

Perkutane stereotaktische Ablation von Leberläsionen

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Fortbildung Radio-Onkologie: «Mittendrin, statt nur dabei» 23.03.2024



IMR so H
Institut für Medizinische Radiologie

solothurner
spitäler so H

Bürgerspital Solothurn - IMR

- Departement of Medical Radiology:
 - 2 CT
 - 2 MR
 - X-Ray, Ultrasound, DXA, Mammo
 - 1 Angio and 1 Hybrid OR
 - Nuclear Medicine

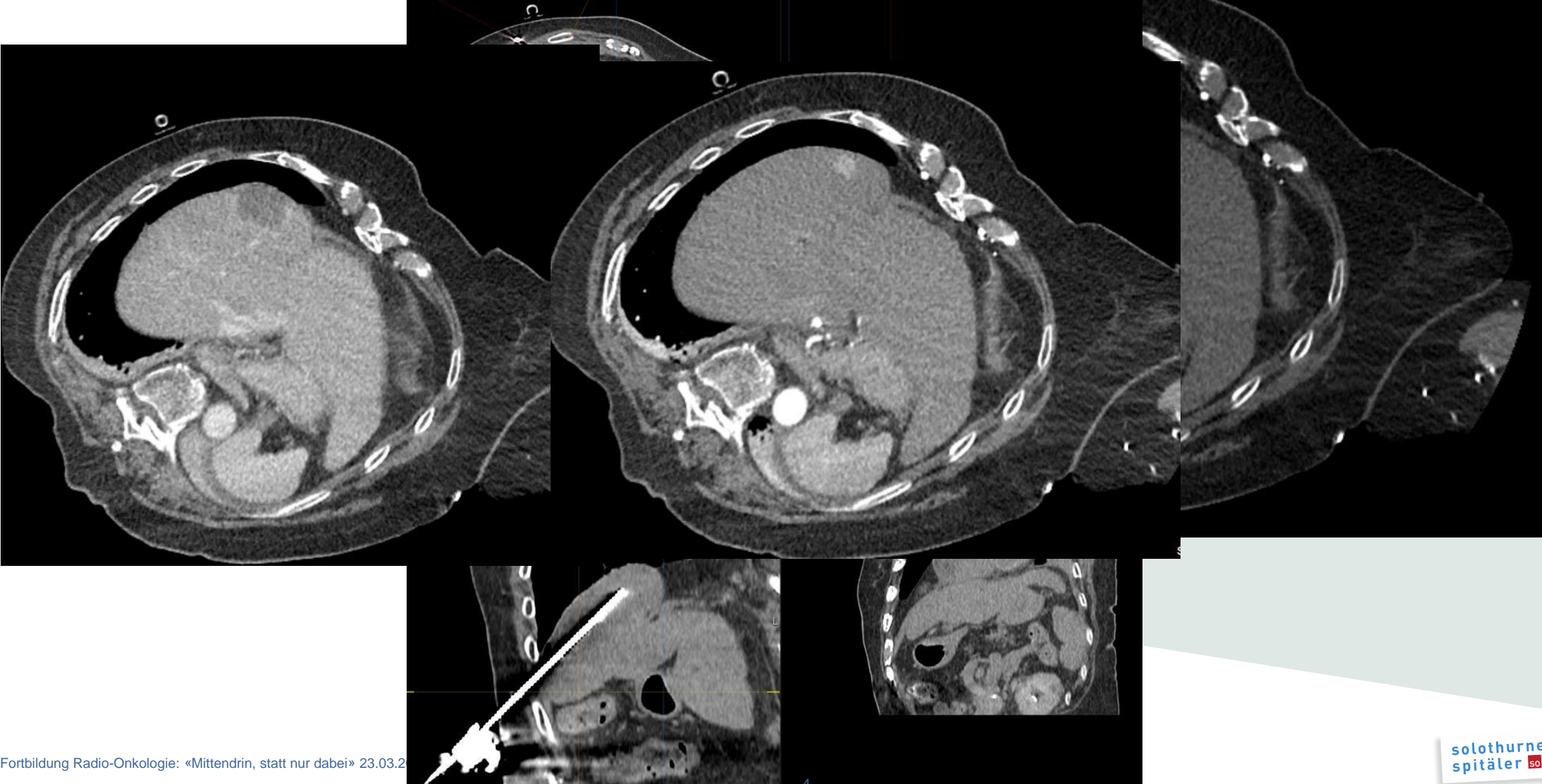


Bürgerspital Solothurn - IMR

- Interventional Oncology:
 - Biopsy
 - Ablations:
 - MWA / RFA
 - Cryoablation
 - IRE
 - Embolization
 - TACE/TAE
 - PVE / LVD



Example



How we do it: CAS ONE IR



CAS ONE IR



CAS ONE IR - Setup

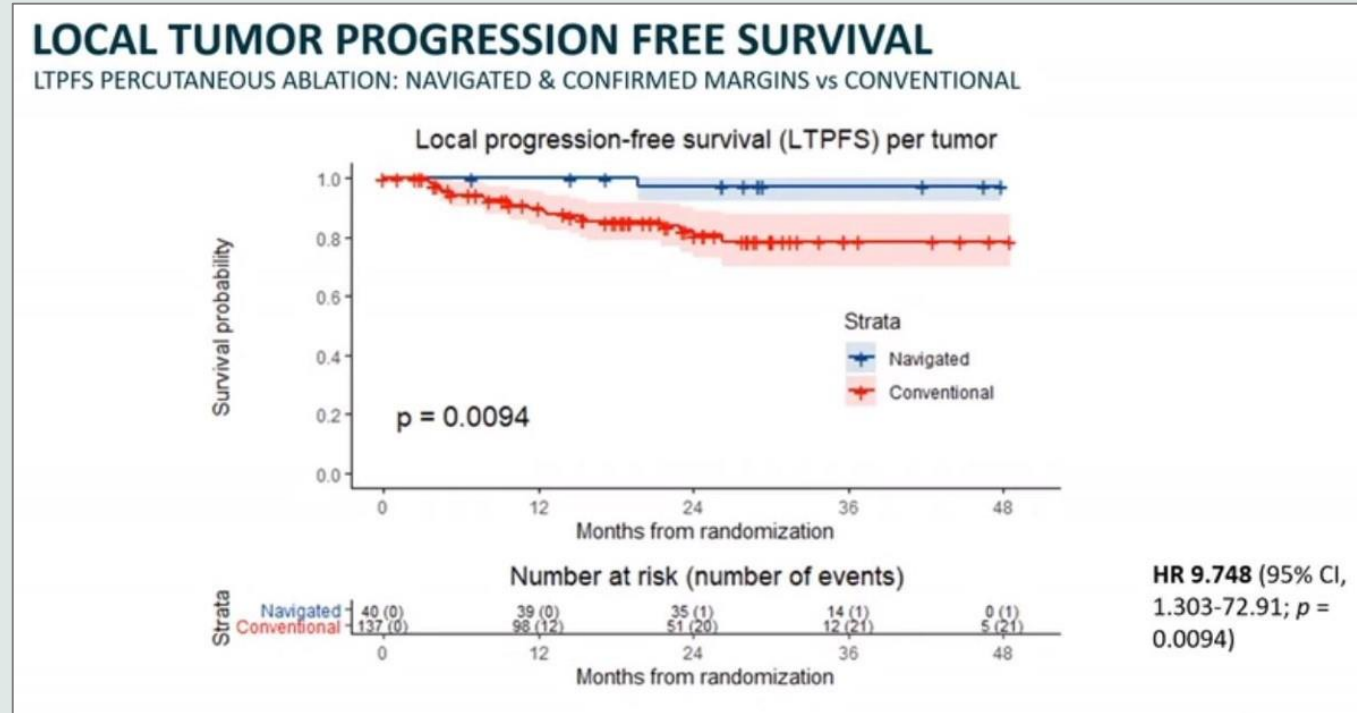
- GA/Jet-ventilation
- Patient immobilized, position as needed
- Navigation system: e.g. Cas One IR
 - Skin-markers and aiming-device
- Ablation system
- CT + i.v. contrast pre and post ablation
- MRI Fusion



Ablations @ Solothurn

Stereotactic ablation in a non-tertiary hospital?

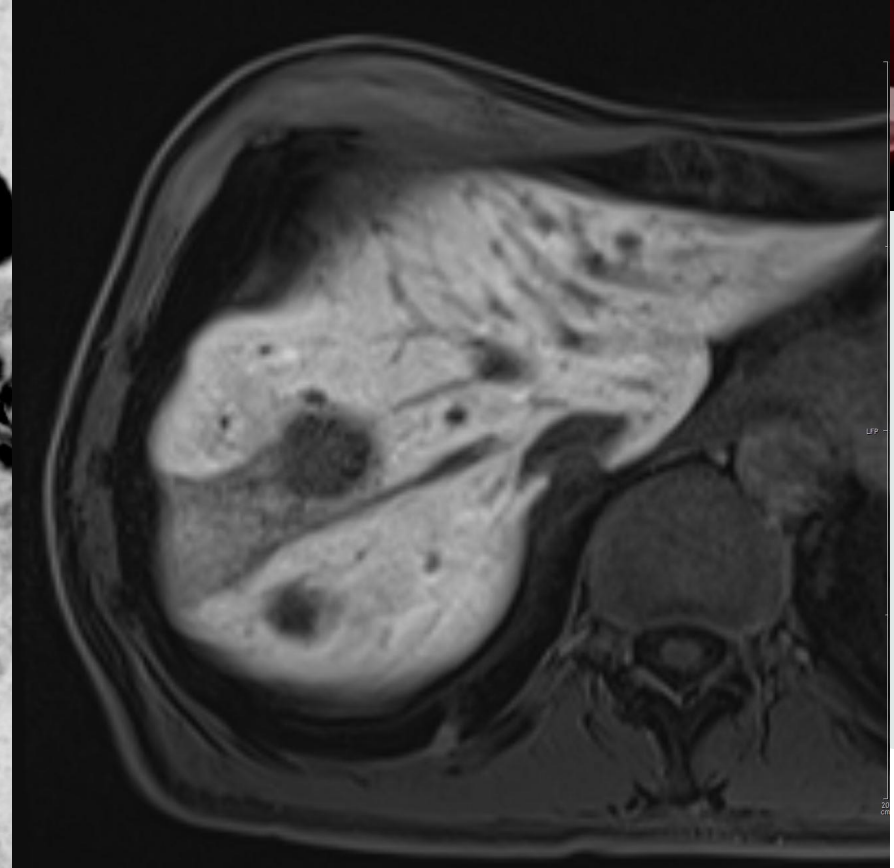
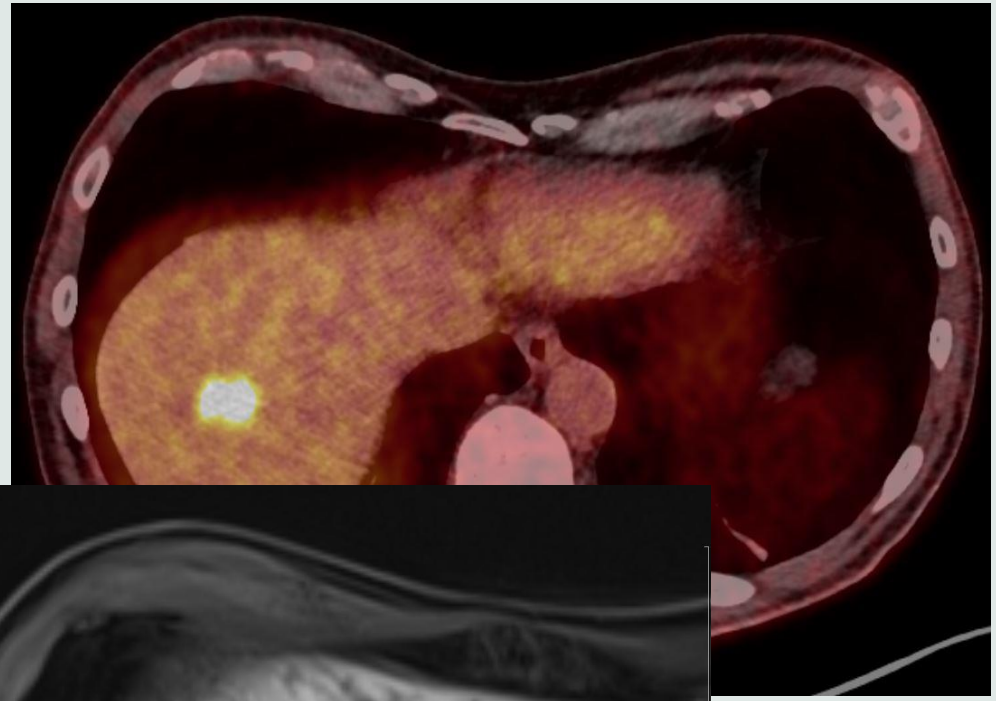
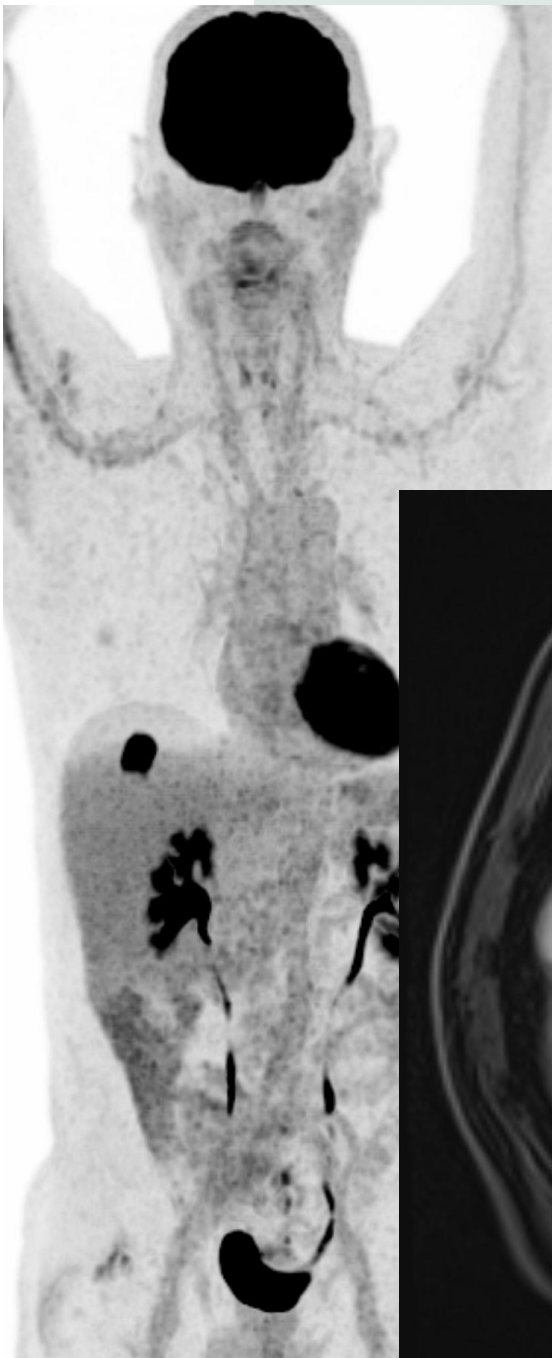
- Overcome limitations: size, location, visibility
- Expand ablatable spectrum
- Treat patients close to home according to „university standards“
- Improved outcomes



Interim analysis COLLISION trial – M. Meijerink et. al.; presented @CIRSE 2021

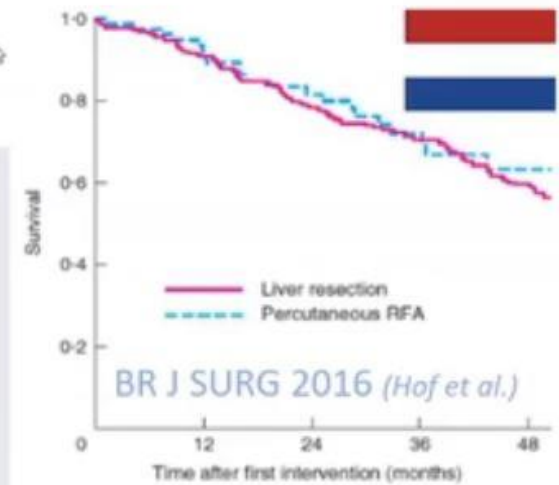
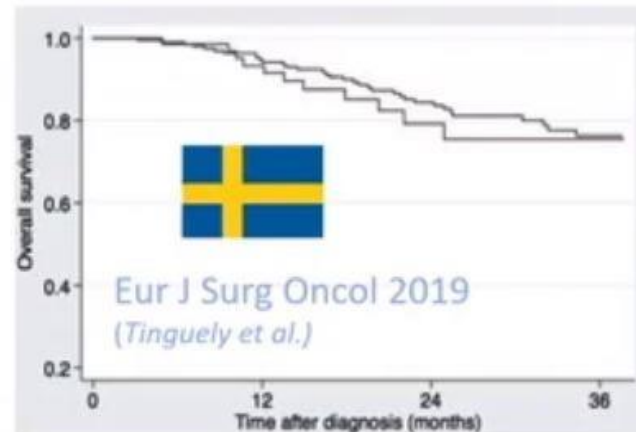
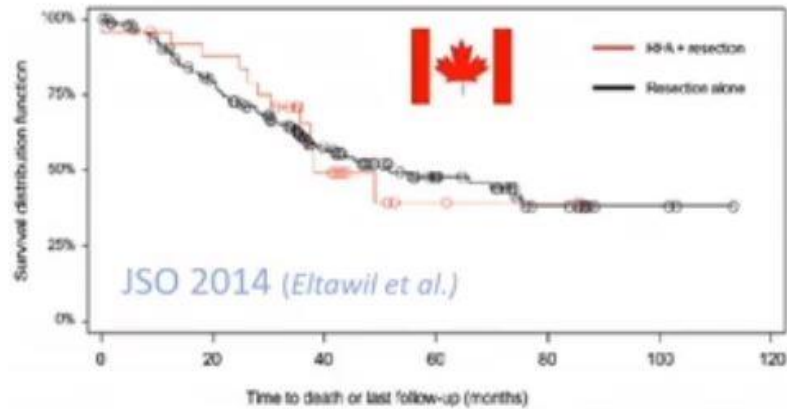
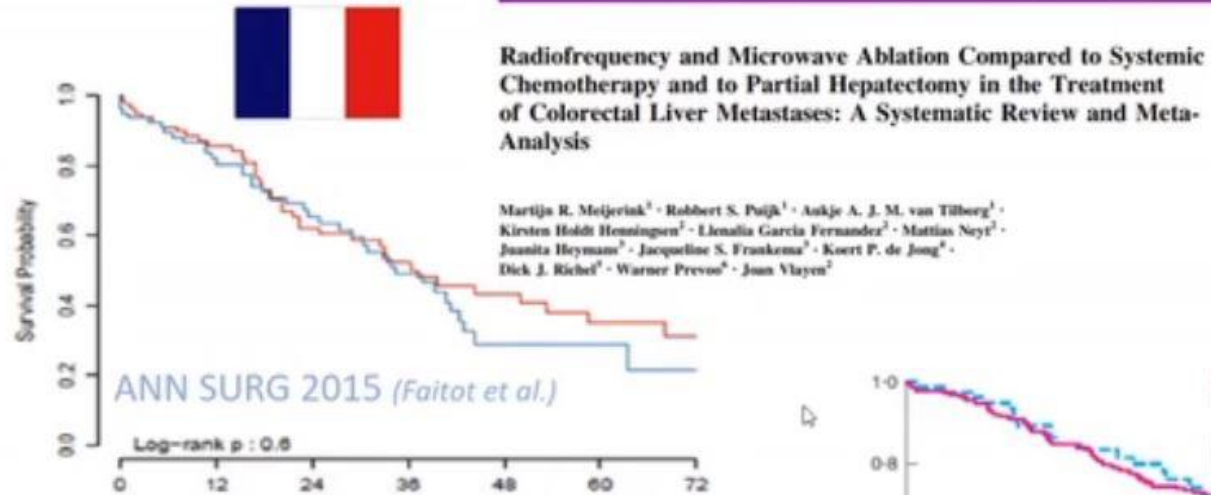
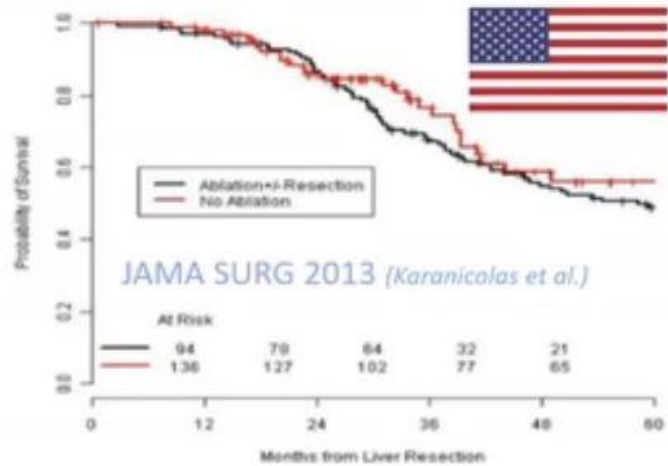
Case 1

