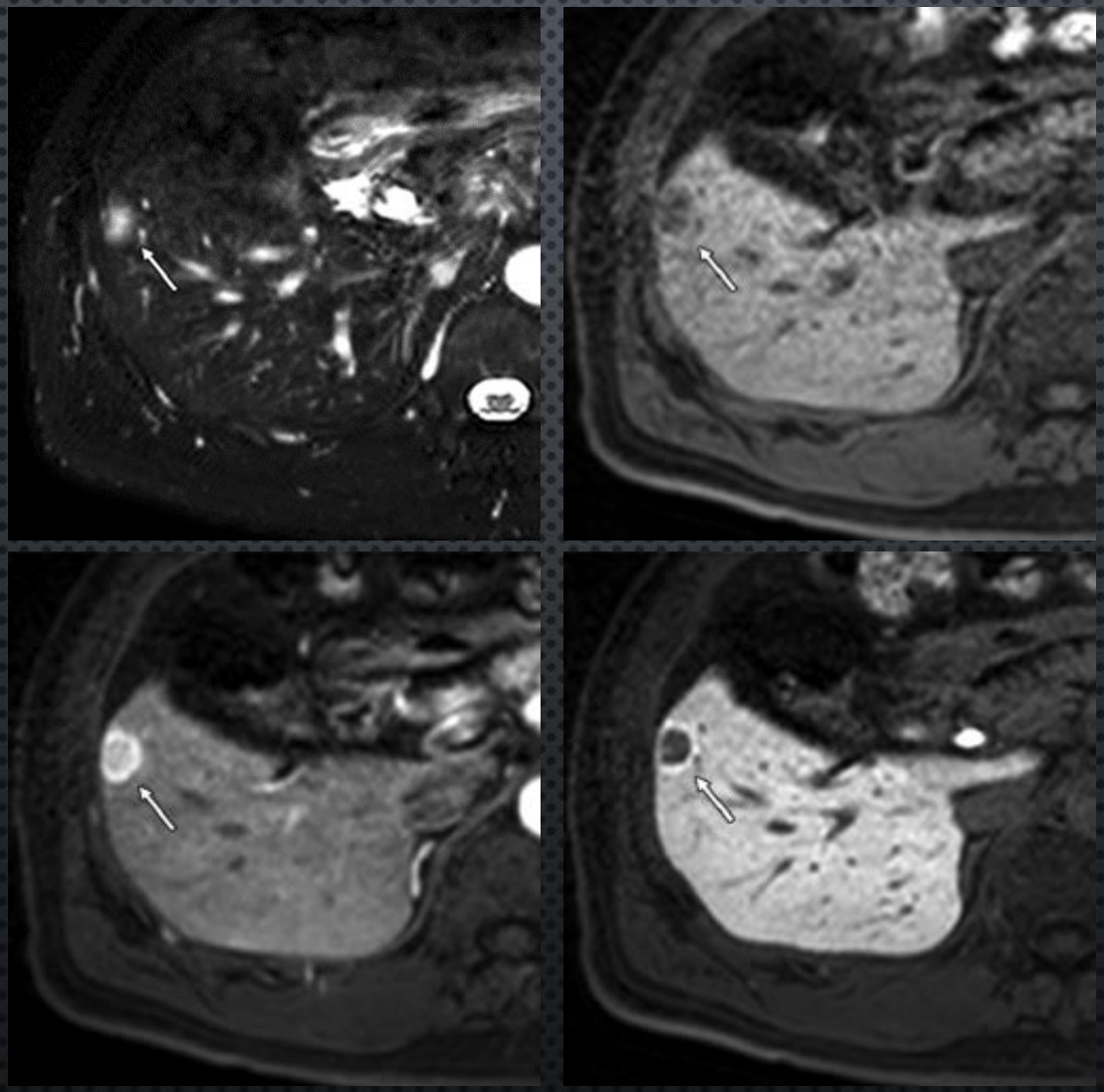

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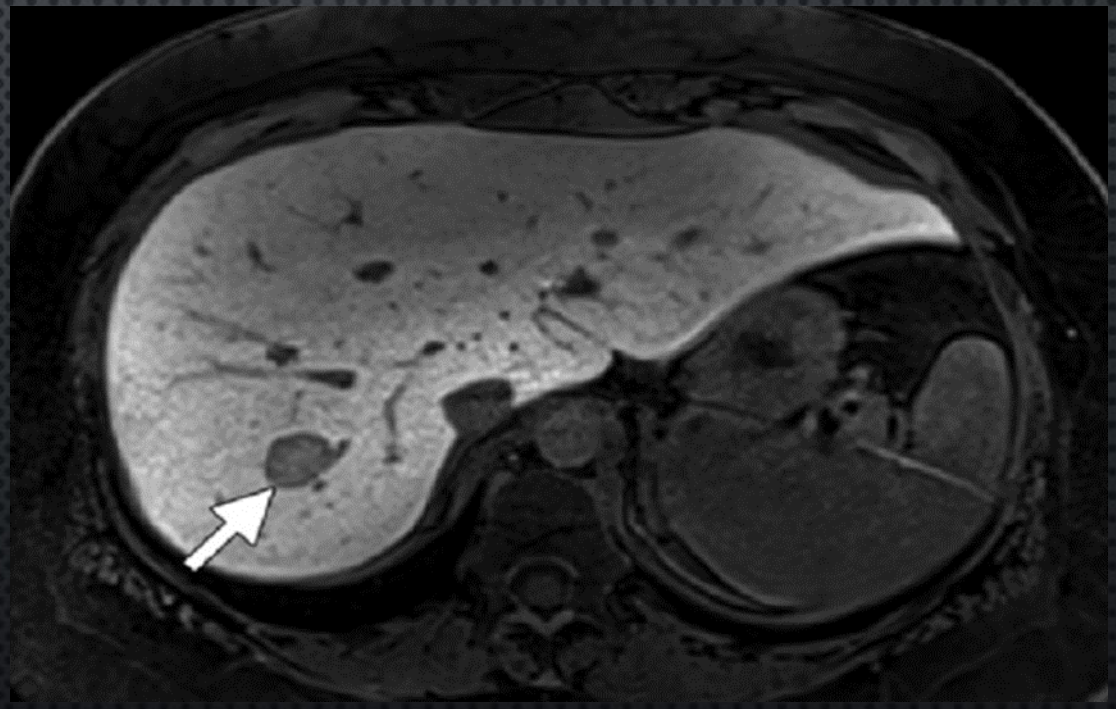
CARACTERIZACIÓN DE LESIONES

ADENOMA

- Raro
- Asociado a ACO, esteroides, DM familiar…
- Riesgo malignización o sangrado
- Cirugía



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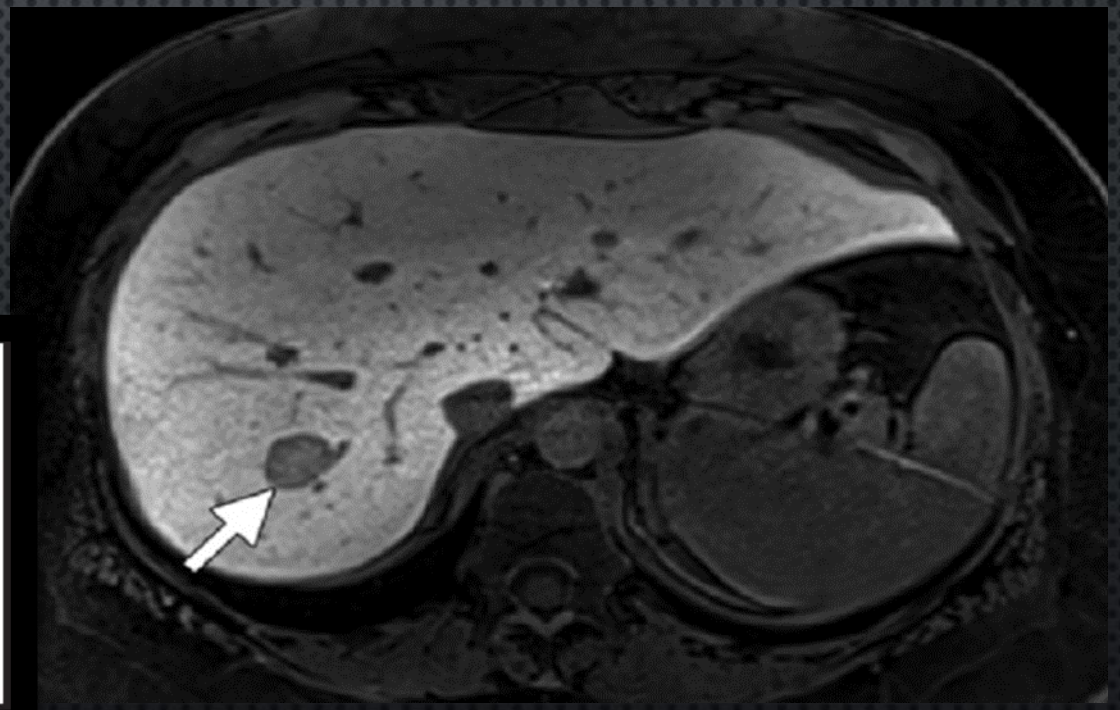

Table 3: Imaging Characteristics of HCA Subtypes

Subtype	Gadoxetic Acid Uptake*	Typical Imaging Finding	Complication
B-HCA	>80%	Gadoxetic acid uptake	Highest risk for malignant transformation
I-HCA	26%–33%	Hyperintense at T2-weighted MRI	Highest risk for hemorrhage
H-HCA	Rare	Intratumoral fat	Least aggressive subtype
U-HCA	Rare	NA	NA

Note.—NA = not applicable.
*Data are the percentages of the given HCA subtype that take up gadoxetic acid.

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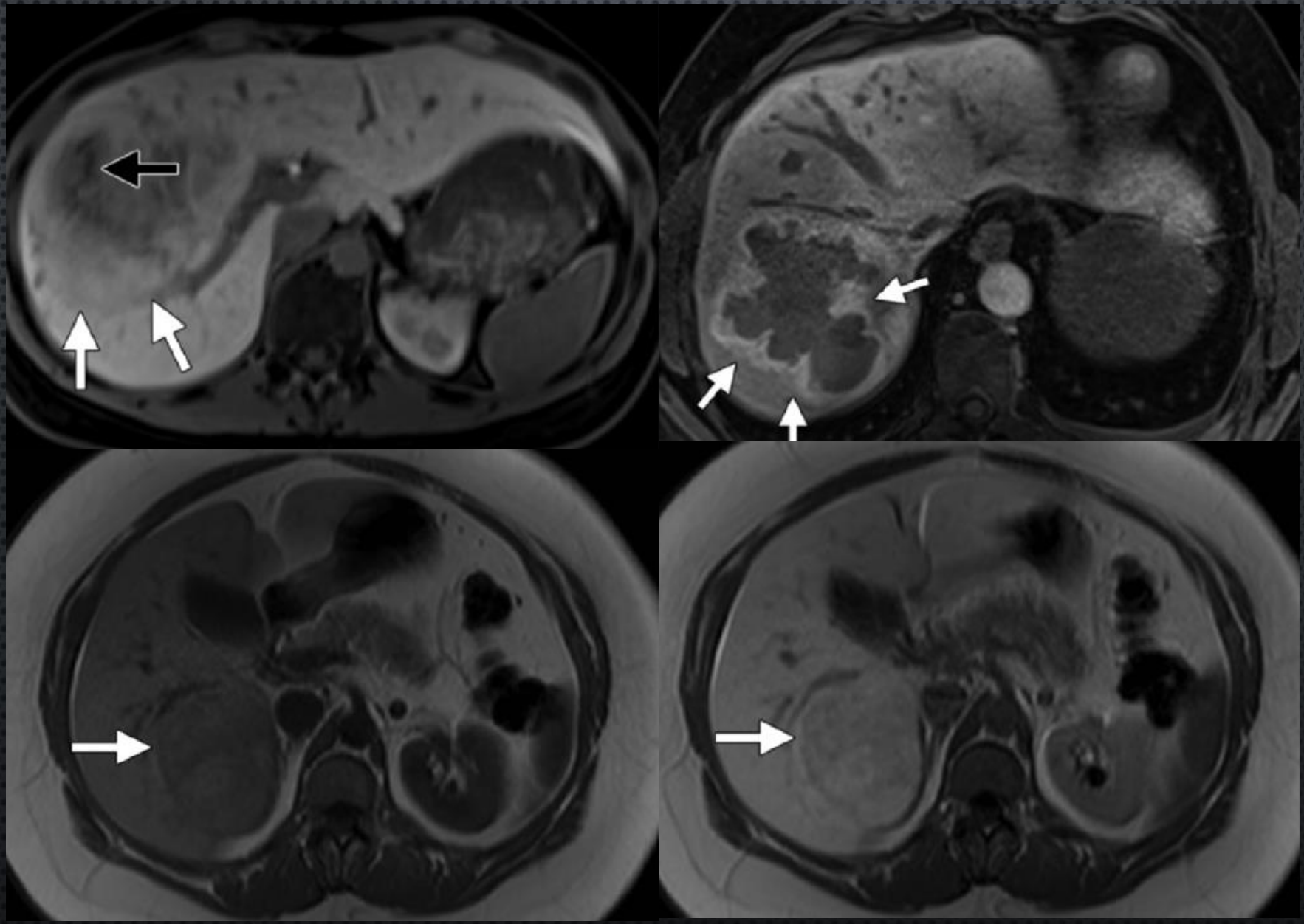

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CARACTERIZACIÓN DE LESIONES

Table 1: Lesions and Mechanisms Causing Hyperintensity during HBP Gadoxetic Acid–enhanced MRI

Hyperintensity-causing Mechanism*	Reported Prevalence or Incidence†	Degree of Hyperintensity
Uptake by hyperplastic normal hepatocytes		
FNH	0.9% (4)	Moderate to marked
FNH-like lesion	3.4% of cirrhotic livers (7)	Moderate to marked
NRH	2.6% of cases in autopsy series (8)	Moderate to marked
Uptake by tumor cells		
HCA	Three to four of 100 000 persons (9)	Mild to moderate
HCC	6.2 cases in 100 000 persons (10)	Mild to moderate
Retention in extracellular space		
Fibrotic tumor	NA	Minimal to moderate
Cavernous hemangioma	≤20% (11)	Minimal to moderate
Peritumoral retention		
HCC	6.2 cases in 100 000 persons (10)	Minimal to marked
GIST	54% of metastatic GISTs (12)	Minimal to marked
NET	82% of metastatic NETs (13) Rare in primary tumors	Minimal to marked
Biliary tract enhancement		
IPNB	Rare	Marked
Malignant lymphoma	Primary: <1% of extranodal lymphomas (14) Secondary: 15% of stage IV lymphomas (15,16)	Marked Marked

*Uptake and retention refer, respectively, to the uptake or retention of gadoxetic acid. FNH = focal nodular hyperplasia, GIST = gastrointestinal stromal tumor, HCA = hepatocellular adenoma, HCC = hepatocellular carcinoma, IPNB = intraductal papillary neoplasm of the bile duct, NET = neuroendocrine tumor, NRH = nodular regenerative hyperplasia.
†Reference numbers for the studies from which the data were taken are in parentheses. NA = not applicable.

