SAINT 2016

Thermosphere Technologie: Thermoablation wird erwachsen

PD Dr. Philipp Wiggermann

THE COCHRANE COLLABORATION®

Radiofrequency (thermal) ablation versus no intervention or other interventions for hepatocellular carcinoma (Review)

Weis S, Franke A, Mössner J, Jakobsen JC, Schoppmeyer K

Analysis 2.2. Comparison 2 Two-year survival, Outcome 2 Resection versus RFA, low risk of bias trials.

Review: Radiofrequency (thermal) ablation versus no intervention or other interventions for hepatocellular carcinoma

Comparison: 2 Two-year survival

Outcome: 2 Resection versus RFA, low risk of bias trials

Study or subgroup	Resection N	RFA N	log [Hazard Ratio] (SE)	Hazard Ratio IV,Random,95% CI	Weight	Hazard Ratio IV,Random,95% CI
Feng 2012	84	84	-0.51 (0.41)		44.5 %	0.60 [0.27, 1.34]
Huang 2010	115	115	-1.32 (0.31)		55.5 %	0.27 [0.15, 0.49]
Total (95% CI)	**199**	**199**			**100.0 %**	**0.38 [0.17, 0.84]**

Heterogeneity: $Tau^2 = 0.20$; $Chi^2 = 2.48$, df = 1 (P = 0.12); $I^2 = 60\%$

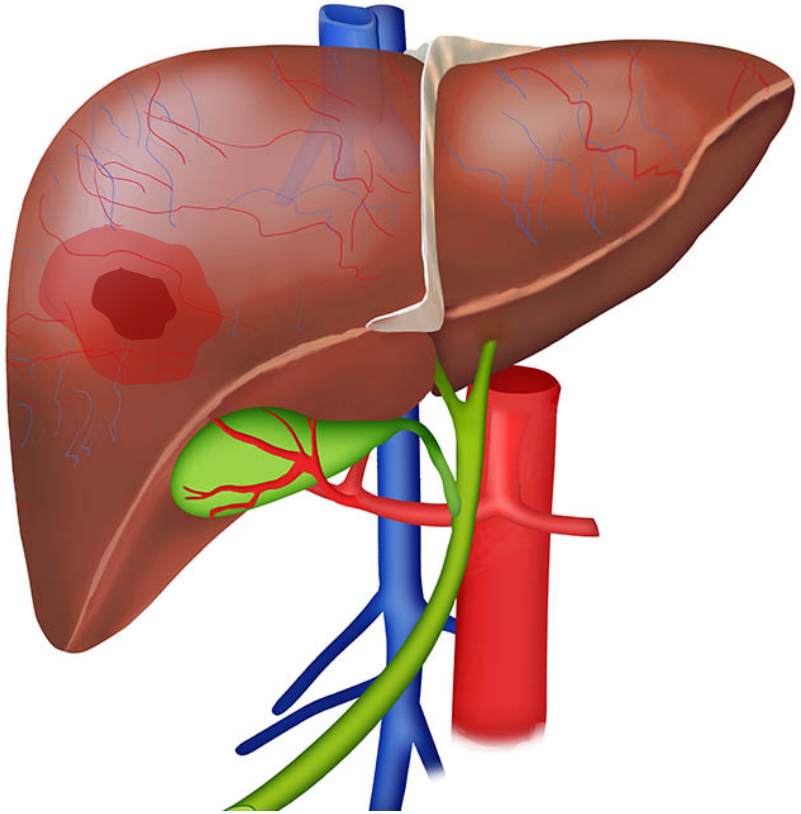
Test for overall effect: Z = 2.38 (P = 0.017)

Test for subgroup differences: Not applicable

Weis S et al. Cochrane Database of Systematic Reviews 2013, Issue 12. Art. No.: CD003046.