- 59y old patient
- Colon-CA pT3a pN2 cM1
- Surgery 2020
- adjuvant Chemo - complications
- 2023 new liver lesion:
Seg. VIII central



CLRM Ablations

SURGERY VERSUS ABLATION OVERALL SURVIVAL



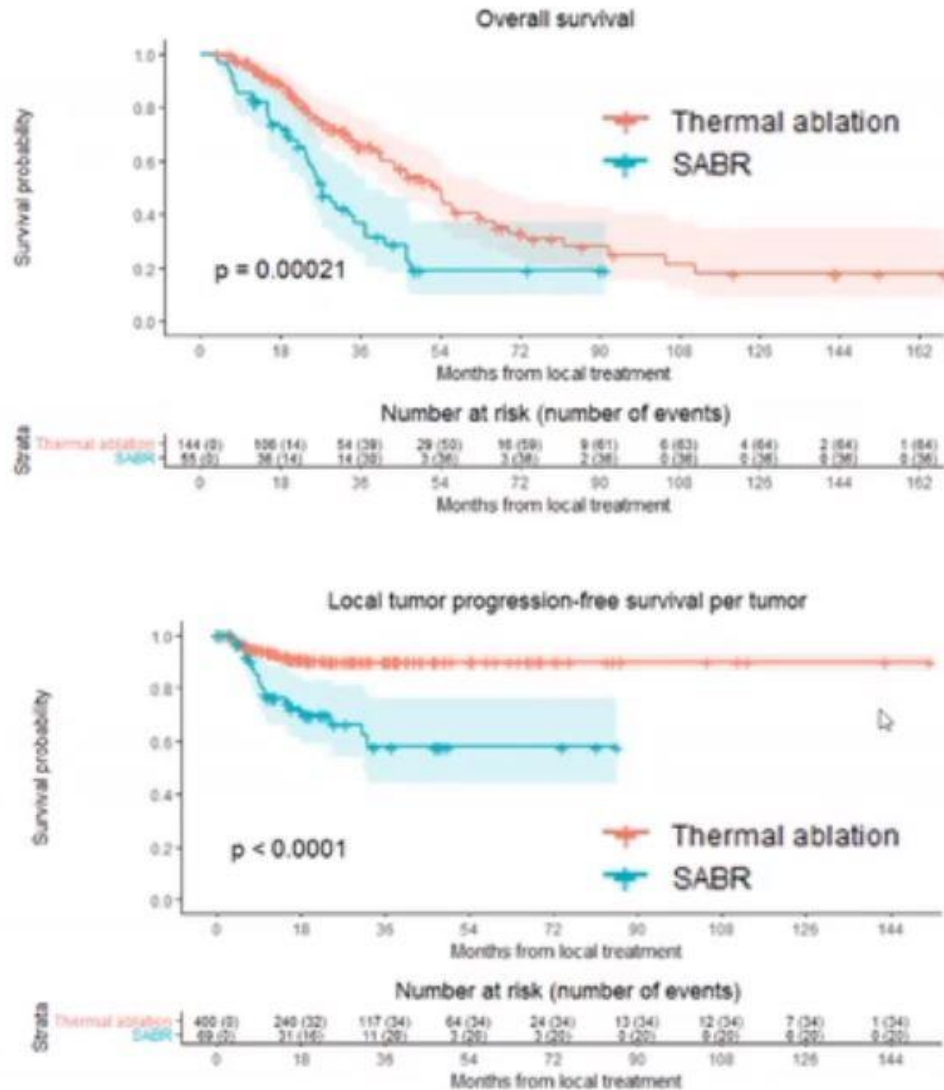
Cardiovasc Intervent Radiol (2010) 43:1189–1204
https://doi.org/10.1007/s00270-010-1959-3

C RSE CrossMark

CLINICAL INVESTIGATION

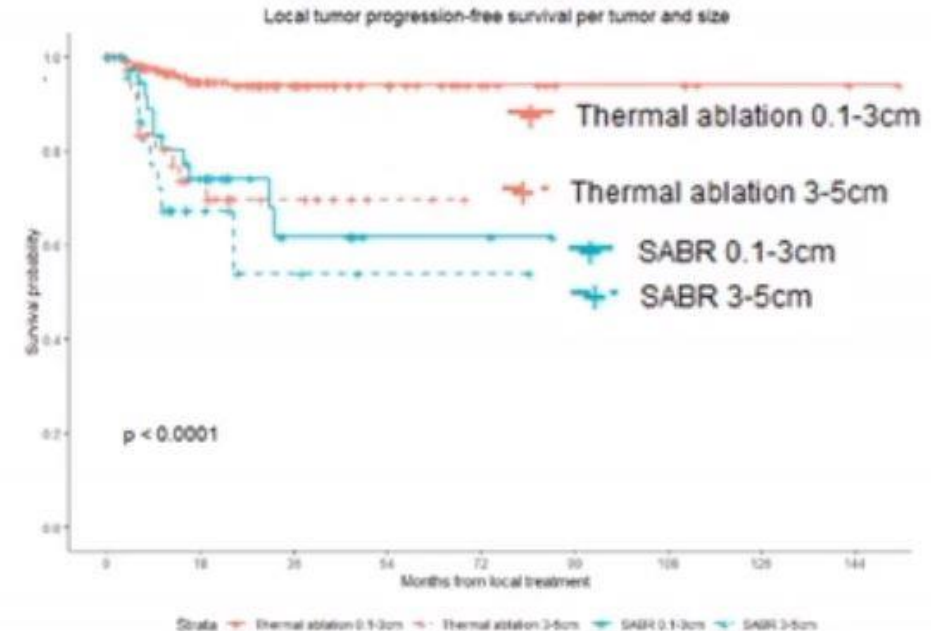
INTERVENTIONAL ONCOLOGY

CLRM Ablations



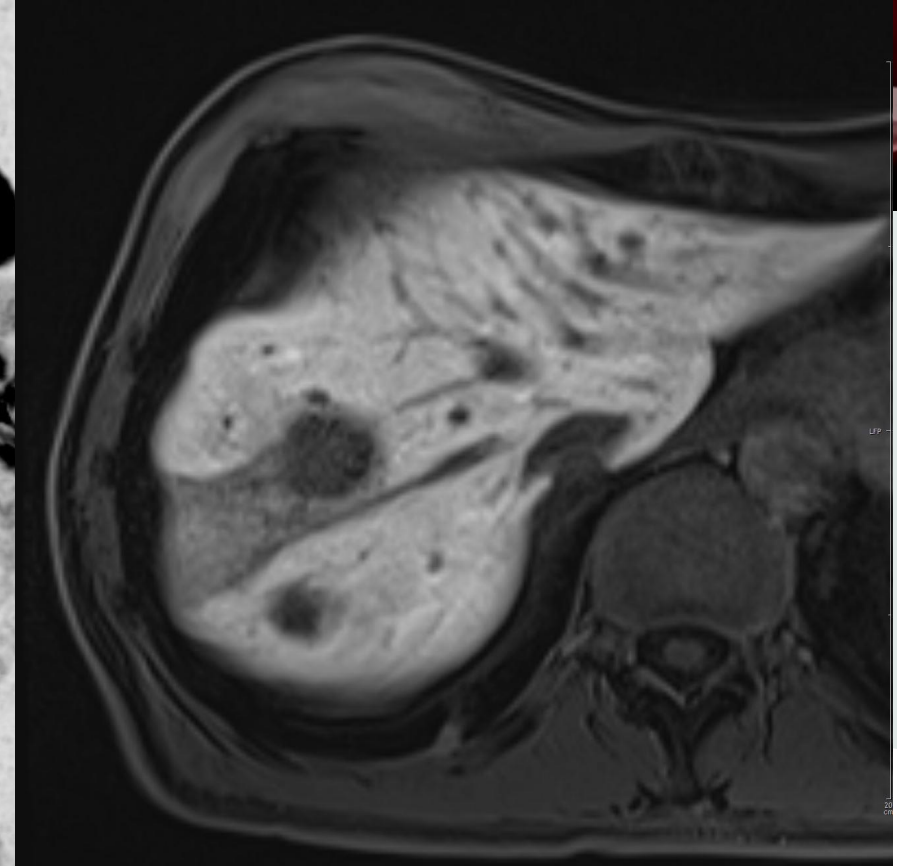
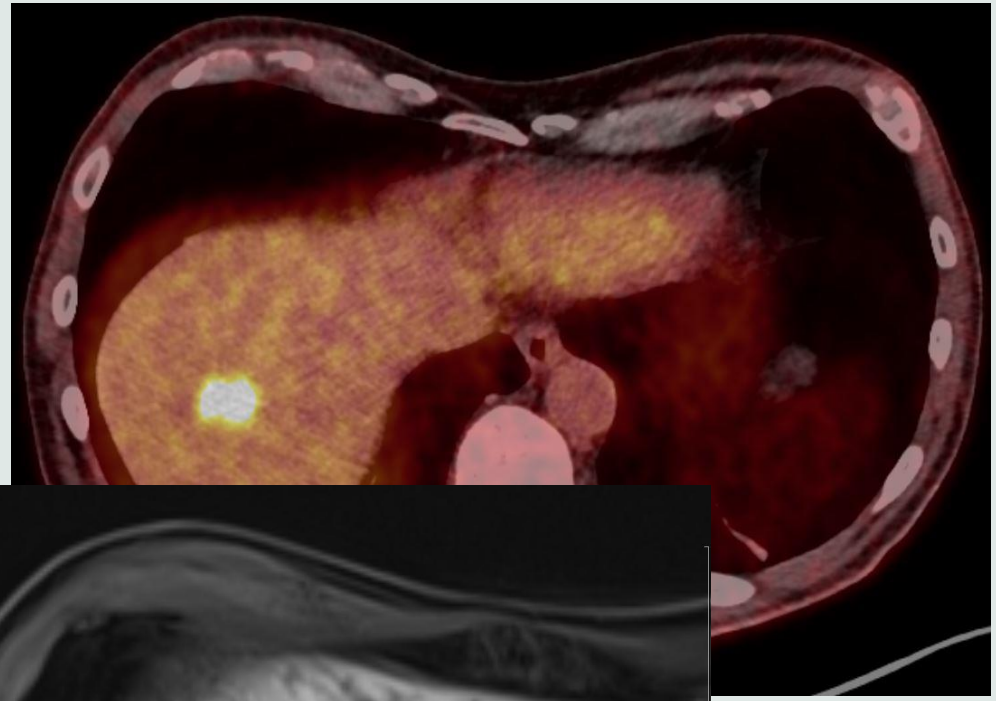
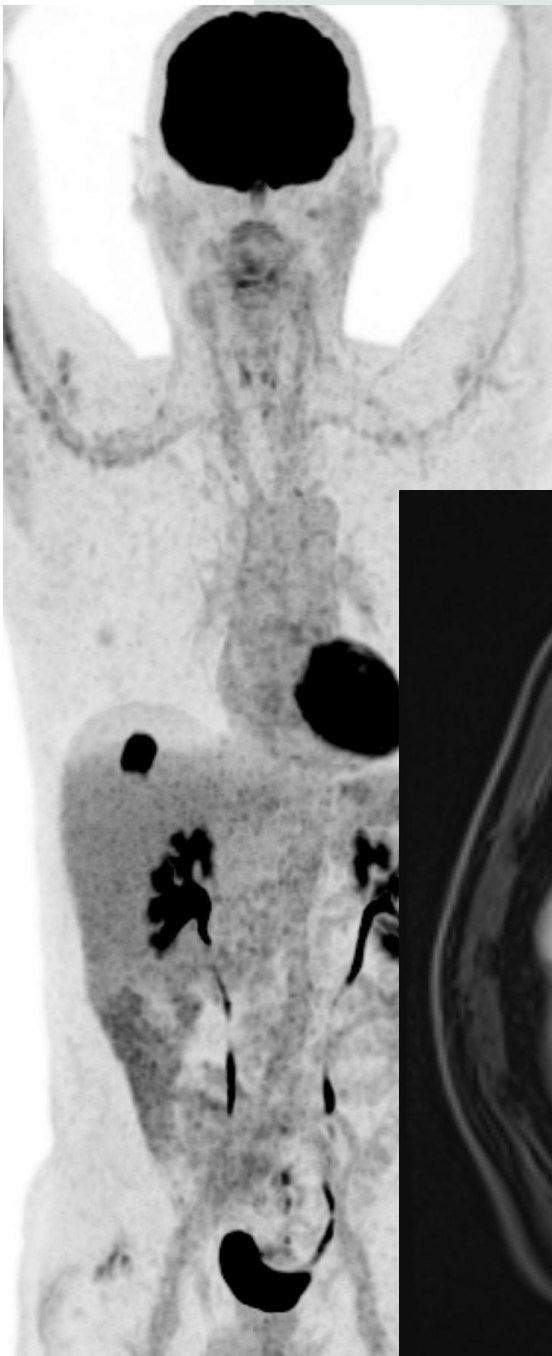
Article Thermal Ablation versus Stereotactic Ablative Body Radiotherapy to Treat Unresectable Colorectal Liver Metastases: A Comparative Analysis from the Prospective Amsterdam CORE Registry

Sanne Nieuwenhuizen ^{1,*,} Madelon Dijkstra ^{1,†}, Robbert S. Puijk ^{1,†}, Florentine E. F. Timmer ^{1,†}, Irene M. Nota ^{1,} Jip Opperman ^{2,} Bente van den Brund ^{1,} Bart Geboers ^{1,†}, Alette H. Ruars ^{1,} Evelien A. C. Schouten ^{1,} Jan J. J. de Vries ^{1,} Hester J. Schetter ^{1,} Anne M. van Gest ^{2,} Jan Hein T. M. van Waasberghe ^{1,} Rutger-Jan Swijnenburg ^{3,} Kathelijn S. Versteeg ^{4,} Birgit I. Lissenberg-Witte ^{5,} M. Petrousjka van den Tol ^{4,} Cornelis J. A. Haasbeek ⁶ and Martijn K. Meijerink ^{1,†}