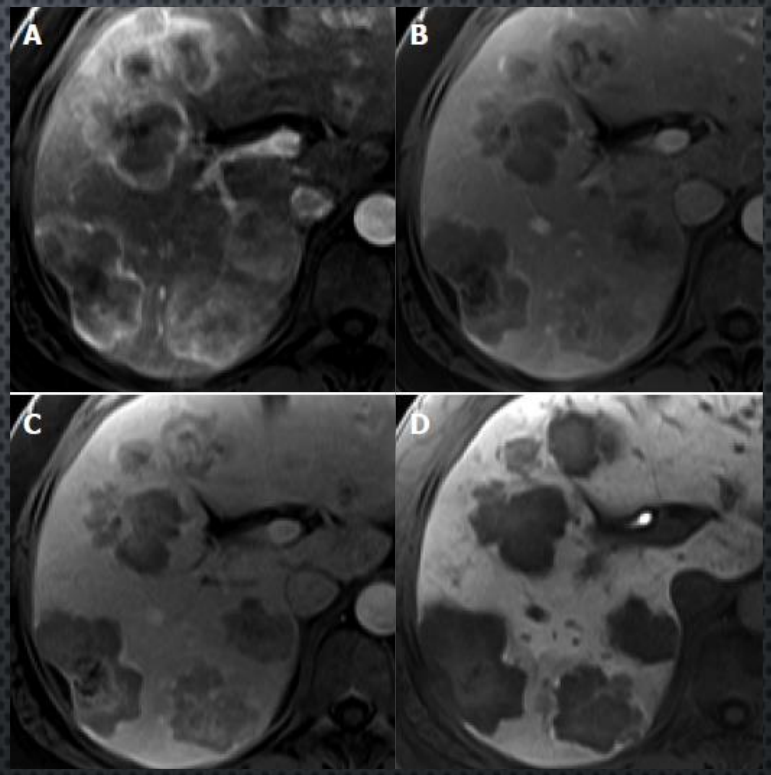
CORRELACIÓN CON RESTO DE SECUENCIAS

- Fujita N, Nishie A, Asayama Y, Ishigami K, Ushijima Y, Kakihara D, et al. Hyperintense liver masses at hepatobiliary phase gadoxetic acid-enhanced MRI: Imaging appearances and clinical importance. Radiographics [Internet]. 2020;40(1):72–94. Disponible en: http://dx.doi.org/10.1148/rg.2020190037

PACIENTE ONCOLÓGICO

VALORACIÓN DE **ENFERMEDAD HEPÁTICA SECUNDARIA** (DETECCIÓN PRECOZ → MAYOR SUPERVIVENCIA)

- CANDIDATOS A RESCATE QUIRÚRGICO O TERAPIA LOCAL
  - LESIONES < 1CM
- DIAGNÓSTICO Y CARACTERIZACIÓN PREOPERATORIA
  - RM → ALTA SENS. (SUPERIOR AL RESTO DE TÉCNICAS: ECO, CT, PET)
  - COMBINACIÓN CON OTRAS SECUENCIAS
- DETECCIÓN DE METASTASIS TRAS TRATAMIENTO QT
- YANG 2014. AC. GADOXÉTICO > GADOBENATO DIMEGLUMINA



- PARK YS, LEE CH, KIM JW, SHIN S, PARK CM. DIFFERENTIATION OF HEPATOCELLULAR CARCINOMA FROM ITS VARIOUS MIMICKERS IN LIVER MAGNETIC RESONANCE IMAGING: WHAT ARE THE TIPS WHEN USING HEPATOCYTE-SPECIFIC AGENTS? WORLD J GASTROENTEROL [INTERNET]. 2016;22(1):284–99. DISPONIBLE EN: HTTP://DX.DOI.ORG/10.3748/WJG.V22.I1.284

PACIENTE ONCOLÓGICO

Radiología 64 (2022) 300–309

RADIOLOGÍA

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ORIGINAL

Recomendaciones de expertos sobre el uso de ácido gadoxético en pacientes con metástasis hepáticas en España

J. Borrego Gómez[a], N. Romera[b], J.M. Tellado[c], L. del Campo[d], J. Díaz Formoso[e], M. Fuster[f], I. Vivas[g], E. Ramón Botella[h,*] y R. Menéndez de Llano Ortega[i,**]

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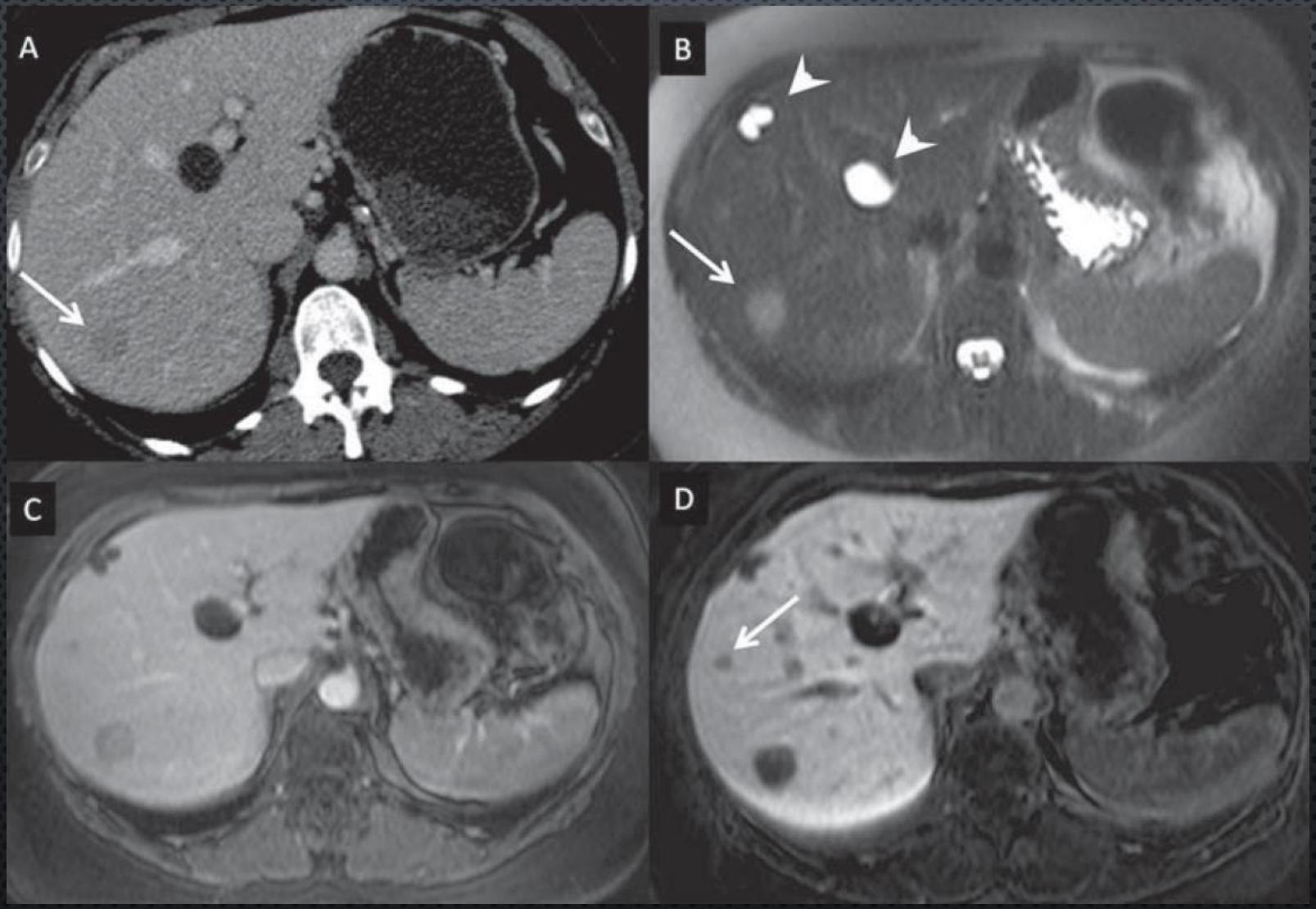

- Bormann, R. L., da Rocha, E. L., Kierzenbaum, M. L., Pedrassa, B. C., Torres, L. R., & D'Ippolito, G. (2015). The role of gadoxetic acid as a paramagnetic contrast medium in the characterization and detection of focal liver lesions: a review. Radiologia Brasileira, 48(1), 43–51. https://doi.org/10.1590/0100-3984.2013.1794

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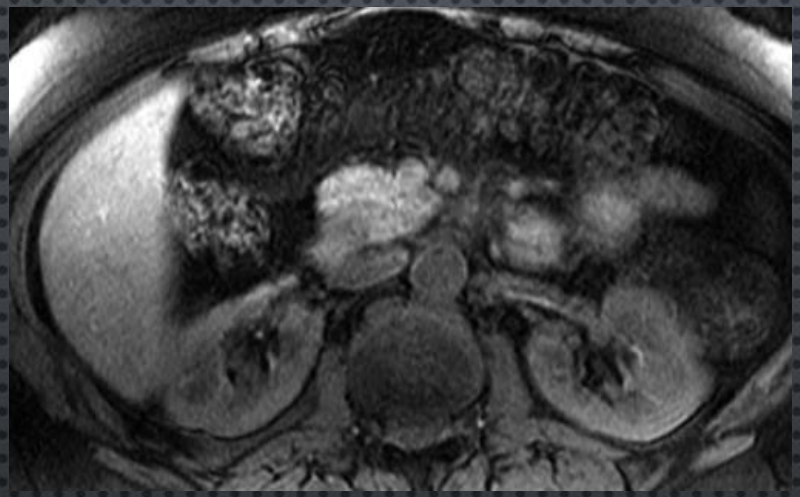

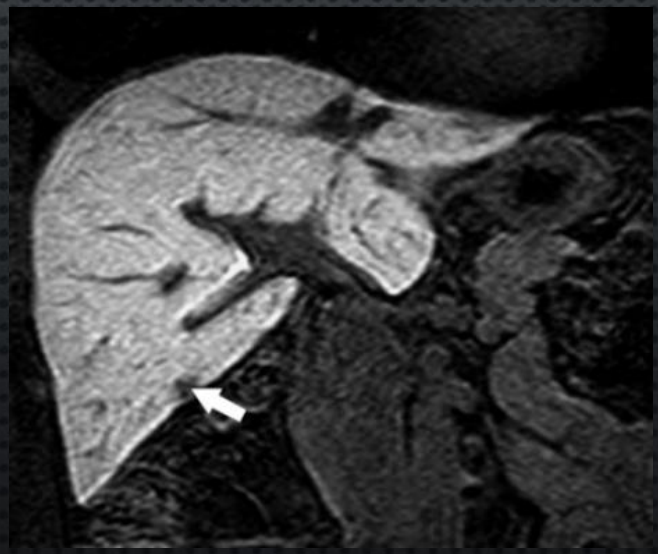

- Seale MK, Catalano OA, Saini S, Hahn PF, Sahani DV. Hepatobiliary-specific MR contrast agents: role in imaging the liver and biliary tree. Radiographics [Internet]. 2009;29(6):1725–48. Disponible en: http://dx.doi.org/10.1148/rg.296095515

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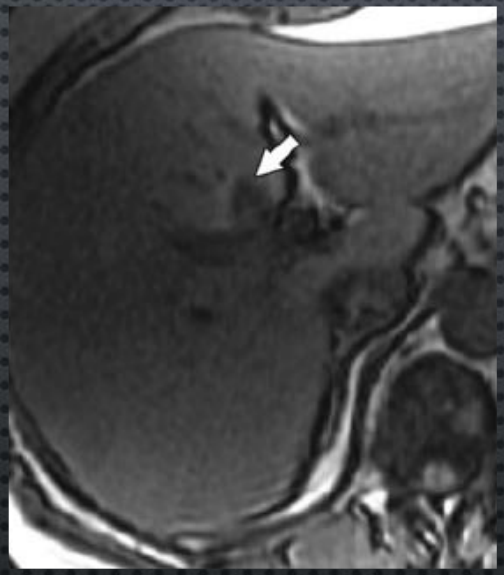

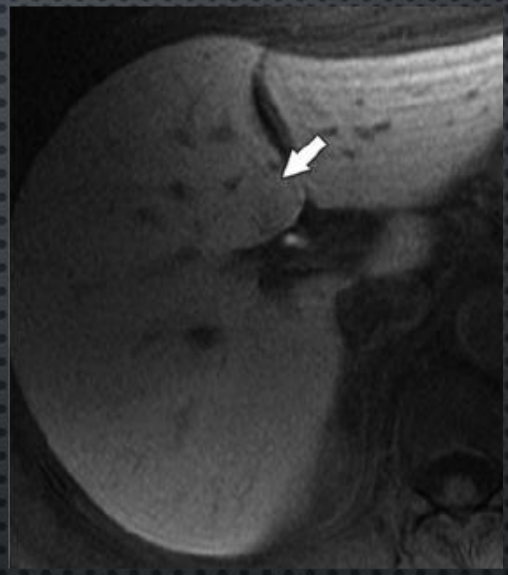

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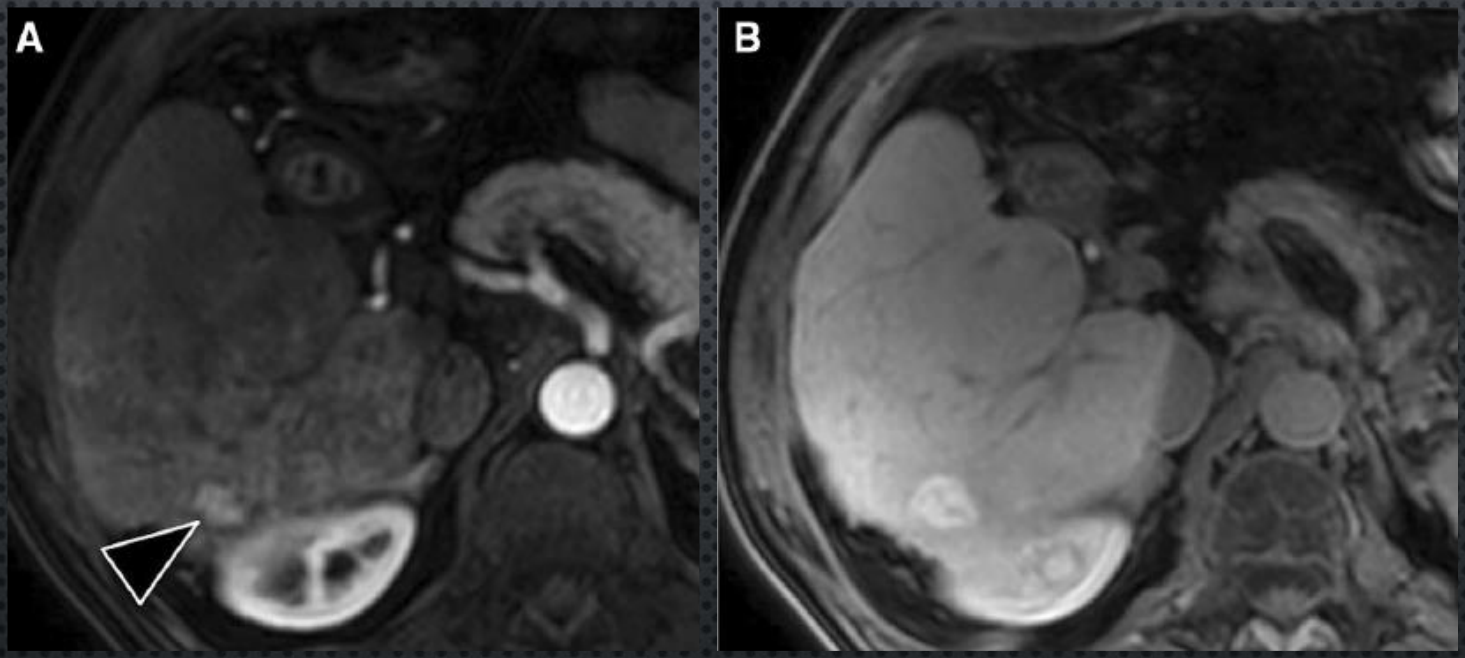