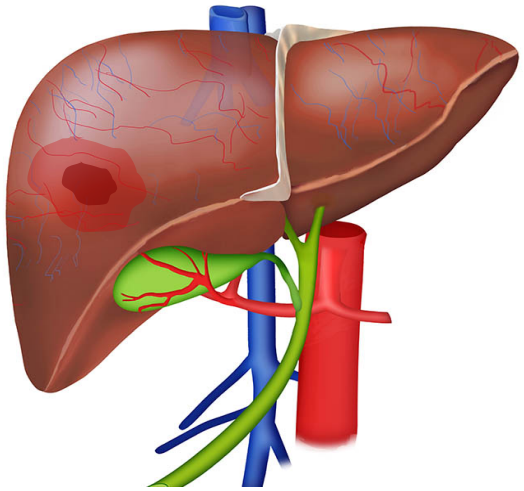
AIM

GOAL A0



Quelle: *http://www.normamed.com/fileadmin/public/images/leber_original.jpg*

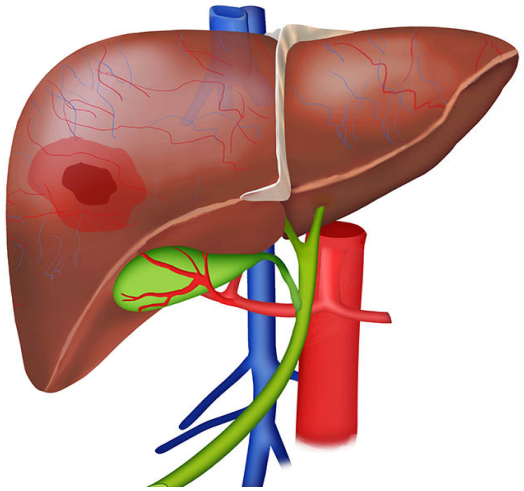
A0 - Ablation



Planning
Simulation
Correct Ablation

Quelle: *http://www.normamed.com/fileadmin/public/images/leber_original.jpg*

A0 - Ablation



Planning

plan trajectory

Simulation

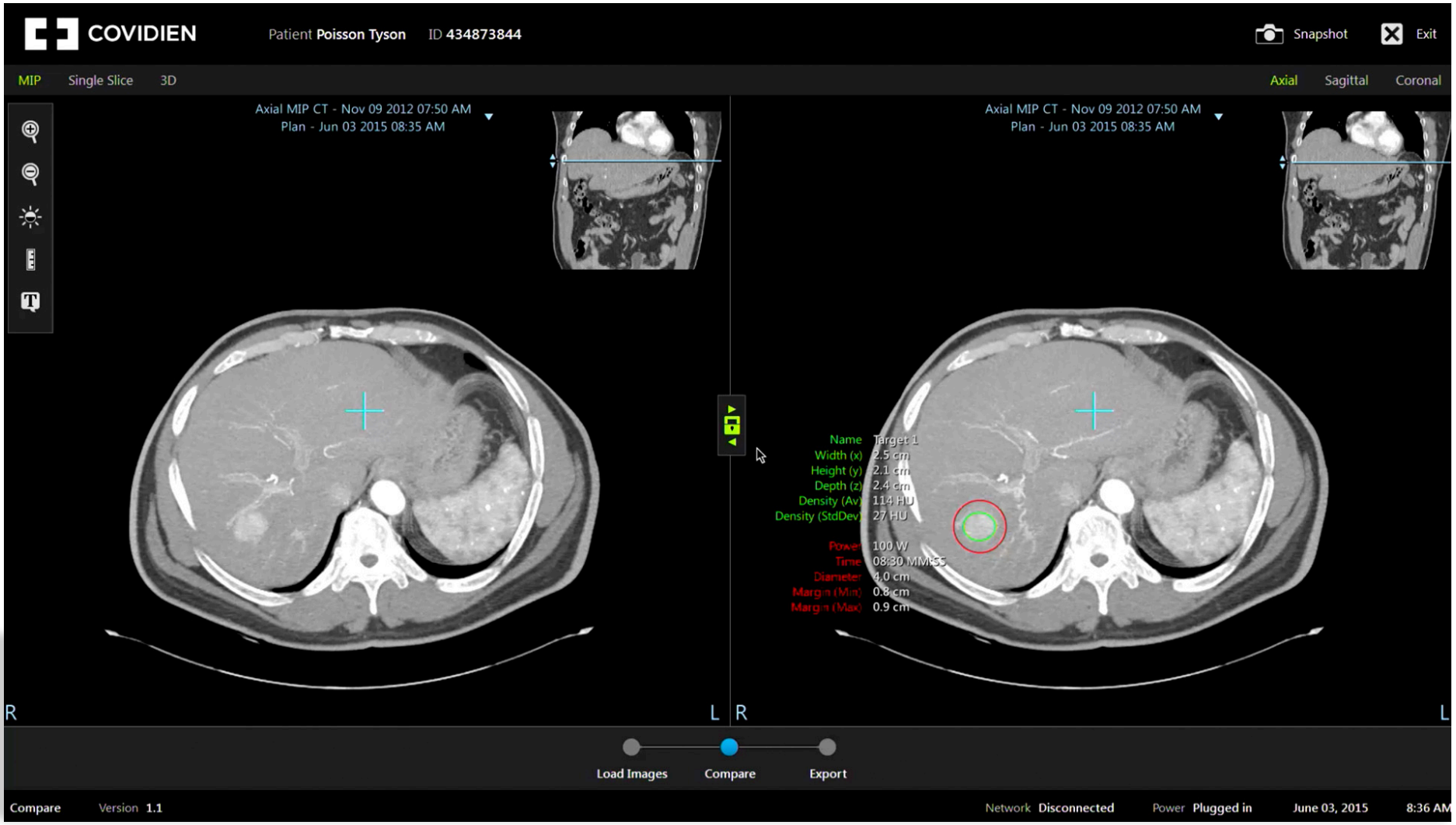
simulate ablation volume

Correct Ablation

precise predictable

Quelle: *http://www.normamed.com/fileadmin/public/images/leber_original.jpg*

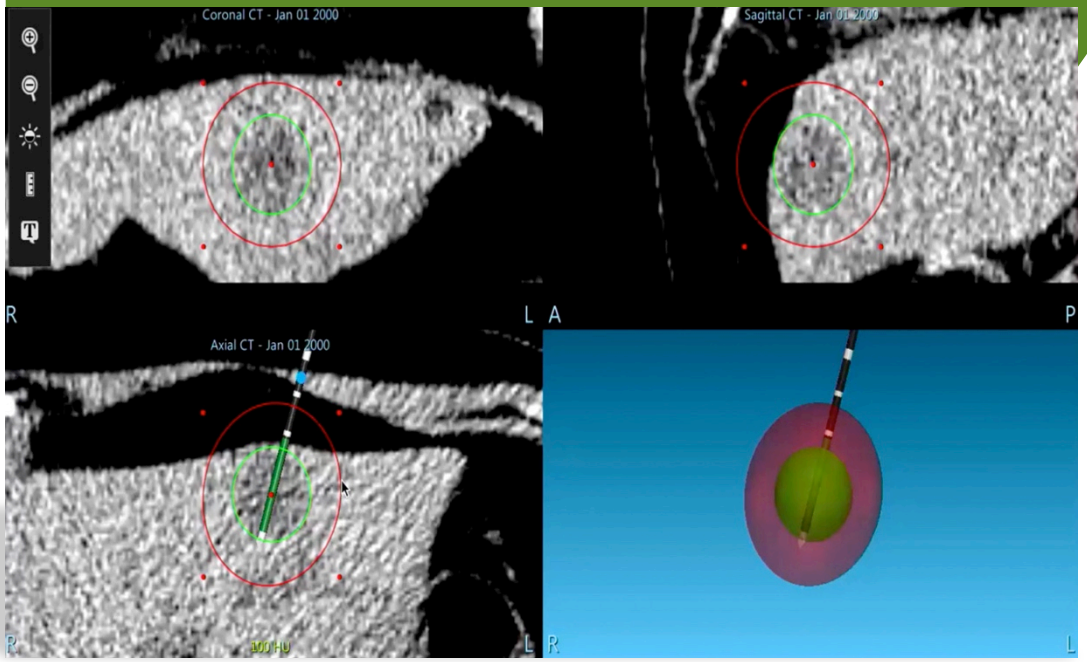
Planning


COVIDIEN
Patient Poisson Tyson
ID 434873844
Snapshot
Exit
MIP
Single Slice
3D
Axial
Sagittal
Coronal
Axial MIP CT - Nov 09 2012 07:50 AM
Plan - Jun 03 2015 08:35 AM
Axial MIP CT - Nov 09 2012 07:50 AM
Plan - Jun 03 2015 08:35 AM
Name Target 1
Width (x) 2.5 cm
Height (y) 2.1 cm
Depth (z) 2.4 cm
Density (Av) 114 HU
Density (StdDev) 27 HU
Power 100 W
Time 08:30 MM:SS
Diameter 4.0 cm
Margin (Min) 0.8 cm
Margin (Max) 0.9 cm
R
L
R
L
Load Images
Compare
Export
Compare
Version 1.1
Network Disconnected
Power Plugged in
June 03, 2015
8:36 AM

Planning

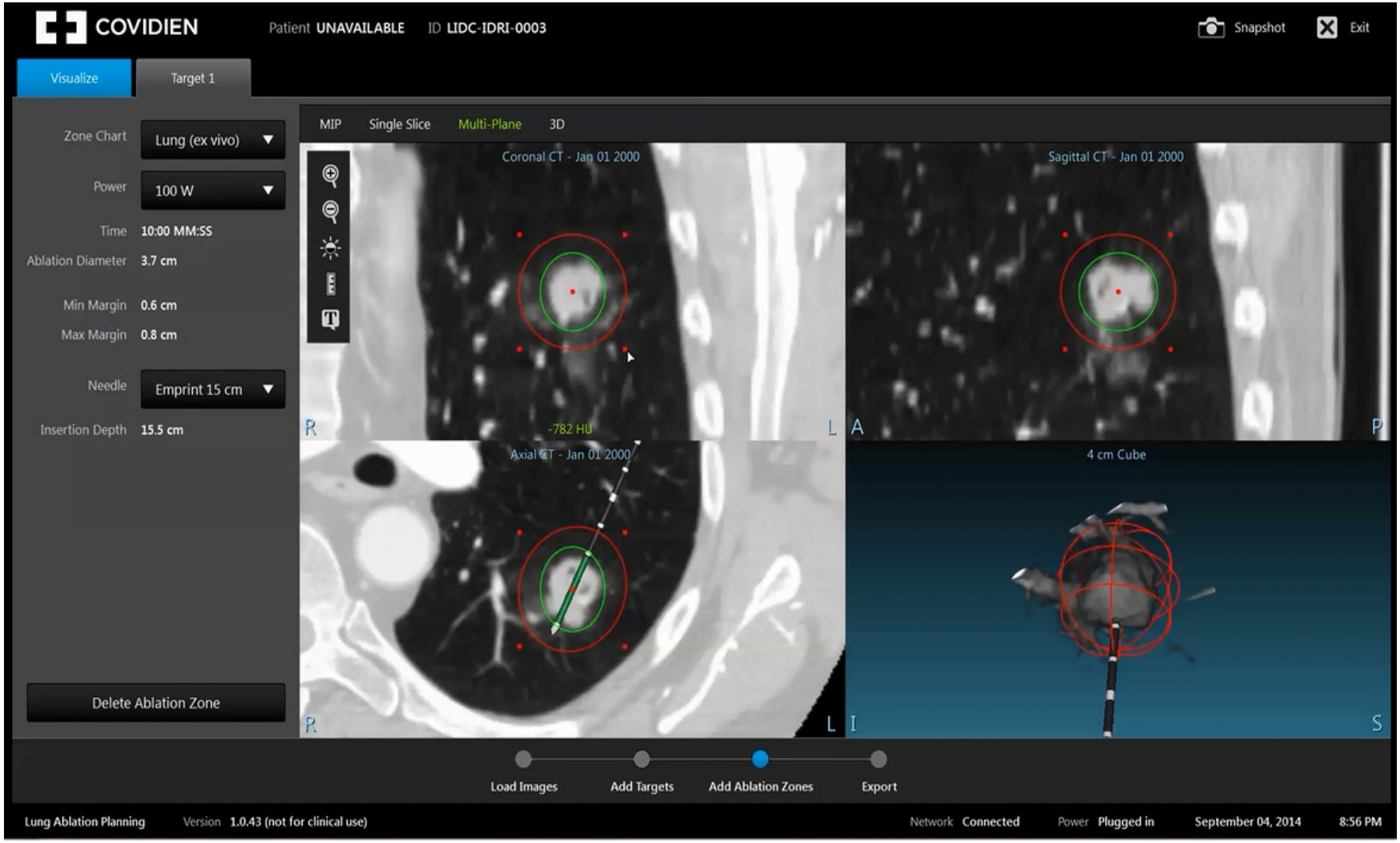
Load Patient Images → Add Targets → Export

Trajectory Planning

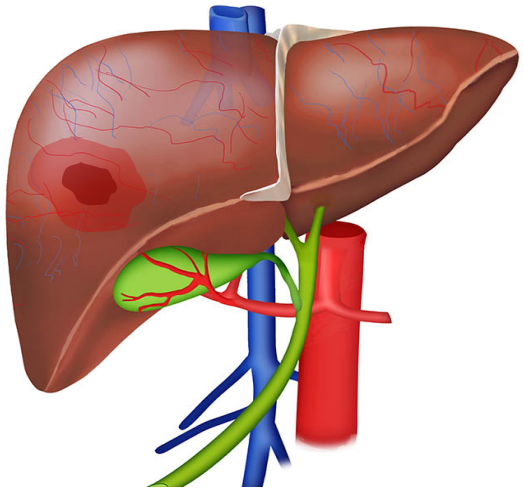


Ablation Zone Planning

Simulation


COVIDIEN
Patient UNAVAILABLE
ID LIDC-IDRI-0003
Snapshot
Exit
Visualize
Target 1
Zone Chart
Lung (ex vivo)
Power
100 W
Time
10:00 MM:SS
Ablation Diameter
3.7 cm
Min Margin
0.6 cm
Max Margin
0.8 cm
Needle
Emprint 15 cm
Insertion Depth
15.5 cm
Delete Ablation Zone
MIP
Single Slice
Multi-Plane
3D
Coronal CT - Jan 01 2000
Sagittal CT - Jan 01 2000
-782 HU
Axial CT - Jan 01 2000
4 cm Cube
Load Images
Add Targets
Add Ablation Zones
Export
Lung Ablation Planning
Version 1.0.43 (not for clinical use)
Network Connected
Power Plugged in
September 04, 2014
8:56 PM

