CASCINATION

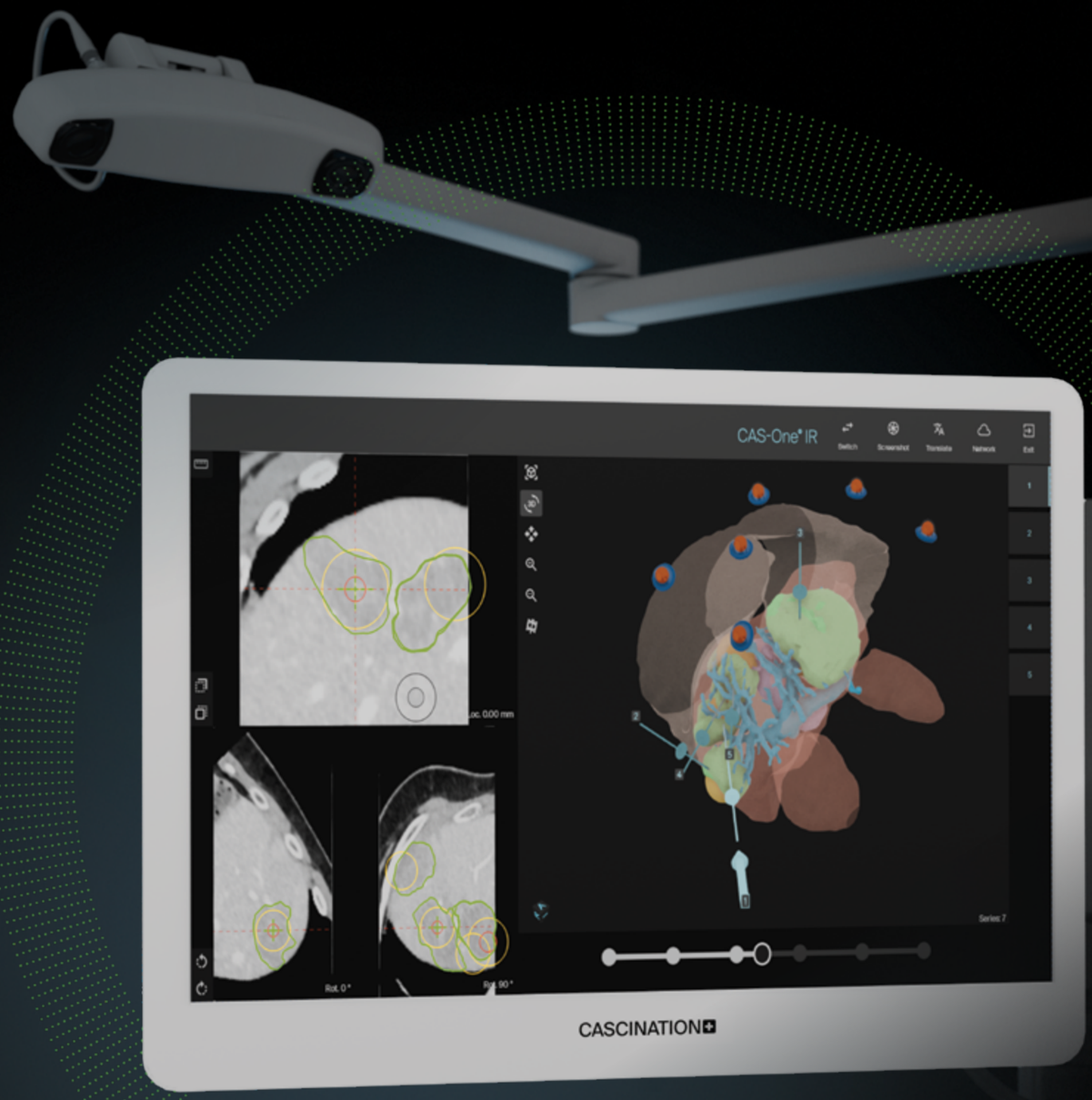
Quality Ablation with
CAS-One® IR

Top Cases 2023

unlock ablation

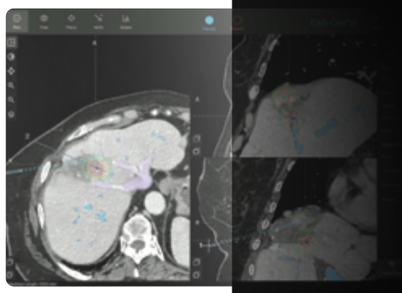
Over 1,600 Cases – Planned, Executed and Confirmed in 2023 by Dedicated Physicians from Around the World

Every month, our team hand picks the most intriguing, intricate, and impactful cases that epitomize the capabilities of CAS-One IR. Among these, we annually crown one case that genuinely shines above the rest.



We congratulate Dr. Christian Weiergang and Dr. Farida Hashimi from Sahlgrenska University Hospital in Gothenburg, Sweden for winning the Top Case of 2023.

A Decade of Excellence
10 Years of Better Outcomes
CAS-One® IR



Case 01

Prof. Dr. Romaric Loffroy
CHU Dijon, France

63y ♀ | L | Cryo

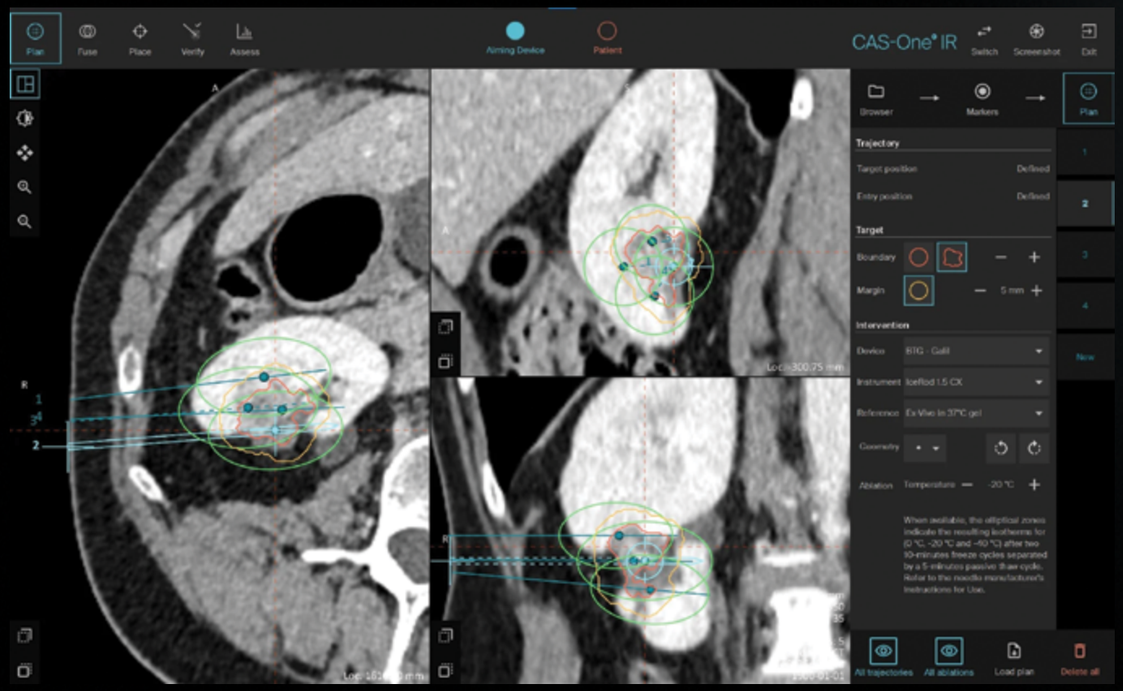
Cryoablation of large kidney lesion post-nephrectomy to preserve renal function

The team at CHU Dijon (France) performed this CAS-One IR case on a patient with a need to preserve renal function due to a left nephrectomy. A multi needle cryoablation (Boston Scientific) of a lesion in the right kidney was performed with precise bracketing to ensure significant iceball coverage. Post-ablation confirmation showed technical success with sufficient margins.

Initial condition In 2006, the patient was initially diagnosed with T2N0M0 grade 3 clear RCC of the left kidney, which was treated with a full nephrectomy. Two new lesions were discovered on the right kidney in 2022, a large lesion (21 x 16 mm) in the inferior part of the kidney and a smaller (10 x 10 mm) invisible lesion. In the period between 2006 until the discovery of the two suspected lesions in 2022, the patient remained under surveillance, but no oncological activity occurred.

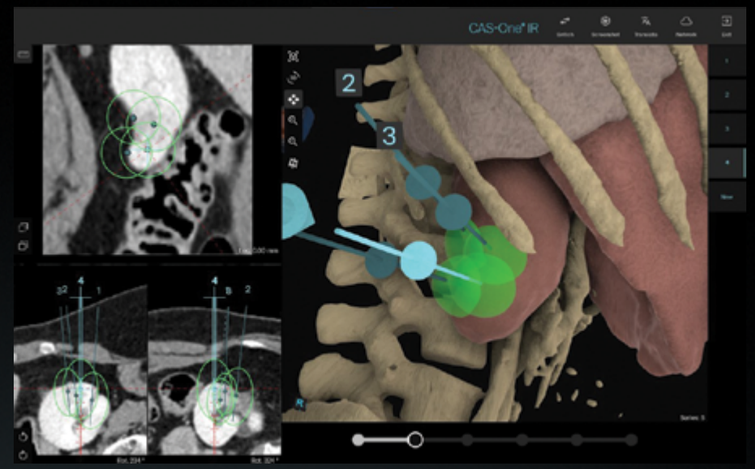
Treatment The decision was made to perform a cryoablation of the large lesion, with sufficient clinical margins, using CAS-One IR guidance in order to preserve the renal function of the solitary kidney. A four-needle arrangement was planned to provide coverage of the lesion and margins, but also to preserve tissue. The four needles were successfully navigated, positioned and ablated. For the smaller lesion, further treatment will be postponed until renal functionality and tumor growth is assessed post-ablation.

Result The cryoablation ice ball showed coverage of the lesion and the treatment was a technical success. Ablation confirmation (AblaSure) confirmed good coverage of the tumor and clinical margins (A0 ablation). Sufficient preservation of healthy tissue on the superior aspect of the kidney was also confirmed. The patient did not have any complications during the treatment. No haematuria was present after and non other complications were observed post-procedure. Quality Ablation provided the user with a certain tissue-sparing approach, facilitating a fast recovery, less complications thus better treatment outcomes and prognosis for the patient. A CT/MRI follow-up is scheduled in 6 weeks.