- Vernuccio, F., Dioguardi Burgio, M., Barbiera, F., Cusmà, S., Badalamenti, G., Midiri, M., Vilgrain, V., & Brancatelli, G. (2019). CT and MR imaging of chemotherapy-induced hepatopathy. Abdominal Radiology (New York), 44(10), 3312–3324. https://doi.org/10.1007/s00261-019-02193-y

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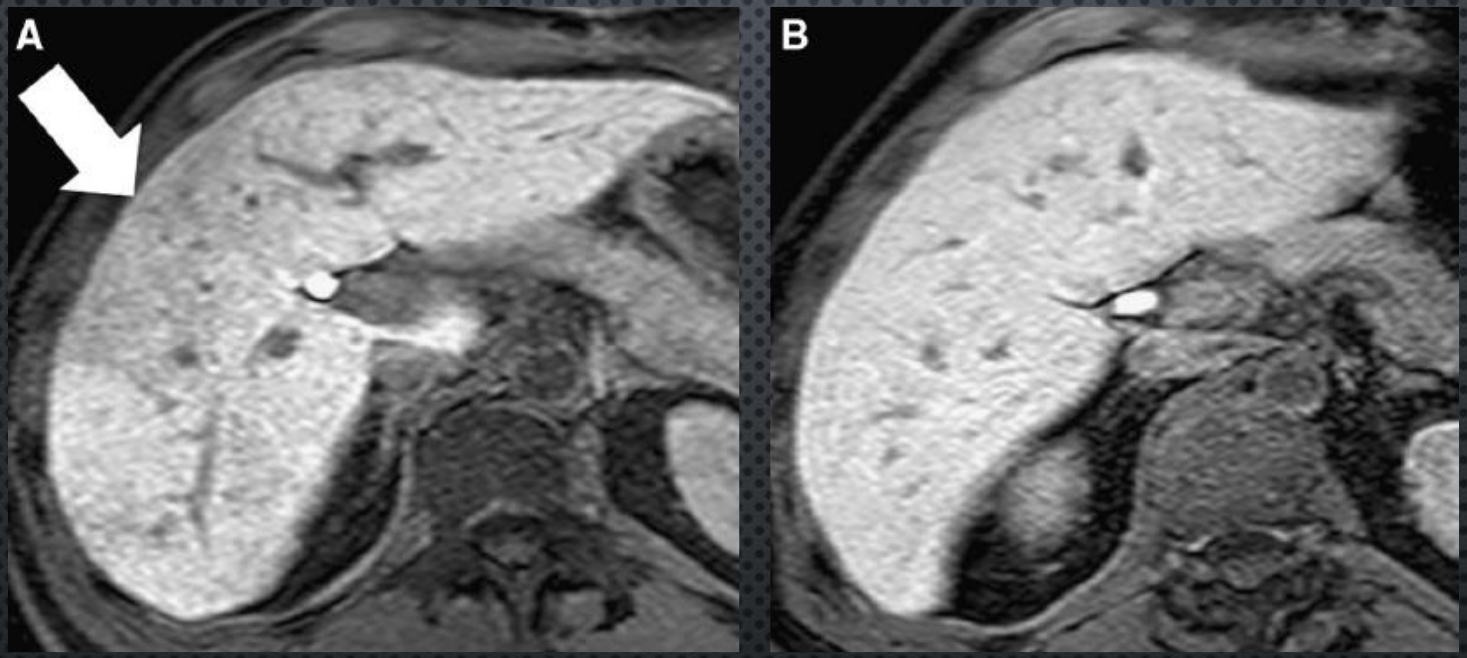

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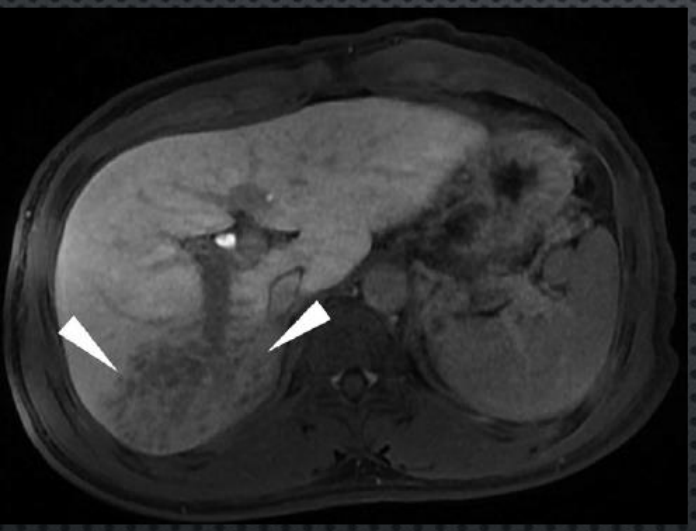
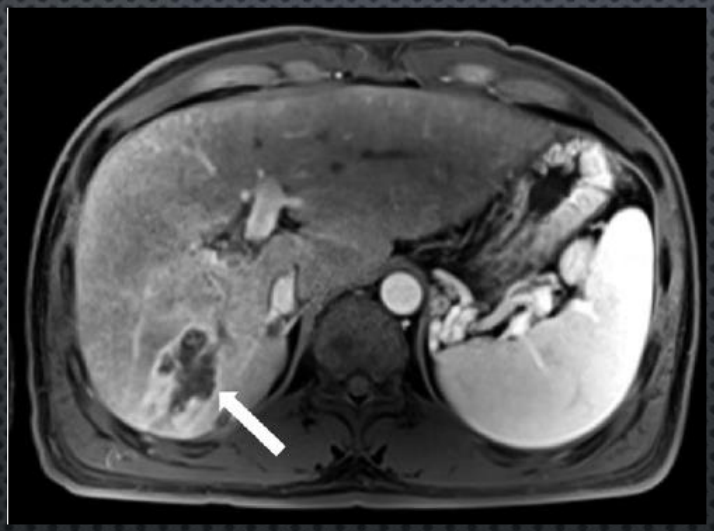
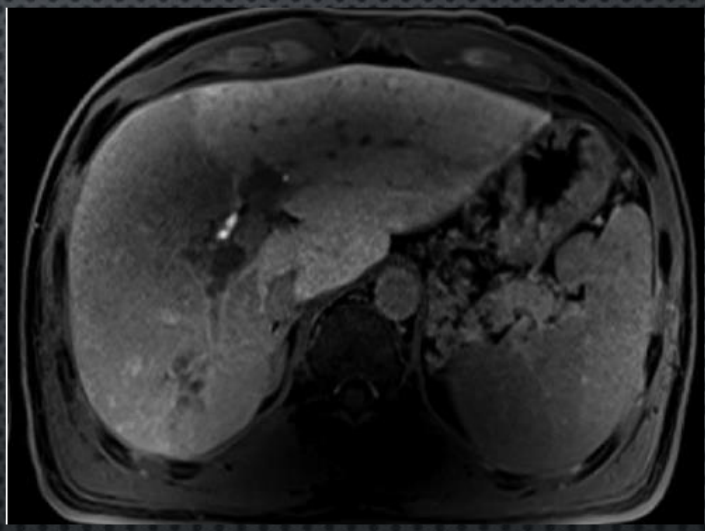

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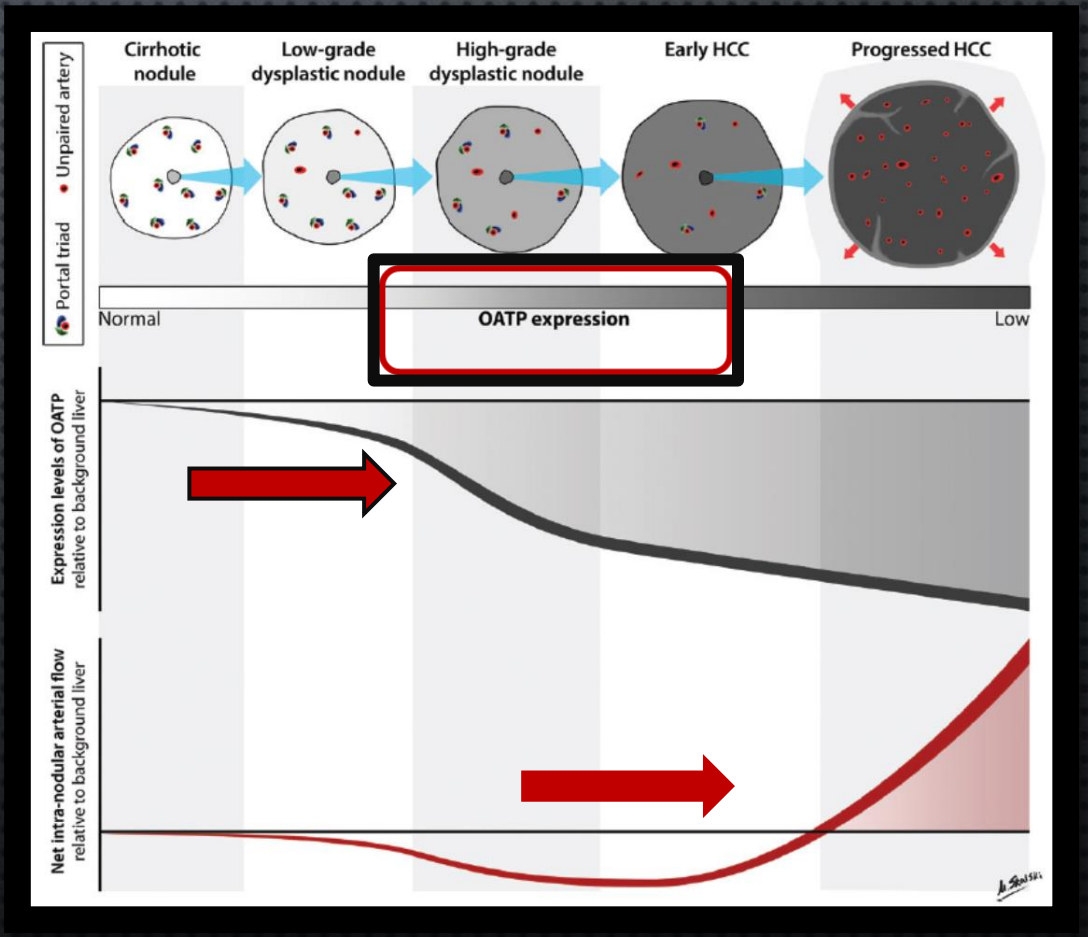
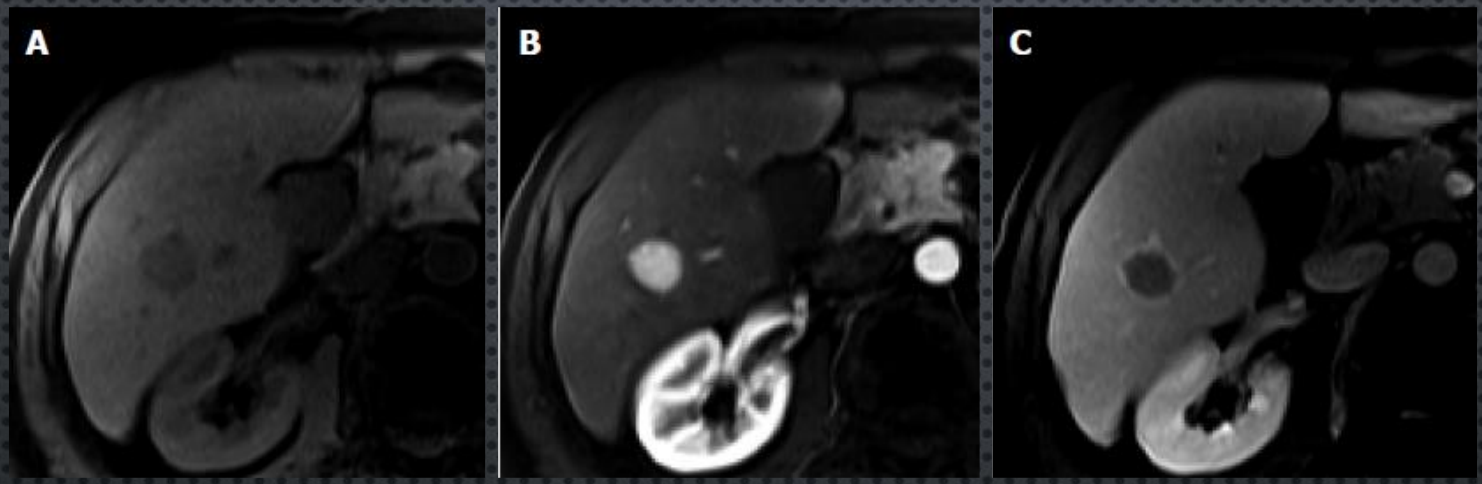
PACIENTE CIRRÓTICO

- DETECCIÓN DE HEPATOCARCINOMA (CHC)
- HEPATOPATÍA CRÓNICA/CIRROSIS HEPÁTICA
  - FR: ALCOHOL, VHB, VHC

COMPORTAMIENTO VASCULAR



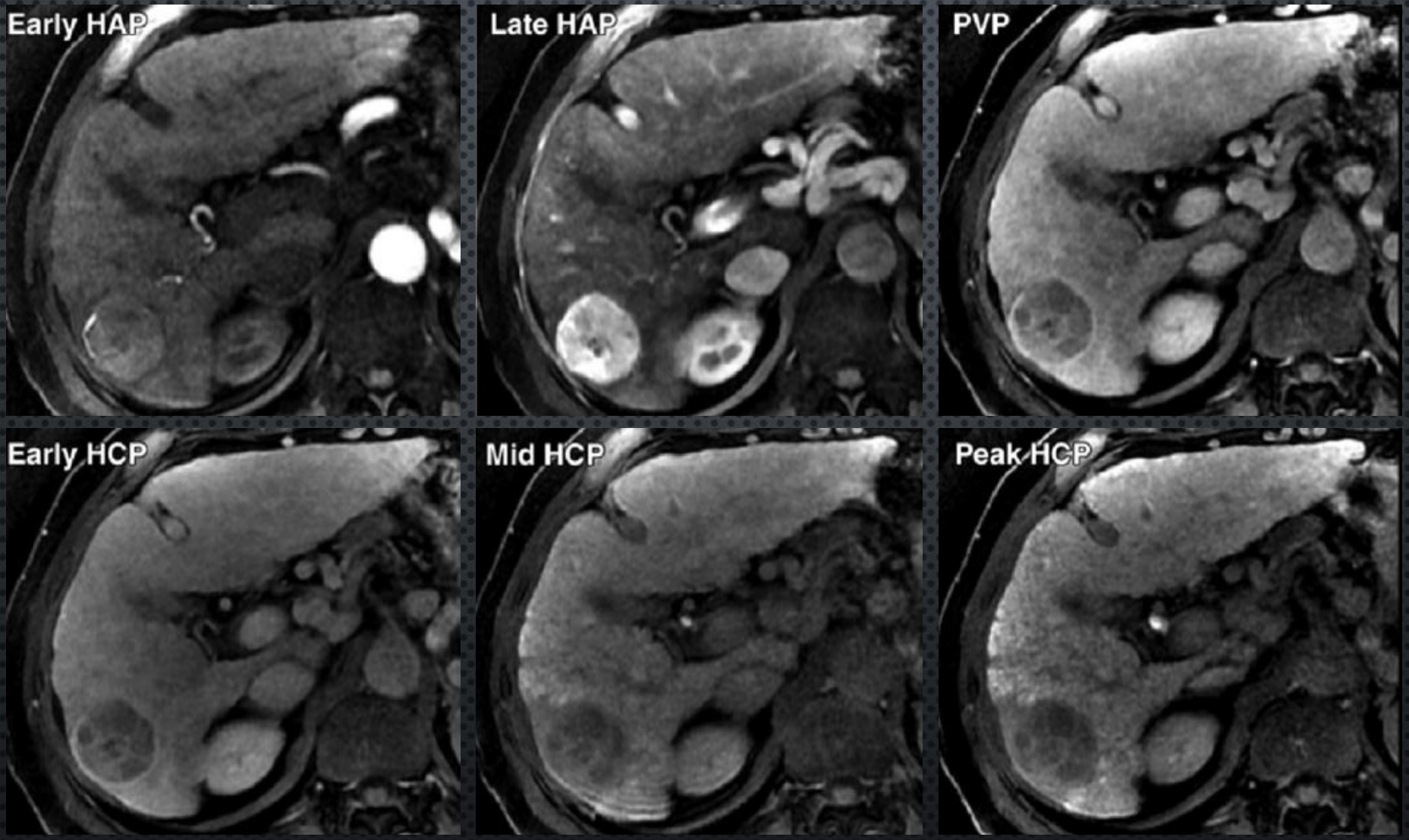
PACIENTE CIRRÓTICO



COMPORTAMIENTO VASCULAR

- Park YS, Lee CH, Kim JW, Shin S, Park CM. Differentiation of hepatocellular carcinoma from its various mimickers in liver magnetic resonance imaging: What are the tips when using hepatocyte-specific agents? World J Gastroenterol [Internet]. 2016;22(1):284–99. Disponible en: http://dx.doi.org/10.3748/wjg.v22.i1.284