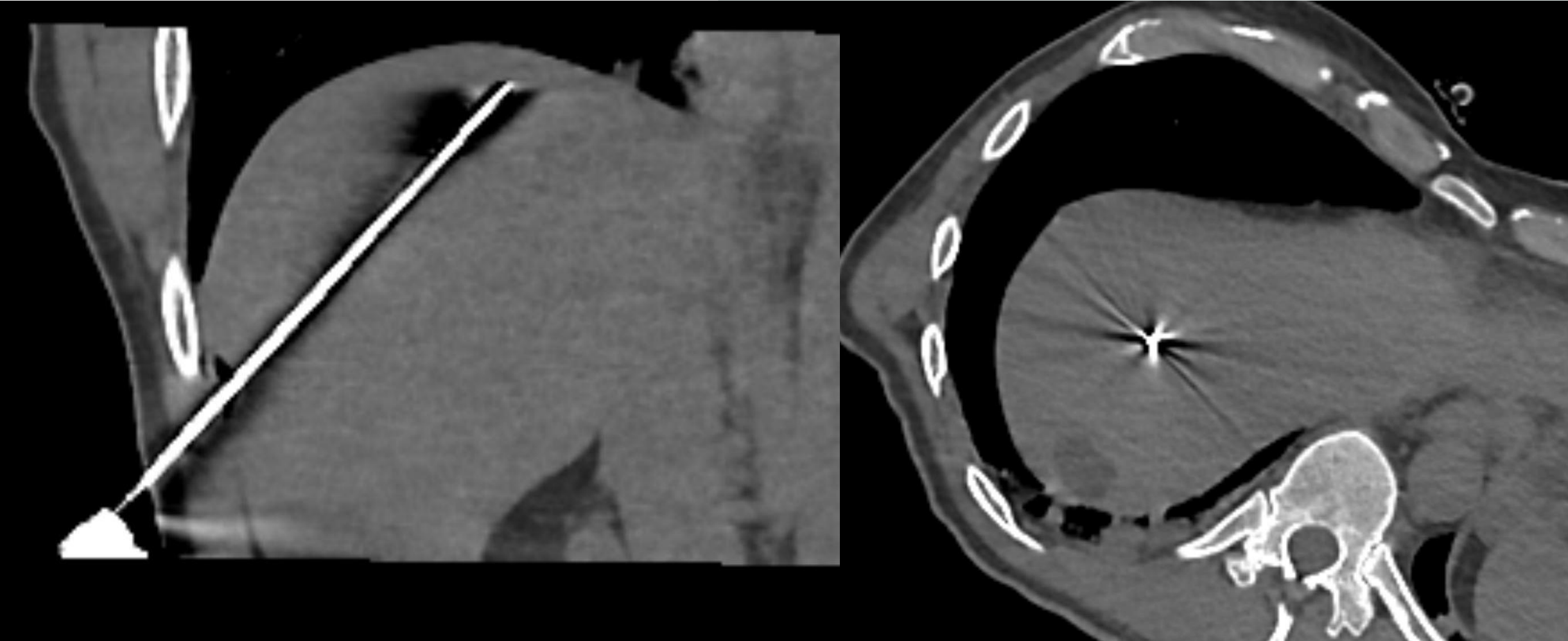


Case 1

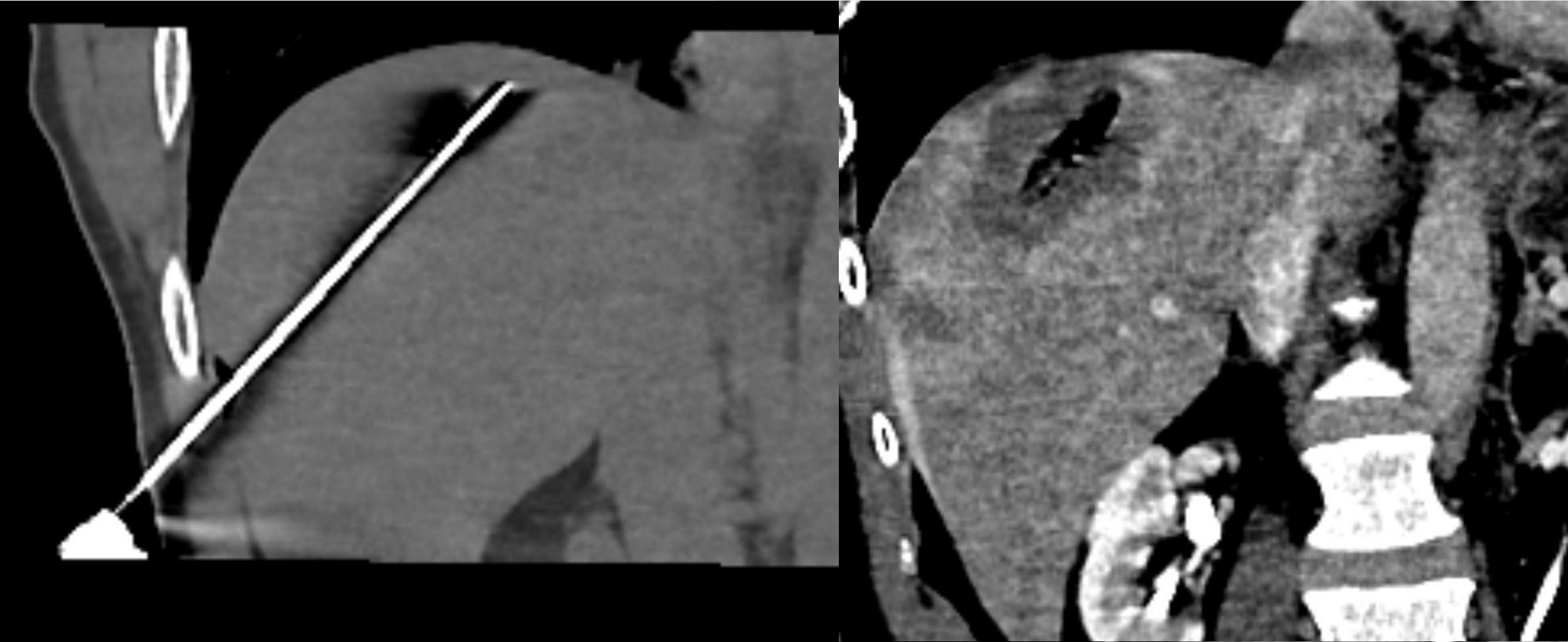
- 59y old patient
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- adjuvant Chemo - complications
- 2023 new liver lesion:
 Seg. VIII central
- MWA planned



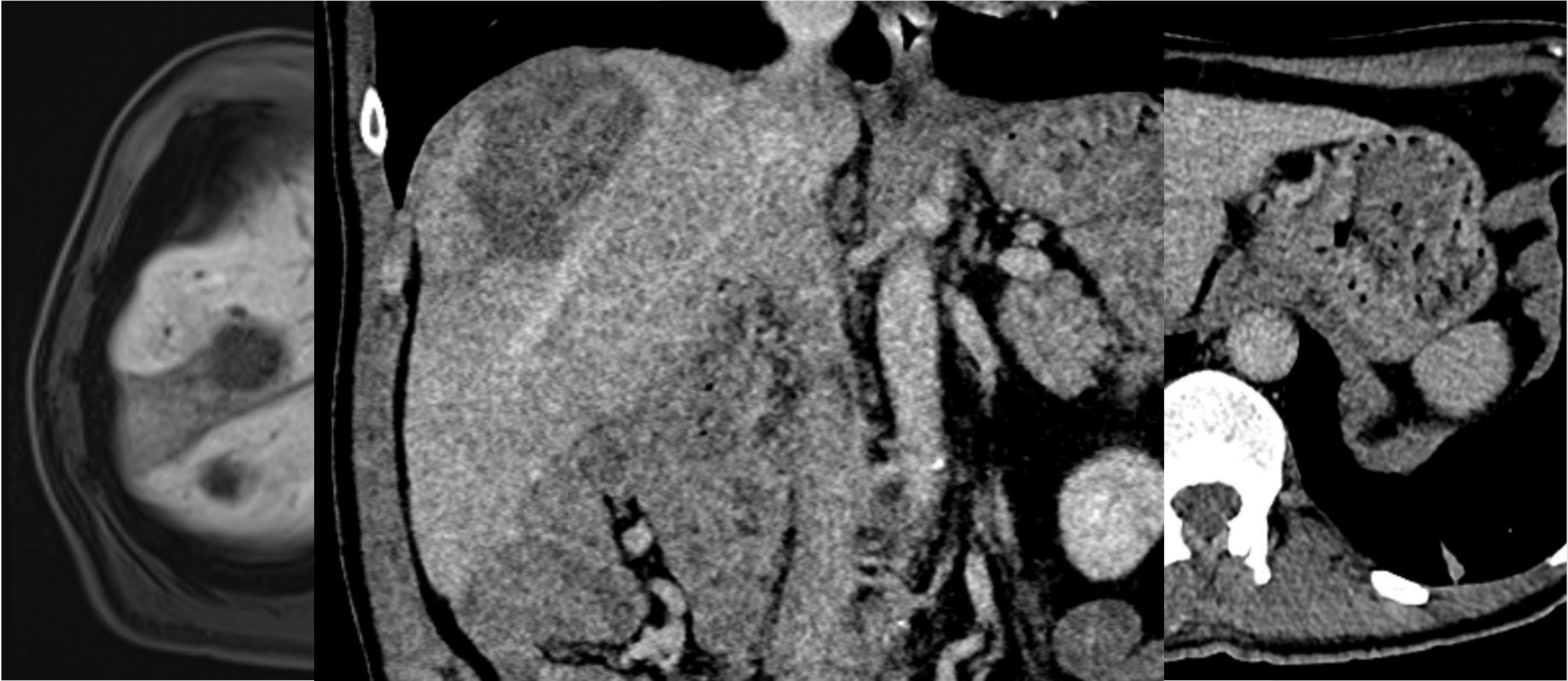
Case 1



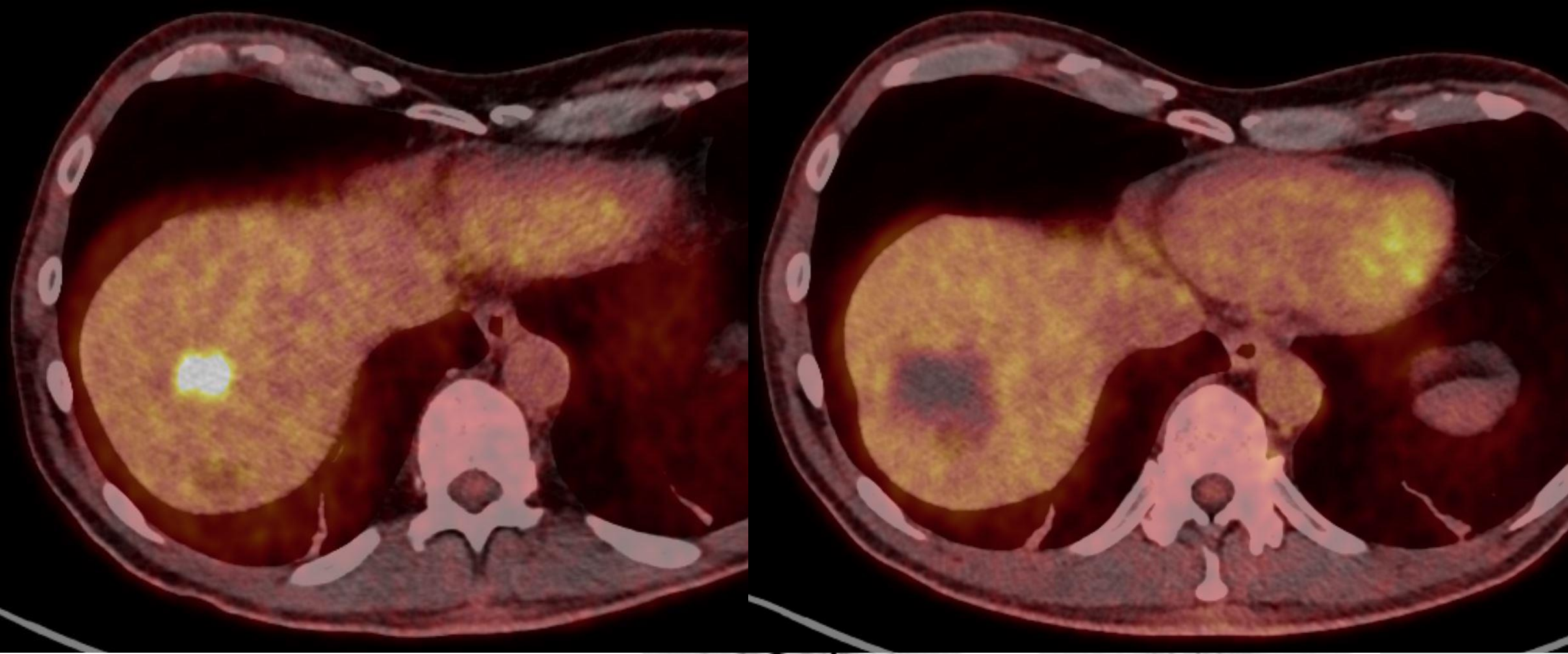
Case 1



Case 1 – CT 3 months



Case 1 – PET 5 months



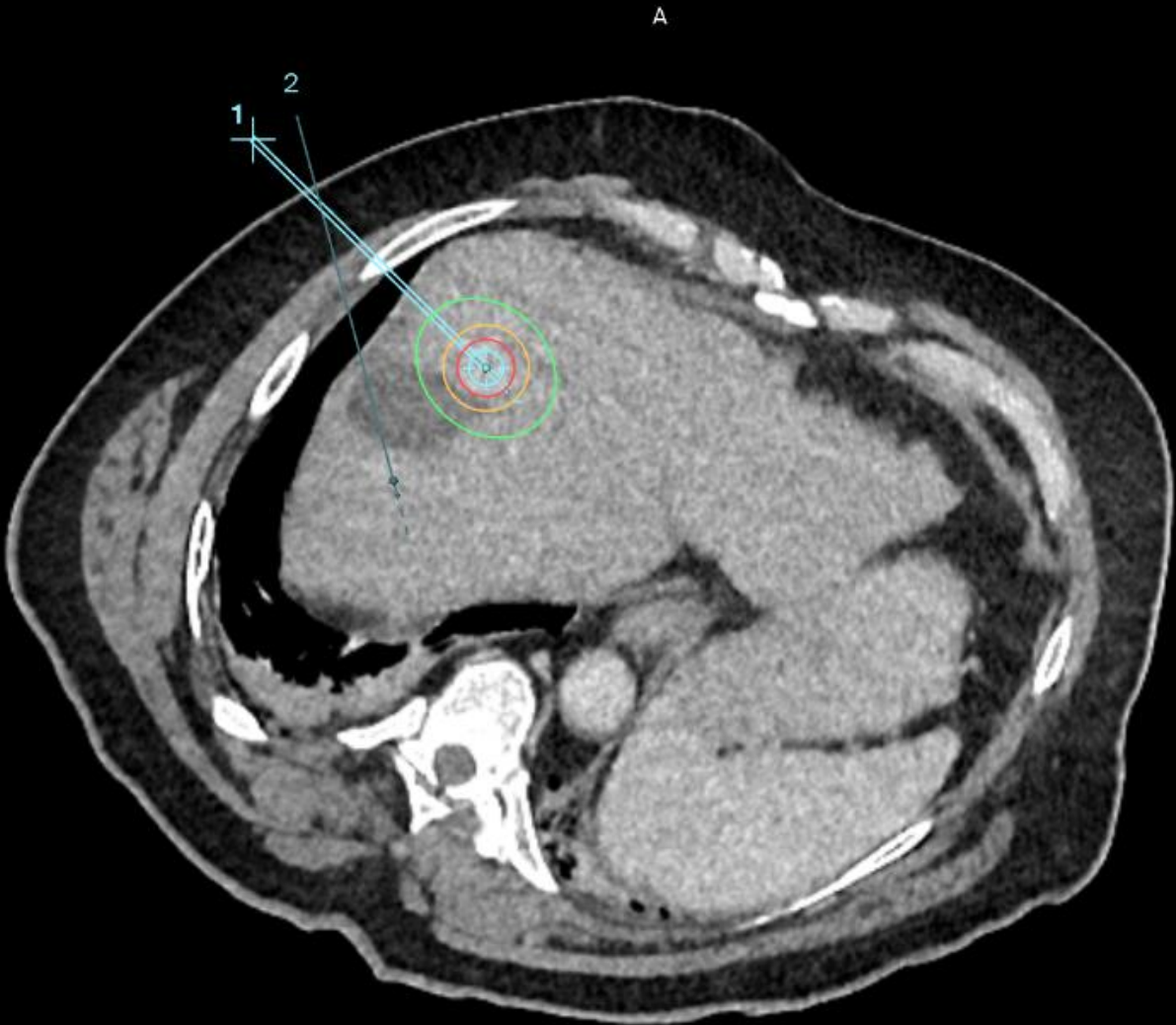
Case 2

- Multifocal HCC

The screenshot displays the CAS-One IR software interface for radiofrequency ablation planning. The main window shows an axial CT scan of the liver with two targets marked: Target 1 (red circle) and Target 2 (blue circle). A trajectory line is shown for Target 2, starting from the top and curving towards the target. The interface includes a top toolbar with icons for Plan, Fuse, Place, Verify, Assess, Pointer, Patient, Switch, Screenshot, Translate, Network, and Exit. A right sidebar contains settings for Trajectory, Target, and Intervention. The bottom status bar shows coordinates, trajectory length, series number, and patient information.

| Parameter | Value |
|-----------------|-------------------------|
| Entry-Position | Defined |
| Target-Position | Defined |
| Boundary | Red circle, Blue circle |
| Margin | 5 mm |
| Device | HS - AMICA |
| Instrument | HS AMICA PROBE MW |
| Reference | Ex-Vivo Bovine Liver |
| Ablation Mode | 0 |
| Power | 100 W |
| Time | 10:00 |

Loc. -61.94 mm
W 350 / C 35
Trajectory-Length: 174.2 mm
Series: 3
Patient: MOLLET RUDOLF, Date of Birth: 06/05/54



Trajectory

Entry-Position Defined

Target-Position Defined

Target

Boundary - +

Margin - 5 mm +

Intervention

Device HS - AMICA

Instrument HS AMICA PROBE MW

Reference Ex-Vivo Bovine Liver

Ablation Mode - 0 +

Power - 80 W +

Time - 10:00 +

Mode 0 = Continuous / Mode 1 = Pulse



Trajectory-Length: 168.6 mm

Loc. -59.17 mm
W 350 / C 35

Series: 3

Patient: MOLLET RUDOLF, Date of Birth: 06/05/54



Plan



Fuse



Place



Verify



Assess



Pointer



Patient

CAS-One® IR



Switch



Screenshot



Translate



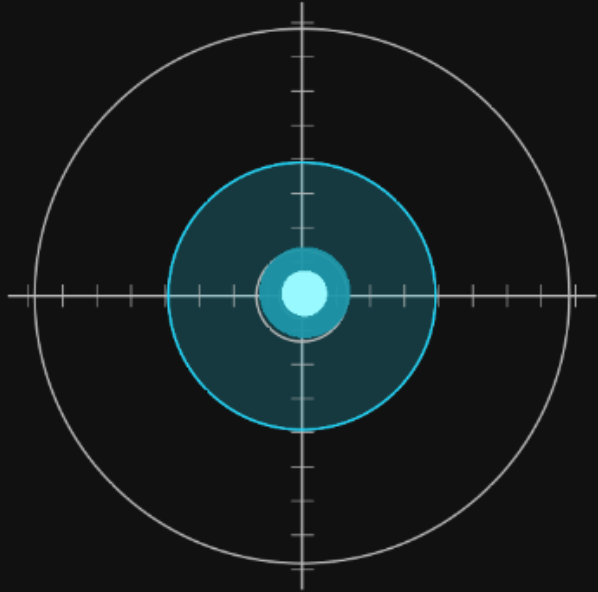
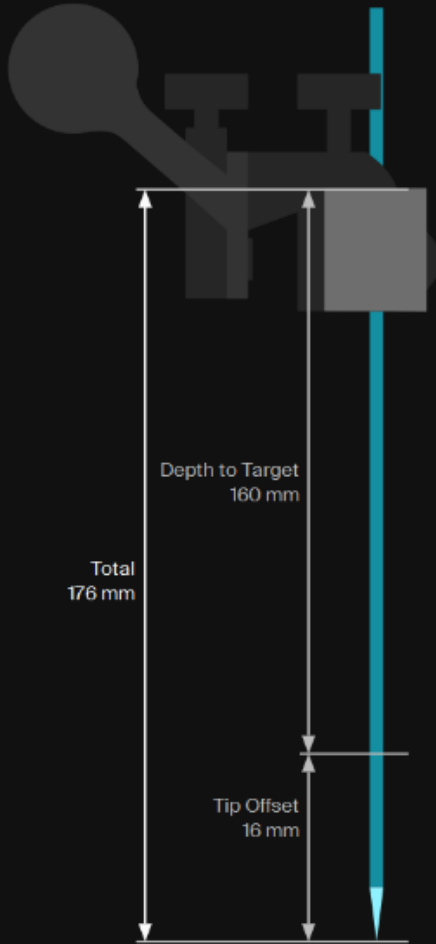
Network