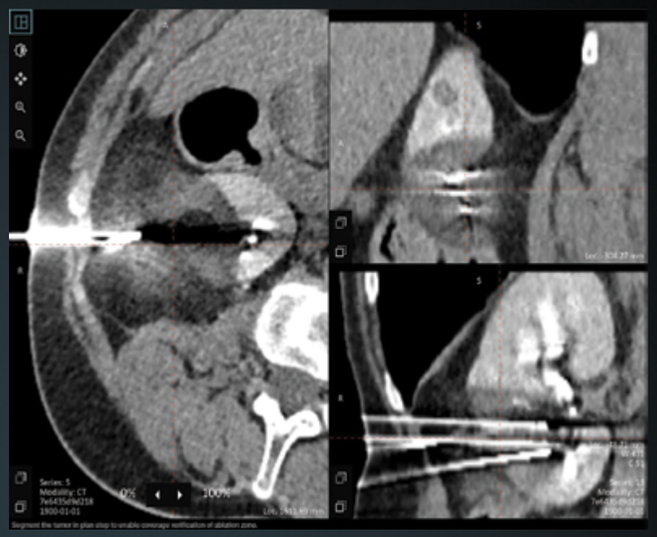


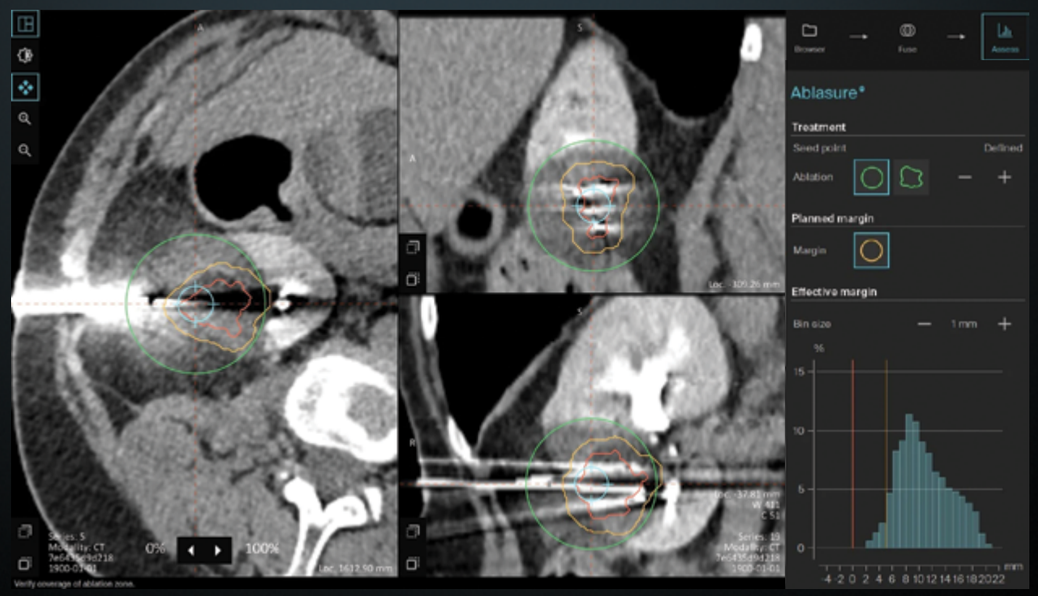
Planning with CAS-One IR, a four-needle overlapping plan as shown in MPR.

Needle-eye views



Four needles positioned according the predefined plan





Ablation confirmation with AblaSure, proving technical success with clear margins

Case 02

Dr. Simon Smith
Ipswich Hospital - East Suffolk and North Essex NHS Foundation Trust, UK

81y ♂ | IV/VIII | MW

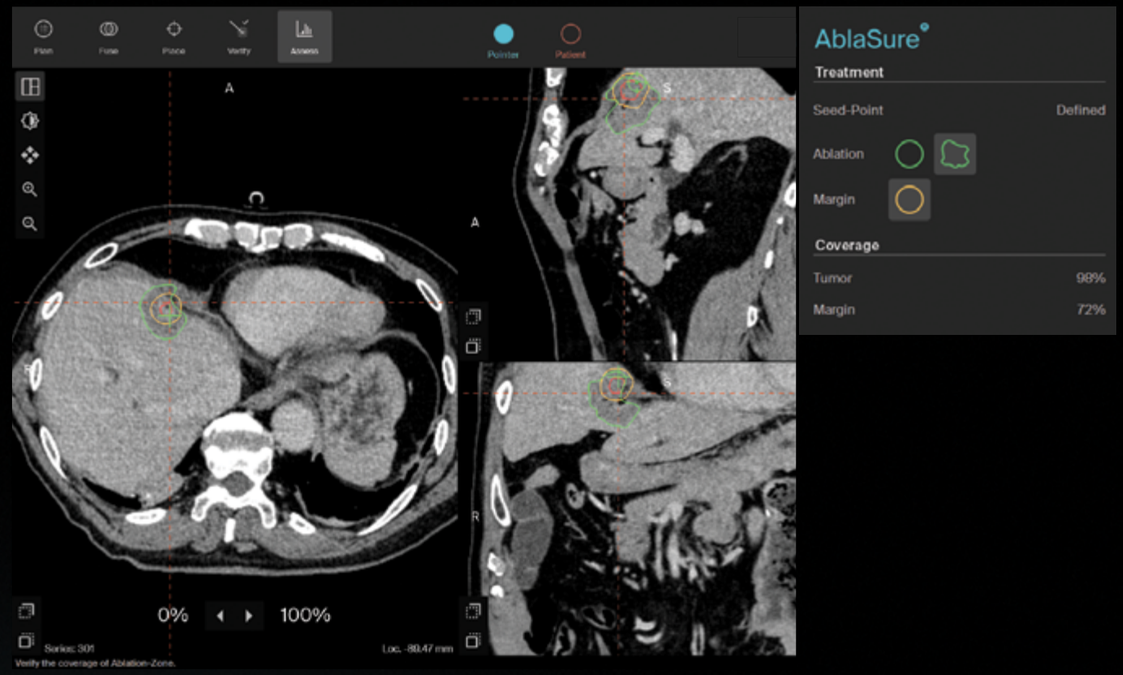
Accessing a high liver dome lesion close to the heart

The patient was diagnosed with colorectal cancer in 2021 and a partial colon resection was performed. Months later, they returned via the multidisciplinary tumor board with a CRLM very close to the heart. Surgery was considered, but the patient was referred for ablation. CAS-One IR made this challenging case straightforward with a single probe approach, and the one-month follow-up shows a complete ablation and no local recurrence.

Initial condition The patient was diagnosed with T3N1 colon cancer in 2021 and was treated with a right hemicolectomy. Follow-up in 2022 revealed a solitary liver metastasis in segment IV/VIII. Surgery was considered, but the MDT advised for a percutaneous ablation with CAS-One IR.

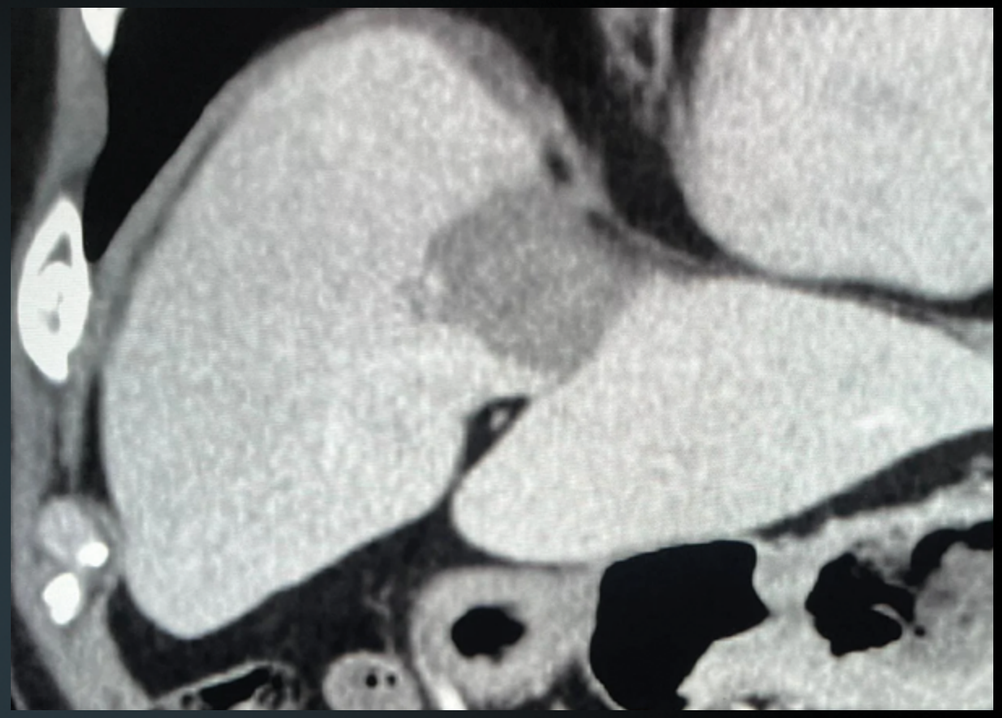
Treatment The location of the lesion was not able to be reached with US. Considering the proximity to the heart, CAS-One IR was chosen for its highly accurate targeting. A single trajectory of about 15 cm was planned and achieved in the first attempt. An ablation at 150W for 4.5 minutes with the Medtronic Emprint needle was completed. AblaSure was used to confirm adequate margins.

Result Discharged after one day without any complications, the patient had a one-month CE-CT follow-up with total tumor response after ablation. This difficult trajectory was safely planned and placed using CAS-One IR navigation capabilities, avoiding needle advancement through the lung and with a safe distance to the heart.