PACIENTE CIRRÓTICO



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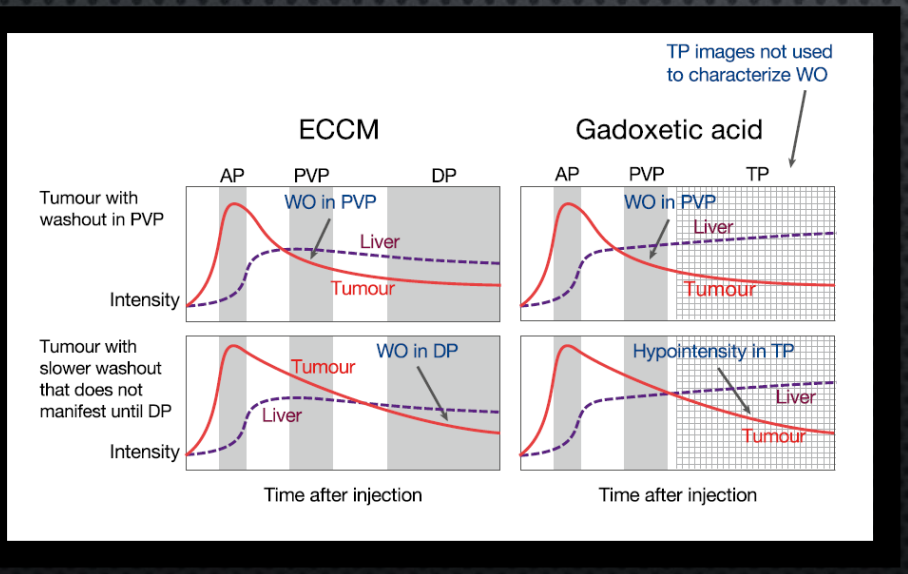
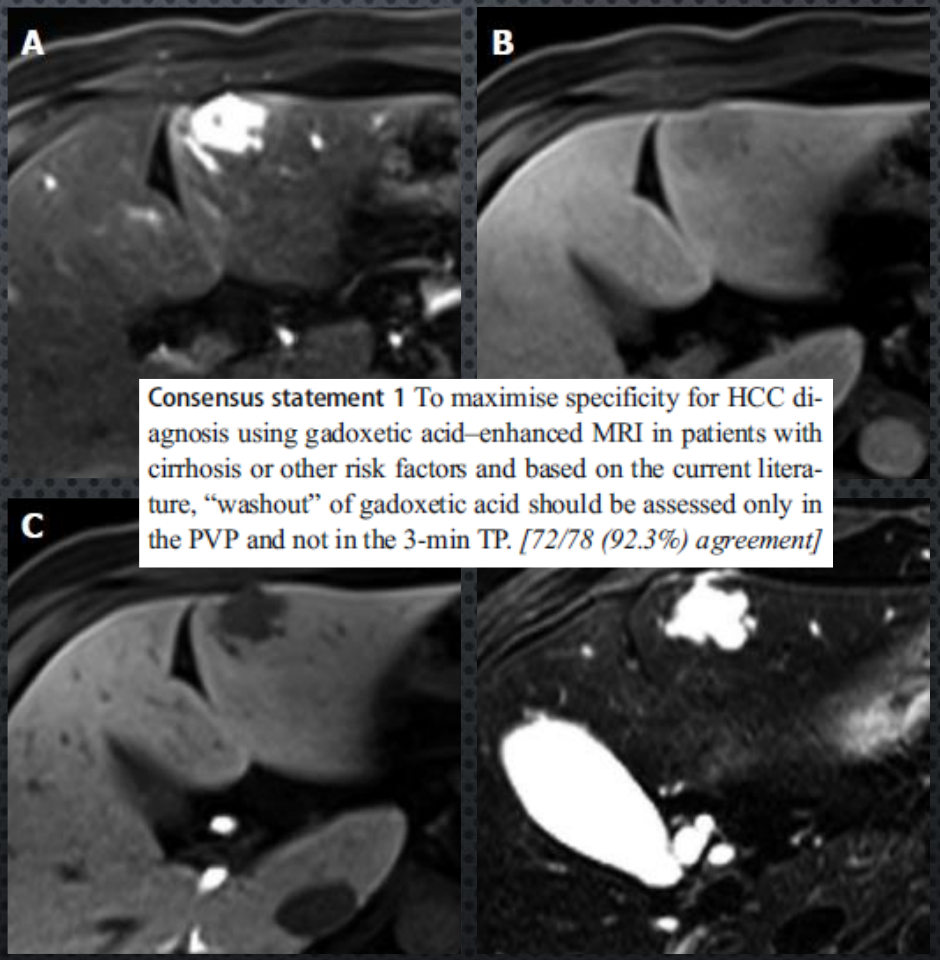
PACIENTE CIRRÓTICO

PSEUDOWASHOUT





Consensus statement 1 To maximise specificity for HCC diagnosis using gadoxetic acid–enhanced MRI in patients with cirrhosis or other risk factors and based on the current literature, "washout" of gadoxetic acid should be assessed only in the PVP and not in the 3-min TP. *[72/78 (92.3%) agreement]*

- Zech CJ, Ba-Ssalamah A, Berg T, Chandarana H, Chau G-Y, Grazioli L, et al. Consensus report from the 8th International Forum for Liver Magnetic Resonance Imaging. Eur Radiol [Internet]. 2020;30(1):370–82. Disponible en: http://dx.doi.org/10.1007/s00330-019-06369-4
- Park YS, Lee CH, Kim JW, Shin S, Park CM. Differentiation of hepatocellular carcinoma from its various mimickers in liver magnetic resonance imaging: What are the tips when using hepatocyte-specific agents? World J Gastroenterol [Internet]. 2016;22(1):284–99. Disponible en: http://dx.doi.org/10.3748/wjg.v22.i1.284

PACIENTE CIRRÓTICO

- CHC vs NÓDULOS CIRRÓTICOS (DISPLÁSICOS)
- LESIONES < 2 CM

Consensus report from the 8th International Forum for Liver Magnetic Resonance Imaging

Results and conclusions It was concluded that gadoxetic acid–enhanced MRI has higher sensitivity for the diagnosis of hepatocellular carcinoma (HCC), when compared with multidetector CT, by utilising features of hyperenhancement in the arterial phase and hypointensity in the hepatobiliary phase (HBP). Recent HCC management guidelines recognise an increasing role for gadoxetic acid–enhanced MRI in early diagnosis and monitoring post-resection. Additional research is needed to define the role of HBP in predicting microvascular invasion, to better define washout during the transitional phase in gadoxetic acid–enhanced MRI for HCC diagnosis, and to reduce the artefacts encountered in the arterial phase. Technical developments are being directed to shortening the MRI protocol for reducing time and patient discomfort and toward utilising faster imaging and non-Cartesian free-breathing approaches that have the potential to improve multiphasic dynamic imaging.

RM-CHE no superior a RM-CEC

. Zech CJ, Ba-Ssalamah A, Berg T, Chandarana H, Chau G-Y, Grazioli L, et al. Consensus report from the 8th International Forum for Liver Magnetic Resonance Imaging. Eur Radiol [Internet]. 2020;30(1):370–82. Disponible en: http://dx.doi.org/10.1007/s00330-019-06369-4

PACIENTE CIRRÓTICO

Table 1 Magnetic resonance imaging features of low-grade dysplastic nodules according to various authors

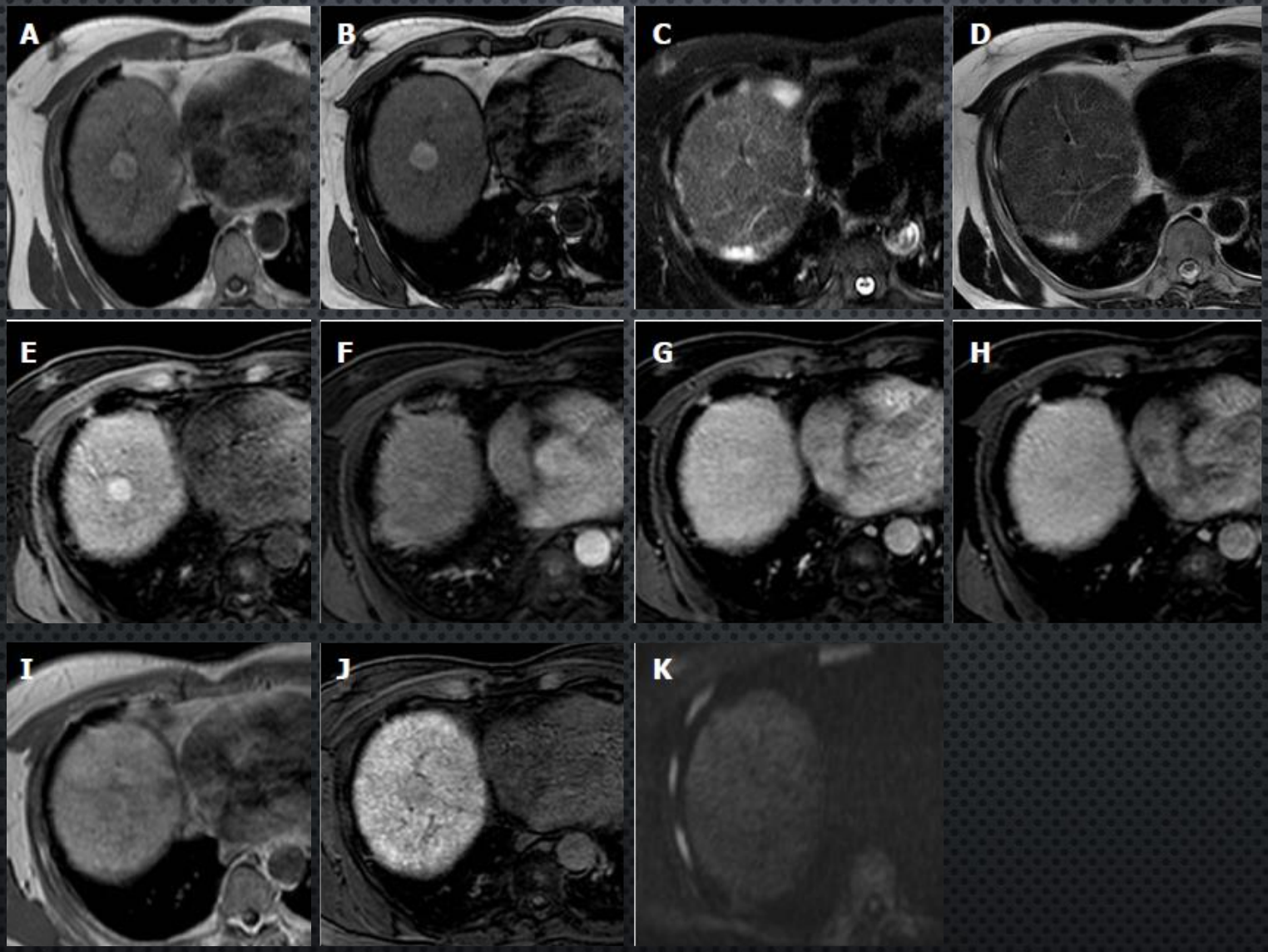
	No. of nodules	T1w	T2w	Arterial phase	Delayed phase	DWI	HB
Golfieri *et al*[10]	38		=/-	=	=		=/-
Bartolozzi *et al*[17]	32	NA		=/+	=/+		+/=
Golfieri *et al*[16]	27	=/+	=/+	=	=		=/+
Chen *et al*[33]	10	+	=/-	=/+	=/-	=/+	
Di Martino *et al*[21]	29	+	-	=/-	=		=/+
Shin *et al*[44]	6	=/-	=/-	=	=	=	

Table 2 Magnetic resonance imaging features of high-grade dysplastic nodules and early hepatocellular carcinoma according to various authors

	No. of nodules	T2w	Arterial phase	Delayed phase	DWI	HB
High grade dysplastic nodules						
Golfieri *et al*[10]	20	+	+/=	=		-
Golfieri *et al*[16]	41		+/=	=		-
Bartolozzi *et al*[17]	30		-/=	-		-
Choi *et al*[48]	17					-
Sugimori *et al*[46]	7					-
Kim *et al*[45]	17		-/=			-
Shin *et al*[44]	12	-/=			-	
Early HCC						
Sano *et al*[59]	180	=/+	+/=	-		-
Renzulli *et al*[61]	24	=/+	+	-	+	-

- Inchingolo R, Faletti R, Grazioli L, Tricarico E, Gatti M, Pecorelli A, et al. MR with Gd-EOB-DTPA in assessment of liver nodules in cirrhotic patients. World J Hepatol [Internet]. 2018;10(7):462–73. Disponible en: http://dx.doi.org/10.4254/wjh.v10.i7.462