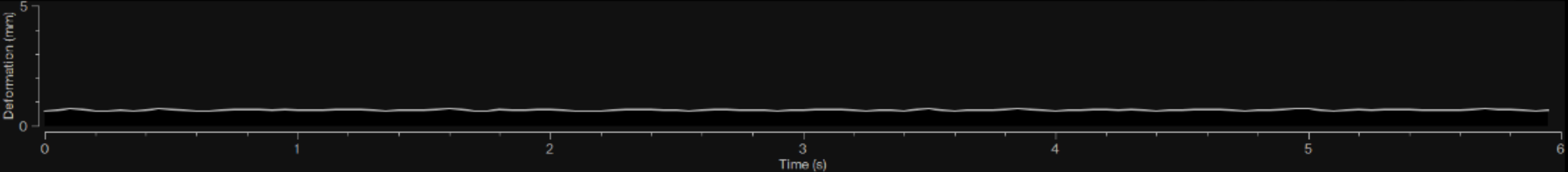
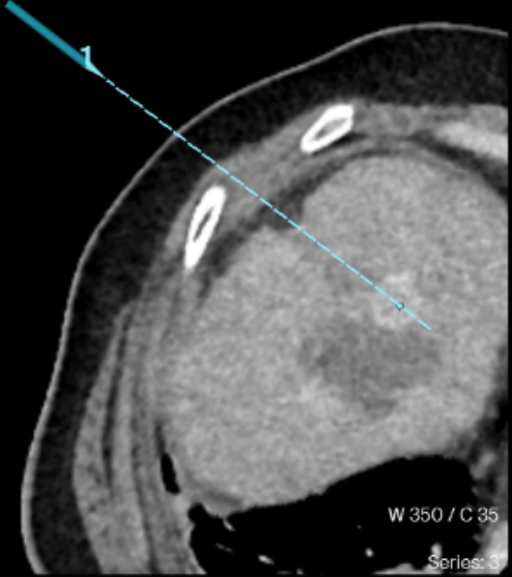
Exit

Redefine Entry

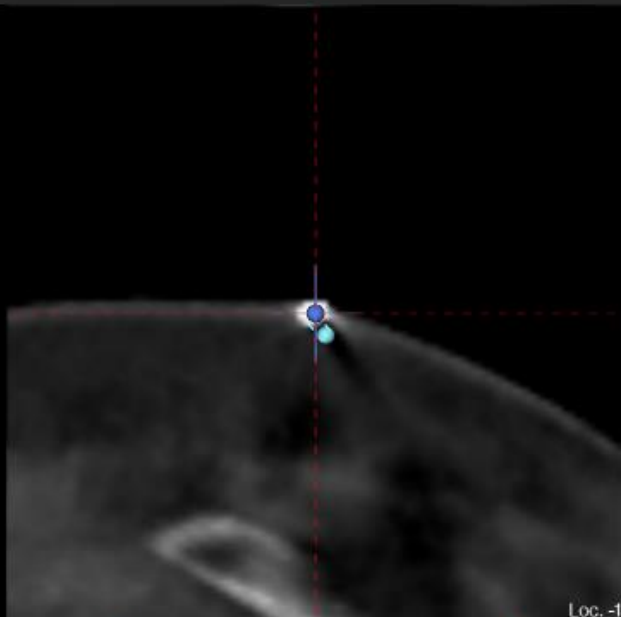
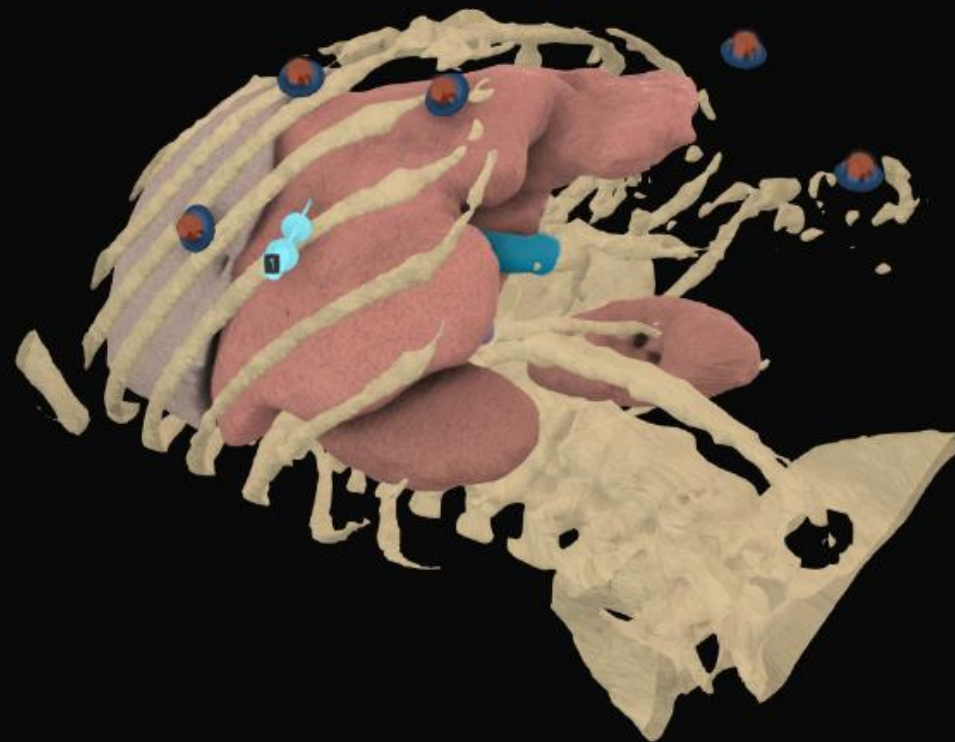
1



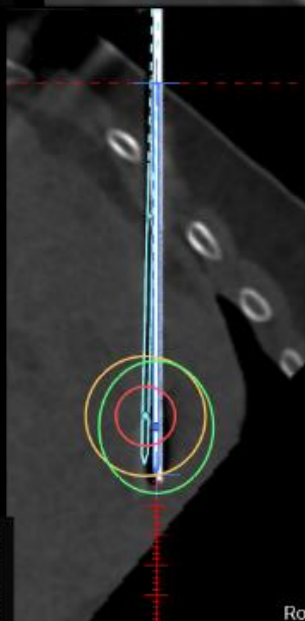
Lateral 0.2 mm
Angular 0.1°



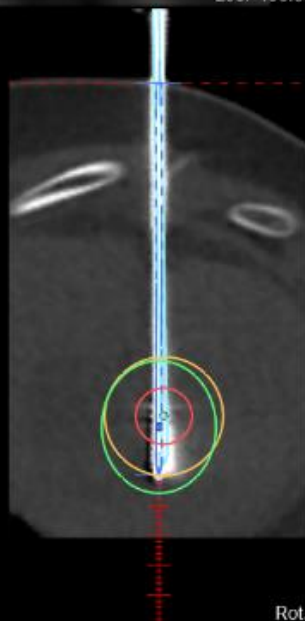
Patient marker definitions do not match with the visible patient markers.
Ensure that all patient markers are clearly visible
and still at their original location.
Also verify that they are correctly defined.



Loc. -130.31 mm

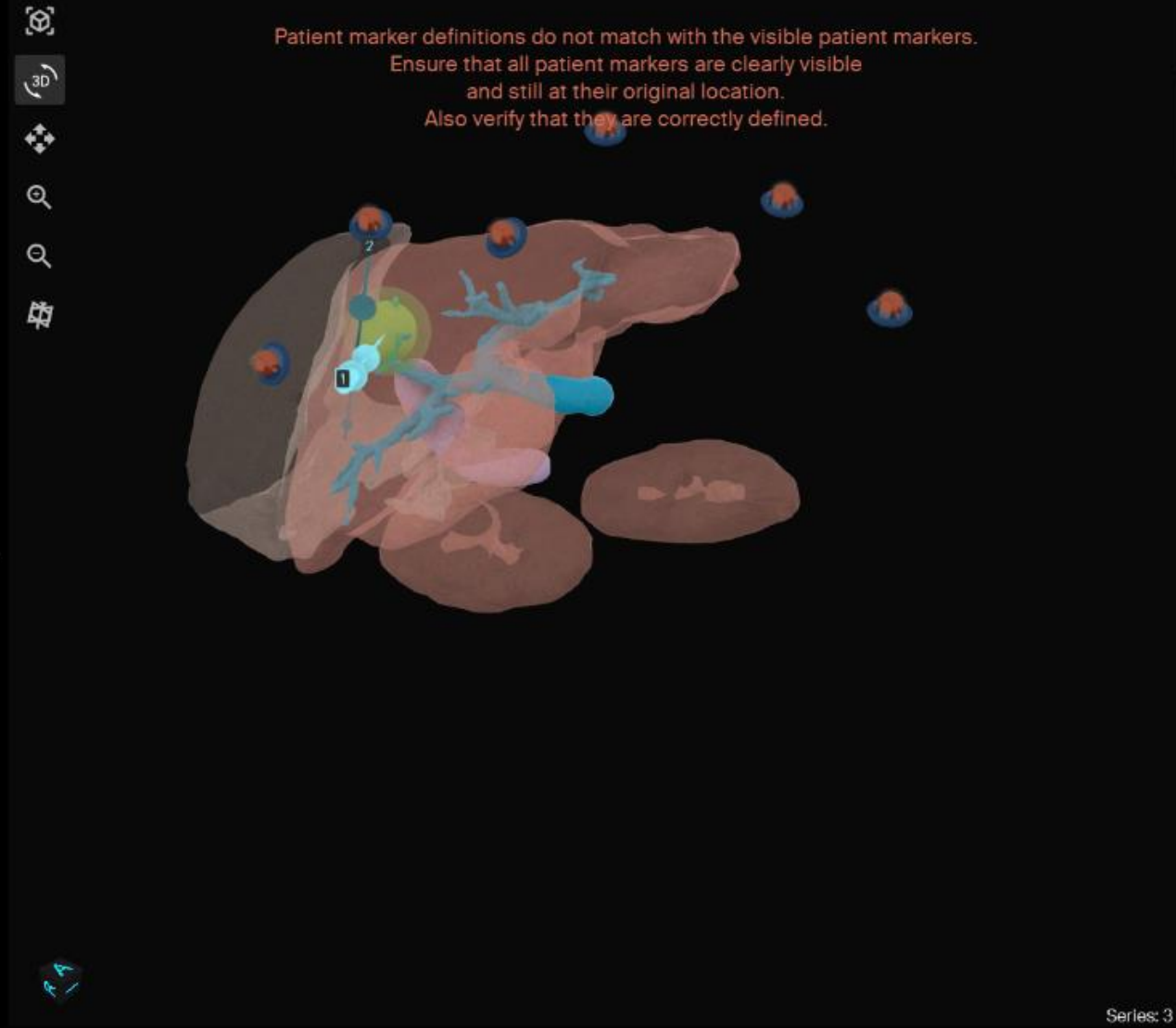
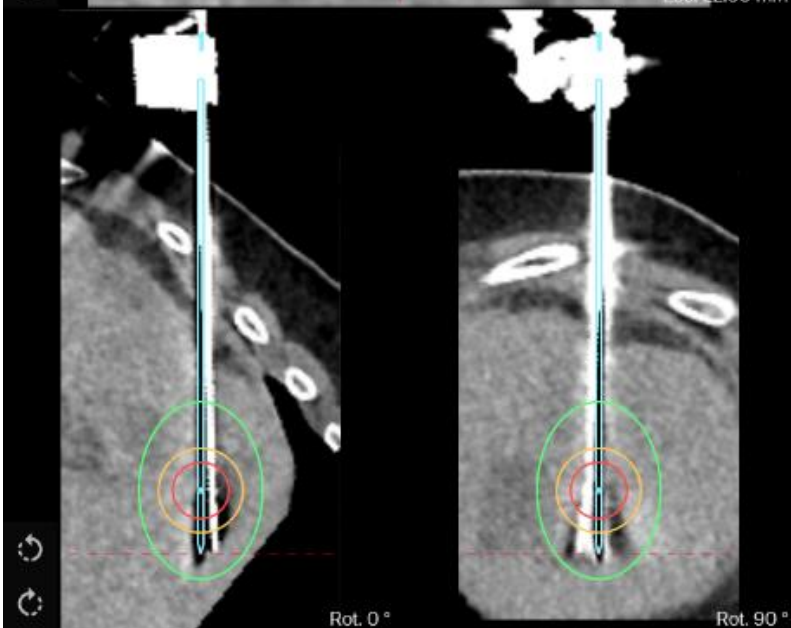
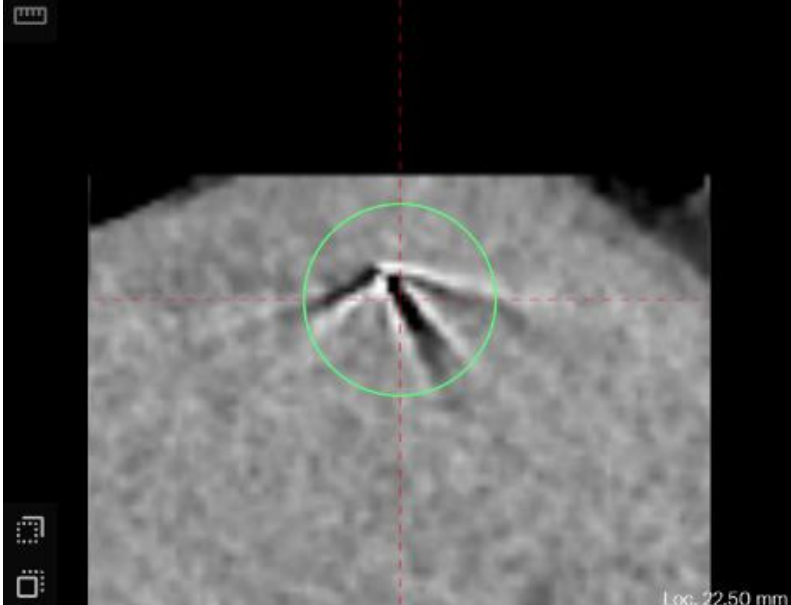