Ablation assessment in MPR showing the margins and the quantitative margin assessment tool, AblaSure

Needle verification image in MPR showing estimated ablation zone in respect to actual needle position



Ablation zone visible on CE-CT scan after one-month follow-up

Case 03

Dr. Lisa Klompenhouwer
The Netherlands Cancer Institute, Netherlands

69y ♀ | VII | Cryo

Metastatic SCLC lesion in the liver dome, treated safely with Cryoablation

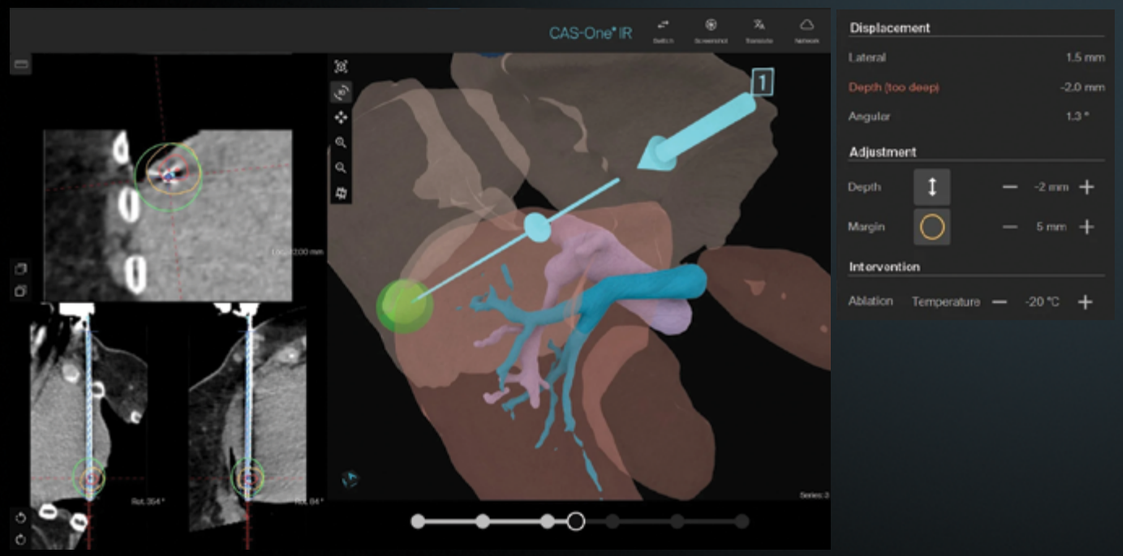
This 69-year-old female patient presented with a metastatic SCLC lesion in segment VII. Cryoablation was chosen due to the need to preserve diaphragmatic tissue. CAS-One IR assisted in the safe planning of this steep inferior-to-superior trajectory, resulting in needle placement with a 1.5 mm lateral error. The patient experienced no complications during the procedure.

Initial condition The patient was initially diagnosed with T1bN2M0, stage 3A, SLCC in the right lower lobe of the lung. The patient underwent chemo- and radiotherapy for the treatment of the lung lesion, where she developed several pulmonary embolisms. The patient developed liver mets which disappeared after immunotherapy. Years later the patient developed histology-proven oligoprogression of a prior liver met which was treated locally (thermal ablation and radiotherapy) by the decision of the MDT. During follow-up, CT and MRI showed a new abnormality in the liver, suspected of oligoprogression. Cryoablation was planned for this subcapsular met in segment VII.

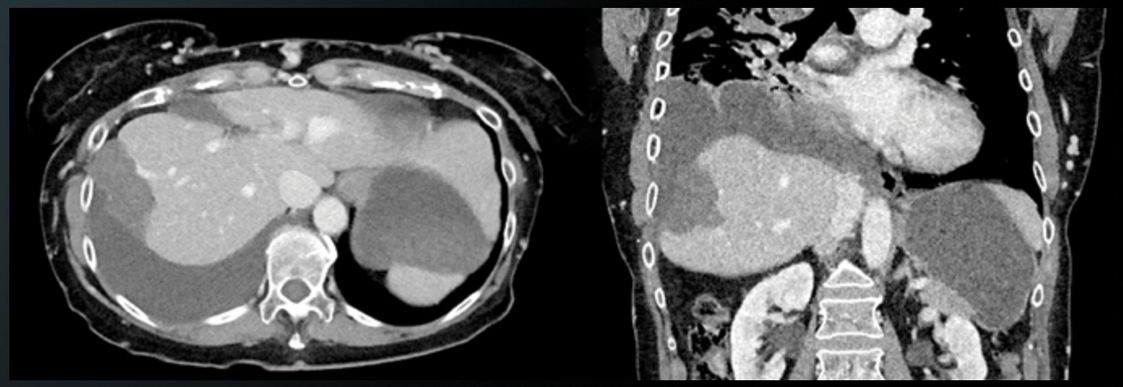
Treatment Cryoablation was the chosen method of treatment in order to preserve the diaphragm. Hydrodissection was not possible due to multiple prior local treatments. A single needle was planned with an inferior to the superior oblique trajectory, to prevent advancement through the lung. The needle was inserted successfully, with very minimal displacement. The post-ablation CT was taken before the end of the freezing cycle to verify the ablation zone at its largest size, before thawing. Complete ablation of the tumor and clinical margin was observed. The patient experienced no complications during the procedure.

Result This difficult trajectory was safely planned and placed using CAS-One IR navigation capabilities, avoiding needle advancement through the lung. One month follow-up showed a complete ablation. Three month post-procedural follow-up showed no sign of recurrence, however the patient did develop a new lesion in liver segment V. The patient has a history of reactive pleural oedema possibly due to Vena Cava superior syndrome (as seen on post-op images).

Ablation image showing ablation zone at maximum size, prior to thawing



Needle verification shown in needle plan and 3D view (rendered in version 4.1)



One month follow-up CE-CT showed a complete ablation of the lesion

Case 04

Dr. Christophe Hälg, Dr. Annkathrin Lachner, Dr. Hans Martin Gissler, Dr. Tim Ohletz
Kantonspital Aarau, Switzerland

67y ♂ | L | MW

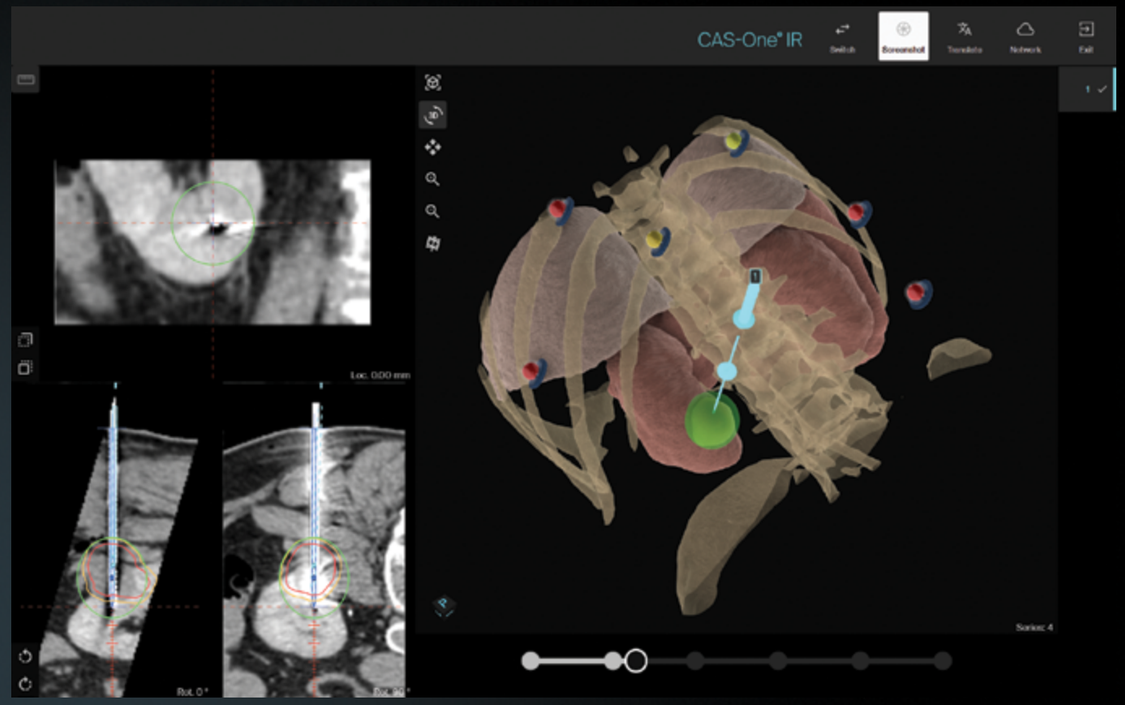
MWA of the kidney with CAS-One IR

A 67-year-old patient with an incidental finding of a 2.3 cm tumor in the lower pole of the left kidney that was discovered during a CT pelvic-leg angiography due to known obstructive arteriopathy. The tumor was treated with MWA by following the Quality Ablation workflow with a curative intent.

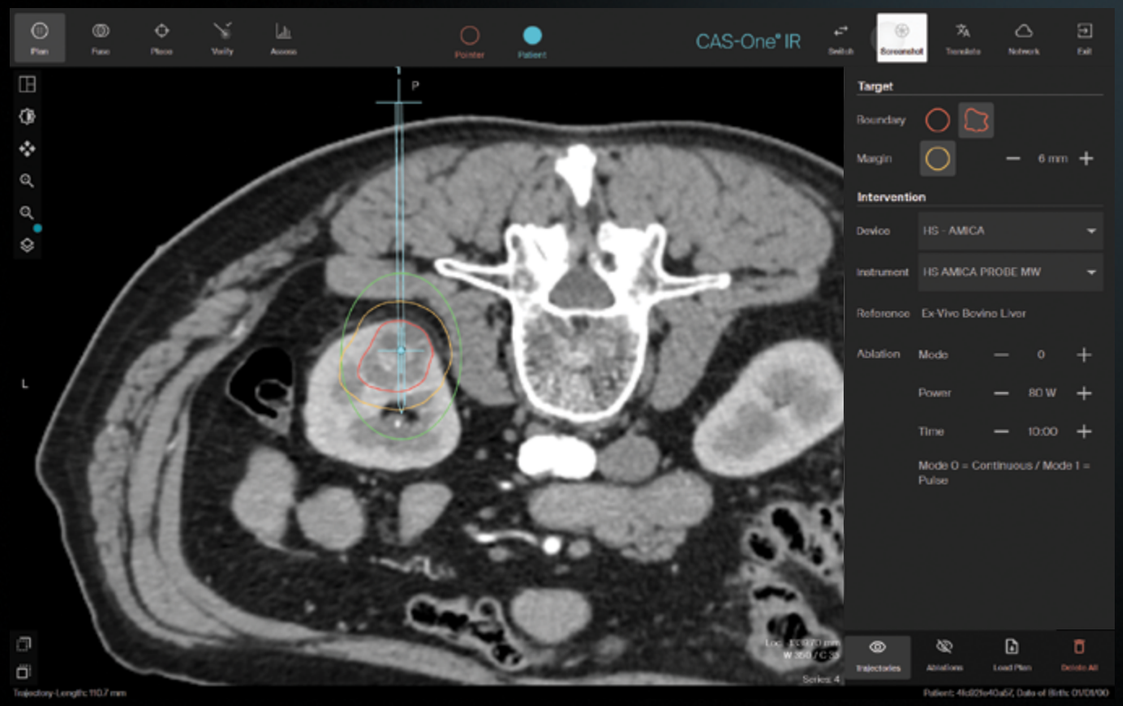
Initial condition Implantation of an aortobifemoral Y-prosthesis in 2008 for Leriche syndrome Metabolic syndrome (type II diabetes mellitus, arterial hypertension, hypercholesterolemia). Hypertensive cardiopathy. A 2.3 cm lesion in the lower pole of the left Kidney was observed during a routing CT-angiography.