PACIENTE CIRRÓTICO



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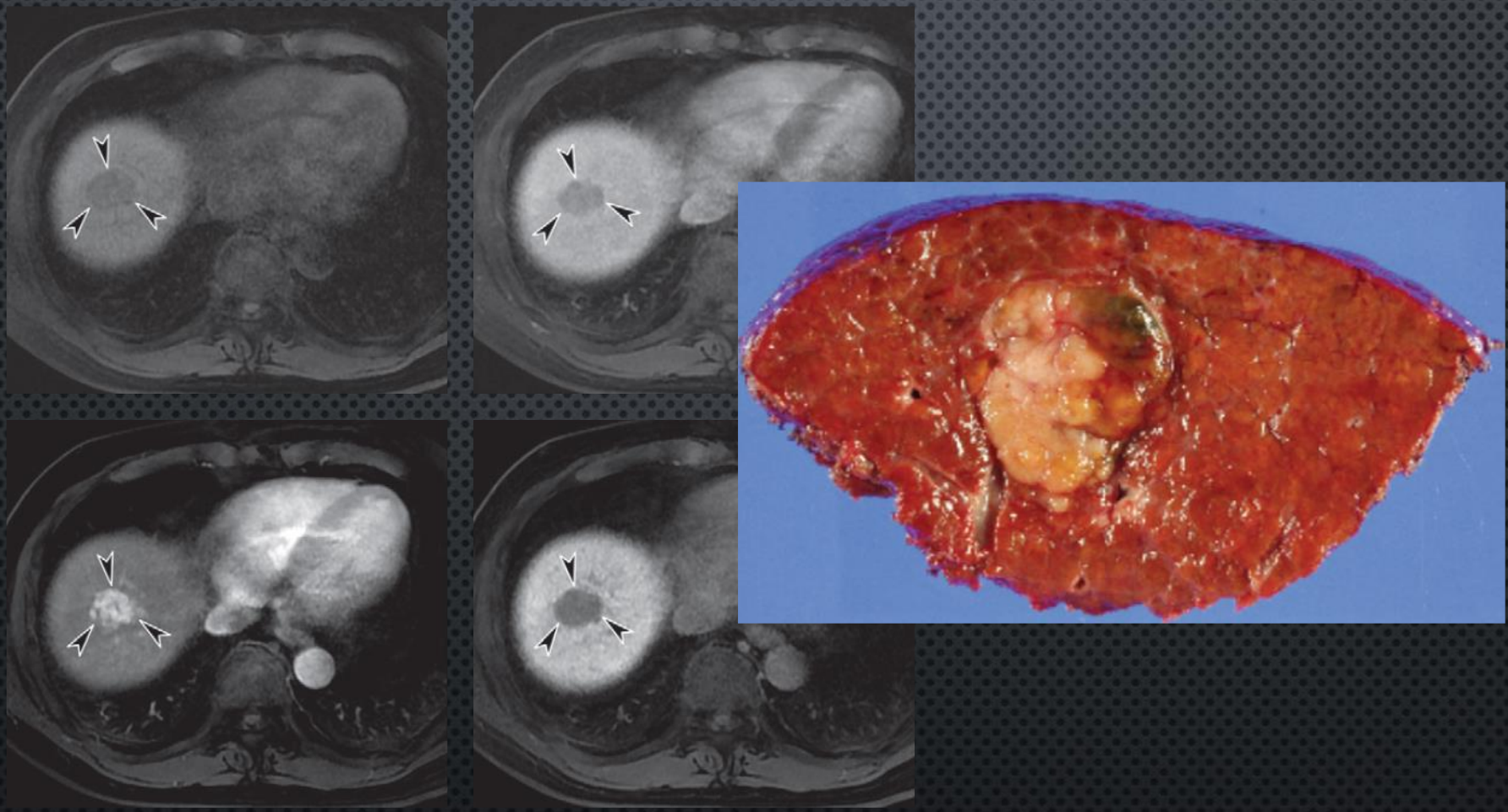
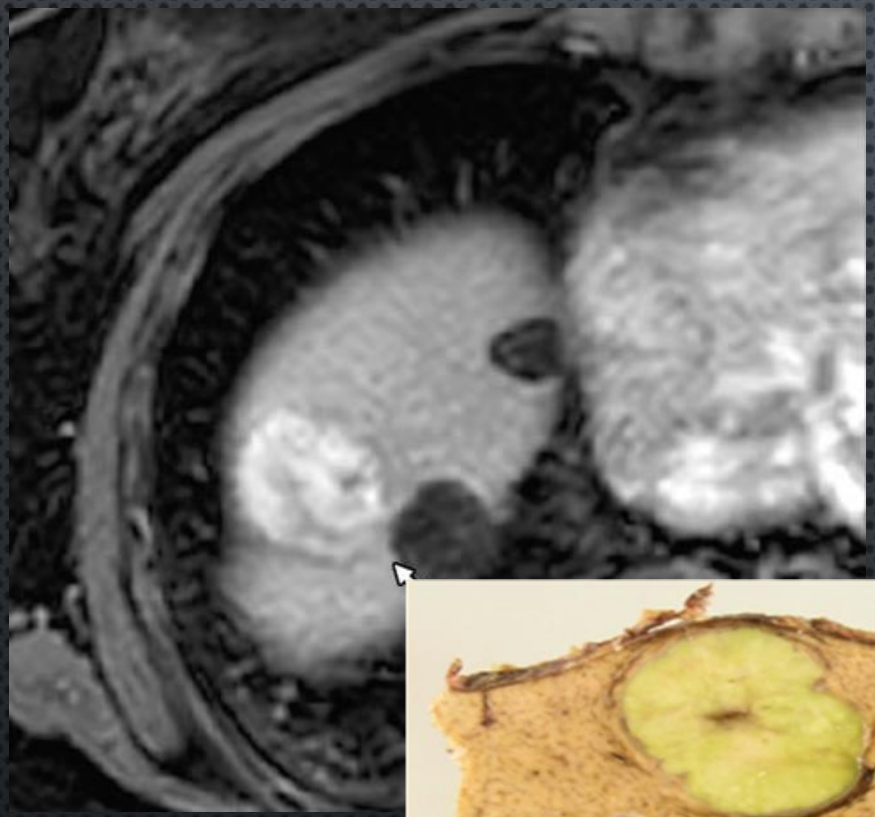
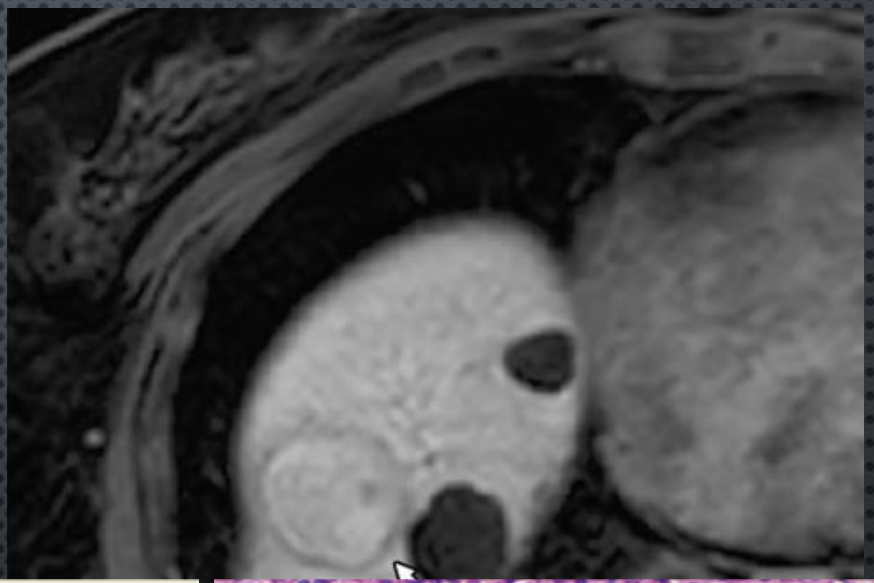
PACIENTE CIRRÓTICO

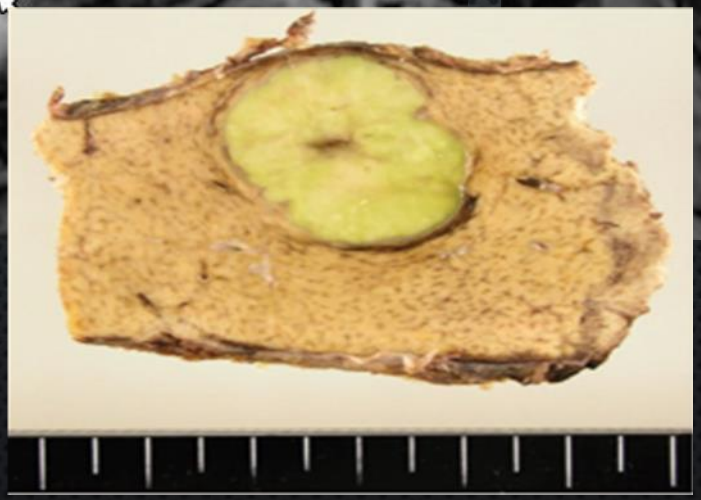


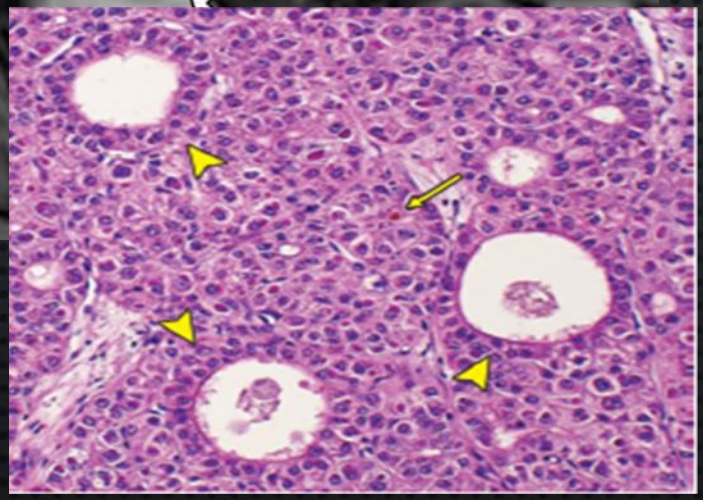
Choi, J. W., Lee, J. M., Kim, S. J., Yoon, J.-H., Baek, J. H., Han, J. K., & Choi, B. I. (2013). Hepatocellular carcinoma: imaging patterns on gadoxetic acid-enhanced MR Images and their value as an imaging biomarker. Radiology, 267(3), 776–786. https://doi.org/10.1148/radiol.13120775

PACIENTE CIRRÓTICO









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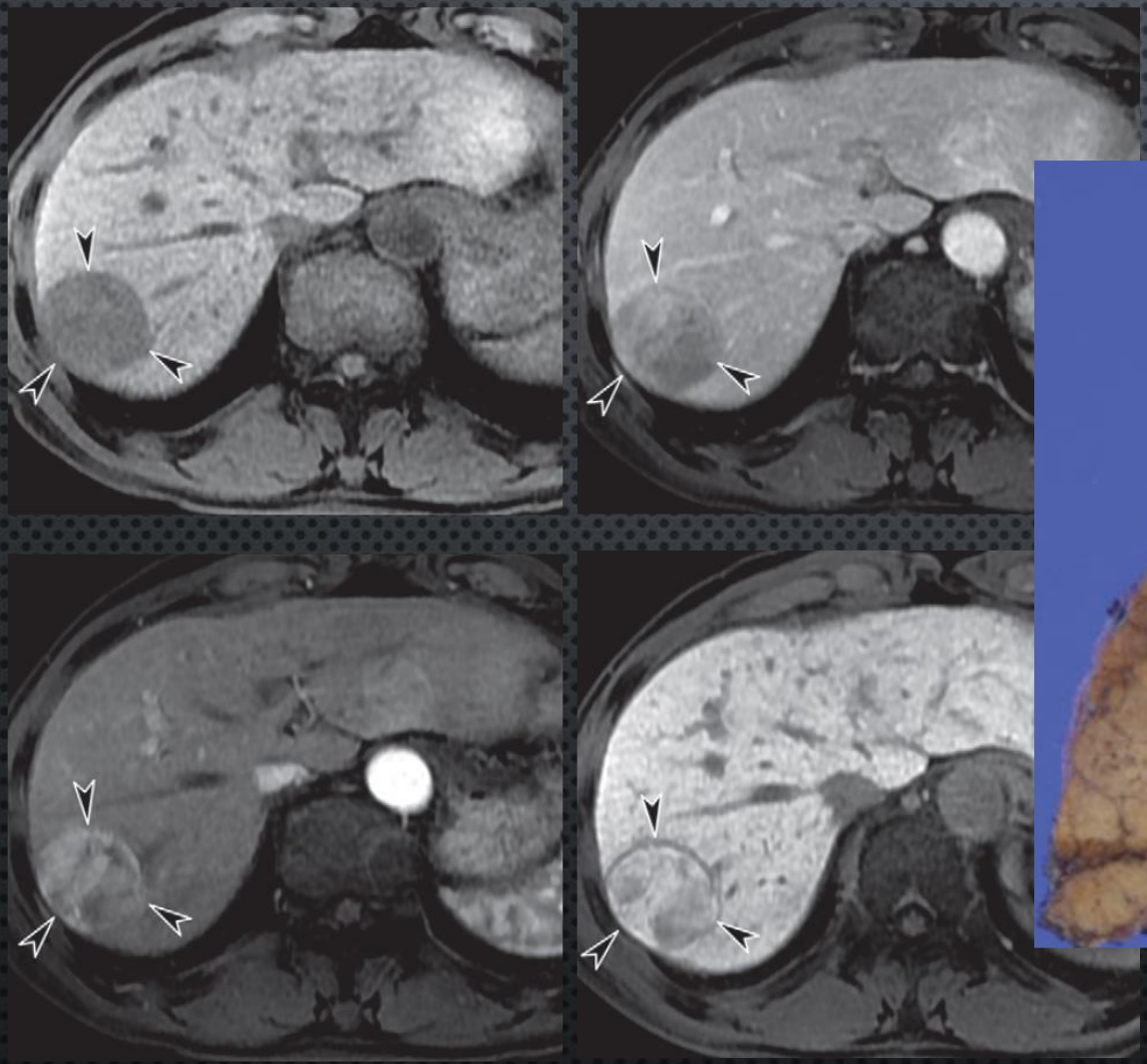