Rot. 0°



Rot. 90°

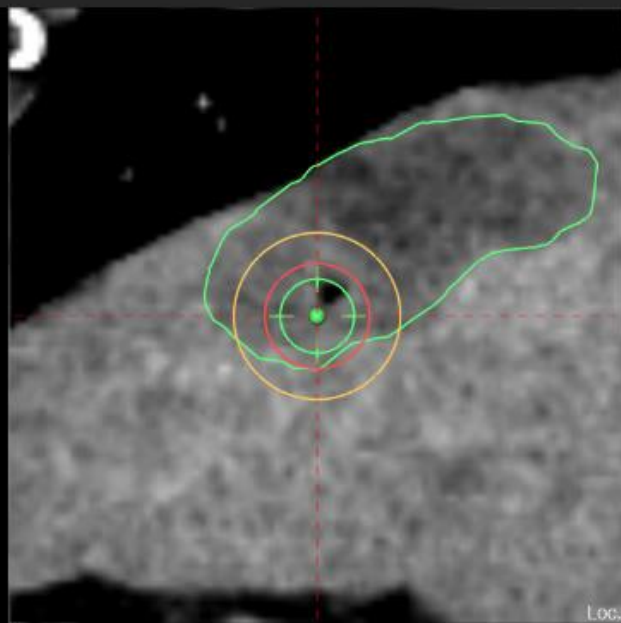
Series: 3



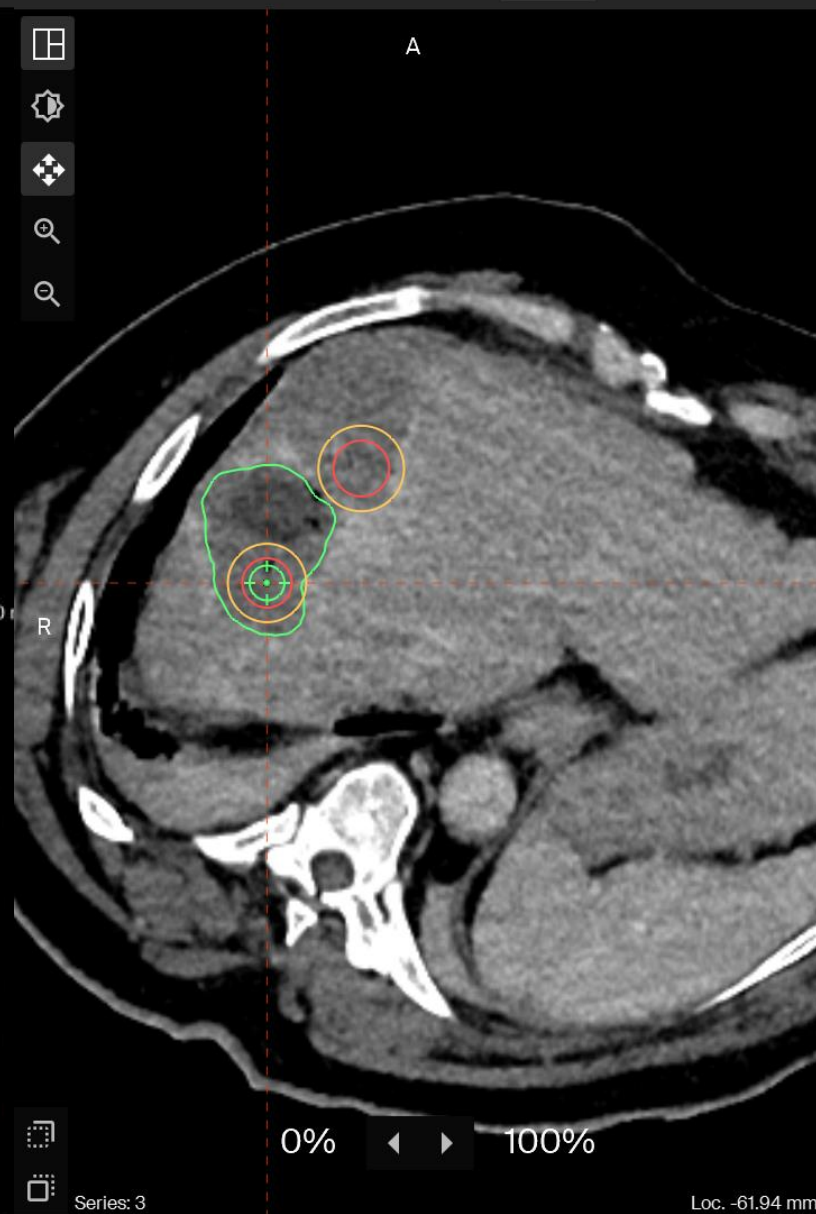
- 1
- 2

Series: 3





Loc: 0.00



A

R

0% 100%

Series: 3

Loc: -61.94 mm



S

A

Loc: -58.92 mm



S

R

Loc: -64.78 mm
W 316 / C 90

Series: 9



Browser

AblaSu

Treatment

- Seed-Point
- Ablation
- Margin

Coverage

- Tumor
- Margin

Effective M

Bin-Size

%

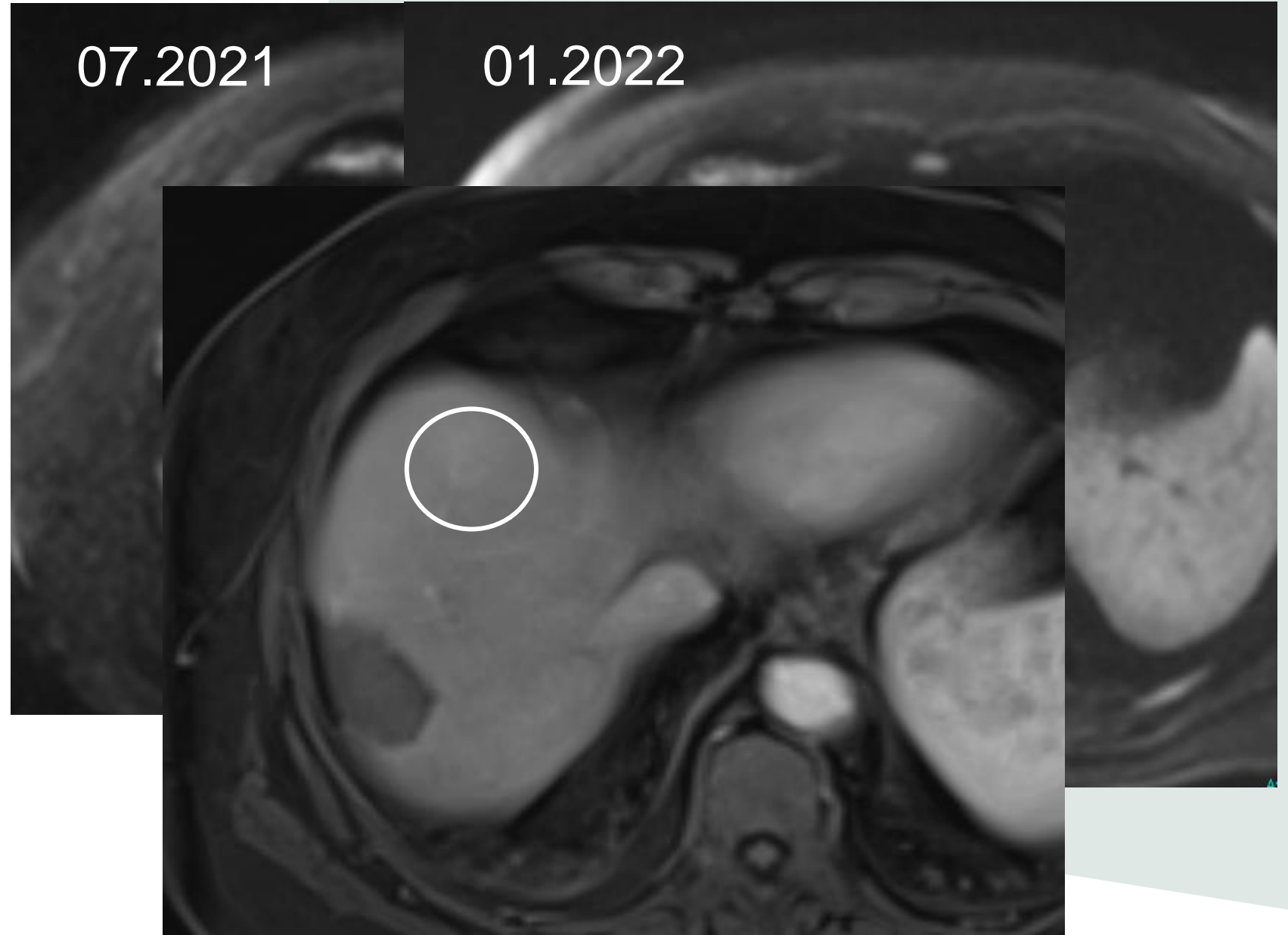
The calculation is available only for accuracy a

Rot: 0°

Rot: ζ Verify the coverage of Ablation-Zone.

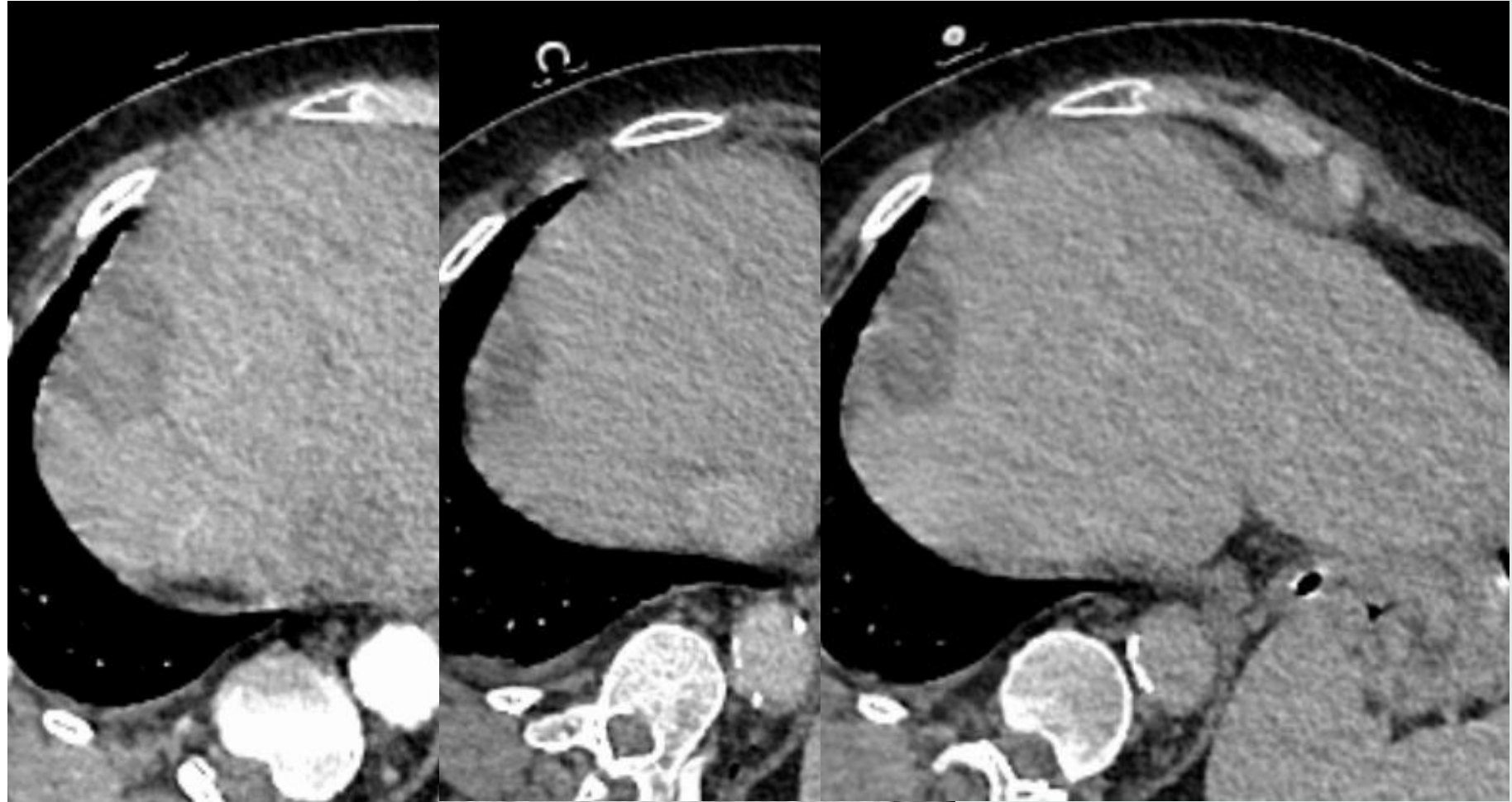
Case 3

- 77y old patient
- Known HCC; 4 previous ablations
- New / enlarging Lesion:
- Seg. IVa
- detected on DWI



Case 3

- 77y old patient
- Known HCC; 4 previous ablations
- New / enlarging Lesion:
- Seg. IVa
- detected on DWI
- MWA planned



Case 3

Plan Fuse Place Verify Assess

Aiming Device Patient

CAS-One® IR Switch REC: 1:00 Exit

Browser Markers Plan

Trajectory 1

Target position Defined

Entry position Defined New

Target

Boundary - +

Margin - 8 mm +

Intervention

Device Medtronic - Emprint

Instrument Emprint

Reference In-Vivo Liver

Ablation Power - 100 W +

Time - 10:00 +

Series: 3
Modality: CT
aa694ab63154
1900-01-01
Loc. -118.11 mm

Series: 9
Modality: MR
aa694ab63154
1900-01-01
Loc. -118.40 mm
W 350
C 35

Trajectory length: 111.1 mm

Patient: aa694ab63154, Date of birth: 1900-01-01

All trajectories All ablations Load plan Delete all

Case 2

Plan Fuse Place Verify Assess Aiming Dev **Plan** Fuse Place Verify Assess Aiming Device Patient CAS-One[®] IR Switch

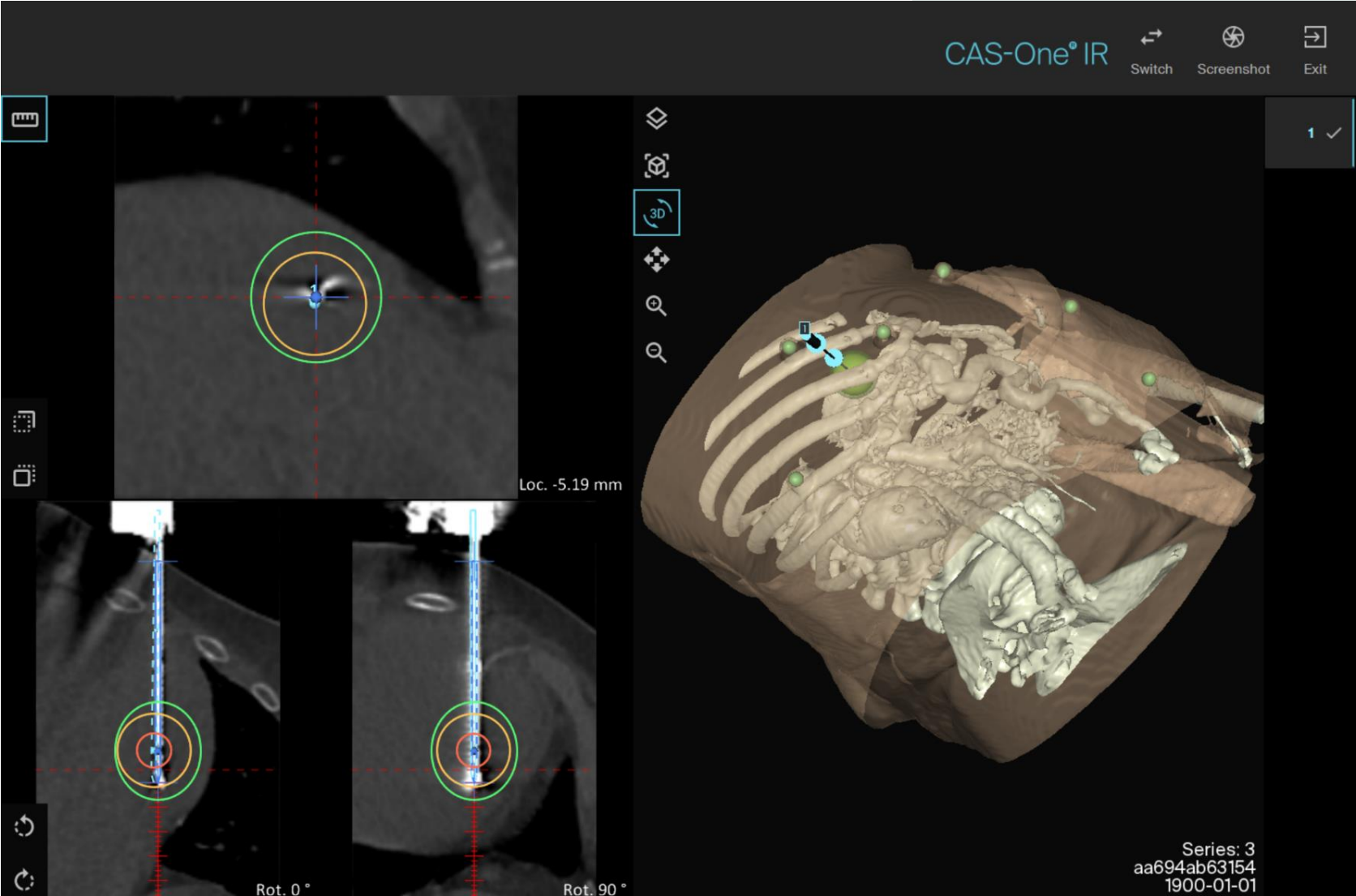
Trajectory
 Target position
 Entry position
Target
 Boundary
 Margin 8
Intervention
 Device Medtronic - Emprint
 Instrument Emprint
 Reference In-Vivo Liver
 Ablation Power 100 W
 Time 10:00

Series: 3
 Modality: CT
 aa694ab63154
 1900-01-01
 100% 0%
 Loc. -118.11 mm
 Trajectory length: 111.1 mm

Series: 3
 Modality: CT
 aa694ab63154
 1900-01-01
 0% 100%
 Loc. -118.11 mm
 Trajectory length: 111.1 mm

Series: 9
 Modality: MR
 aa694ab63154
 1900-01-01
 Loc. -118.40 mm
 W 350
 C 35
 All trajectories All ablations Load
 Patient: aa694ab63154

Case 3



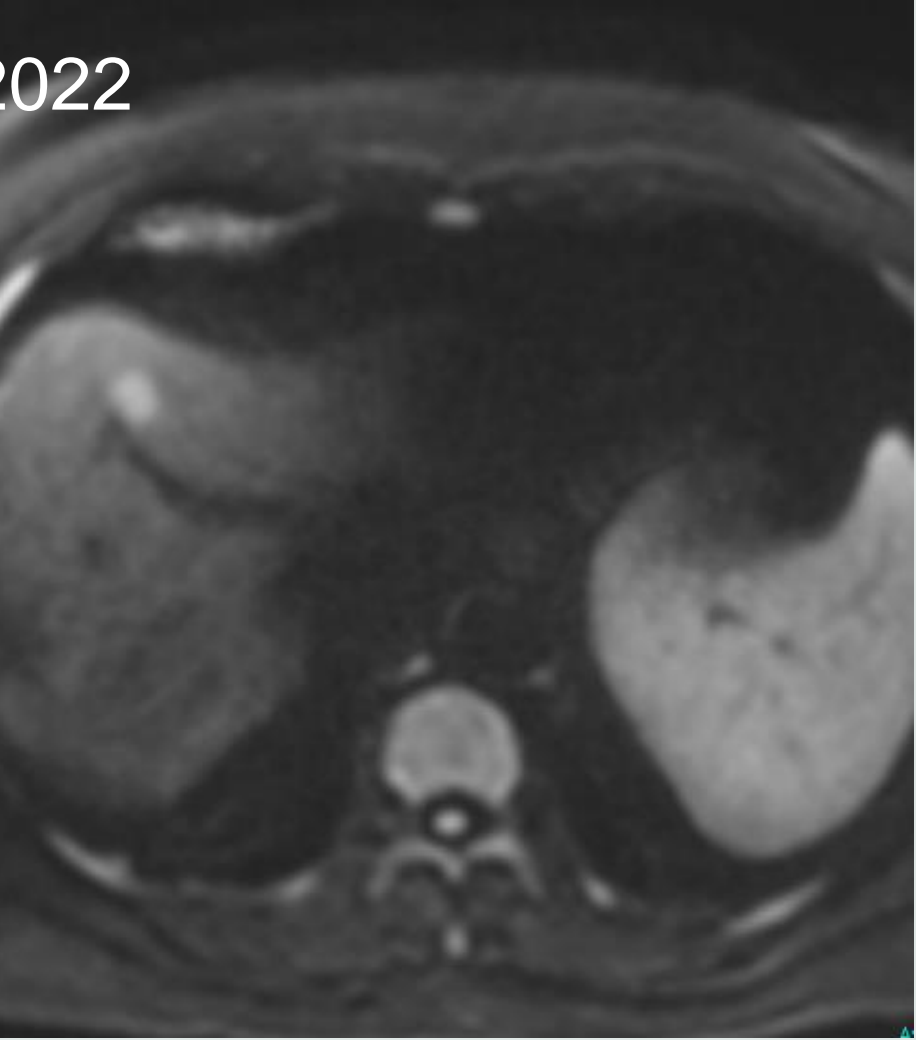
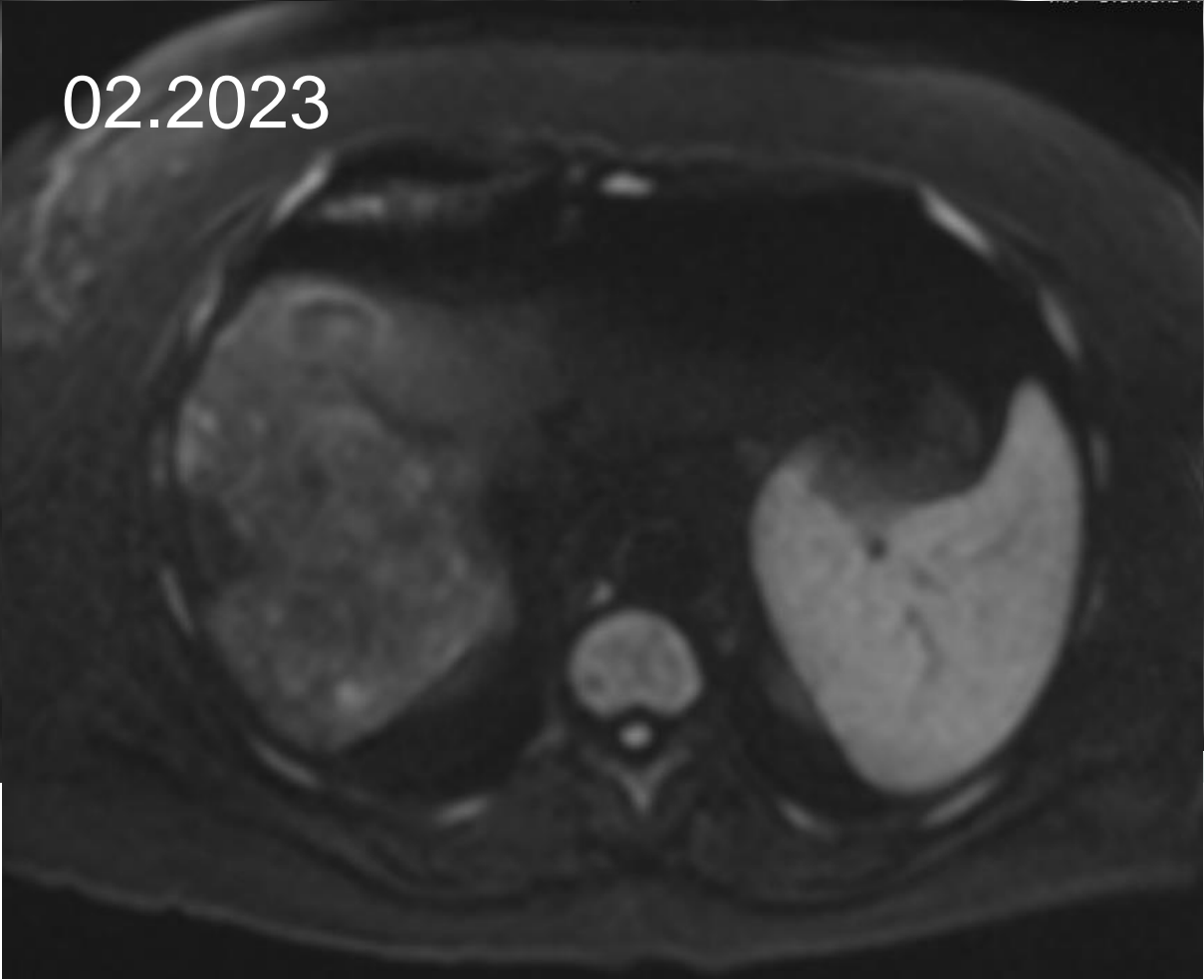
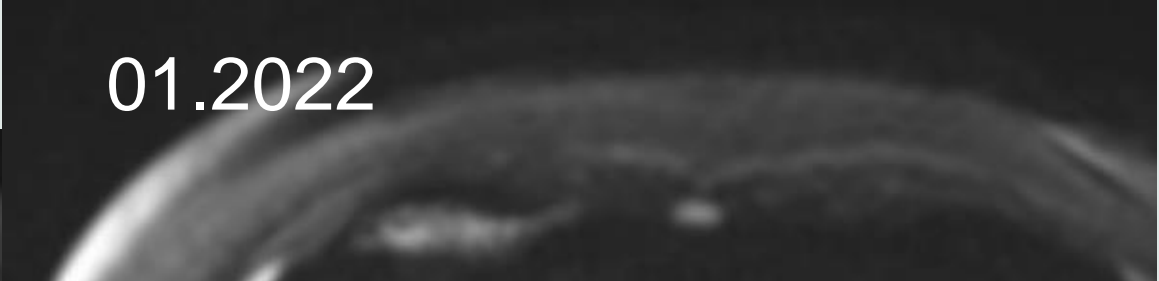
Case 3