A 0



Planning

plan trajectory

Simulation

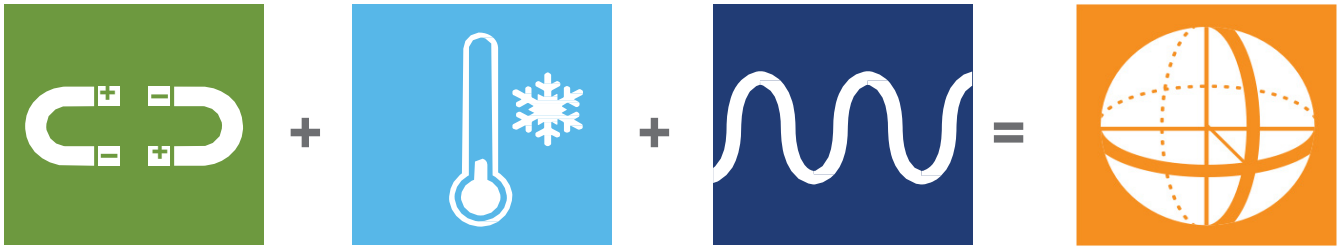
simulate ablation volume

Correct Ablation

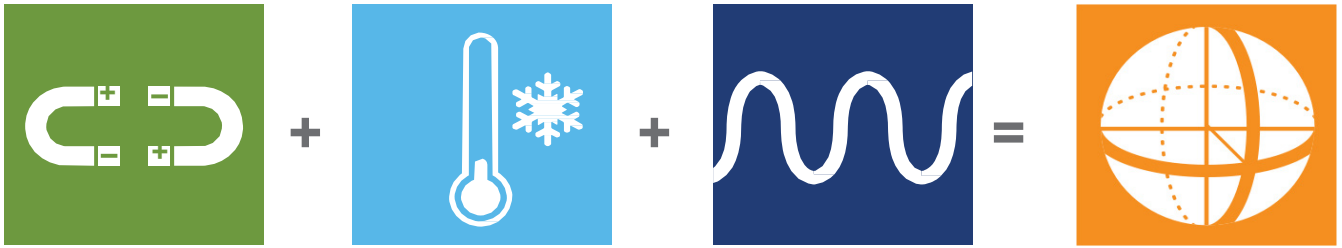
precise predictable

Quelle: *http://www.normamed.com/fileadmin/public/images/leber_original.jpg*

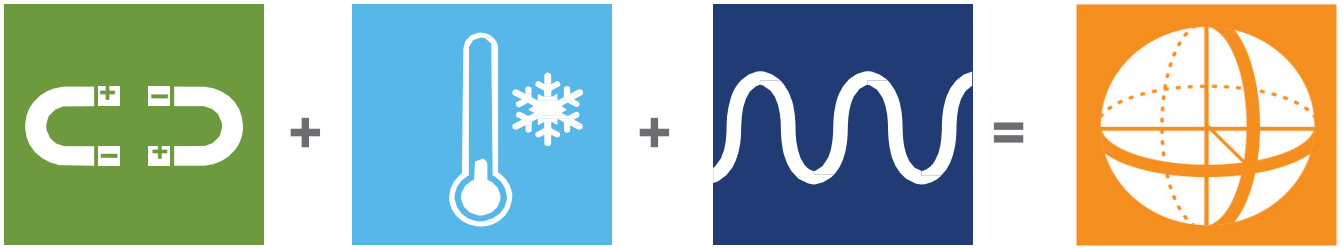
Thermosphere technology



Thermosphere technology

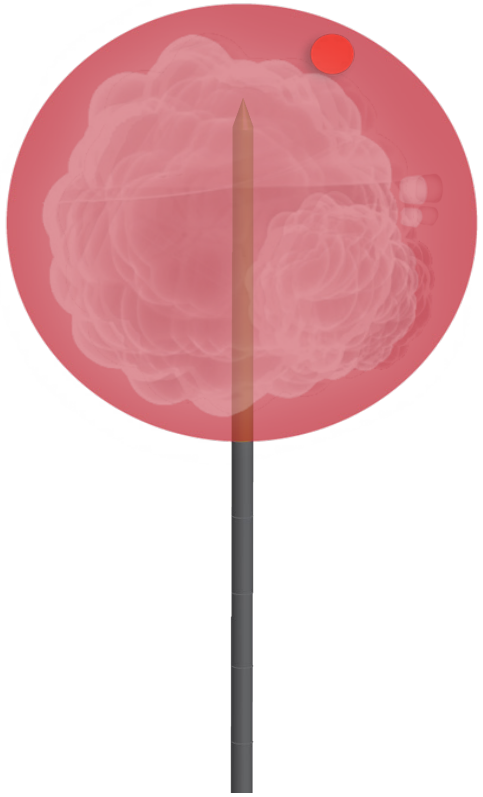


- predictability
- spherical shape

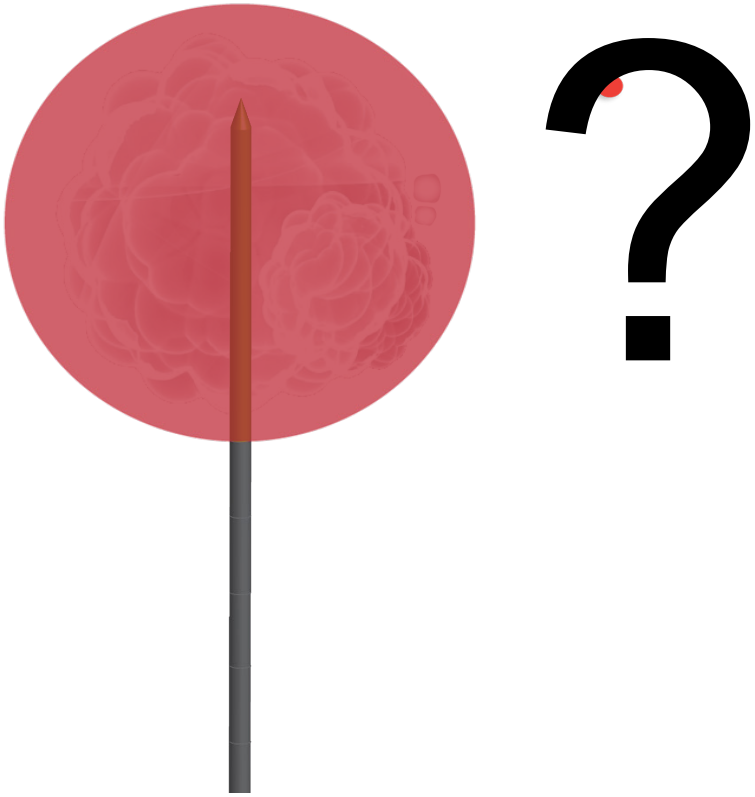


- predictability ?
- spherical shape ?