Treatment The MDT decided for MWA with CAS-One IR for curative intent. MWA was the chosen method of treatment, as the lesion is exophytic and would not harm any surrounding structures, nor the parenchyma. MWA is faster than Cryo, creates bigger ablation zones with one needle and has less heat-sink effect. CAS-One IR was used to achieve optimal placement of the ablation probe and for documentation of adequate safety distance. A single needle was planned in prone position, to prevent advancement through the colon. The needle was inserted successfully, with very minimal displacement.

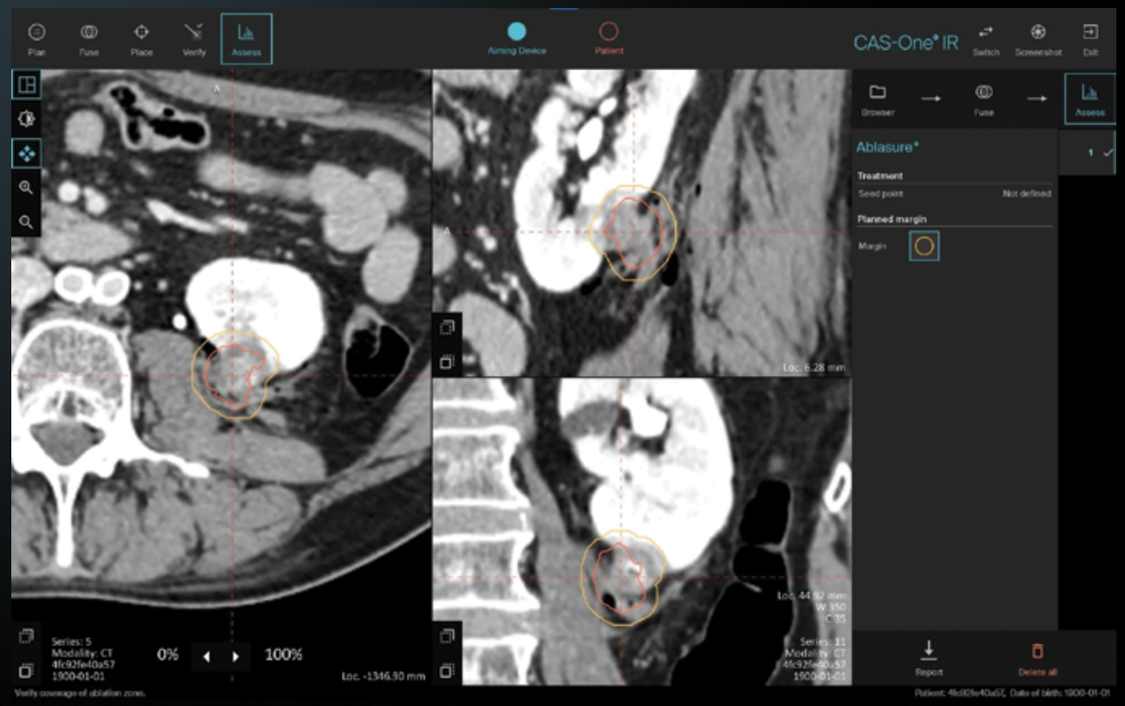
Result Complete ablation of the tumour and clinical margin was observed. The patient experienced no complications during the procedure. This trajectory was safely planned and placed using CAS-One IR navigation capabilities, avoiding needle advancement through the colon, no re-positioning and therefore resulting in fewer CT-scans during the procedure. Follow-up imaging is planned 6-months post procedure.



Needle placement view, where the blue line shows the initial plan, with the needle perfectly over it



Planning of the trajectory in axial view. In red is the lesion segmented with AI, in orange the safety margin, and in green is the simulated ablation zone



Post-Ablation scan showcasing a technical success of the treatment

Case 05

Dr. Olivier Chevallier
CHU Dijon, France

61y ♂ | IV/VIII | MW

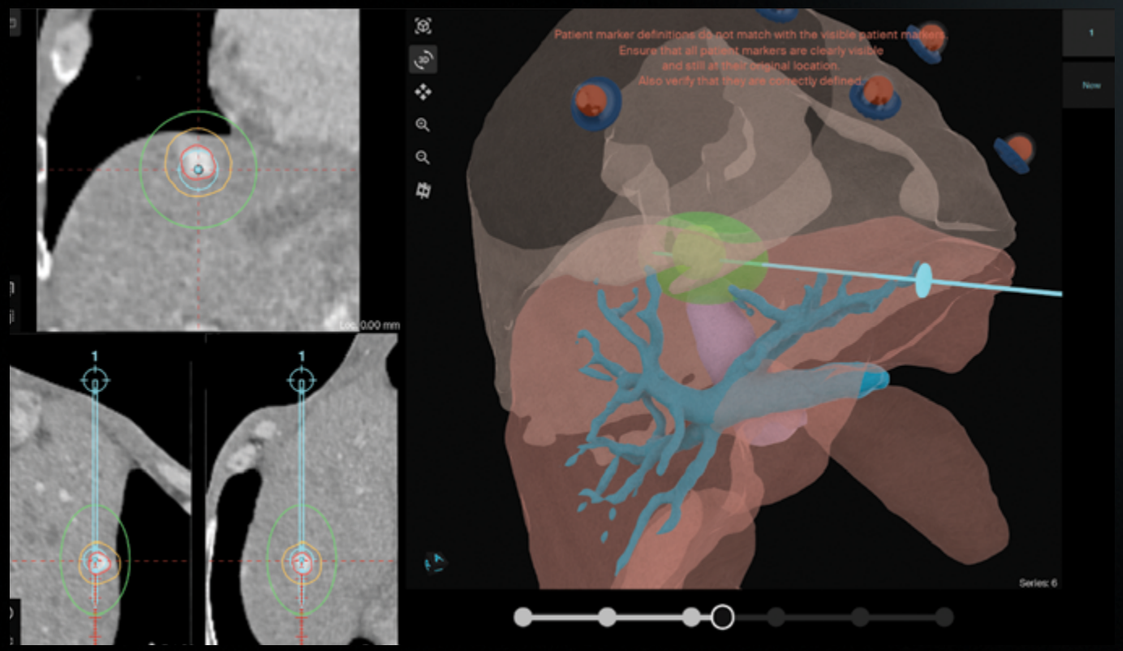
Biopsy plus MWA for a subphrenic, hypervascular neuroendrocrine liver metastasis

A 61 year-old patient, with multiple endocrine neoplasia type 1 and history of left pancreatectomy for a neuroendocrinal tumor (insulinoma) presented a new subphrenic 8 mm hypervascular lesion at the junction of the liver segments IV and VIII. Percutaneous MWA with concomitant core biopsy was decided at the MDT. Technical success was achieved using CAS-One IR with no complications, and especially no significant damage to the diaphragm.

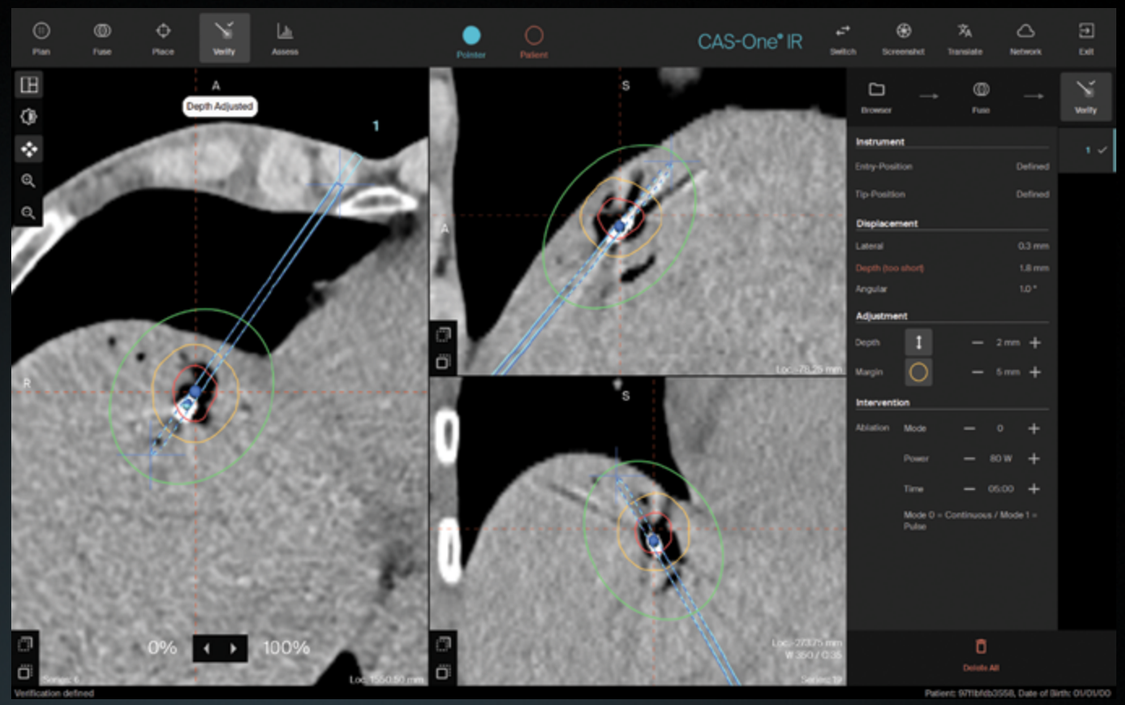
Initial condition The patient diagnosed with pancreatic neuroendocrine tumors (multiple endocrine neoplasia type 1 (MEN 1)): Insulinoma. Left pancreatectomy was performed in 2010. Recent MRI follow-up demonstrated a new single liver metastasis. Confirmation of uptake on the 68Ga-DOTATOC PET-CT. Percutaneous core biopsy and ablation in a single session decided at the MDT. A biopsy was necessary to re-analyze the classification of the tumor. MWA was planned for this lesion located very close to the diaphragm and the right atrium.

Treatment A 9mm subdiaphragmatic liver lesion at the junction of segments IV and VIII. Percutaneous CT-guided core biopsy (5 samples) performed using 18G automatic Tru-Cut biopsy needle through a 17G coaxial needle. Coaxial needle was first placed using the new custom mode defining an offset of 2 cm. Biopsy was followed by embolization of the puncture tract using gelfoam. Percutaneous MWA (ECO) of the hepatic target lesion at 80W for 5 minutes. Pre-ablation hydrodissection to separate the diaphragm and the liver was not performed. However, the MWA antenna was placed at the lower part of the lesion away from the diaphragm, and CT acquisitions were performed during ablation to look for extracapsular infiltration or thickening of the diaphragm. Positioning of the MWA needle was very successful with a 0.2 lateral displacement.