The screenshot displays a medical planning software interface with a dark theme. At the top, a navigation bar includes icons for Plan, Fuse, Place, Verify, and Assess. The 'Assess' icon is highlighted with a blue box. Below the navigation bar, the interface is divided into several panels:

- Left Panel:** Shows a CT scan in axial view. A target area is outlined in green, with a blue crosshair and concentric orange and red circles representing the ablation zone. The text 'Verify coverage of ablation zone.' is visible at the bottom left.
- Middle Panel:** Shows a CT scan in axial view with a blue trajectory line starting from a point labeled '1' and ending at the target area. The text 'Trajectory length: 111.1 mm' is visible at the bottom.
- Right Panel:** Shows two MR scan slices in axial view. The top slice shows a target area with a blue trajectory line and a location label 'Loc. 4.81 mm'. The bottom slice shows a target area with a blue trajectory line and a location label 'Loc. -118.40 mm'. The text 'Series: 9 Modality: MR aa694ab63154 1900-01-01' is visible at the bottom right.

On the far right, a vertical sidebar contains a 'Browser' icon and a list of items: 'Trajectory', 'Target po', 'Entry po', 'Target', 'Boundary', 'Margin', 'Intervent', 'Device', 'Instrument', 'Reference', and 'Ablation'. At the bottom right, there is an 'All trajectory' icon.

Case 3



Case 4

- 77y old patient
- Known CCC / Klatskin Tumor
- Resektion / Anastomosis 2020
- New single hepatic lesion:
 - Seg. V
 - In close contact with anastomosis/intestines
 - PET +
- Pt. refused hemihepatectomy

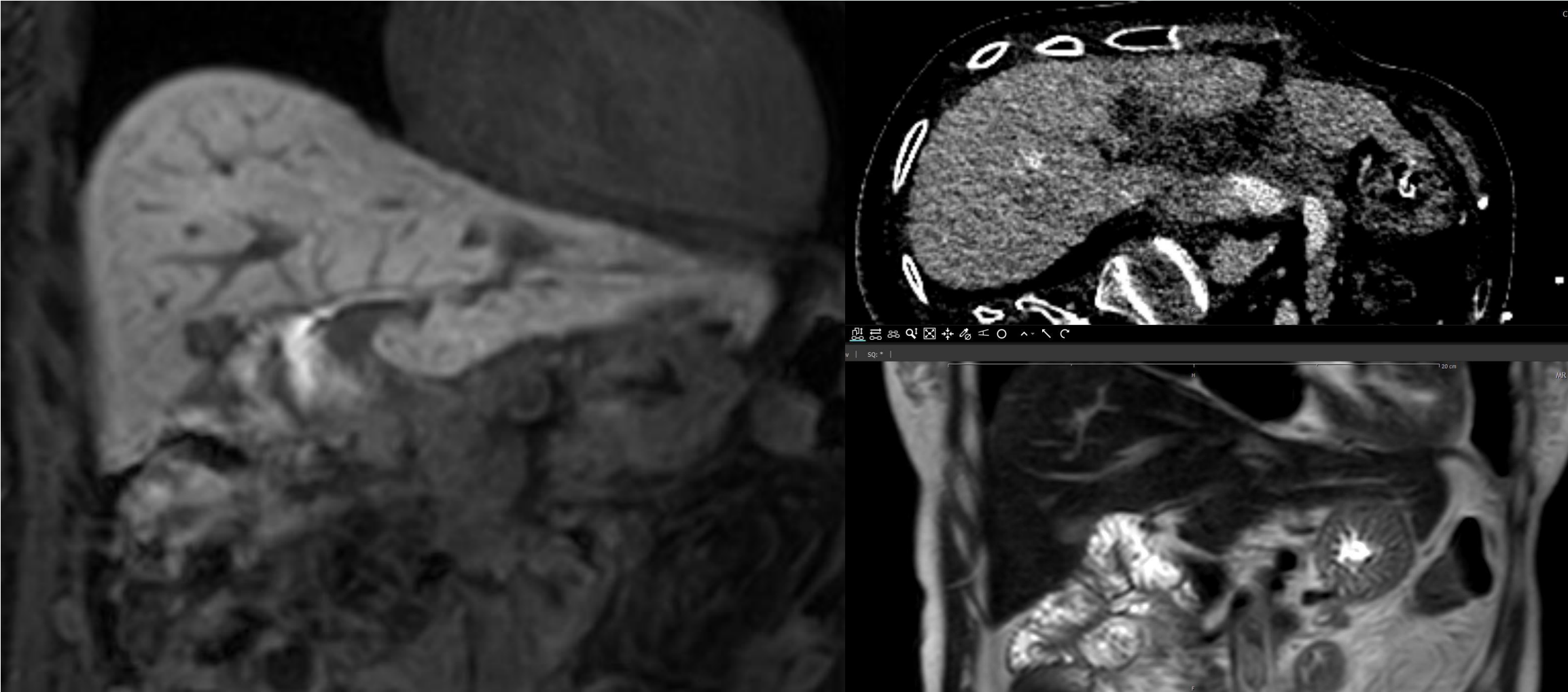


Case 4

- 77y old patient
- Known CCC / Klatskin Tumor
- Resektion / Anastomosis 2020
- New single hepatic lesion:
 - Seg. V
 - In close contact with anastomosis/intestines
 - PET +



Case 4

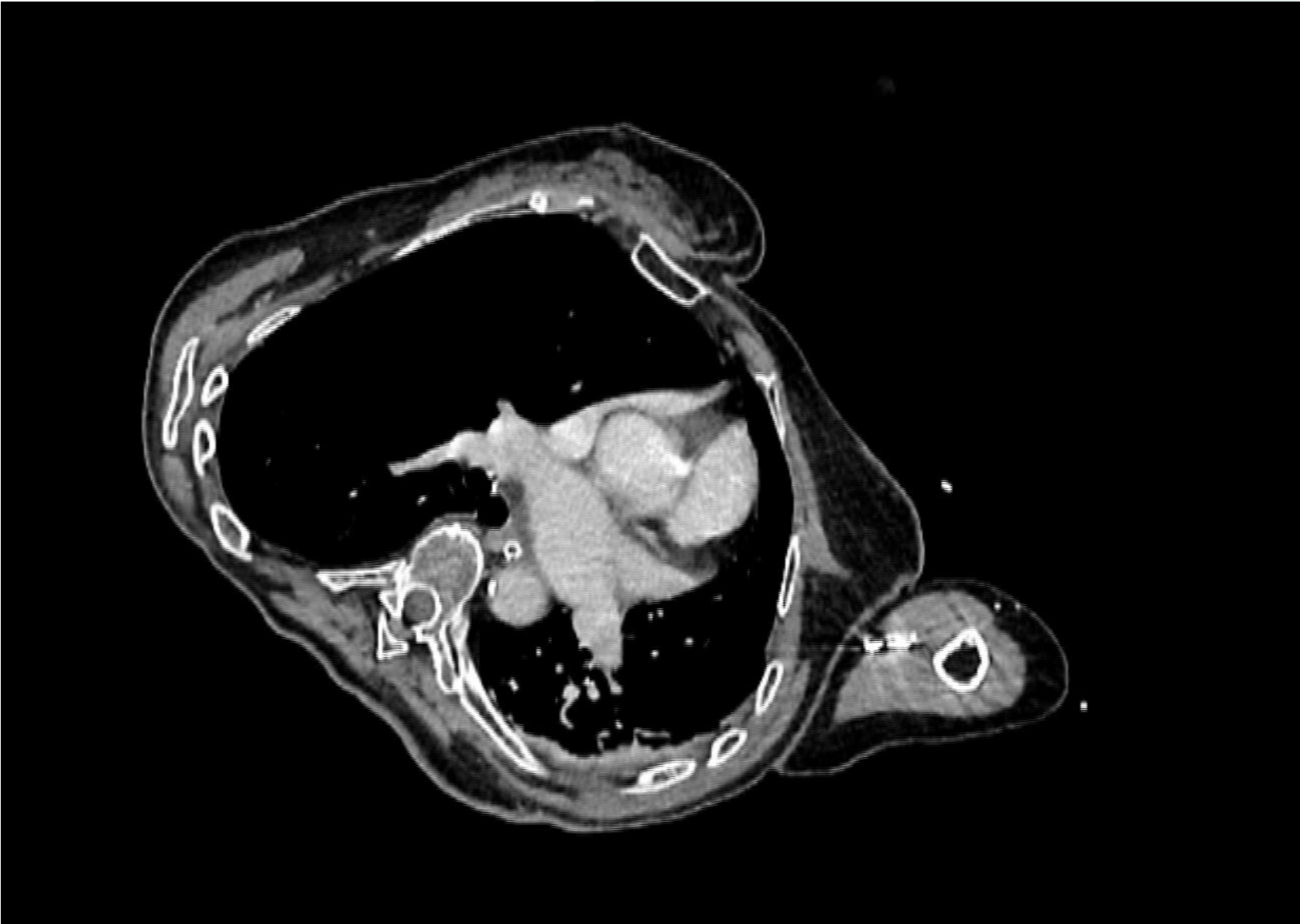


Case 4

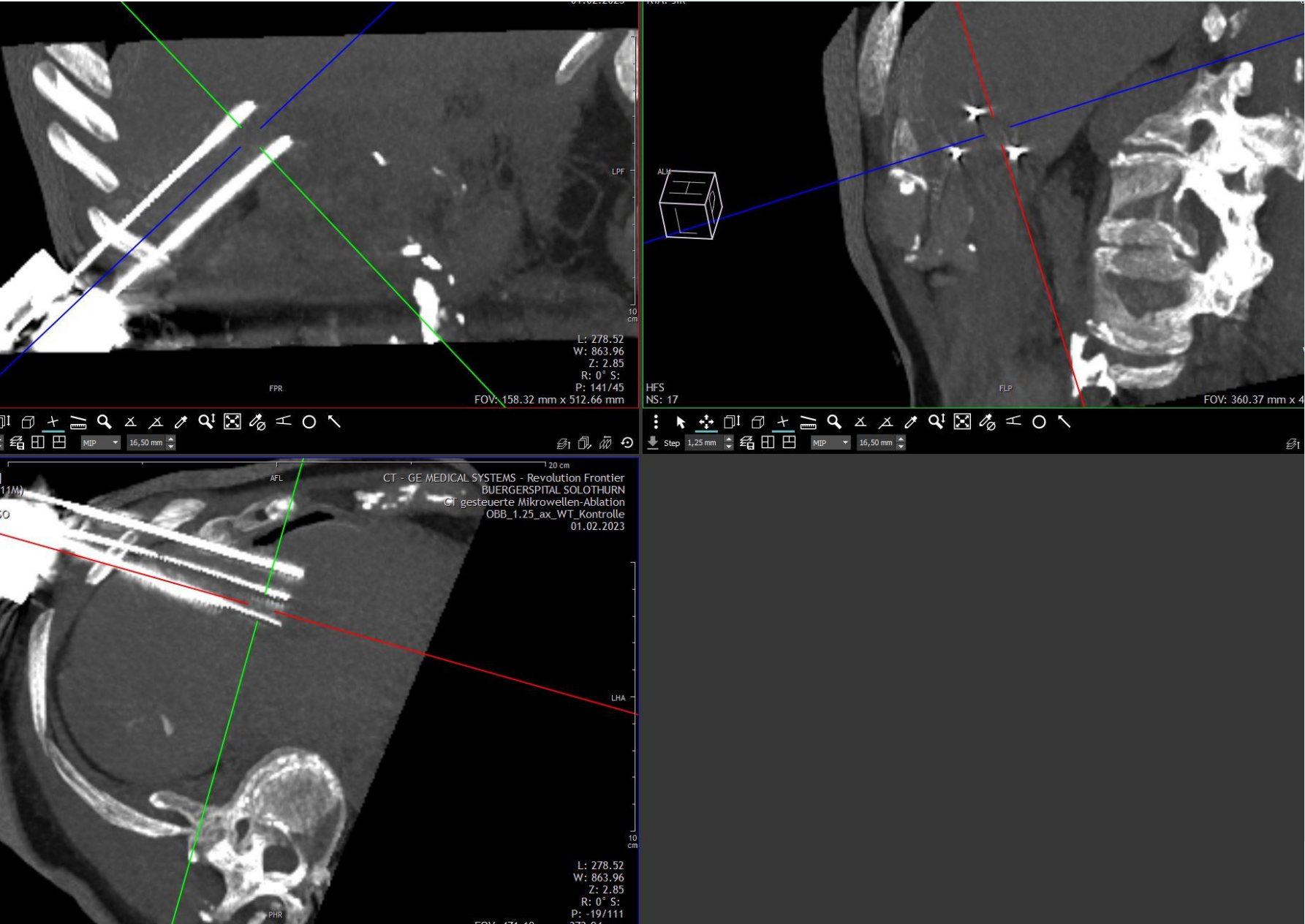
- 77y old patient
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- Resektion / Anastomosis 2020
- New single hepatic lesion:
 - Seg. V
 - In close contact with anastomosis/intestines
 - PET +
- Pt. refused hemihepatectomy
- Options - IRE