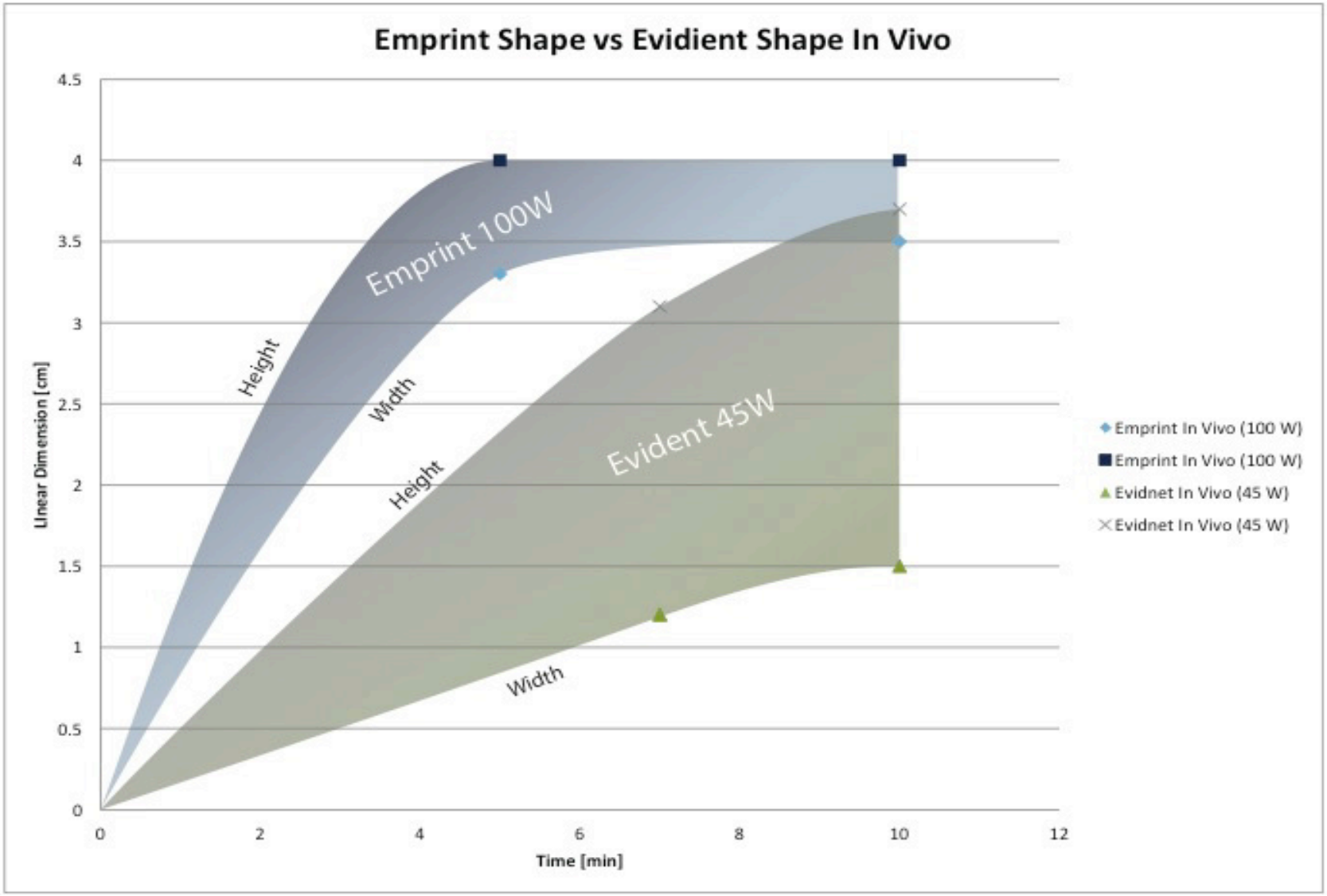
spherical shape



spherical shape

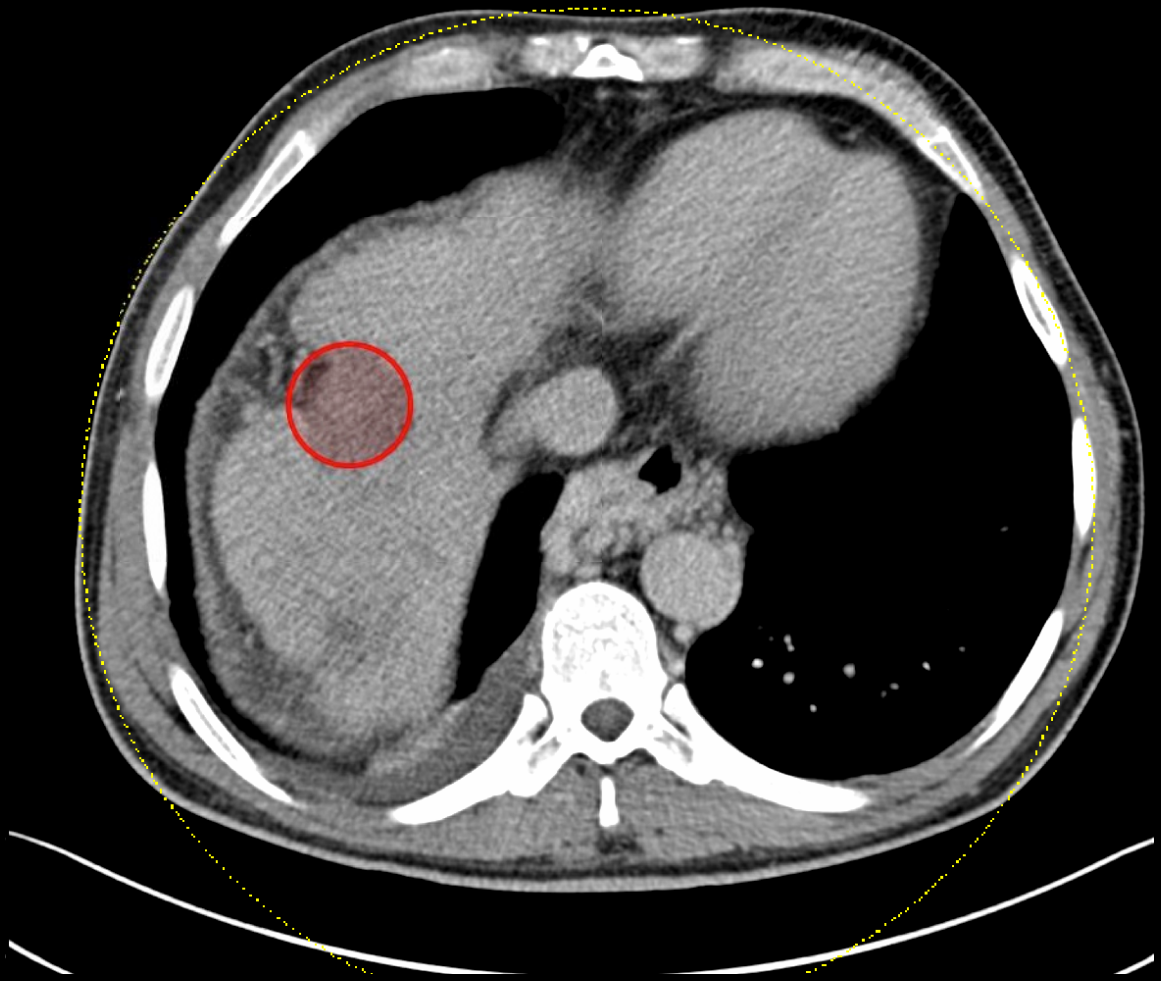


near spherical shape



Case 1

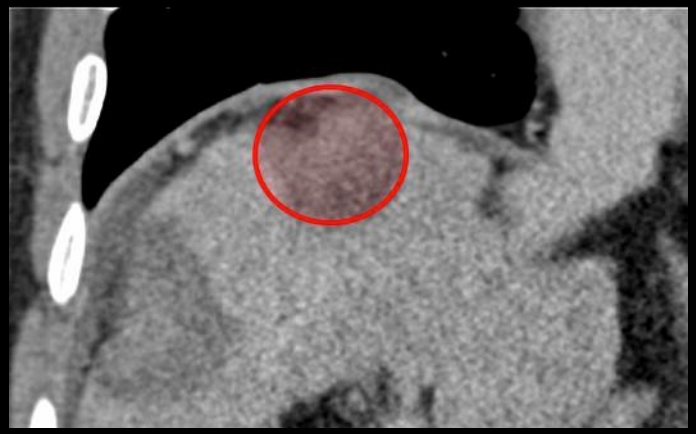
HCC Seg VIII



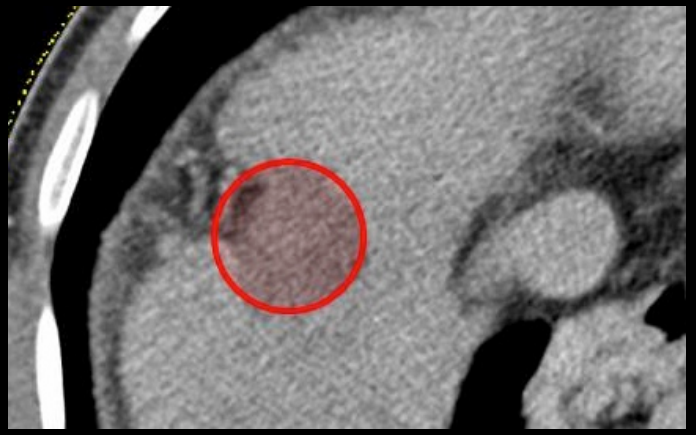
Case 1

Case 1

HCC Seg VIII



Coronal