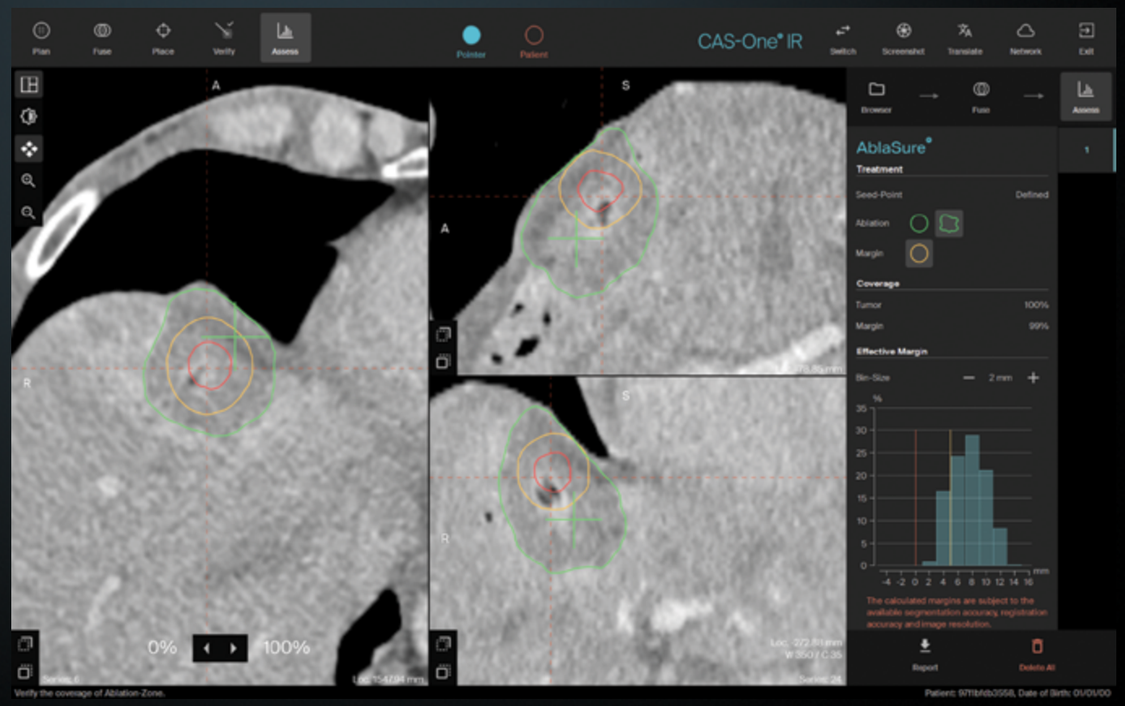
Result Biopsy/Pathology was a clinical and technical success. The material obtained was sufficient to perform a thorough anatomopathological analysis: Well-differentiated neuroendocrine tumor, grade 2. Technical success of MWA of the tumor with adequate margins. No complications occurred. A thickening of the diaphragm was observed on the control-CT after ablation, but without any symptoms. The antenna was placed in a single shot, limiting repositioning and the number of CT acquisitions. No analgesia was required on awakening from anesthesia. Patient was asymptomatic on discharge at 24 hrs. Follow-up liver MRI planned at 8 weeks. Chromogranin level assessment.



The MWA planning scan with a 5 mm margin (in yellow) and the estimated ablation volume in green



The needle verification scan showing 0.2 mm lateral error



The post ablation scan with AI-driven AblaSure showing 99% margin coverage (the 1% remaining being in the lung)

Case 06

Dr. Arash Najafi
Kantonspital Winterthur, Switzerland

82y ♀ | VIII | MW

Five overlapping ablation zones of a CRLM recurrence

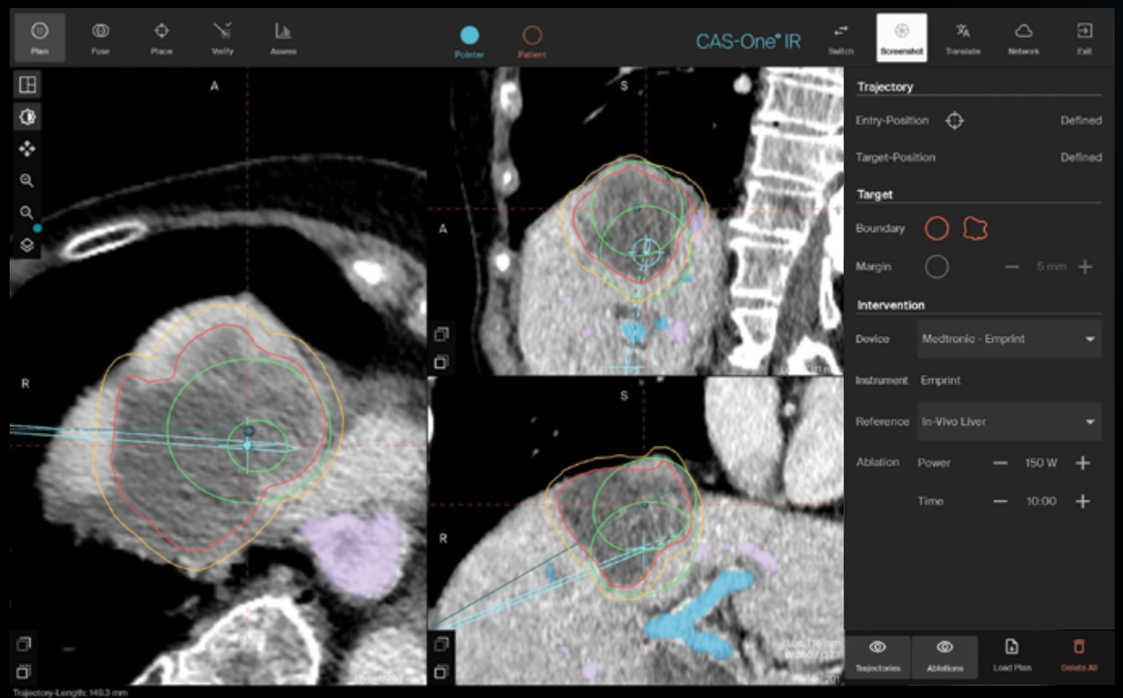
An 82-year old patient with past history of colon cancer had developed a metachronous CRLM that had been previously treated with MWA using US guidance. In 2023 the patient presented with a large local recurrence in segment VIII. Due to the possibility of planning and executing large overlapping ablation zones, a CAS-One IR MWA was chosen over other therapies with curative intent. A total of six ablation zones were planned and executed. Segmentation helped plan trajectories and ablation zones to minimize risk. The 6-week post-intervention MRI highlights the success of this treatment.

Initial condition The 82-year old patient with post-operative colon cancer was discovered with a metastasis in 2021. A CRLM appeared and was ablated at the time with guidance. A crescent-shaped recurrence was discovered in March 2023 around the edges of the previous ablation zone. Original metastasis was 55 mm, recurrence was 28 mm.

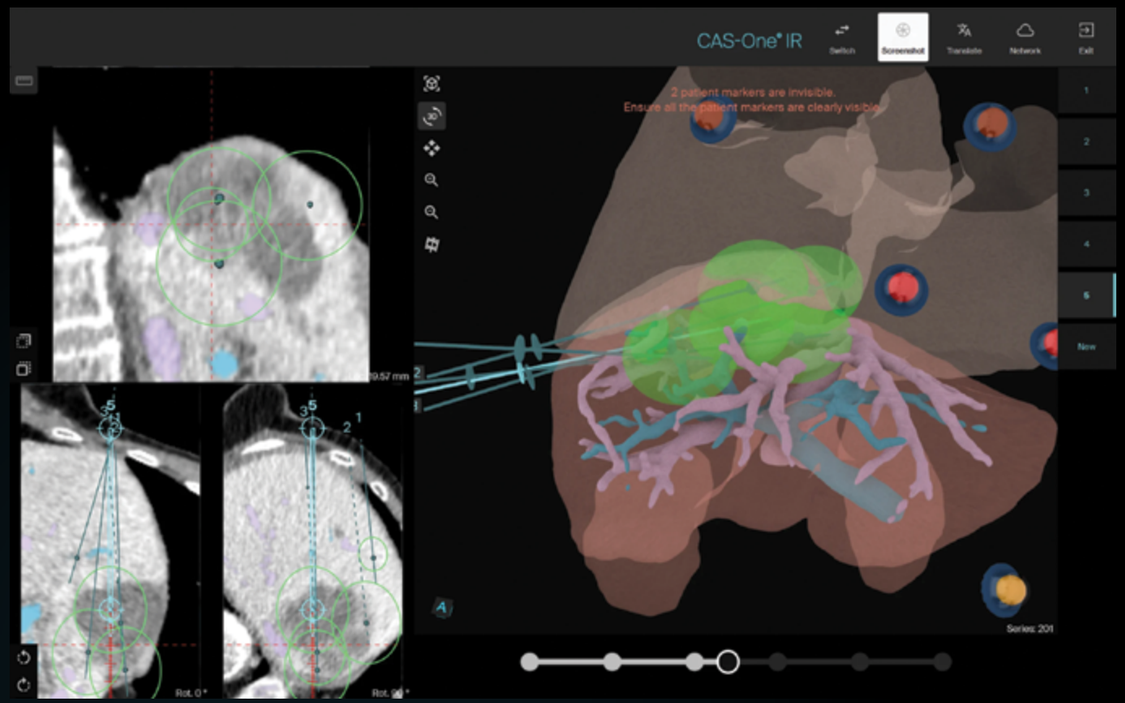
Treatment MWA was chosen over a hemi-hepatectomy and radiotherapy, with curative intent, as the patient did not have further tumor progression. Five overlapping ablation zones using Medtronic Emprint were planned and simulated with the advantage of vascular structure segmentation in the new CAS-One IR software. A sixth ablation zone was planned for another CRLM in segment VIII. Anesthesia time was minimal due to careful planning of the six ablation zones.

Result Complete ablation, including clinical margins were observed after treatment. No complications were observed due to the ablation. 6-week post intervention MRI showed clinical margins and no local recurrence for this large ablative area. The patient will remain under routine control.