Case 4



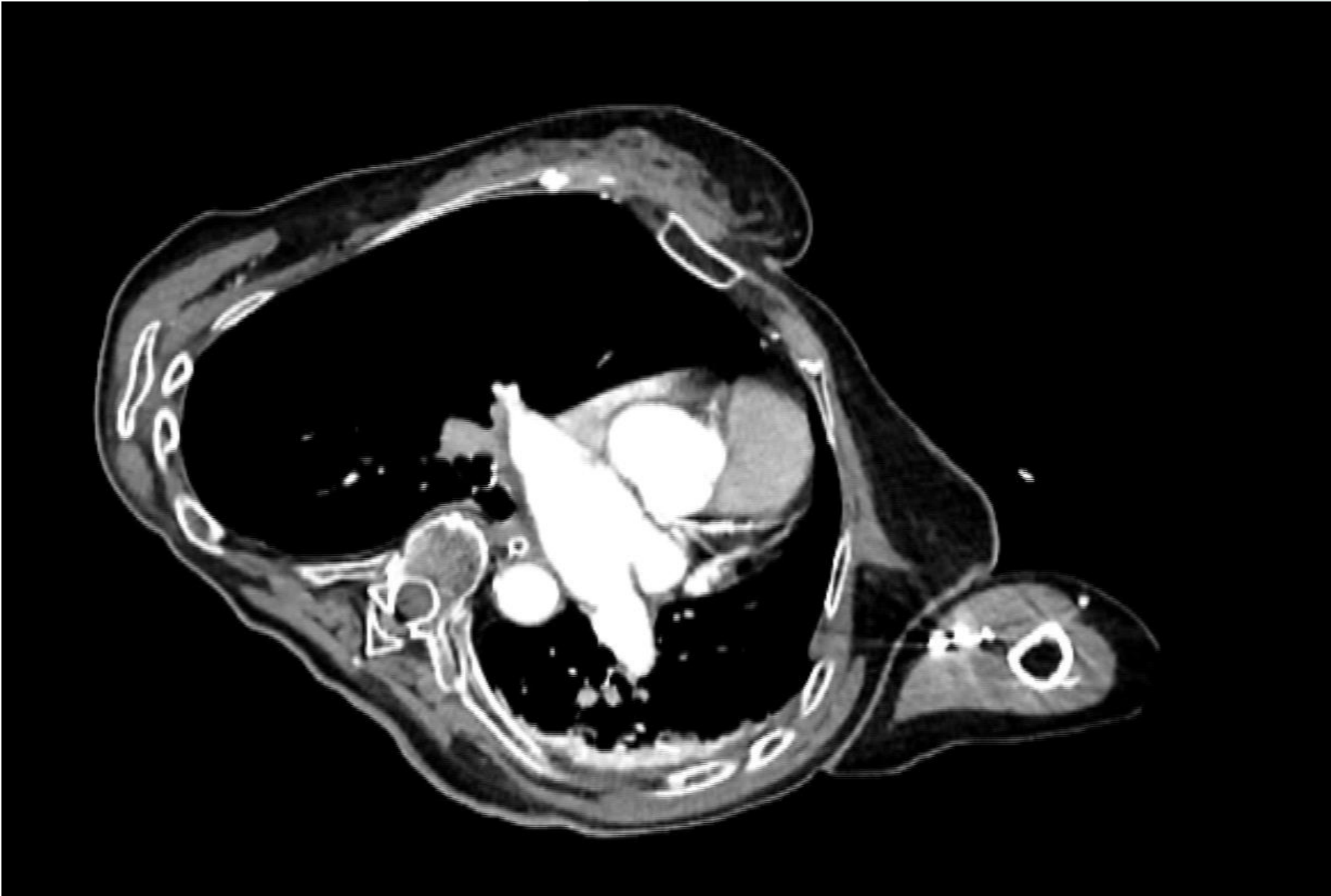
Case 4



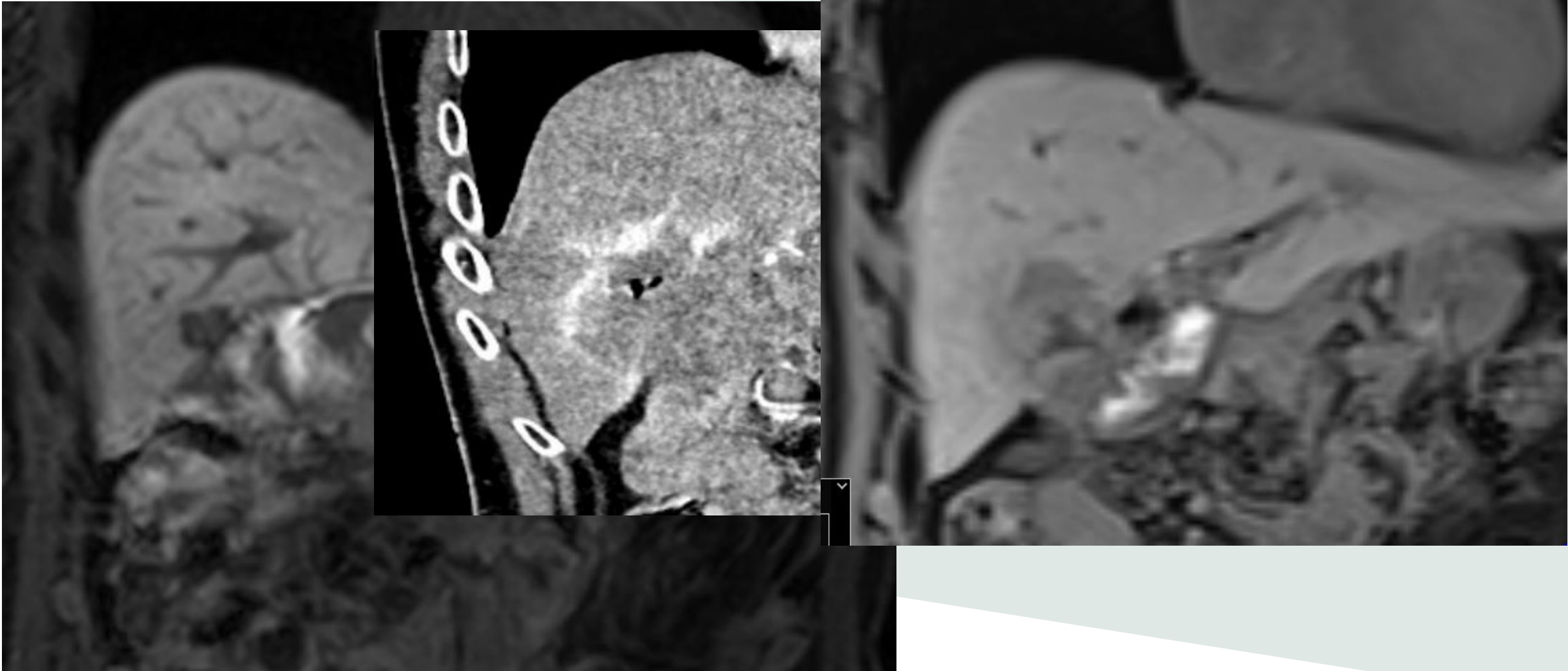
Case 4



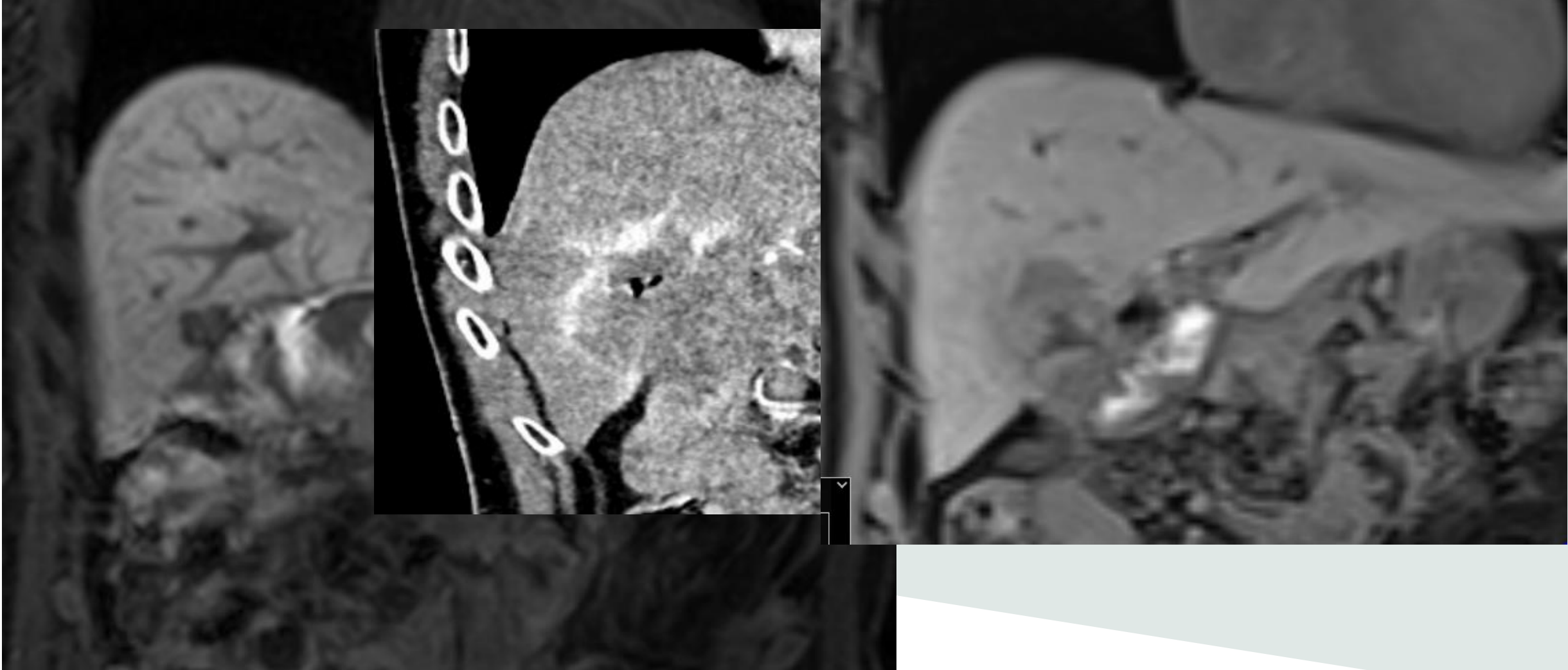
Case 4



Case 4



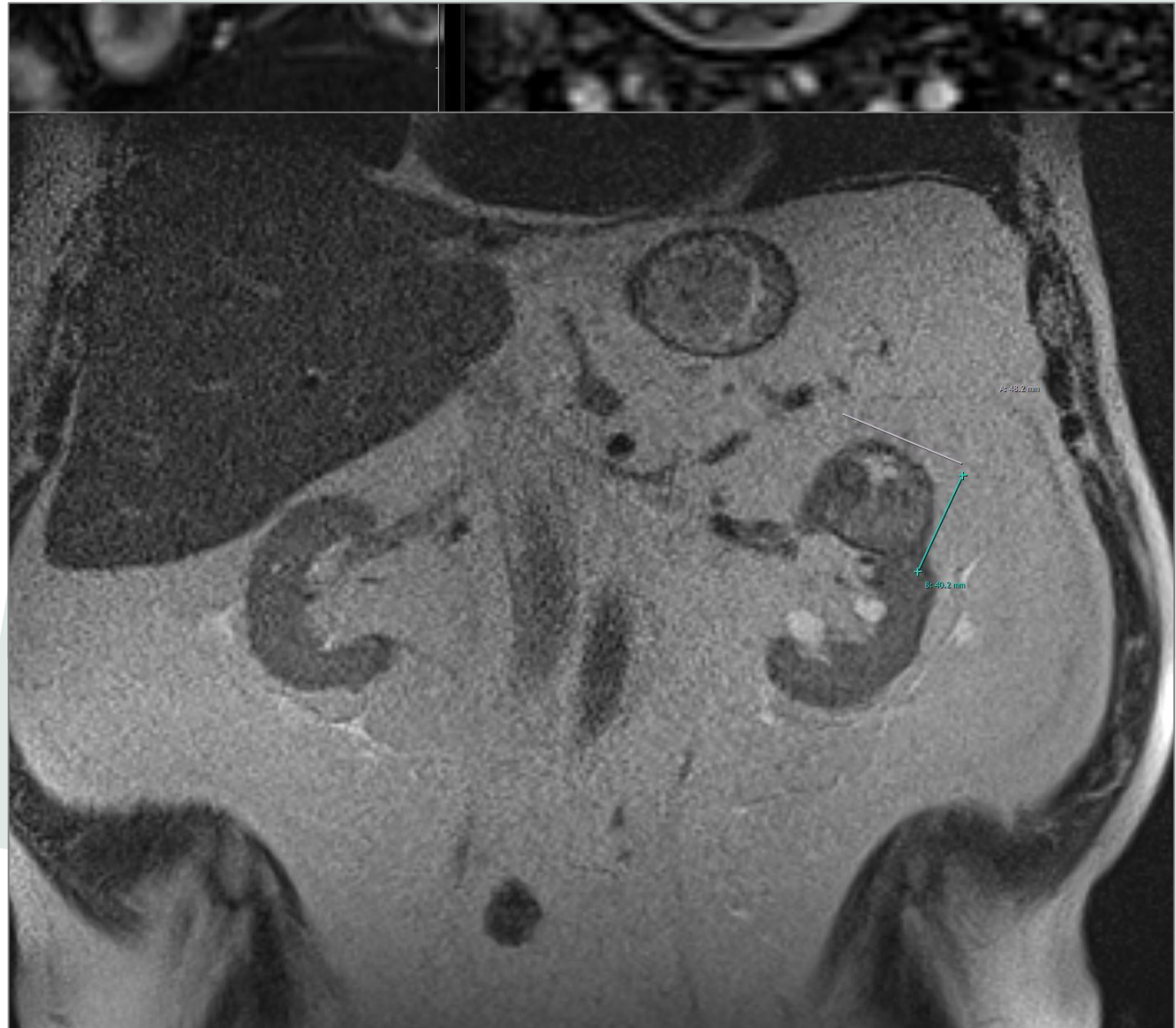
Case 4



Case 5

- 83yrs old patient
- Enlarging 5cm RCC left kidney
- Cardiac comorbidities, obese, surgically unfit

- Minimal-invasive alternative:
 - Embolization first
 - Cryoablation



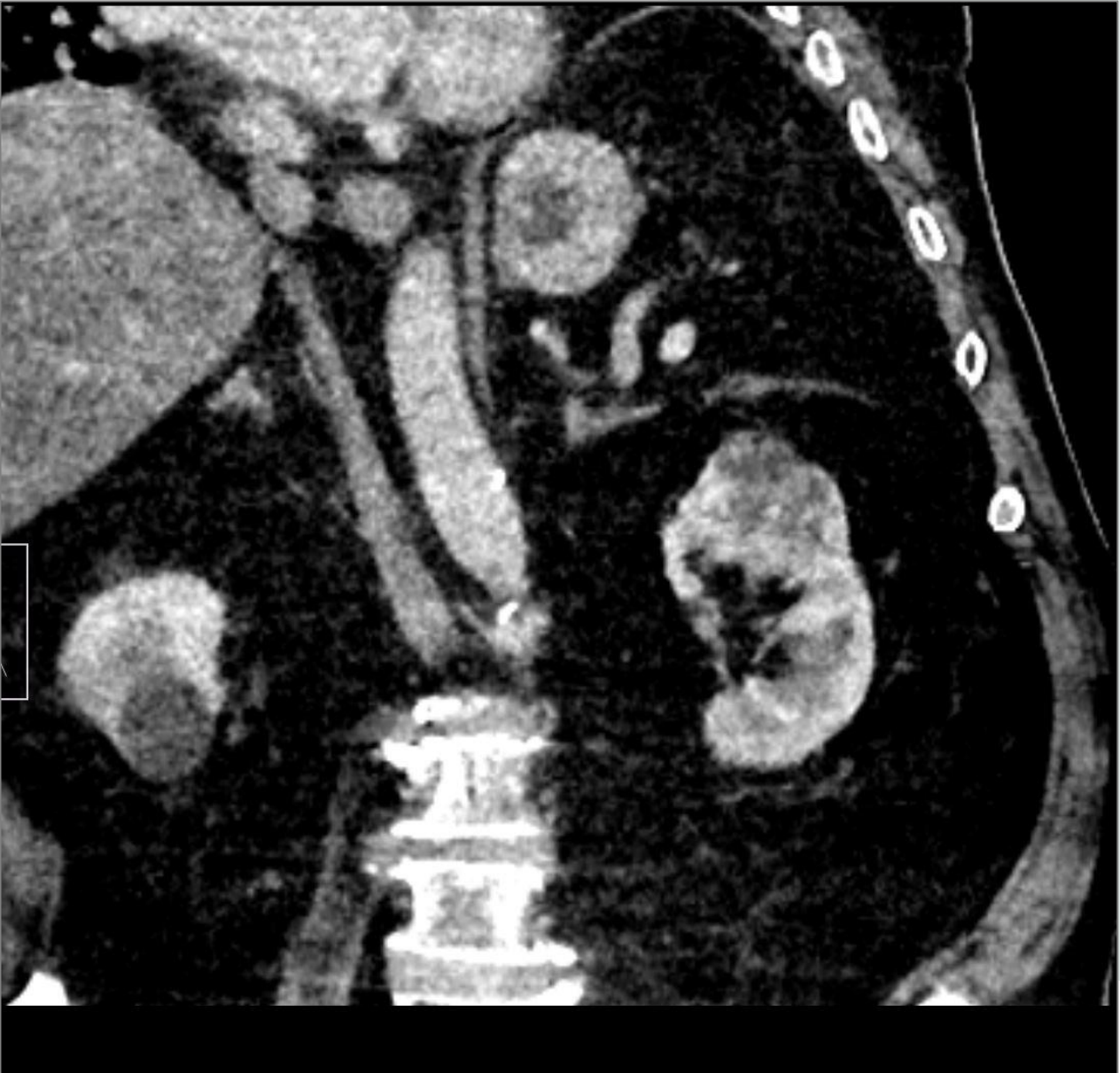
Case 5

- 83yrs old patient
- Enlarging 5cm RCC left kidney
- Cardiac comorbidities, obese, surgically unfit

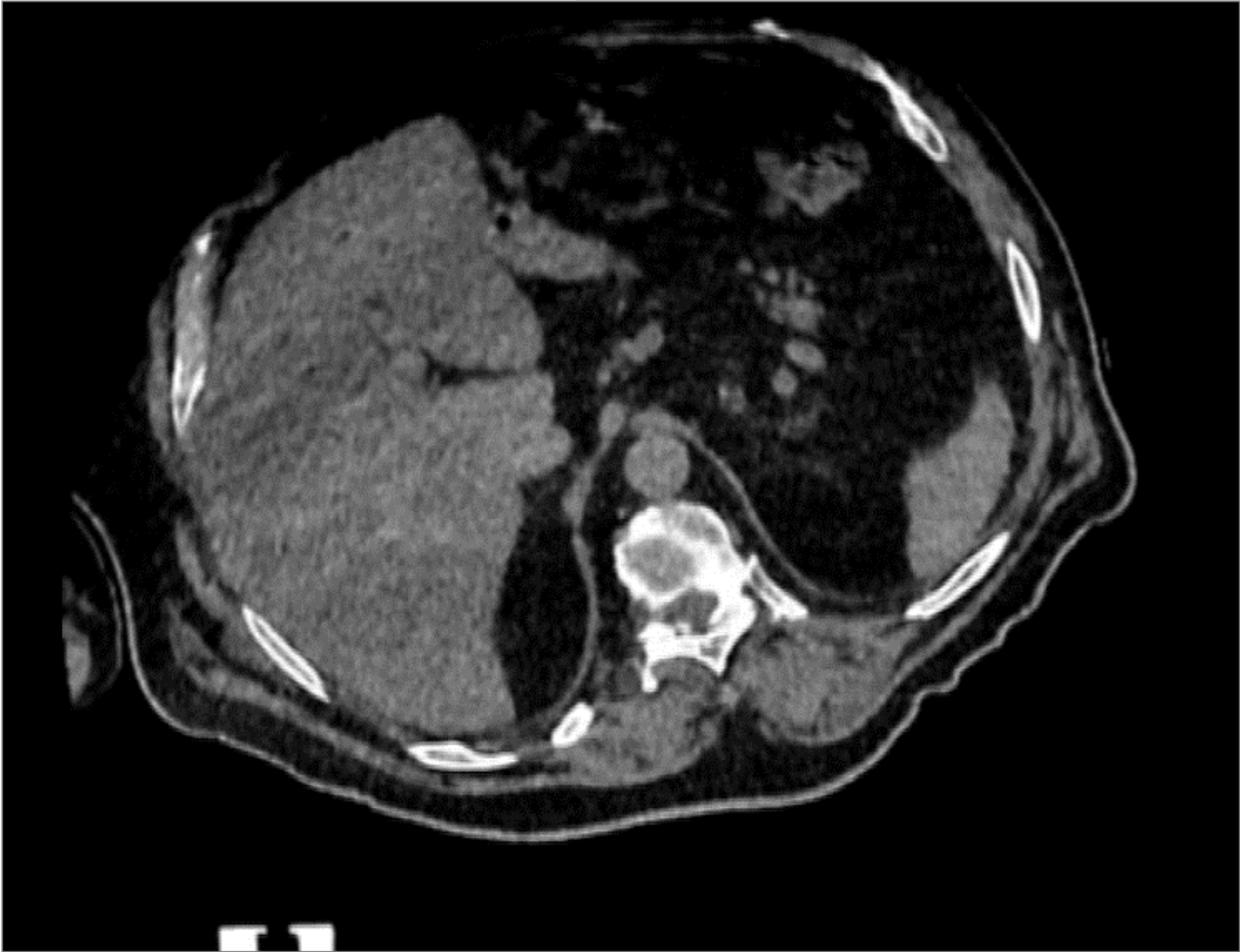
- Minimal-invasive alternative:
 - Embolization first
 - Cryoablation