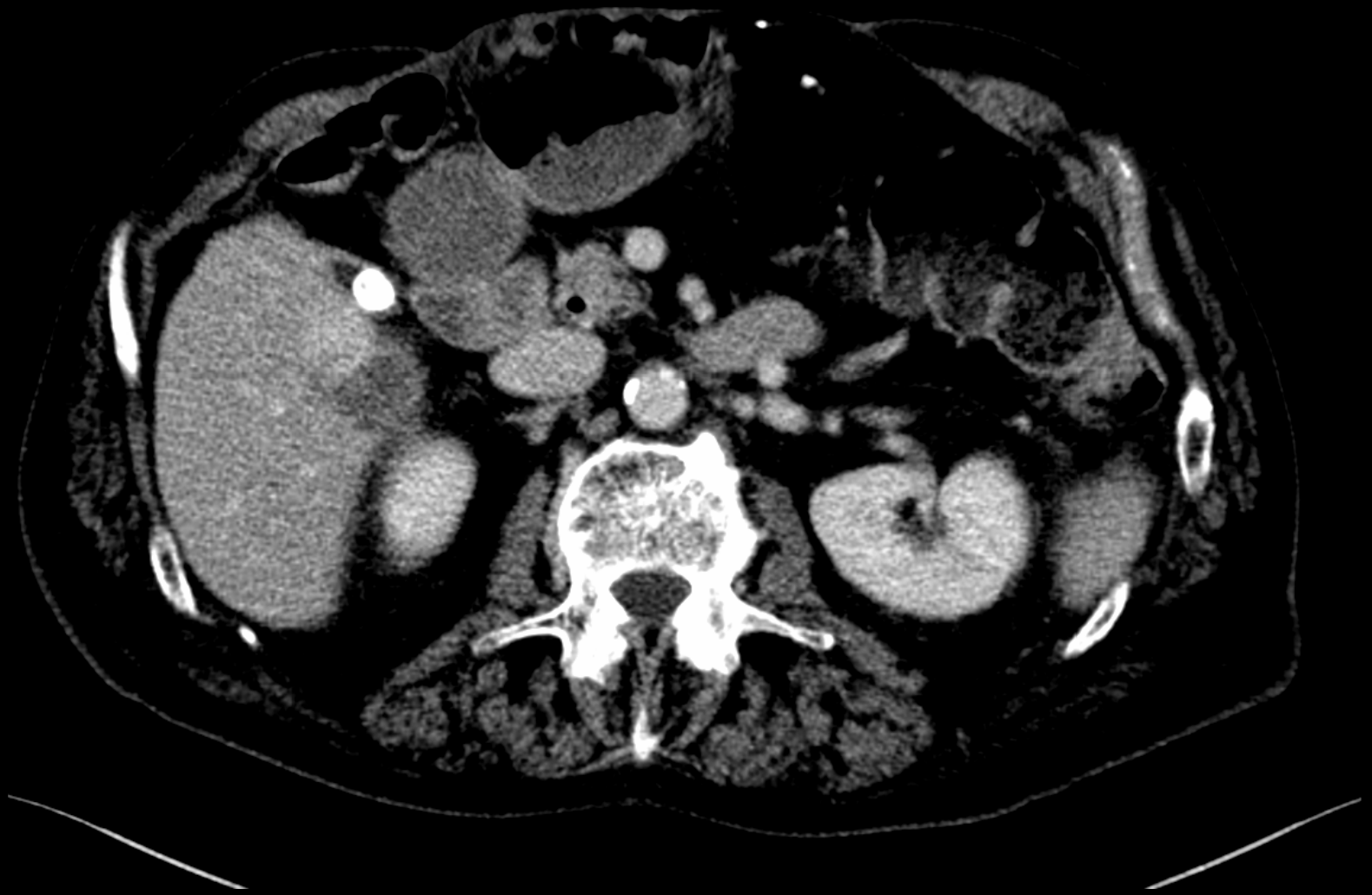
Axial

near spherical shape

Case 2

- local recurrence CCC
- risky location

CCC Seg VI



Case 2

predictability and control of ablation

→ risk of thermal damage to the GB

Case 2

CCC Seg VI

Case 2

CCC Seg VI

Case 2

CCC Seg VI

Case 2

CCC Seg VI

predictable