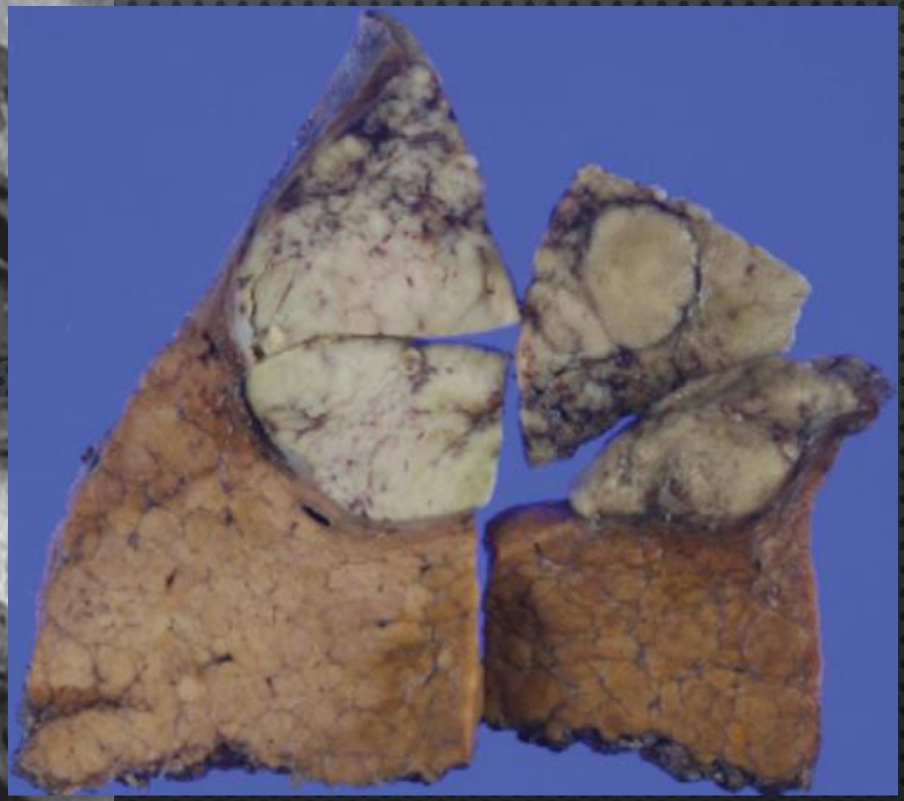

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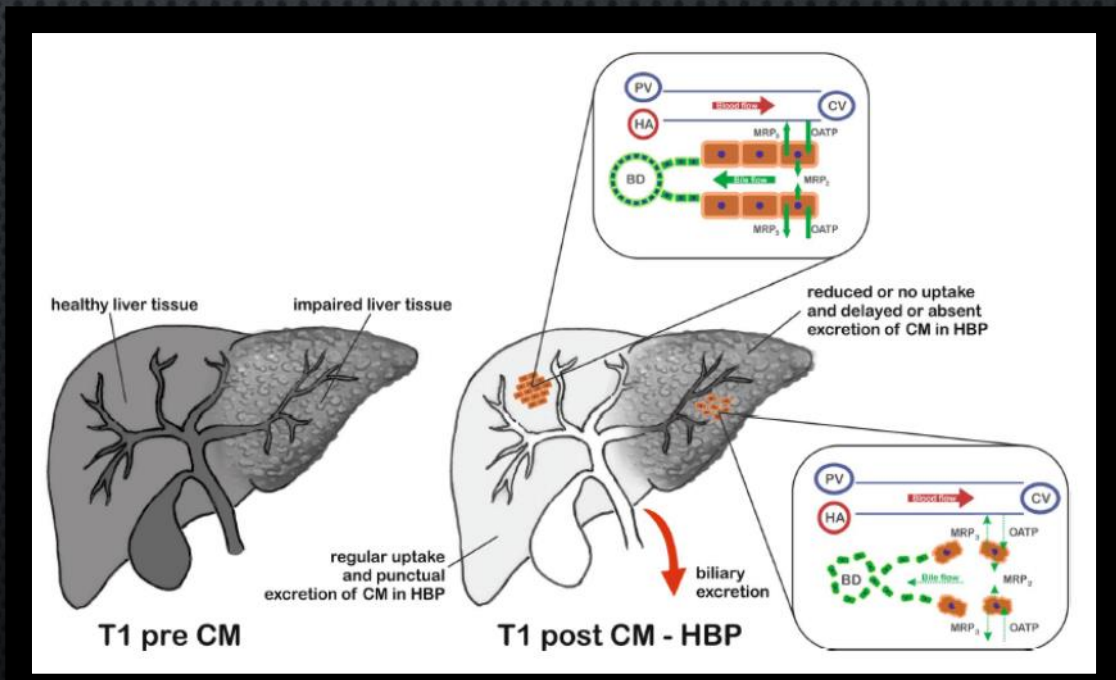
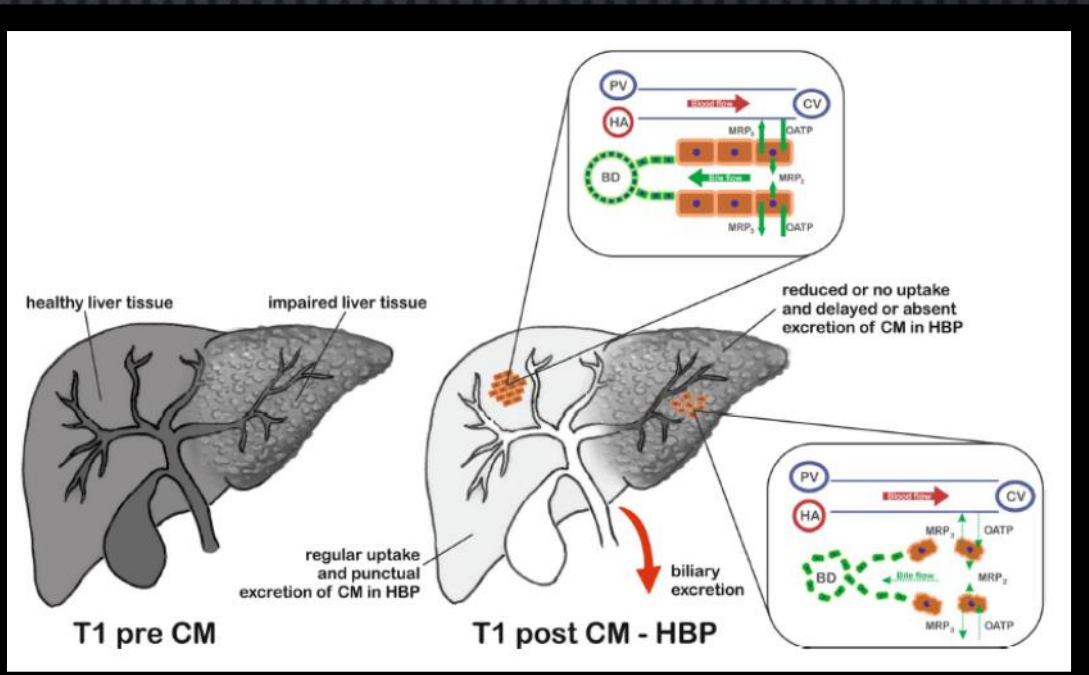
PACIENTE CIRRÓTICO

- **LIMITACIONES EN EL HÍGADO CIRRÓTICO**
  - DISFUNCIÓN HEPÁTICA GRAVE O COLESTASIS



PACIENTE CIRRÓTICO

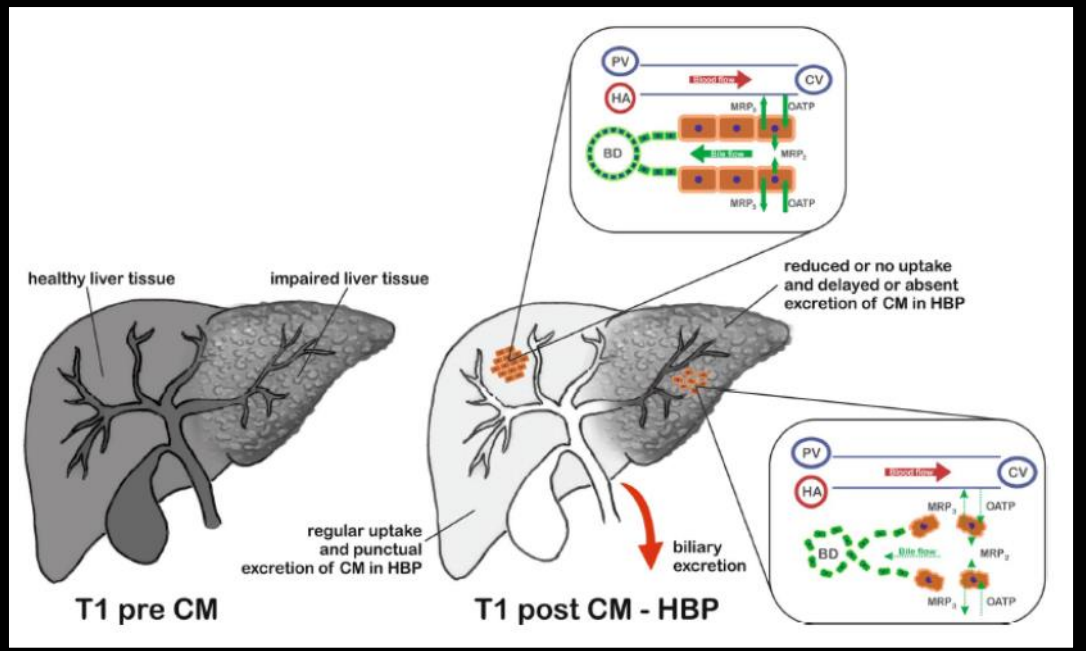
- **LIMITACIONES EN EL HÍGADO CIRRÓTICO**
  - DISFUNCIÓN HEPÁTICA GRAVE O COLESTASIS
  - INESPECIFICIDAD. LESIONES FIBRÓTICAS, HEMANGIOMAS, NEOPLASIAS NO HCC…



PACIENTE CIRRÓTICO

- **LIMITACIONES EN EL HÍGADO CIRRÓTICO**
  - DISFUNCIÓN HEPÁTICA GRAVE O COLESTASIS
  - INESPECIFICIDAD. LESIONES FIBRÓTICAS, HEMANGIOMAS, NEOPLASIAS NO HCC…

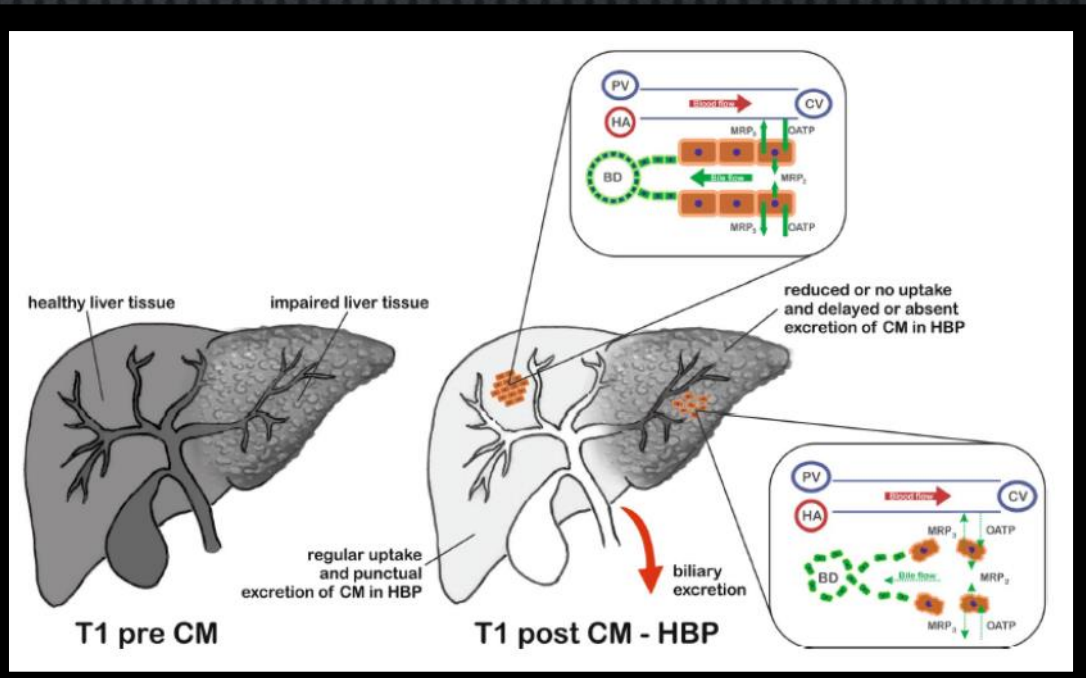
RESTO DE SECUENCIAS FUNDAMENTALES



PACIENTE CIRRÓTICO

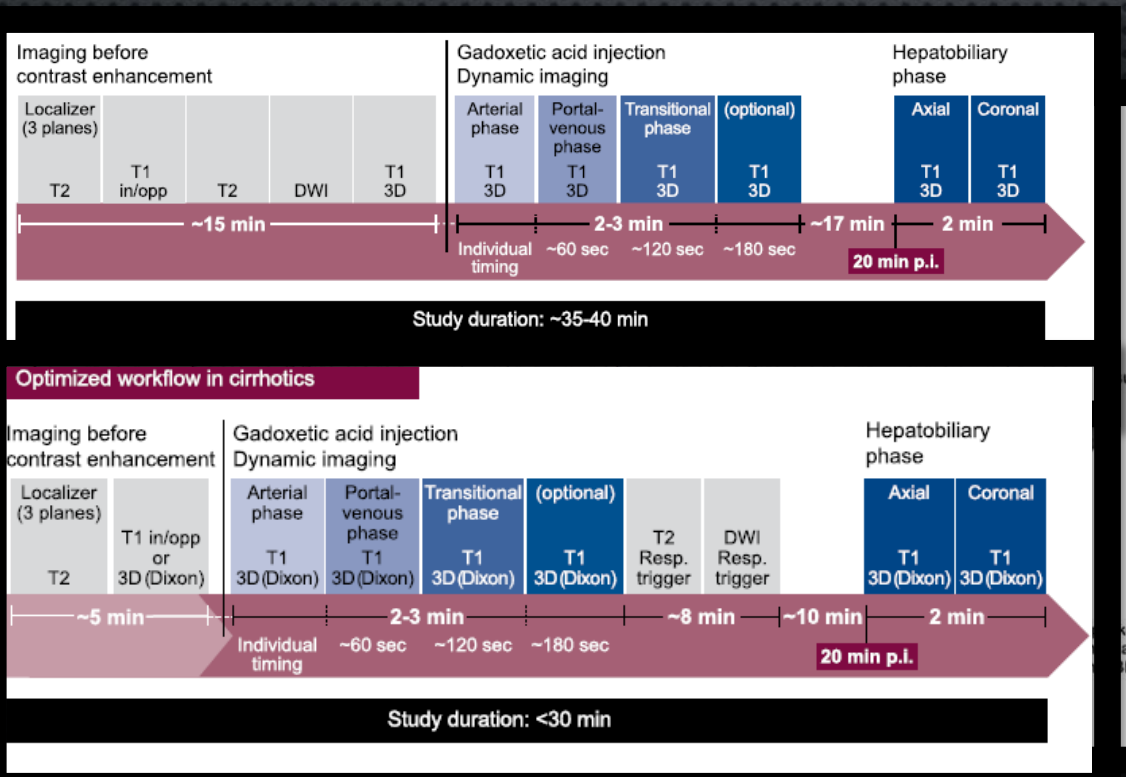
- **LIMITACIONES EN EL HÍGADO CIRRÓTICO**
  - DISFUNCIÓN HEPÁTICA GRAVE O COLESTASIS
  - INESPECIFICIDAD. LESIONES FIBRÓTICAS, HEMANGIOMAS, NEOPLASIAS NO HCC…
  - FASE VASCULAR SUBÓPTIMA. ARTEFACTOS RESPIRATORIOS (HASTA UN 20% DE ESTUDIOS)

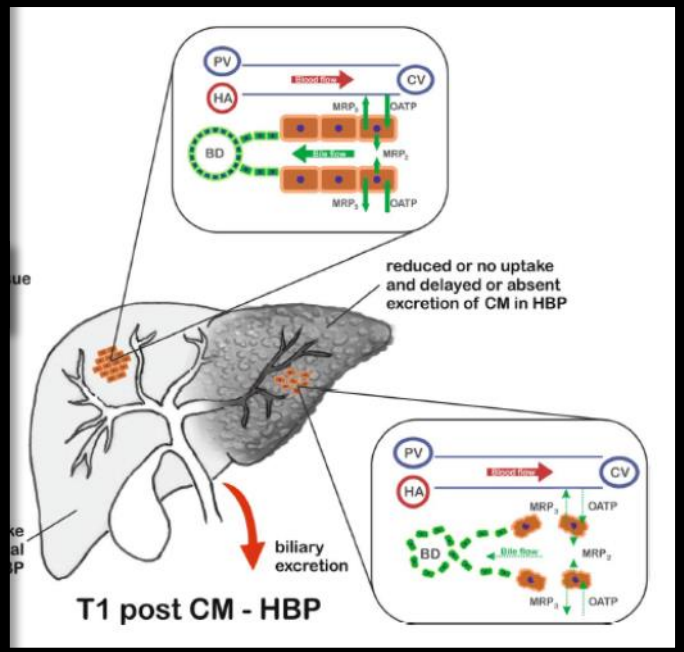
RESTO DE SECUENCIAS FUNDAMENTALES



PACIENTE CIRRÓTICO

- **LIMITACIONES EN EL HÍGADO CIRRÓTICO**
  - DISFUNCIÓN HEPÁTICA GRAVE O COLESTASIS
  - INESPECIFICIDAD. LESIONES FIBRÓTICAS, HEMANGIOMAS, NEOPLASIAS NO HCC…
  - FASE VASCULAR SUBÓPTIMA. ARTEFACTOS RESPIRATORIOS (HASTA UN 20% DE ESTUDIOS)
  - TIEMPO DE ADQUISICIÓN





PACIENTE CIRRÓTICO

- CHC vs NÓDULOS CIRRÓTICOS (DISPLÁSICOS)
- LESIONES < 2 CM

Consensus report from the 8th International Forum for Liver Magnetic Resonance Imaging

Results and conclusions It was concluded that gadoxetic acid–enhanced MRI has higher sensitivity for the diagnosis of hepatocellular carcinoma (HCC), when compared with multidetector CT, by utilising features of hyperenhancement in the arterial phase and hypointensity in the hepatobiliary phase (HBP). Recent HCC management guidelines recognise an increasing role for gadoxetic acid–enhanced MRI in early diagnosis and monitoring post-resection. Additional research is needed to define the role of HBP in predicting microvascular invasion, to better define washout during the transitional phase in gadoxetic acid–enhanced MRI for HCC diagnosis, and to reduce the artefacts encountered in the arterial phase. Technical developments are being directed to shortening the MRI protocol for reducing time and patient discomfort and toward utilising faster imaging and non-Cartesian free-breathing approaches that have the potential to improve multiphasic dynamic imaging.