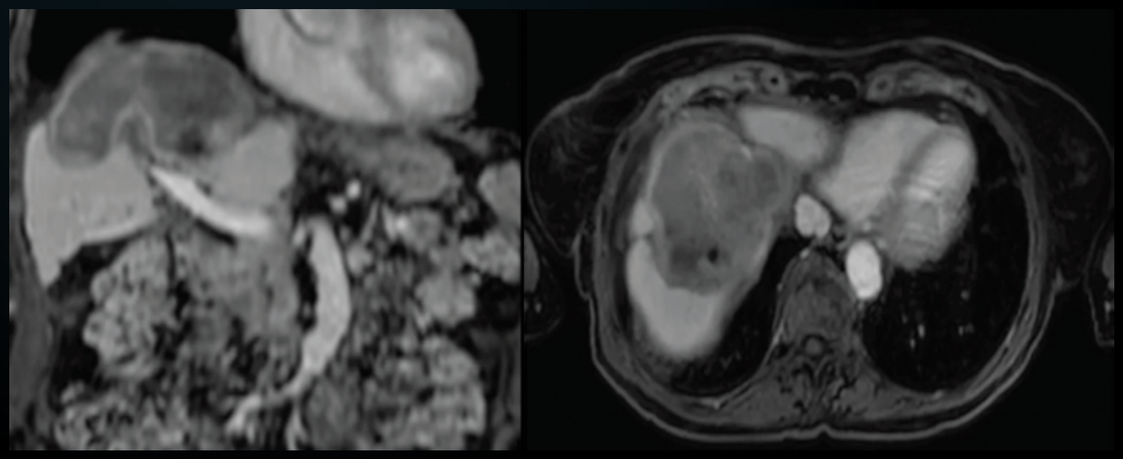
CAS-One IR 4.1 enabled this complex treatment with its ability to systematically plan the treatment with accurate needle placement.



Planning scan with vasculature segmented (red: segmentation of the tumorous region, orange: 5mm safety margin, green: overlapping ablation zones)



Planning scan with 3D reconstruction of estimated ablation zones and organ segmentation (green: overlapping ablation zones)



6-week post-procedure MRI in axial and coronal view showcasing no local recurrence

Case 07

Vinzenz Mayr, Andrea Goetz, PD Dr. Ingo Einspieler
Regensburg University Hospital, Germany

65y ♀ | adrenal gland | MW

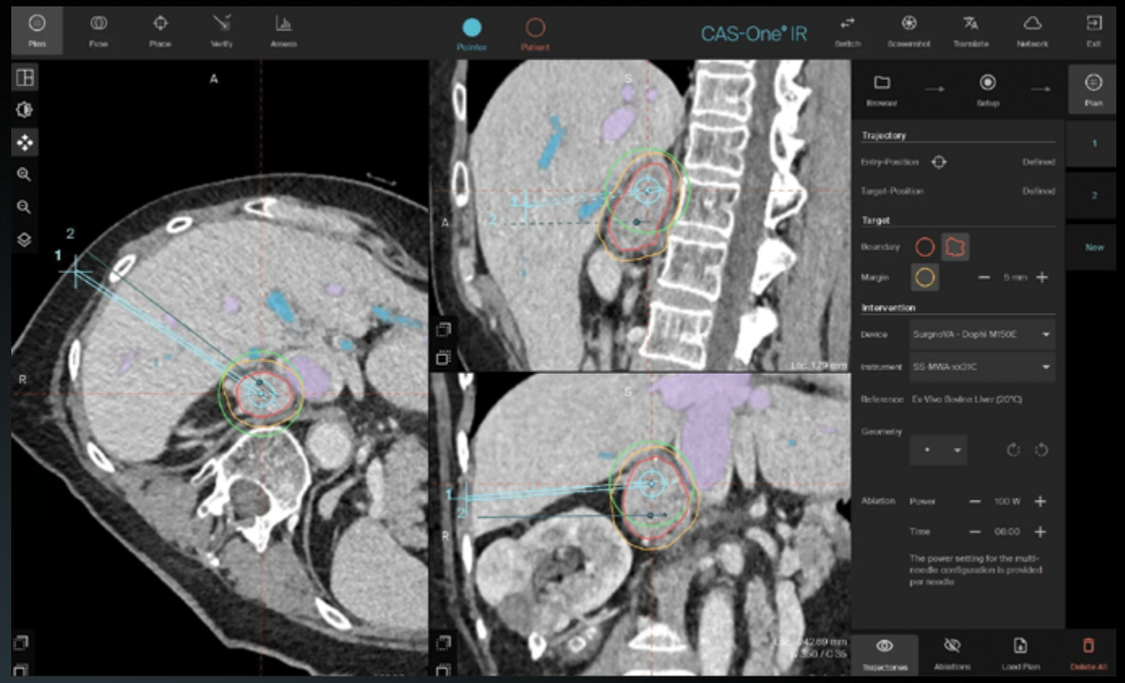
Multi-trajectory MWA of the adrenal gland

A patient with a history of RCC, nephrectomies, pulmonary metastases, chemotherapy, prior MWA and radiotherapy had a metastasis on the right adrenal gland. It was decided to treat the patient with MWA and CAS-One IR due to the challenging position of the target directly adjacent to the inferior vena cava. Two overlapping ablation zones were planned and executed transhepatically, along with track ablation to prevent tumor seeding. Post-procedure, the lesion showed a reduction and there were no periprocedural complications. The patient awaits longer term follow up but is doing well.

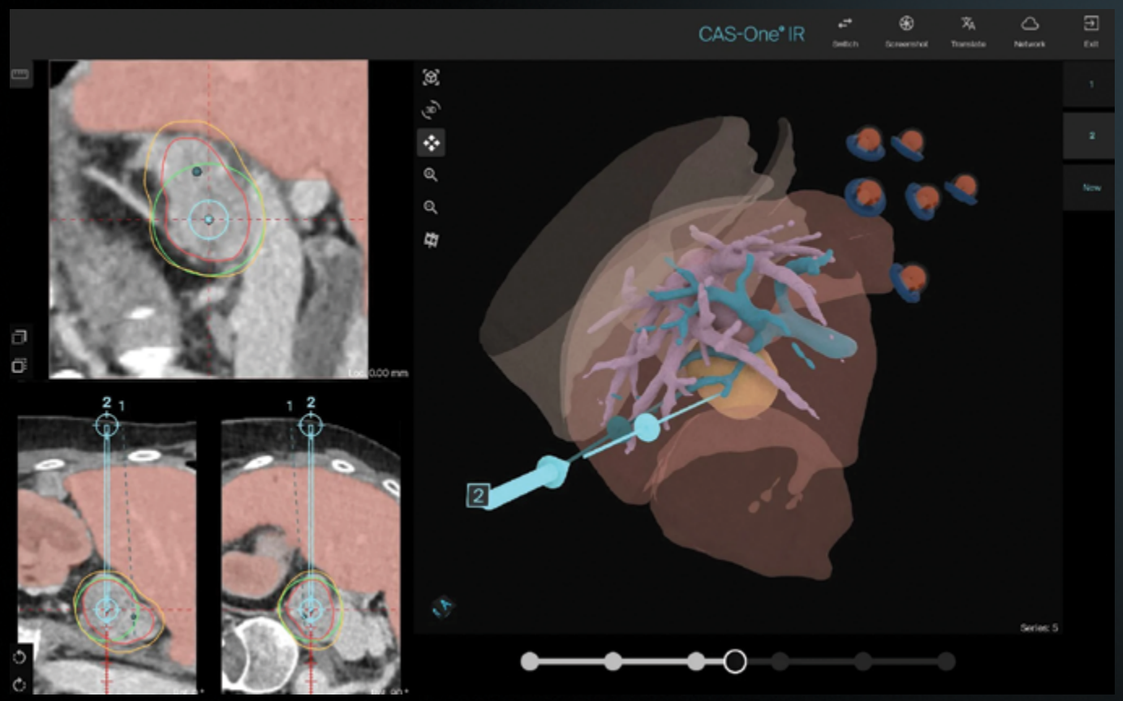
Initial condition An initially diagnosed RCC was treated with radical nephrectomy of the left kidney in 1991. Partial nephrectomy of the right kidney was performed in 2007. Several cycles of differing chemotherapies were performed. Multiple MWAs of renal lesions in the right kidney were conducted. A metastatic lesion of the right adrenal gland was detected in 2021 and radiotherapy was performed. In 2023 the initially stable metastasis of the right adrenal gland showed progression. Patient referred to our center for CAS-One IR MWA of the adrenal metastasis.

Treatment The metastasis of the right adrenal gland was directly adjacent to the inferior vena cava. Lesion size was 38 x 25 x 46 mm. Two overlapping ablation zones were planned using CAS-One IR. Correct electrode placement (Surgnova Dophi) was achieved using transhepatic access. Two ablation cycles were performed over a duration of eight minutes using 75W and 100W, respectively. Track ablation was performed to prevent tumor seeding.

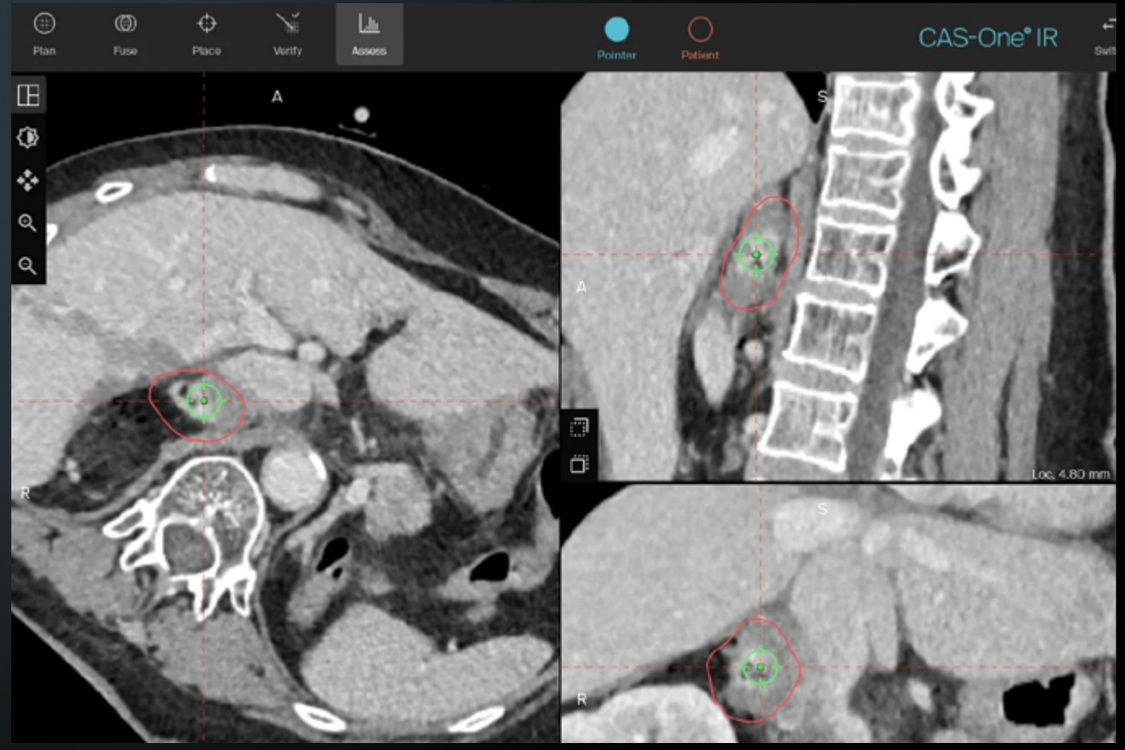
Result Directly after ablation the adrenal metastasis showed devascularization and a decrease in size. The patient showed a swift recovery. MWA of two renal lesions was successfully performed afterwards.