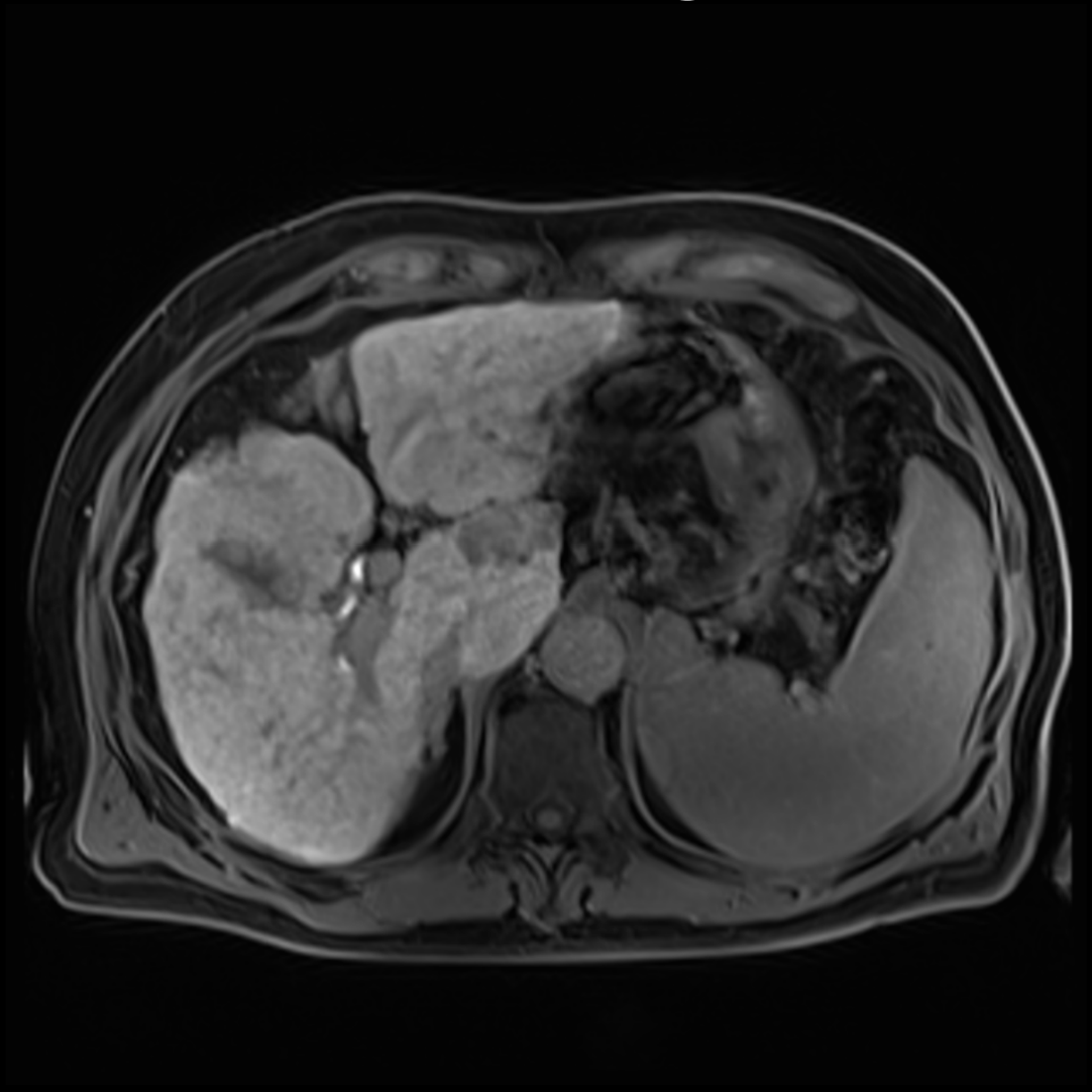
Case 2

CCC Seg VI

predictable

Case 3

HCC Seg I

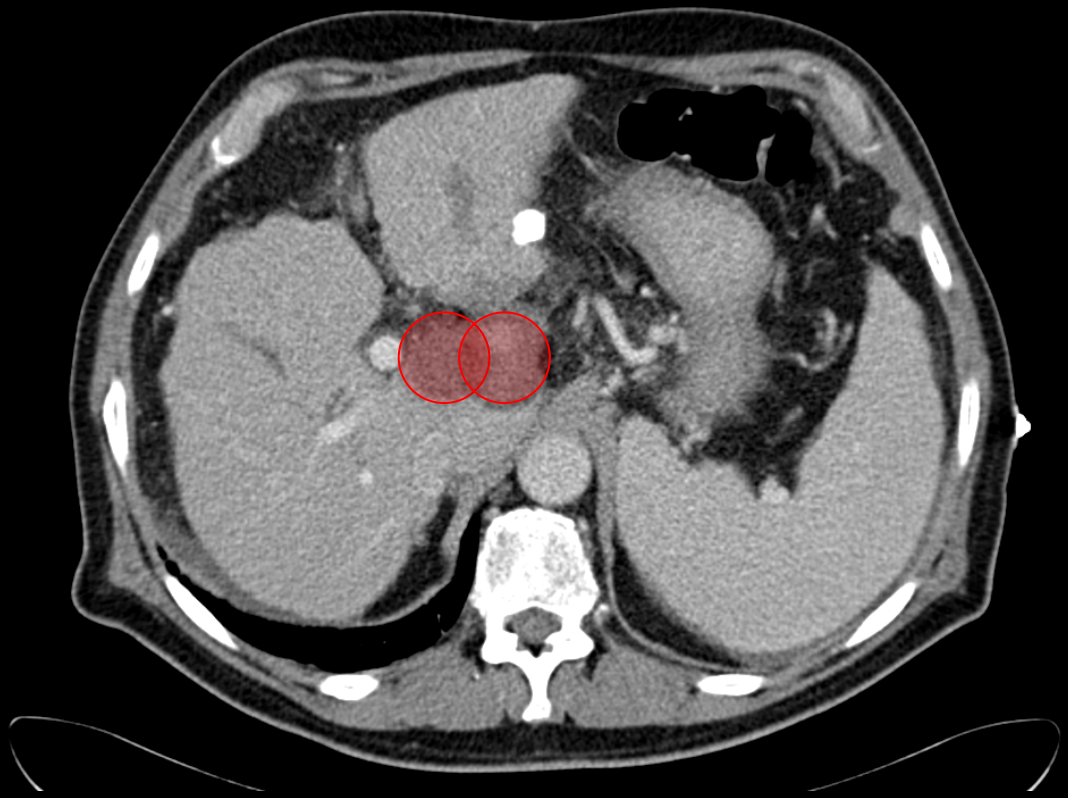


Case 3

HCC Seg I

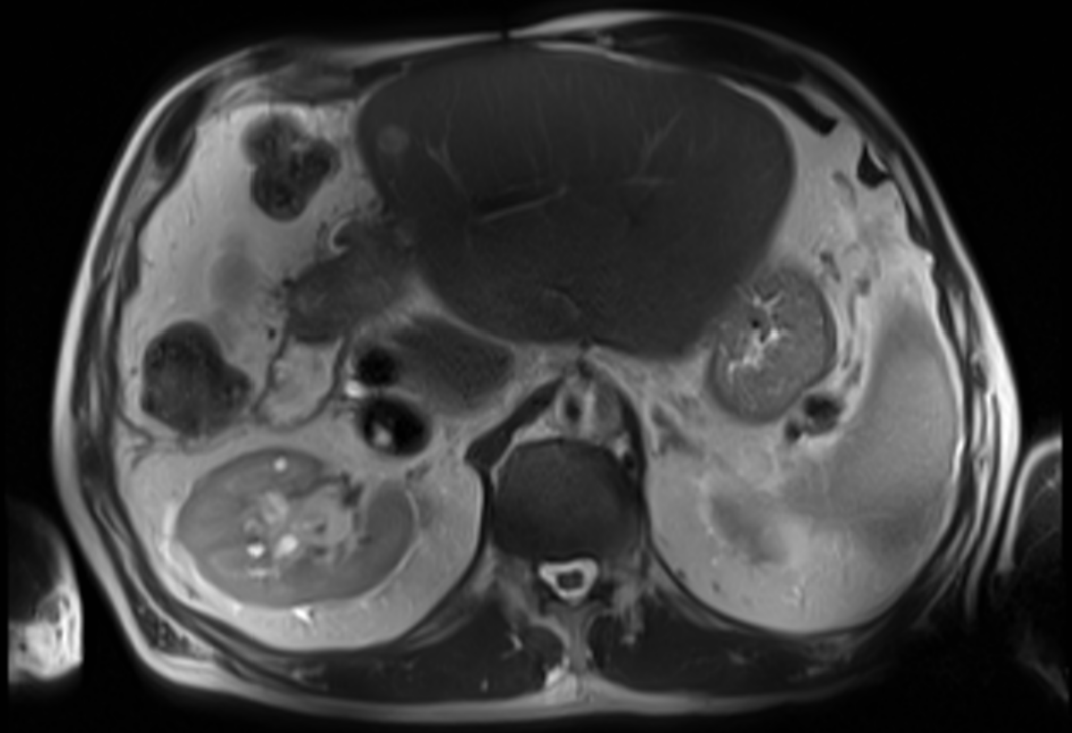
Case 3

HCC Seg I



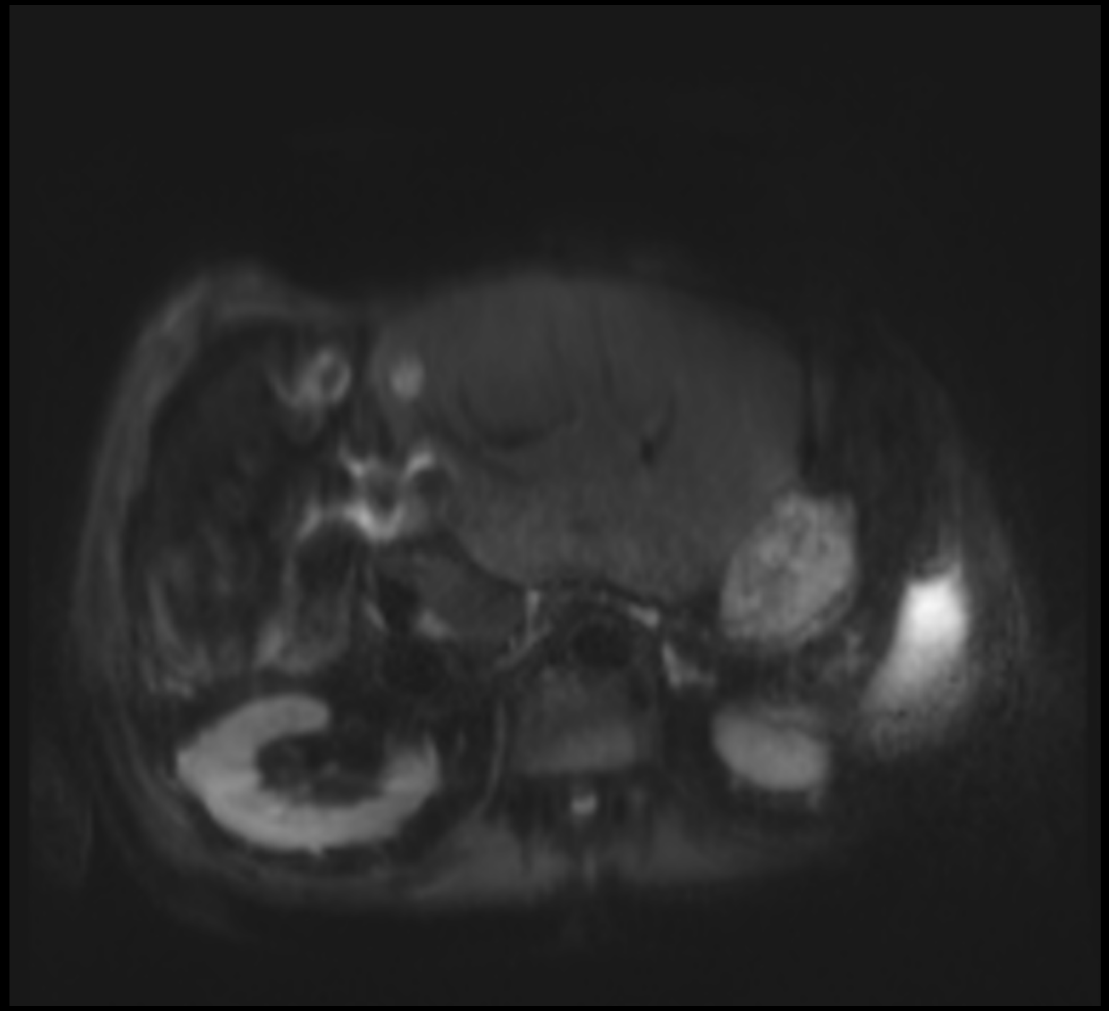
Case 4

HCC Seg IVb s/p right hemihepatectomy