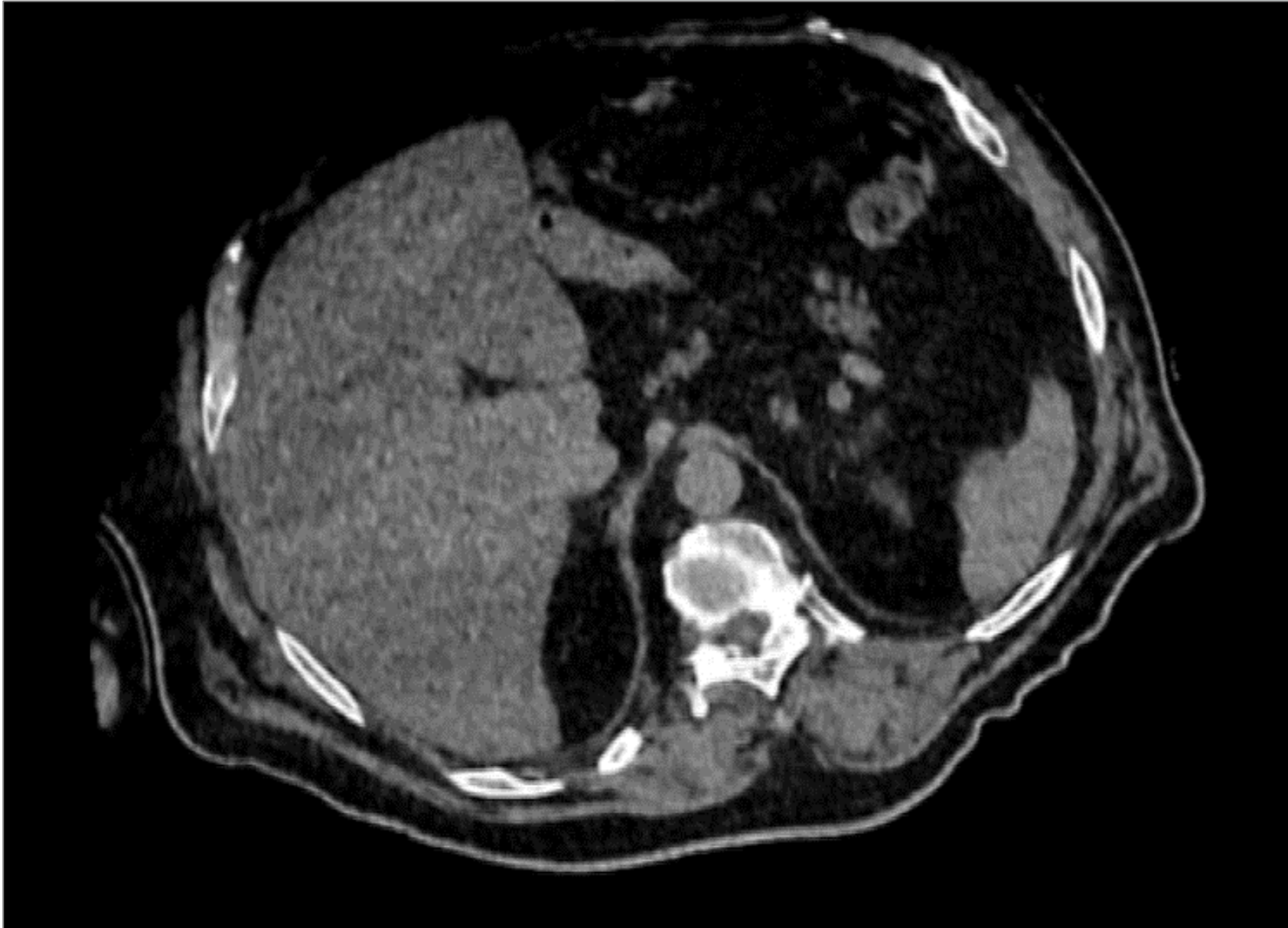
Case 5



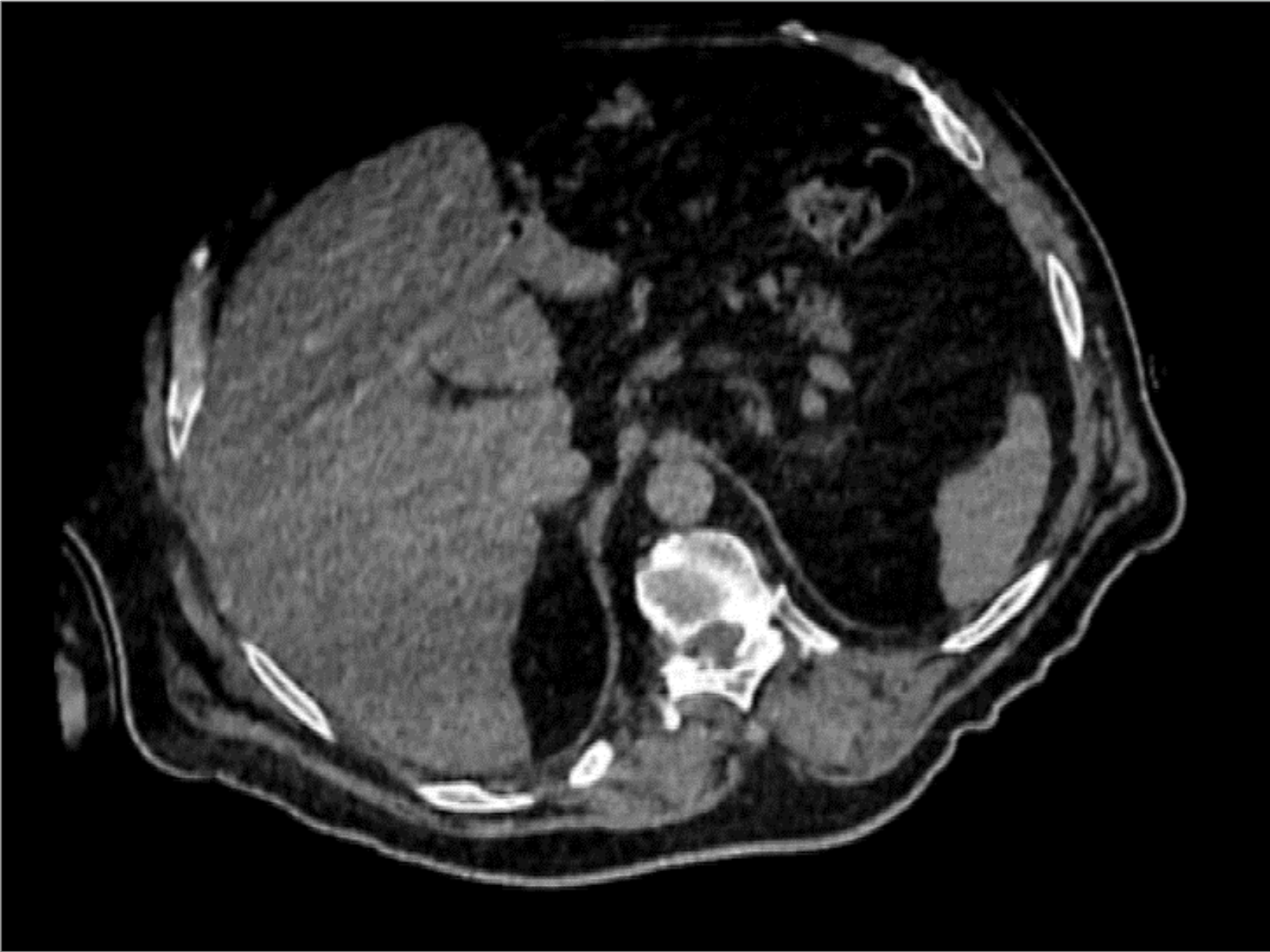
Case 5



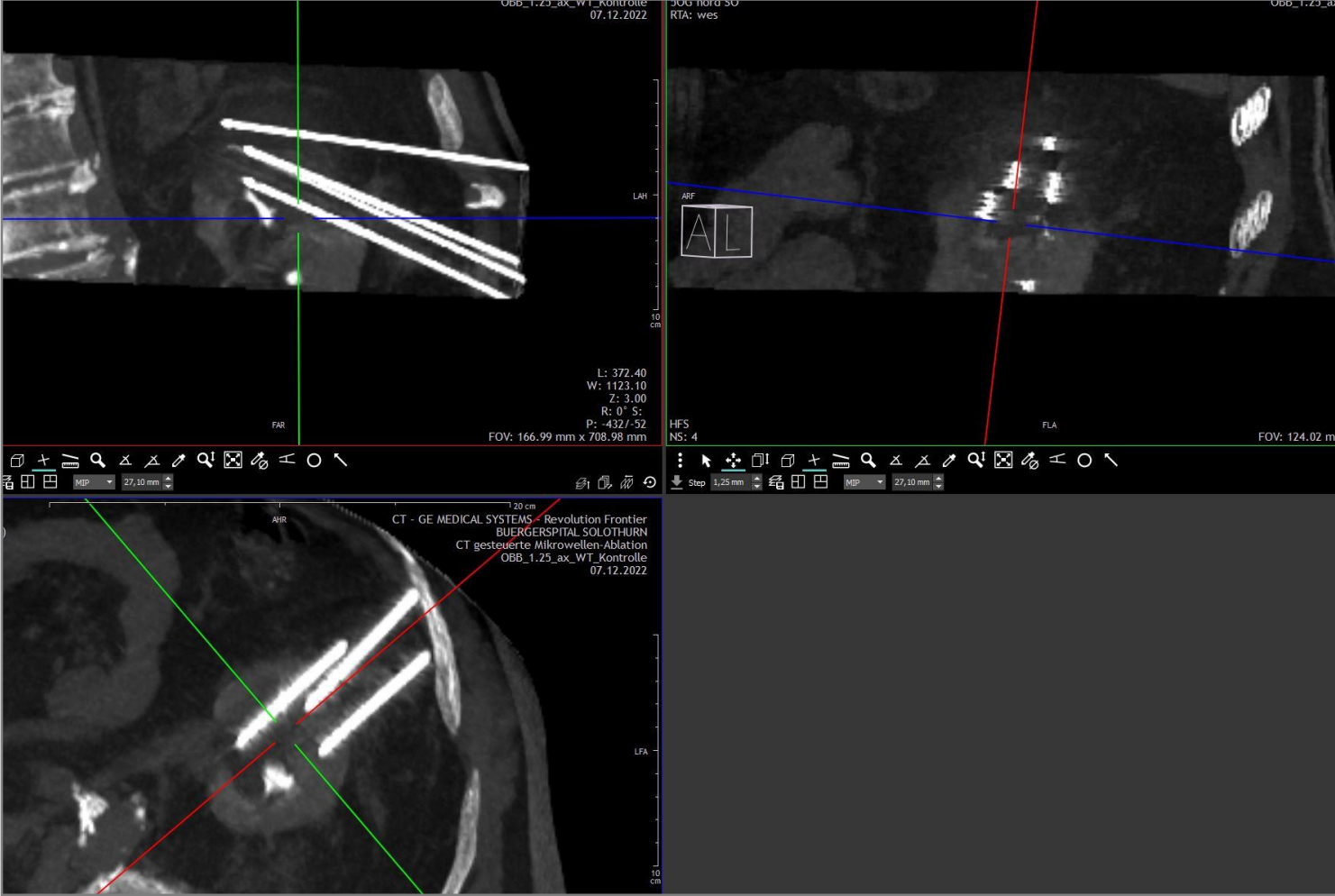
Case 5



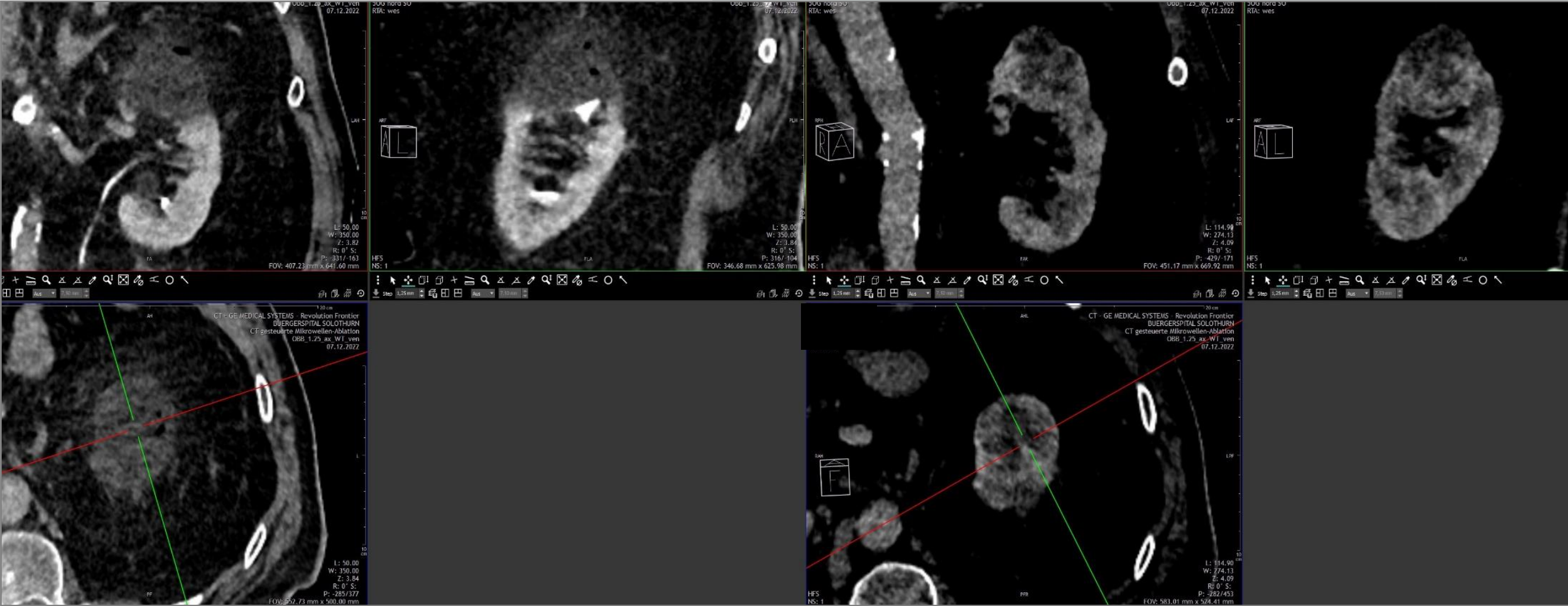
Case 5



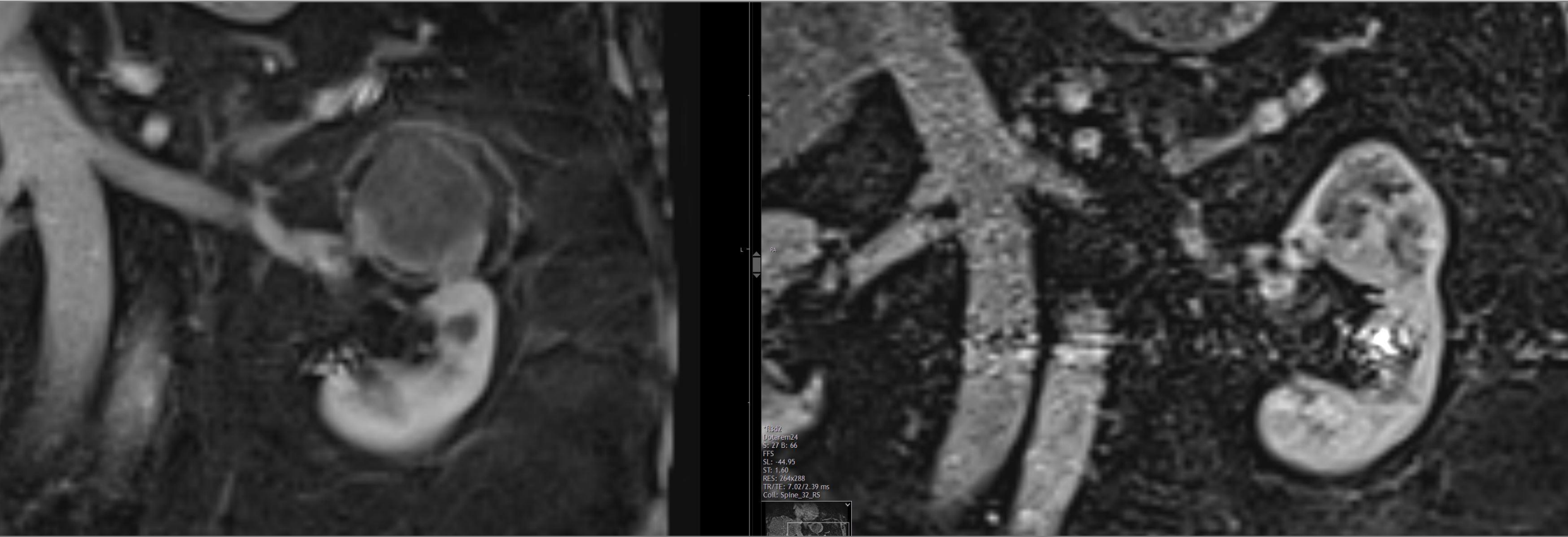
Case 5



Case 5



Case 5 – FUP @ 6 Months



Percutaneous stereotactic ablation of liver lesions

- Single Session
- Biopsy
- Exzellent results up to 3 cm

- Less «invasive» than surgery
- More «invasive» compared to SBRT
- Multiple ablations possible

- Always interdisciplinary treatment approach
- Patient centered

Danke für die Aufmerksamkeit



Source: Sbb.ch