Planning scan of first trajectory including portal and hepatic vein segmentation



Planning scan of both trajectories in needle-eye view with organ and vasculature reconstruction (on left -red: segmentation of the tumorous region, orange: 5mm safety margin, green: overlapping ablation zones)



Post-ablation scan showing reduced tumor size and devascularization

Case 08

Dr. Waldemar Czekierda
Linköping University Hospital, Sweden

92y ♀ | II/III, IV, V/VIII | MW

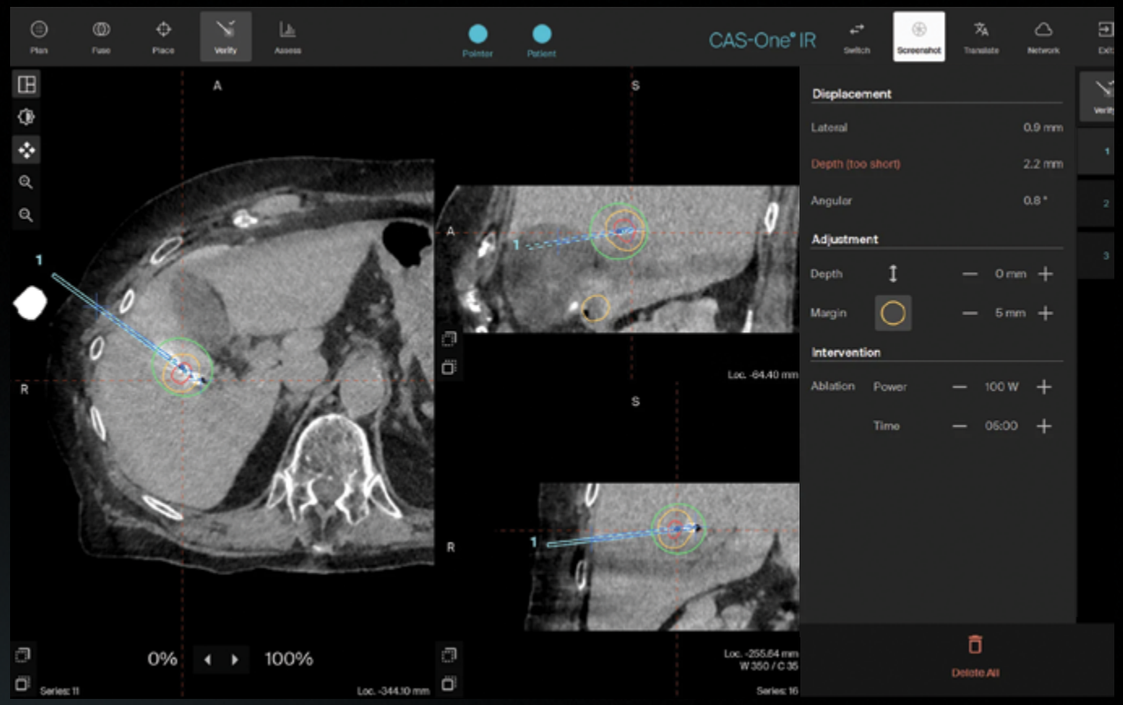
Inoperable 92 year old treated with Quality Ablation

MWA of three liver metastasis in segments II/III, IV and V/VIII for a patient that previously underwent acute surgery for a perforated tumor in the ascending colon and has now developed metastasis in the liver. Due to the age of the patient, a surgical solution was not an option, therefore Quality Ablation with CAS-One IR was chosen.

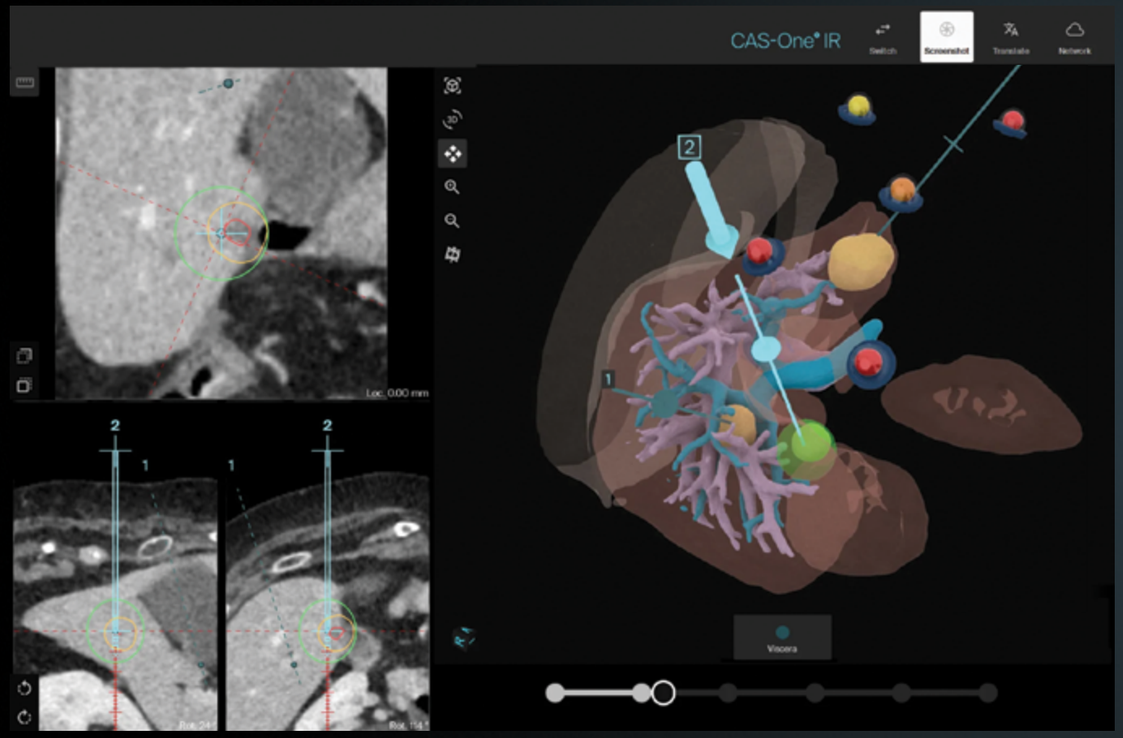
Initial condition The patient with a history of hypertonia, hyperlipidemia and hyperthyroidism underwent acute surgery for a perforated tumor in the ascending colon (T4aN1a) in October 2022. Recently three liver metastasis in segment II/III, IV and V/VIII were discovered. Due to age, the patient was not eligible for another surgical treatment. The multidisciplinary tumor board decided for a minimally invasive approach with MWA. Quality Ablation with CAS-One IR is the standardized treatment option for these patients in Linköping.

Treatment The procedure was performed under general anesthesia with high-frequency jet-ventilation (HFJV) for optimal respiratory motion control. Three single-needle trajectories were planned, simulated and navigated with the new interactive planning mode. The ablation of the lesions was performed with the Medtronic Emprint system (15cm antenna). Needle placement control scans were performed for all needles, with no manual repositioning needed. After treatment of all lesions, the AI-driven AblaSure confirmed that no additional ablation was needed.

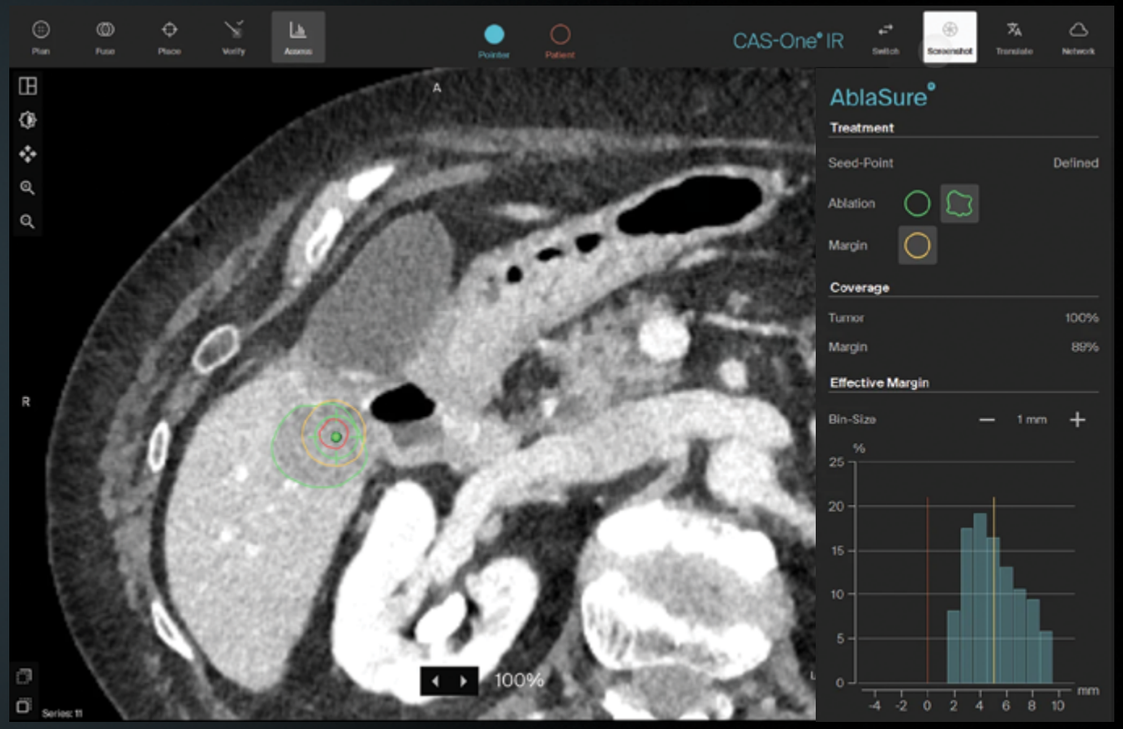
Result All three lesions were successfully treated with sufficient ablation margins (5-10mm) as assessed by AblaSure. The patient was discharged the following day and showed a swift recovery. A routine follow-up CT scan is planned within 3 months.