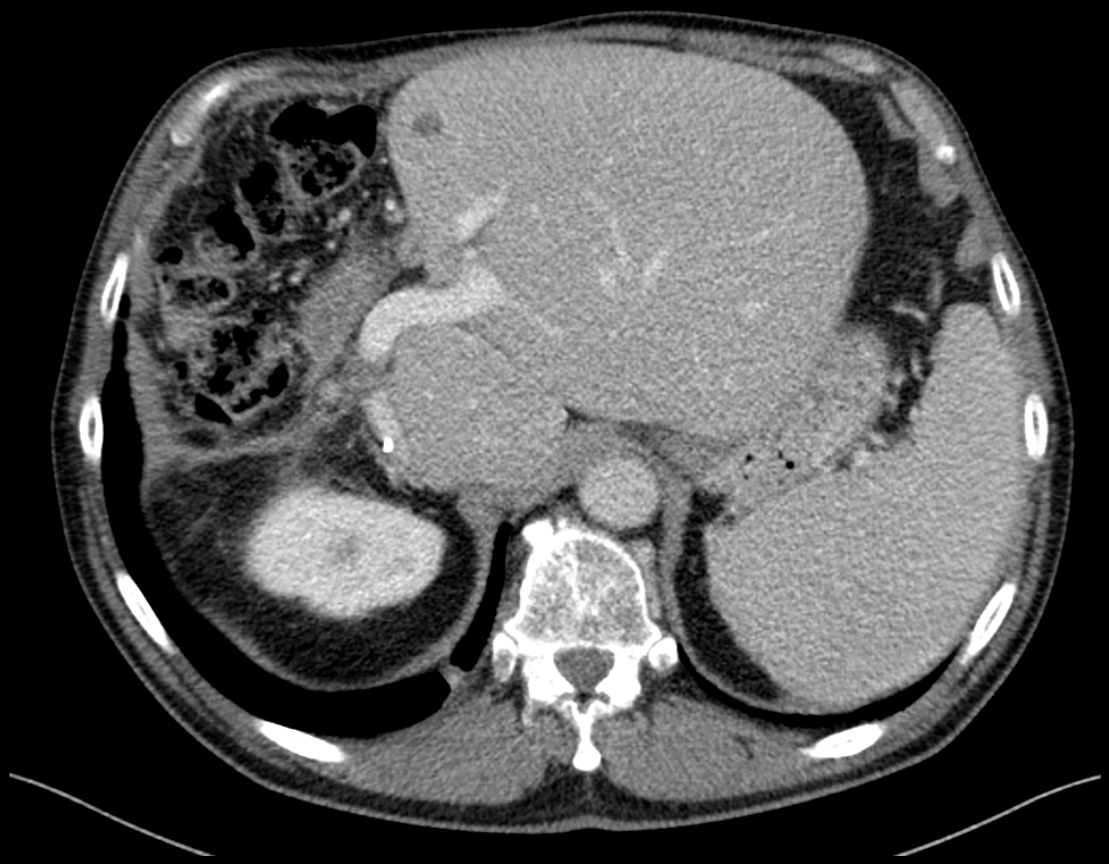
Case 4

HCC Seg IVb s/p right hemihepatectomy



Case 4

HCC Seg IVb s/p right hemihepatectomy

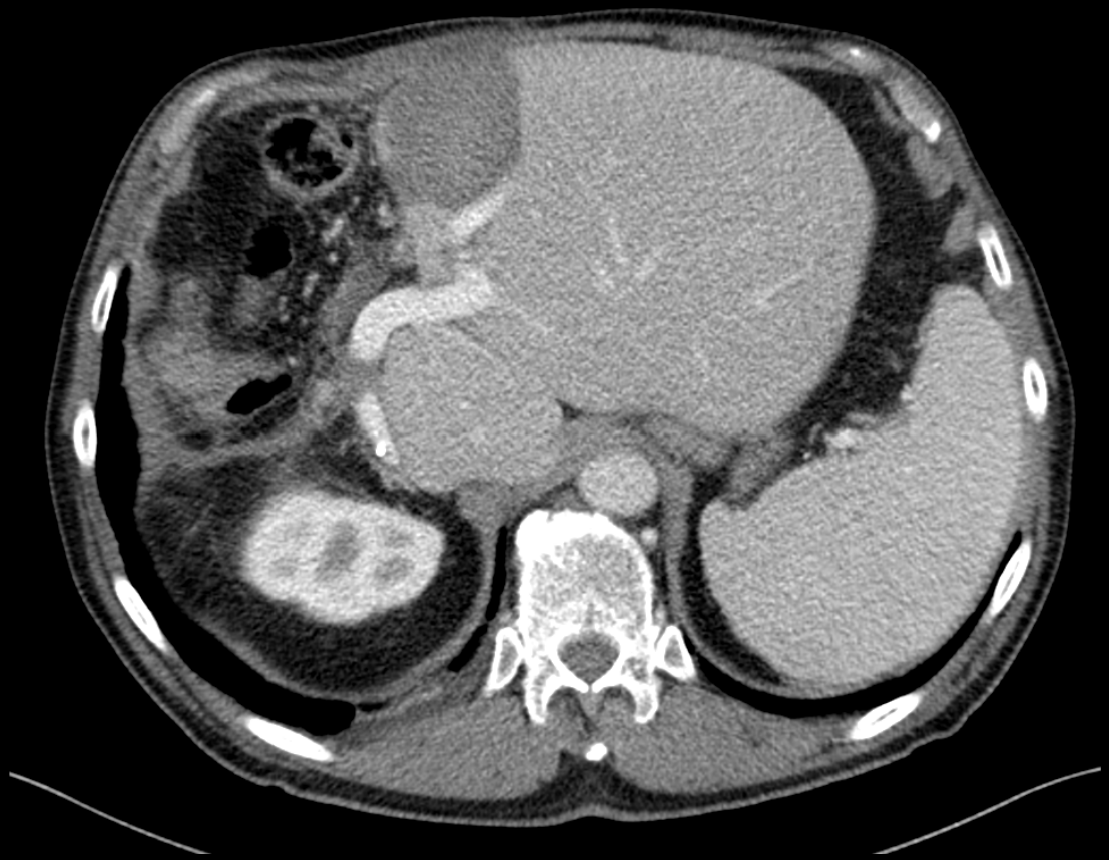


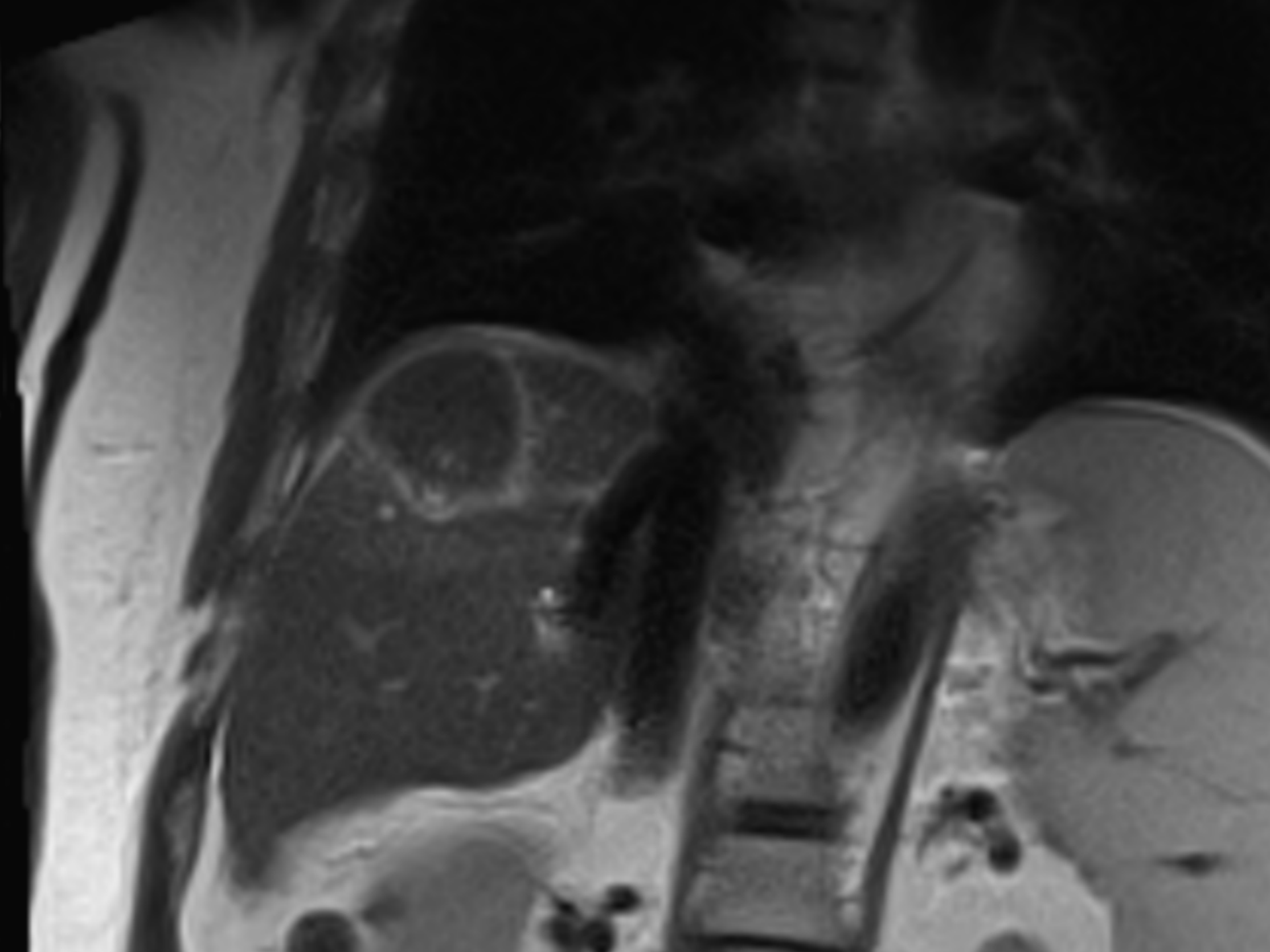
Case 4

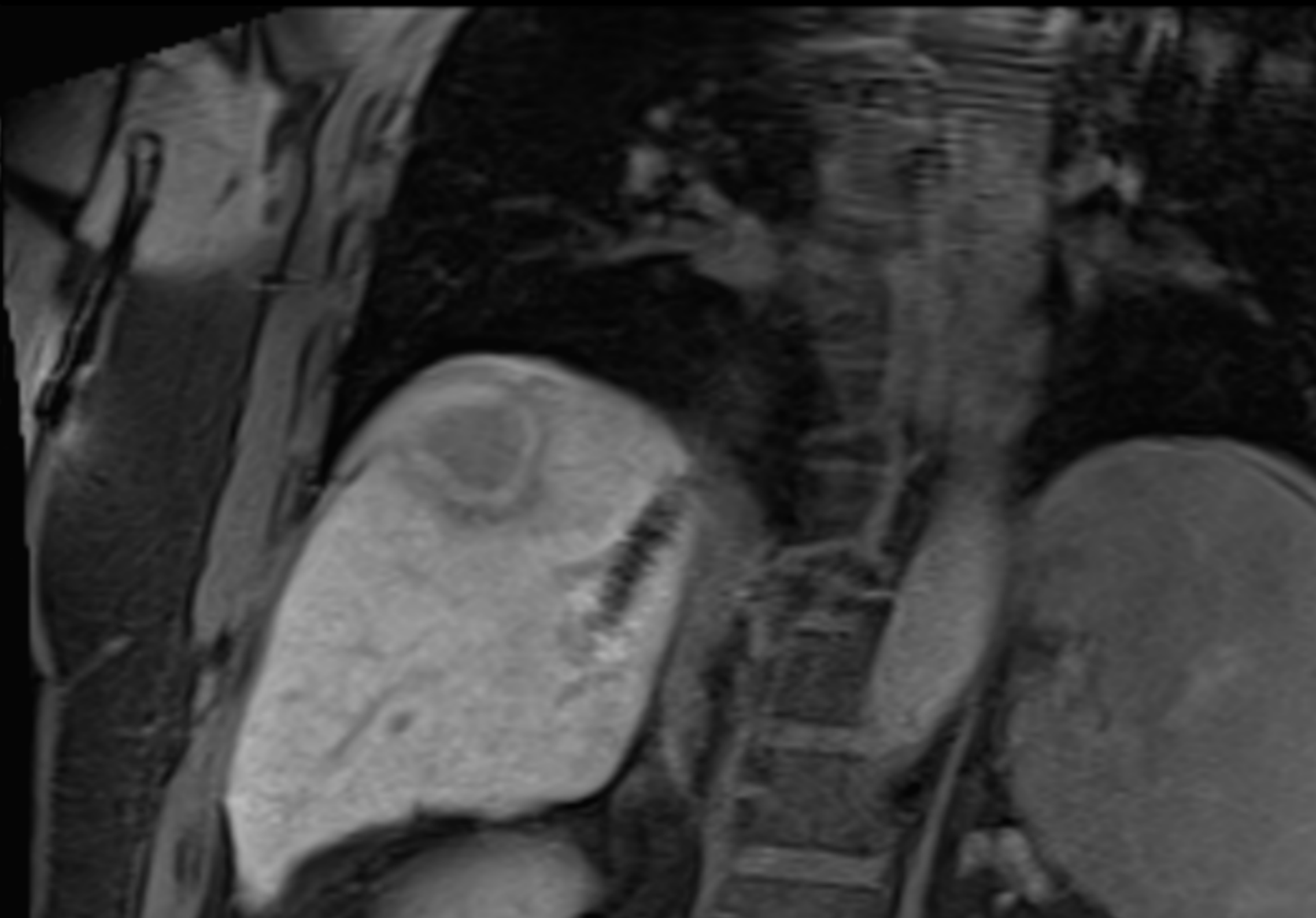
HCC Seg IVb s/p right hemihepatectomy