RECOMENDACIÓN: RM-CEC

. Zech CJ, Ba-Ssalamah A, Berg T, Chandarana H, Chau G-Y, Grazioli L, et al. Consensus report from the 8th International Forum for Liver Magnetic Resonance Imaging. Eur Radiol [Internet]. 2020;30(1):370–82. Disponible en: http://dx.doi.org/10.1007/s00330-019-06369-4

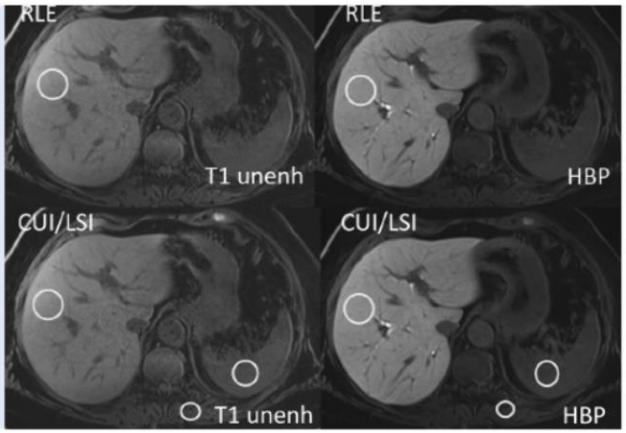
PACIENTE CIRRÓTICO

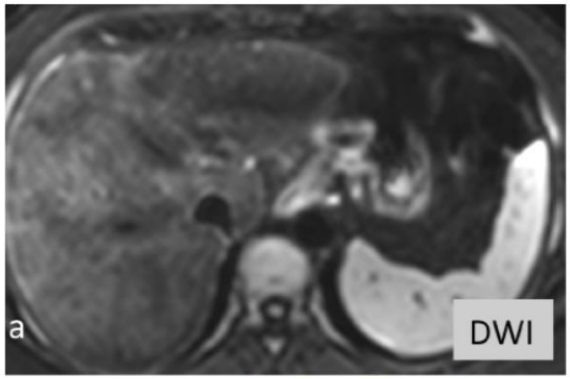
$$RLE = \frac{SI_{Liver\ enh\ HBP} - SI_{Liver\ unenh}}{SI_{Liver\ unenh}} \times 100$$

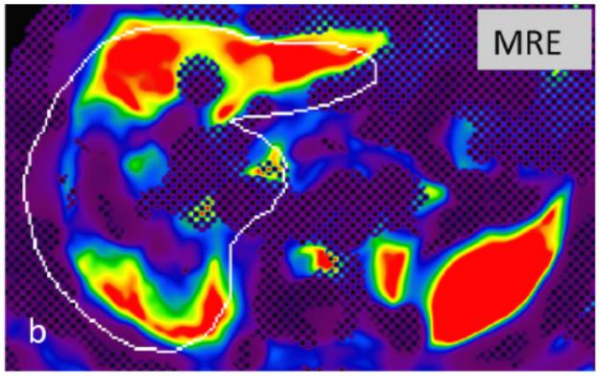
$$CUI = \frac{SIR_{enh}}{SIR_{unenh}} \qquad SIR = \frac{SI_{Liver}}{SI_{paraspinal\ muscle}}$$

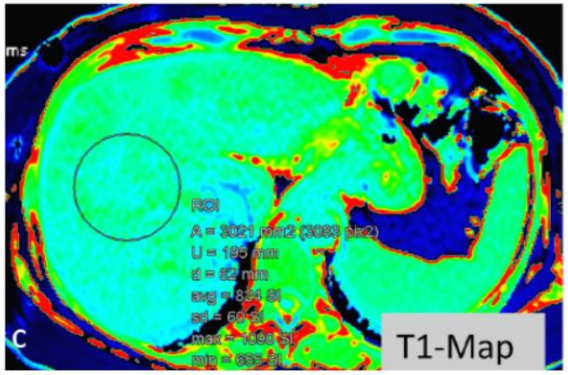
$$HUI = VOL_{Liver}\left[\frac{SI_{Liver}}{SI_{Spleen}^{-1}}\right]$$

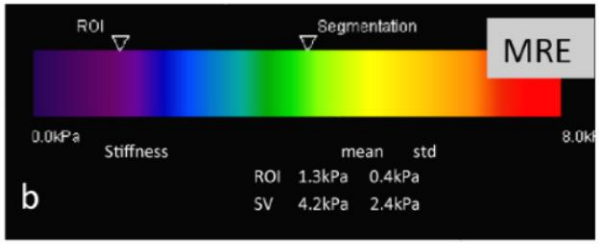
$$LSI = \frac{SI_{Liver\ enh\ HBP}}{SI_{Spleen\ enh\ HBP}}$$











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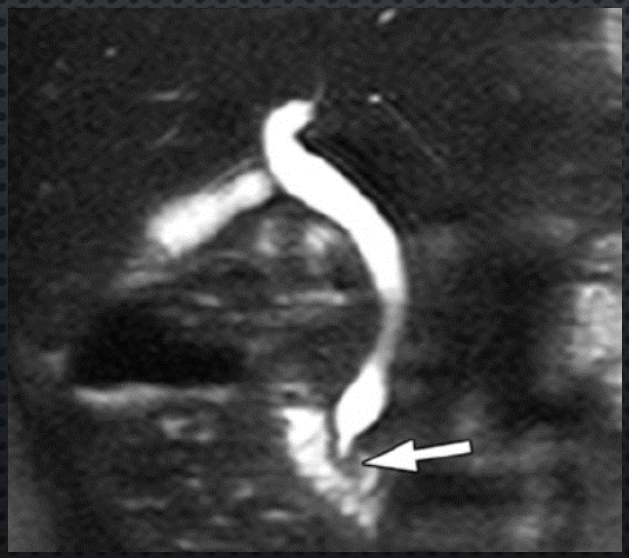
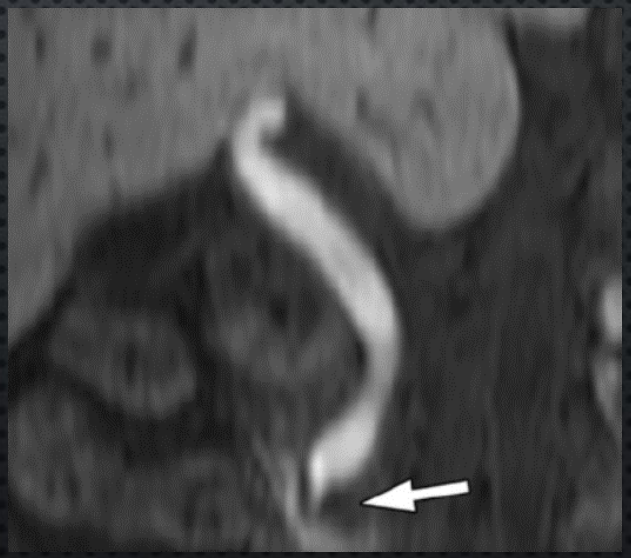
COLANGIOGRAFÍA

- Evaluación anatómica
- Evaluación funcional
- Evaluación pre/postquirúrgica
- Resolución de artefactos en estudio sin contraste

COLANGIOGRAFÍA

- **EVALUACIÓN ANATÓMICA**
- **EVALUACIÓN FUNCIONAL**
- EVALUACIÓN PRE/POSTQUIRÚRGICA
- RESOLUCIÓN DE ARTEFACTOS EN ESTUDIO SIN CONTRASTE





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COLANGIOGRAFÍA

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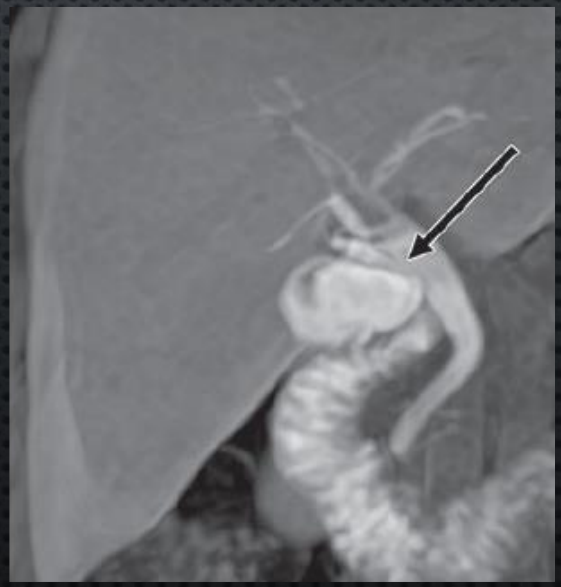

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COLANGIOGRAFÍA

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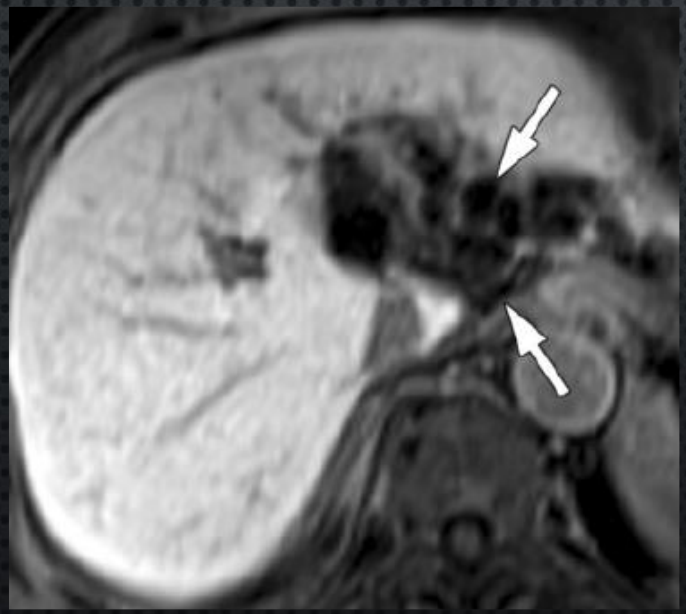

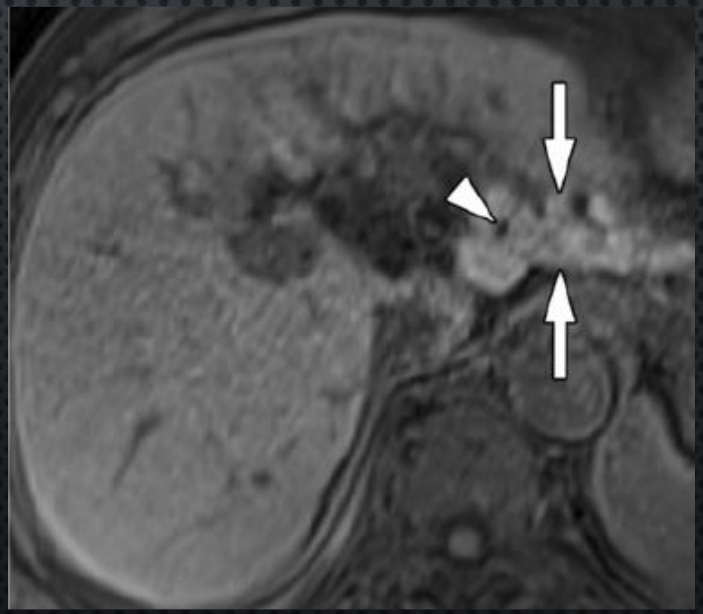

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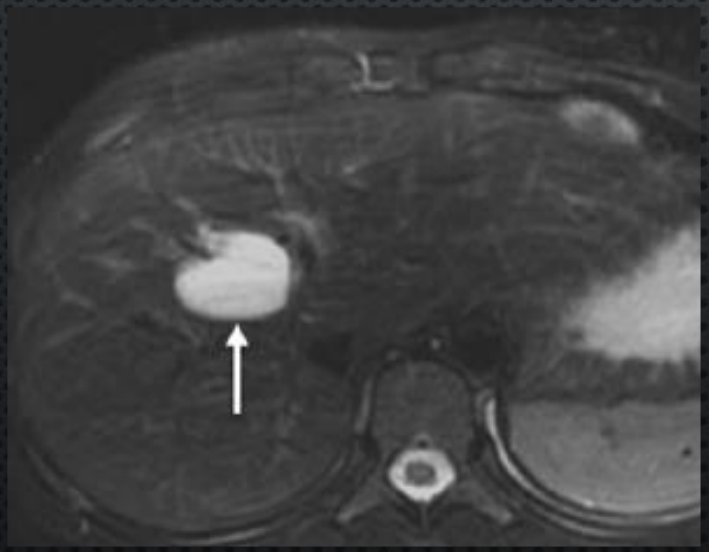

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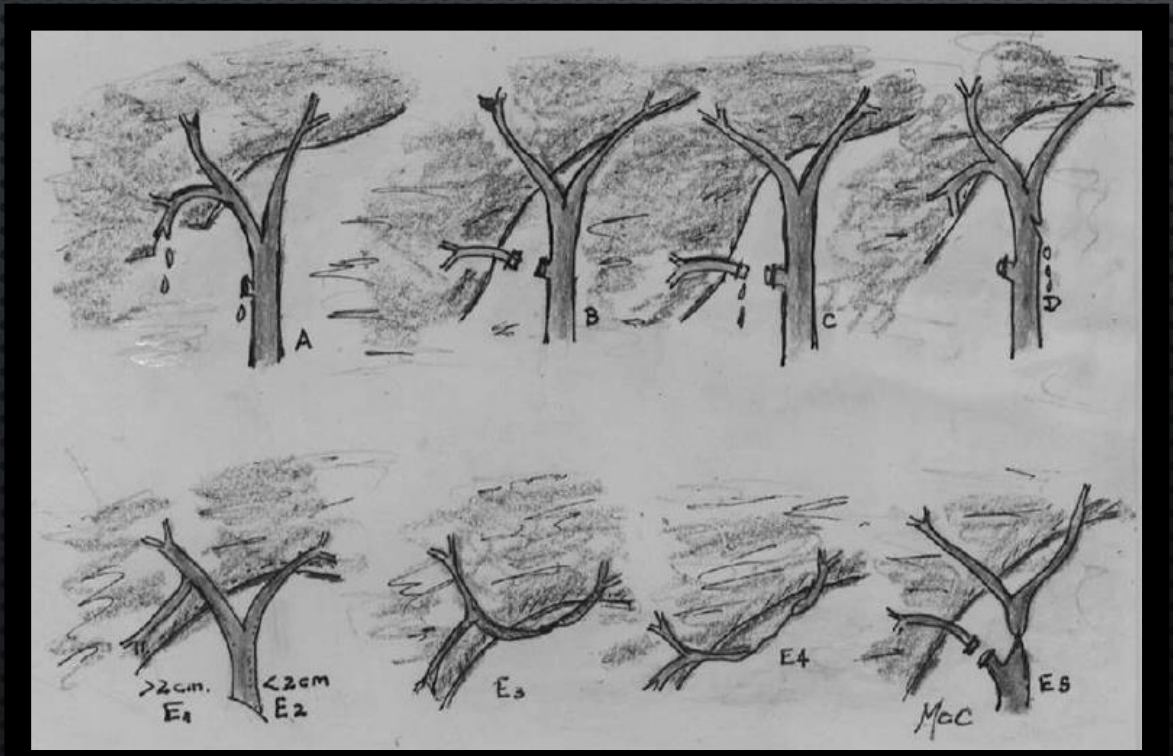
COLANGIOGRAFÍA