Needle verification shows sub-millimeter accuracy of the first needle



Planned trajectory with a 3D segmented visual of the abdomen, showcasing optimal simulation of the ablation zone between the gallbladder and colon



Ablation assessment of one of the tumours with AblaSure, showcasing 100% tumor coverage and 89% margin coverage

Case 09

Dr. Christian Weiergang,
Dr. Farida Hashimi
Sahlgrenska, Göteborg University Hospital, Sweden

53y ♀ | VIII, VI/VIII, II/III | MW

MWA of five invisible liver lesions with MRI/CT fusion

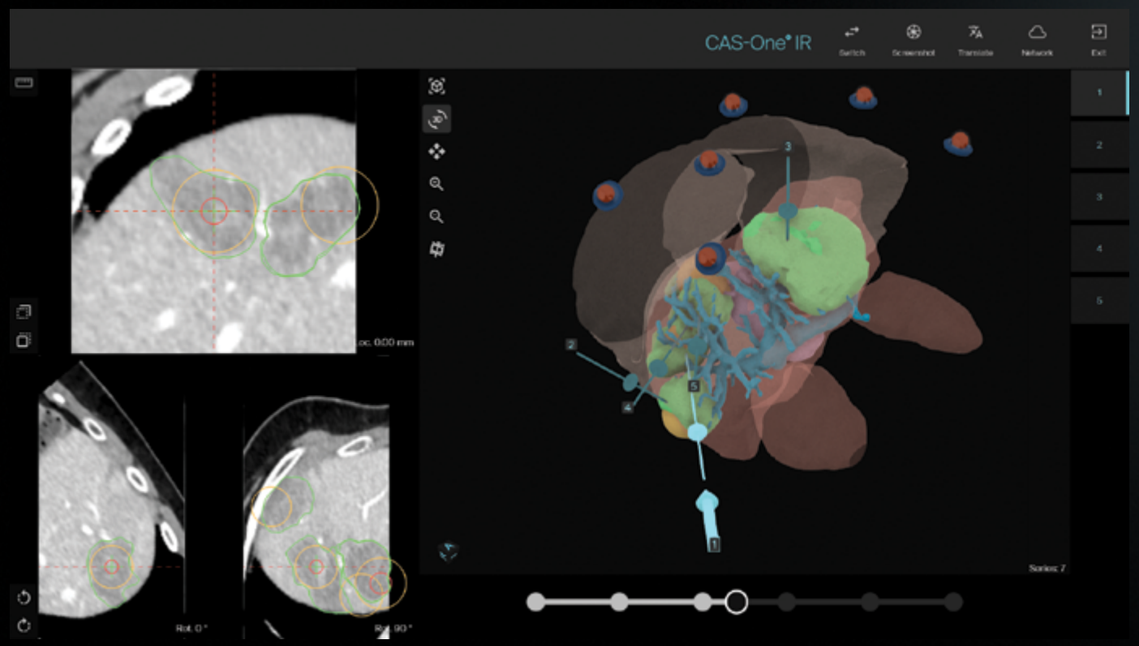
CASE OF THE YEAR

A young woman with metastatic colorectal cancer presented with five invisible lesions. The lesions located in liver segments: VIII, VI/VIII, II/III, VIII and VIII were treated with the support of CAS-One IR. The MDT decided for Quality Ablation, because of its ability to simulate a treatment plan fused with the former MRI. AI-driven segmentation of the organs and vasculature made for a safer treatment.

Initial condition The patient with metastatic colorectal cancer diagnosed in October 2022 underwent resection of two liver metastasis, but developed early local recurrence that was treated with chemotherapy (FOLFOX). A liver specific MRI from February 2023 showed five new liver metastases of various sizes (4-12 mm). The pre-ablation MRI scan from May 2023 showed only two lesions were visible. Because the patient did not have a chemo-break in between it was decided to ablate all five lesions based on the MRI from February 2023.

Treatment CAS-One IR was chosen as treatment option because of its ability to fuse the planning CT with the previous MRI to visualize all five lesions (visible and invisible). The procedure was performed under general anesthesia with high-frequency jet-ventilation for optimal respiratory motion control. Five single-needle trajectories were planned and simulated based on a CT-MRI Fusion. The ablation of the lesions was performed with the HS AMICA system. Needle placement control scans showed that there was no need for any repositioning. After treatment, the AI-driven AblaSure was used to assess the success of the ablation. In two of the lesions ablation margins were acceptable, but not optimal. Re-ablation was not performed due to the high complexity of the case.

Result All lesions were successfully treated with sufficient ablation margins between 5-10 mm. The patient was discharged from the hospital the day after, no adverse events were reported and will have a follow-up MRI in December 2023.



Planning in Oblique MPR with multi-organ segmentation and planned trajectories on the right including AI driven organ and vasculature segmentation

Intra-operative ablation margin assessment with AblaSure showcasing a broader margin (>5 mm) with 84% coverage

Case 10

Dr. Jose Maria Abadal,
Dr. Esther Galvez
Hospital Universitario Severo Ochoa, Madrid, Spain

77y ♀ | VIII | MW

Two challenging CRLMs in segment VIII: close to liver dome and middle hepatic vein

A 77-year-old patient diagnosed in 2014 with metastatic colorectal cancer underwent resection in 2014 and 2017, and RFA in 2019. A new lesion was treated by MWA in 2021. In 2023 PET-CT showed two new lesions hardly seen on CT or MRI and invisible on US. MWA with CAS-One IR was chosen as a treatment option because of its ability to fuse the planning CT with MRI and partially with PET-CT. The dome lesion was challenging due to its mandatory ascending access, and AI-driven segmentation proved very useful for the second lesion adjacent to the middle hepatic vein and portal branch. Sub-millimeter accuracy was achieved in needle placement, as well as 100% tumor and margin coverage in the post-ablation scan. No complications were observed.

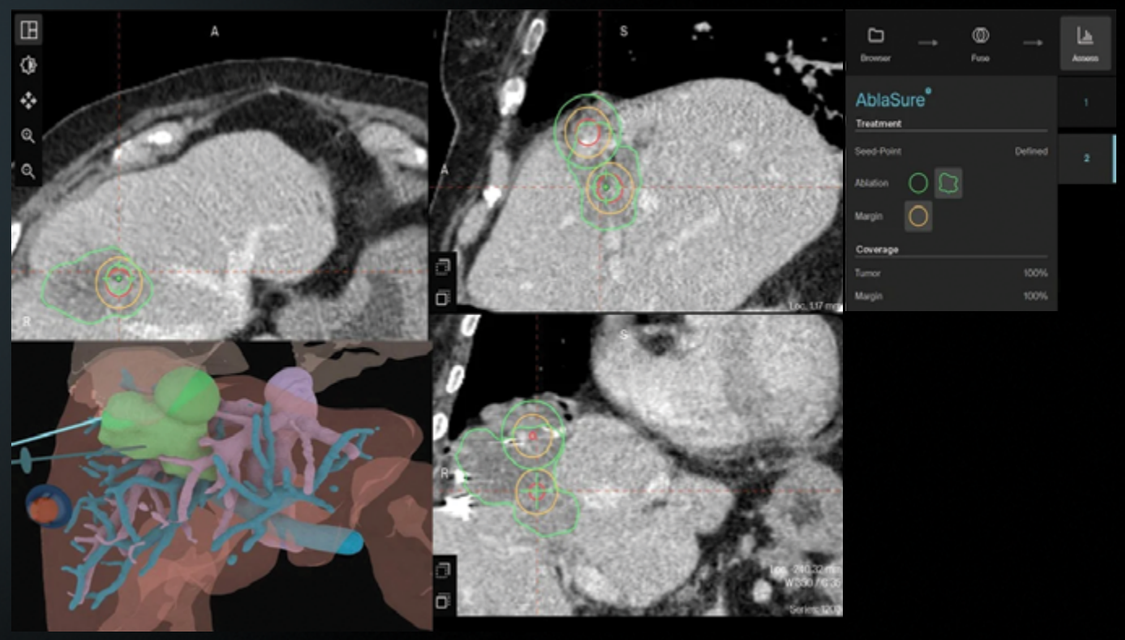
Initial condition The 77 years old patient with metastatic colorectal cancer diagnosed in 2014 underwent resection of two liver metastases in 2014. Hepatic progression in 2017 and 2019 were treated with surgery and RFA, a new lesion in 2021 with MWA. PET-CT in 2023 revealed two new lesions, one 20mm in segment VIII adjacent to middle hepatic vein and the second 18 mm lesion in the dome of segment VIII.

Treatment MWA with CAS-One IR was chosen because of the poor visibility of the lesion and challenging trajectories with mandatory double obliquity for the dome lesion. Procedure was performed under general anesthesia and apnea was done for CT scans and needle positioning. Each lesion was treated with MWA using Medtronic Emprint system. AI-driven AblaSure was used after treatment to assess the success of the ablation. There were no complications on post procedural CT and the patient was released the next day.

Result Complete ablation, including clinical margins were observed after treatment. No complications observed due to the ablation. The patient will remain under routine control, follow-up images are due in January. At the end of the case, the physician said: " Without CAS-One IR it would have been very difficult to perform the procedure and to guarantee coverage of the lesion with oncological margins".

Needle verification shows sub-millimeter accuracy of the first needle

Planning scan showing the two challenging trajectories close to the liver dome and hepatic/portal veins



Ablation assessment of one of the tumours with AblaSure, showcasing 100% tumor coverage and 100% margin coverage

Clinical evidence
Publications and cases

Since its launch in 2013 an increasing body of evidence supports percutaneous tumour treatment with CAS-One IR.

A comprehensive list of publications can be found online.

Monthly selected “Top Cases” feature challenging cases and how CAS-One IR made a difference.

Thanks to all of the physicians
for their ongoing commitment to generating exciting evidence for CAS-One IR

What will come in 2024 with CAS-One® IR 4.2

PET / Spectral CT support?

Immediate re-ablation planning?

Integrated measurement tools?

Tumor tracking?

Enhanced AI-driven organ and tumor segmentations?

more patients
better results

CASCINATION AG
Steigerhubelstrasse 3
CH-3008 Bern

Phone +41 31 306 26 26
info@cascination.com
www.cascination.com

CASCI8-1264090756185