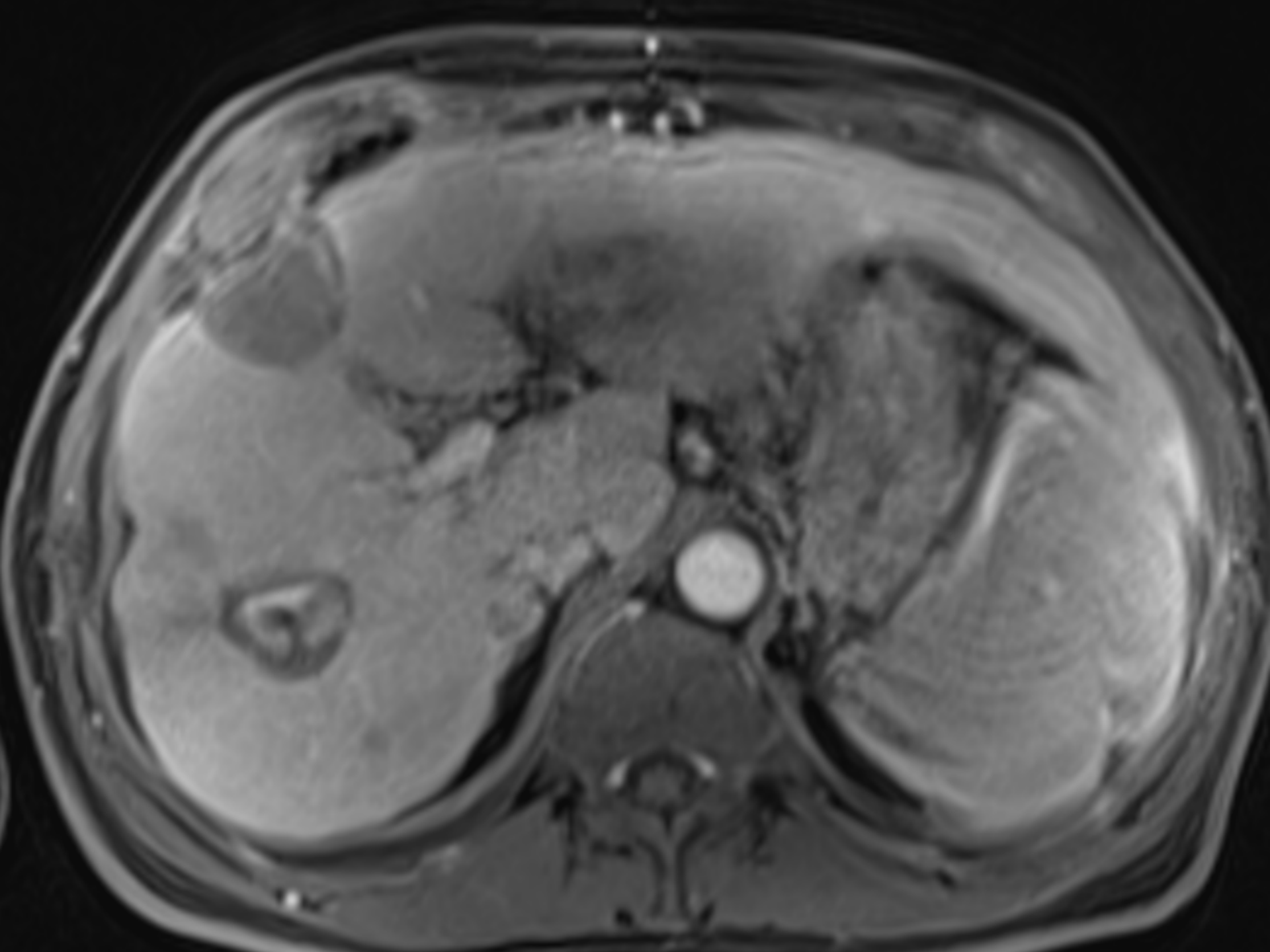
Case 4

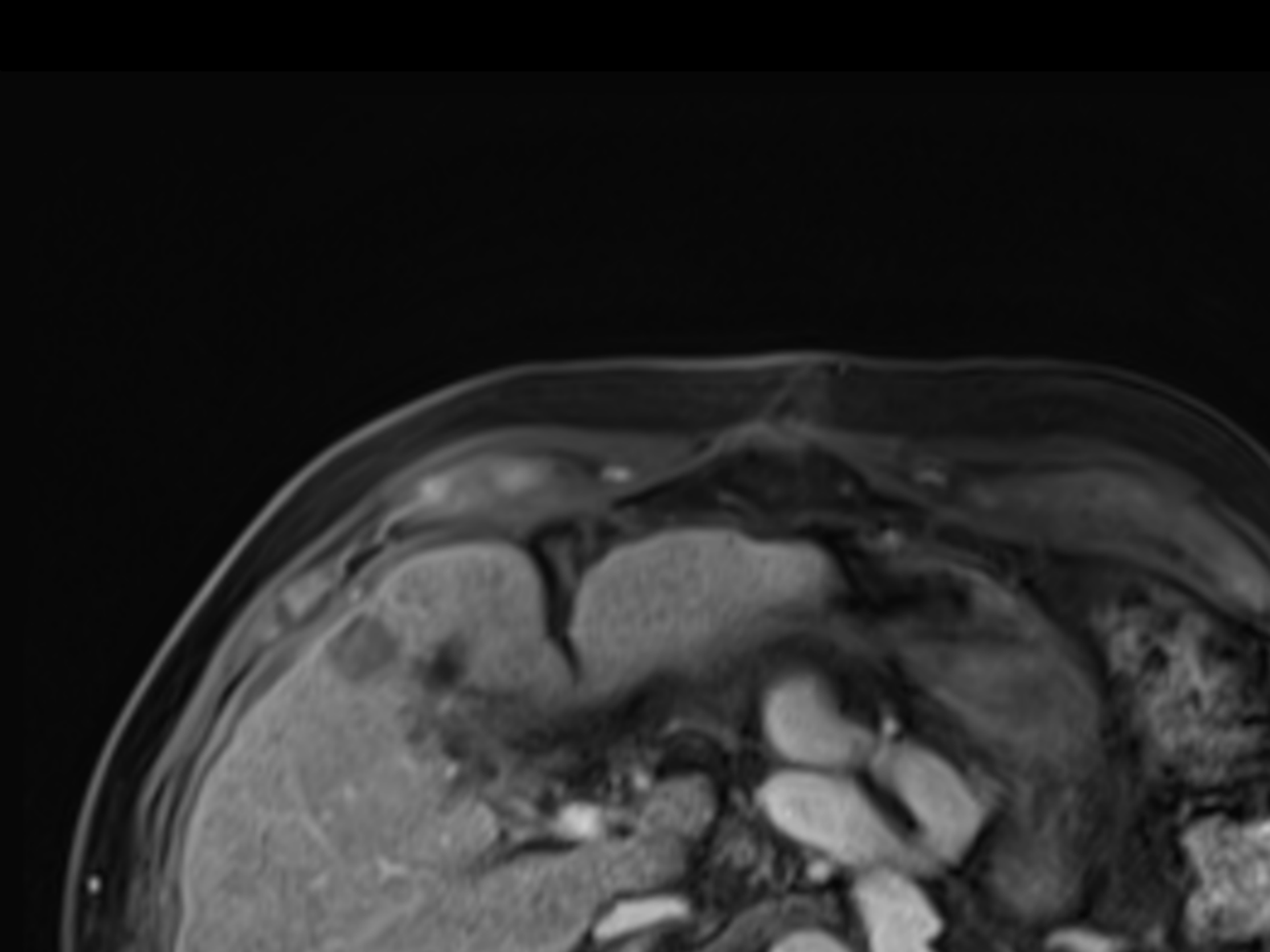
HCC Seg IVb s/p right hemihepatectomy

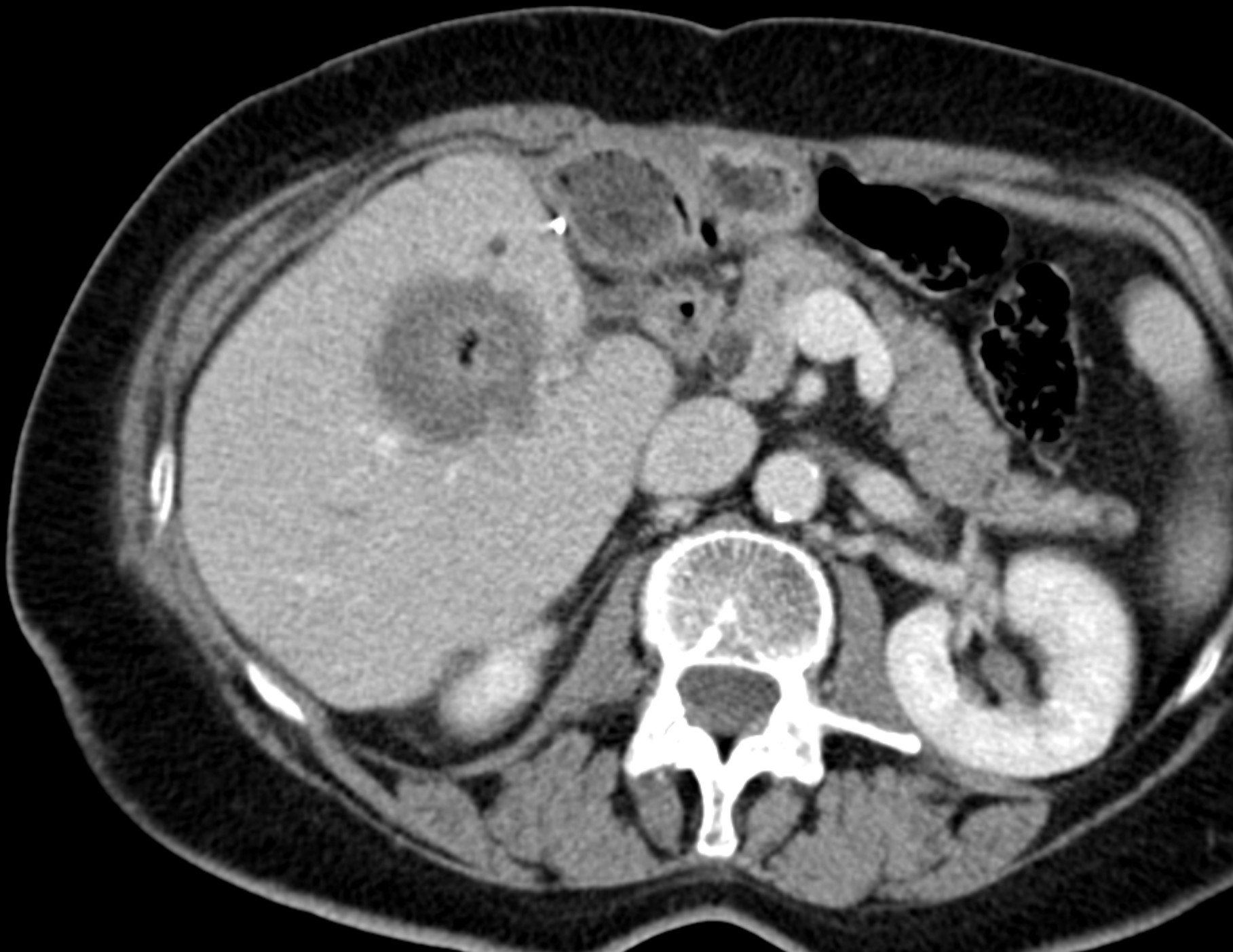






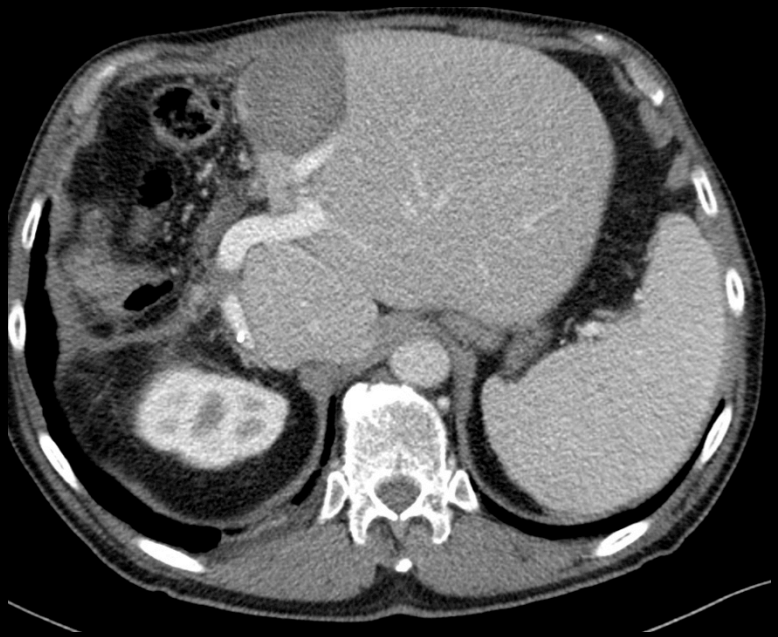






Conclusion

spherical shape



predictable


Thank you for your attention
Philipp.Wiggermann@ukr.de