- Detección de lesiones biliares asociadas a colecistectomías laparoscópicas o abiertas (0,3%)
- Clasificación de Strasberg o Bismuth
- Caracterización de colecciones postquirúrgicas



Strasberg Classification of Bile Duct Injuries

Type	Criteria
A	Leaks from the cystic duct or the bile ducts of Luschka
B	Occlusion of aberrant right hepatic ducts
C	Transection without ligation of aberrant right hepatic ducts
D	Lateral injuries to major bile ducts
E	Subdivided per the Bismuth classification into E1–E5

- Ruiz Gómez, F., Ramia Ángel, J. M., García-Parreño Jofré, J., & Figueras, J. (2010). Lesiones iatrogénicas de la vía biliar. Cirugia espanola, 88(4), 211–221. https://doi.org/10.1016/j.ciresp.2010.03.045
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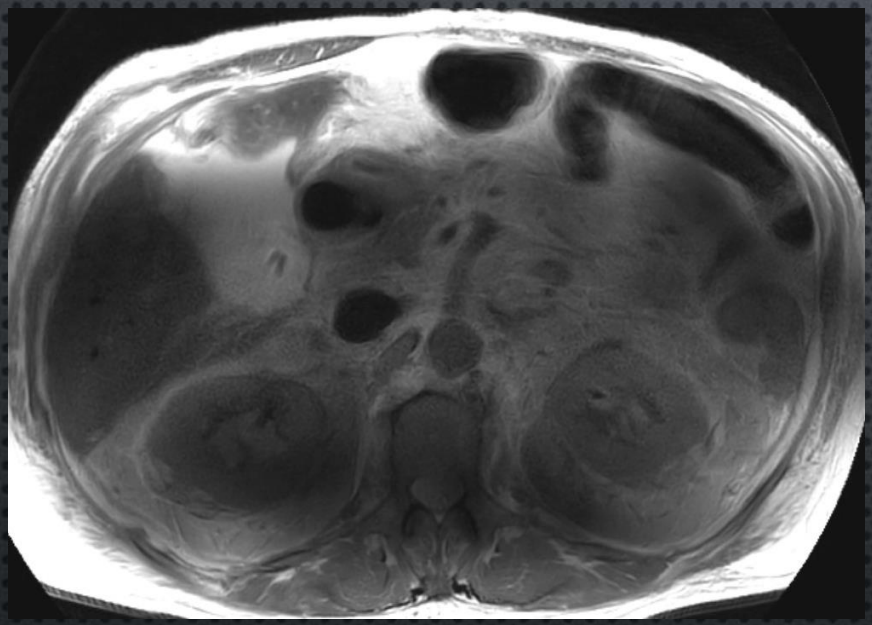
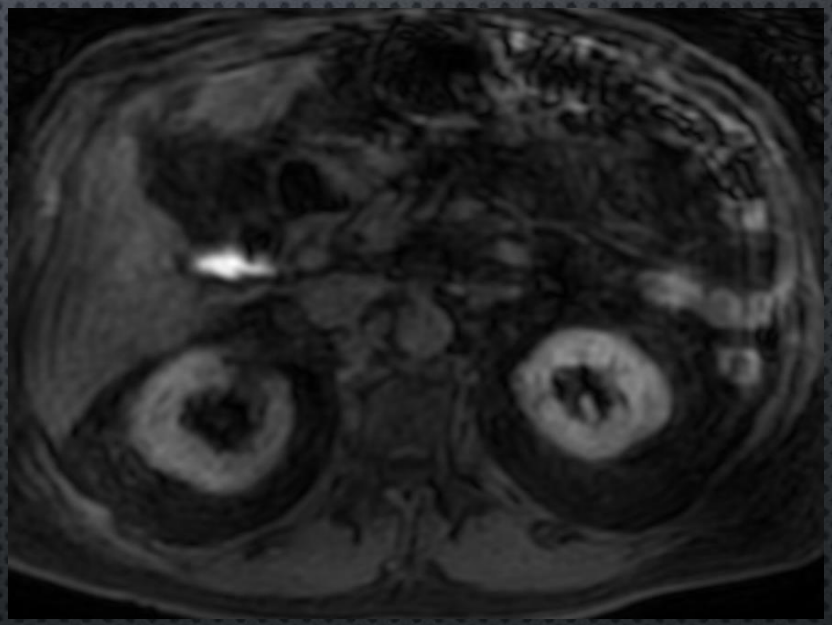
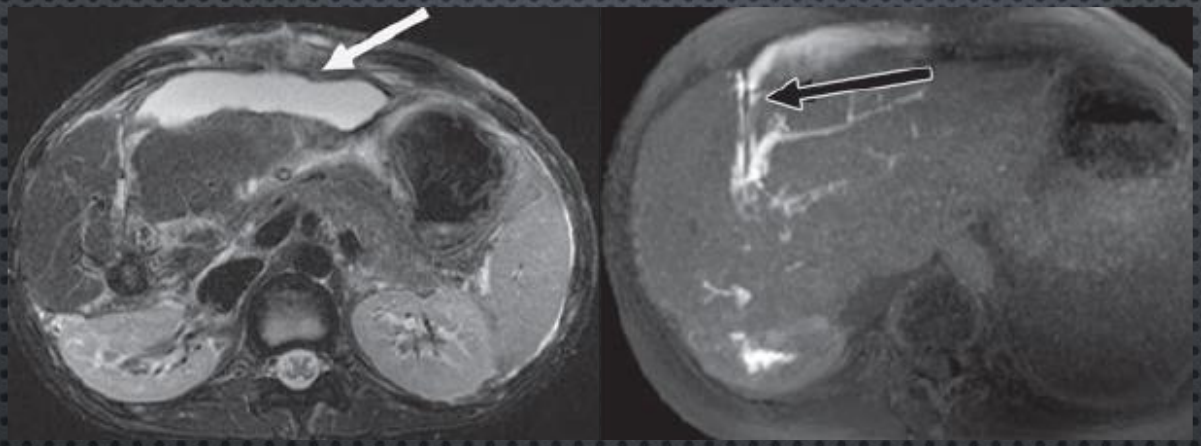
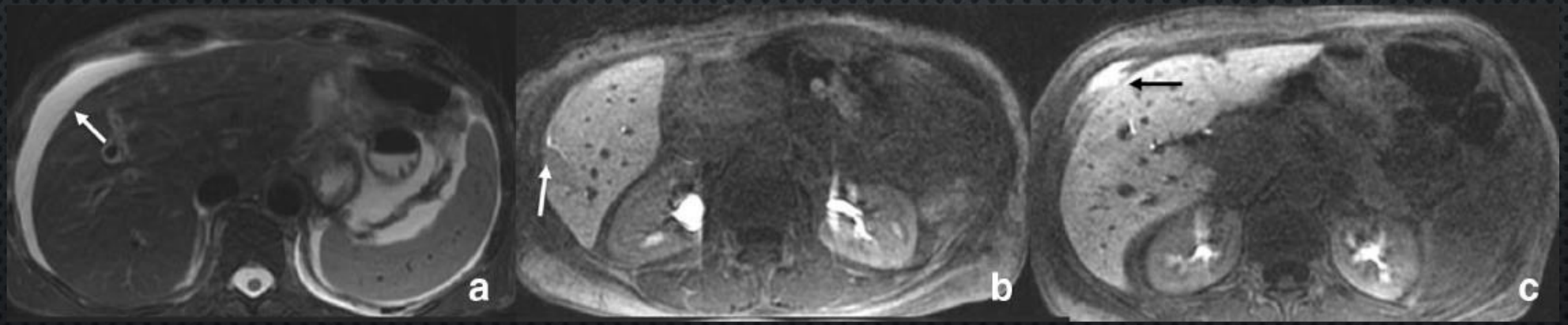
COLANGIOGRAFÍA





COLANGIOGRAFÍA





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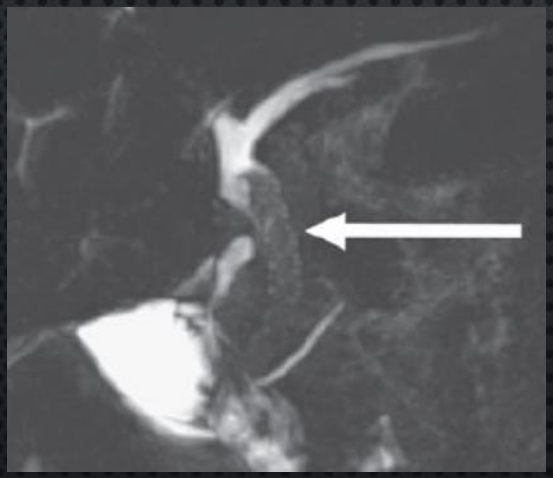
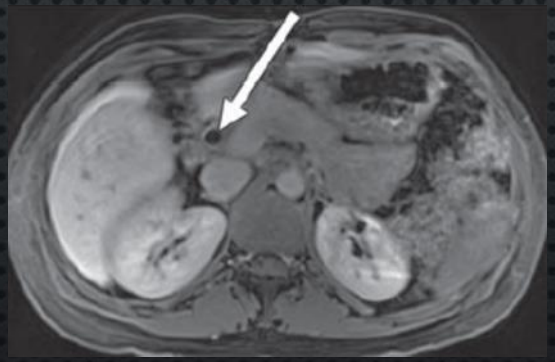
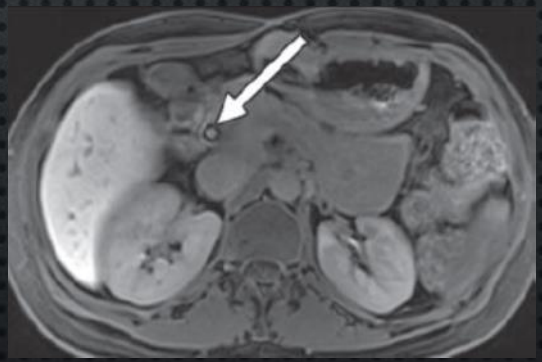
COLANGIOGRAFÍA

- Evaluación anatómica
- Evaluación funcional
- Evaluación postquirúrgica
- **Resolución de artefactos en estudio sin contraste**







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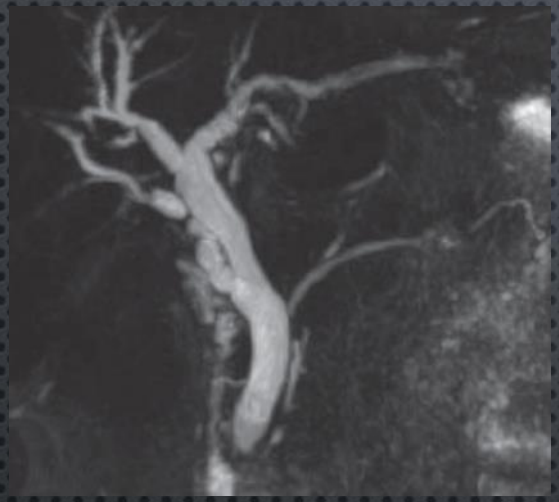
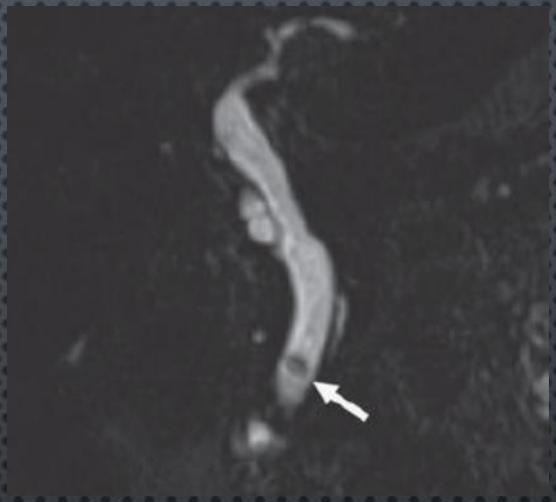
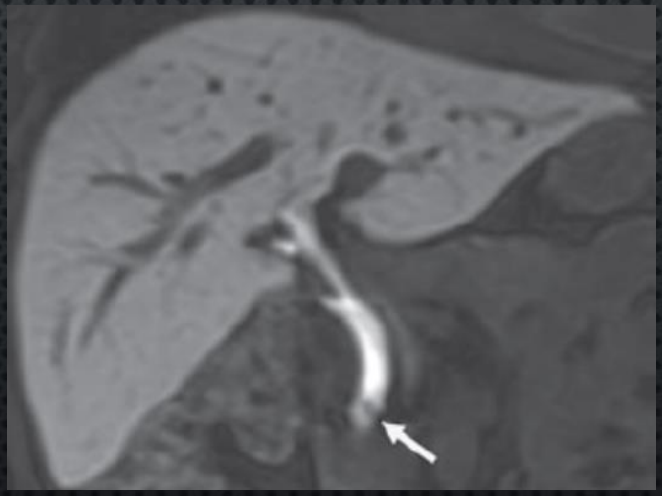
COLANGIOGRAFÍA







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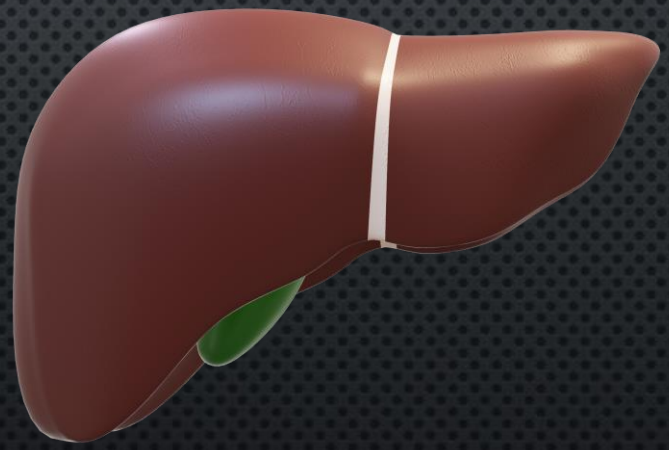
CONCLUSIONES

El conocimiento de los usos y aplicaciones de los contrastes en RM permite una mayor rentabilidad de las exploraciones y una mayor precisión diagnóstica.



CONCLUSIONES

- **PRINCIPALES VENTAJAS FRENTE DE CHE vs CEC**
  - Detección de lesiones de pequeño tamaño (<1CM)

    DETECCIÓN DE METÁSTASIS
  - Utilidad en caracterización de lesiones hepáticas

    LESIONES HEPATOCITARIAS FUNCIONANTES
  - Utilidad en diagnóstico de lesiones borderline en paciente cirrótico (DNvsHCC)

    IMPRESCINDIBLE CORRELACIÓN CON RESTO DE SECUENCIAS
  - Valoración de vía biliar

    SOSPECHA DE FUGA BILIAR

CONCLUSIONES

	CHE	CEC
LOE INDETERMINADA TC/ECO		X
LOE INDETERMINADA EN CEC	X	
SOSPECHA DE HNF	X	
DIAGNÓSTICO CHC		X
PLANIFICACIÓN QX	X	
HEPATOPATÍA AVANZADA		X

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