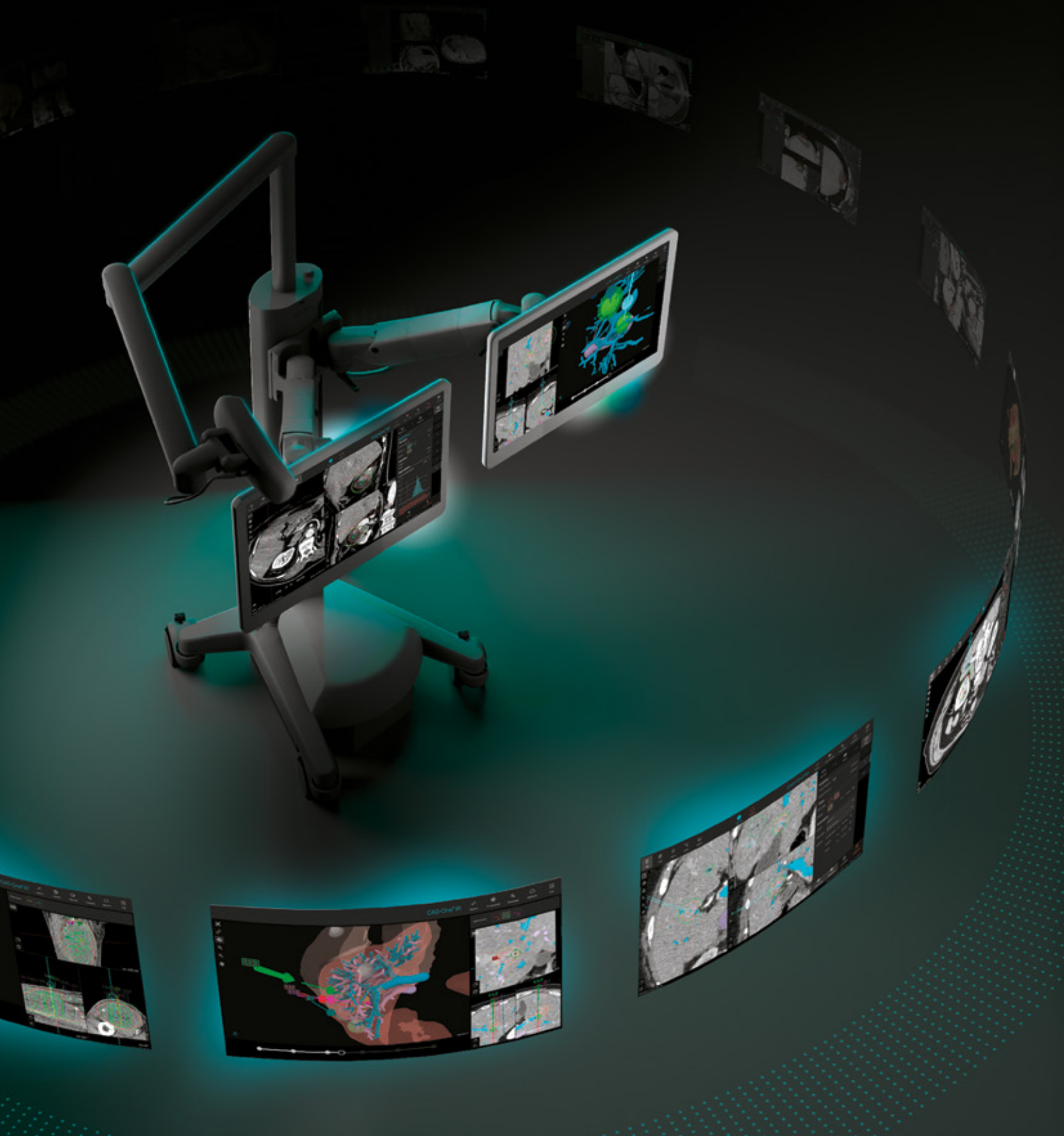
CASCINATION

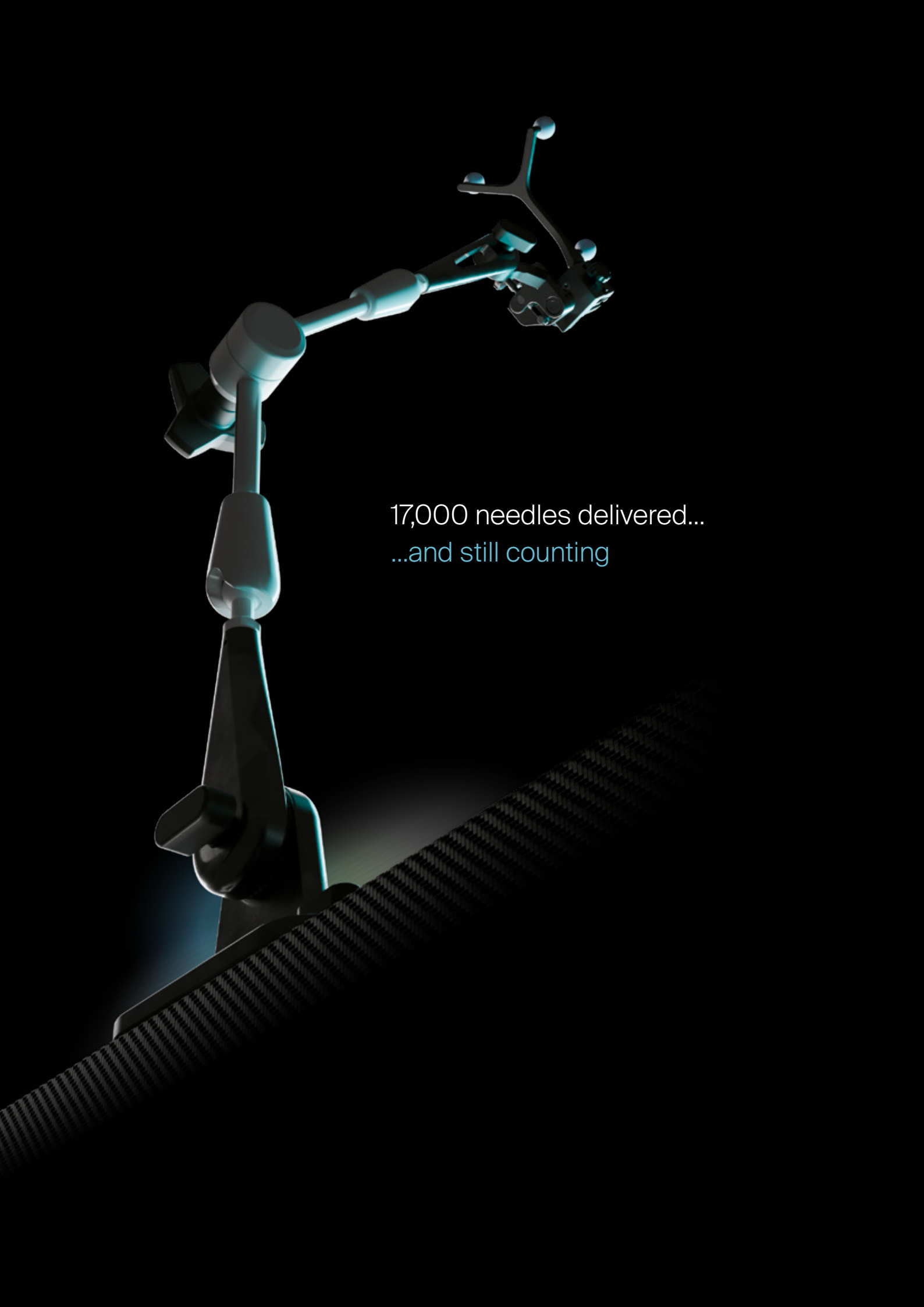
ablation unlocked top cases 2024



Unlocking Ablation. Nearly 2,000 Quality Ablations were performed in 2024 by top physicians worldwide, pushing the limits of interventional oncology.

Each year, we distinguish one exceptional case that defines the capabilities of CAS-One IR for tumor ablation.

We congratulate Dr. Marie Beermann from Danderyd Hospital in Stockholm, Sweden, for winning the Top Case of 2024. It exemplifies the innovation that CAS-One IR enables, setting the stage and raising the bar for all future cases.


17,000 needles delivered...
...and still counting

Case 01

Dr. Marie Beermann
Danderyd Hospital, Sweden

32y ♂ | Liver | MW

MWA of two challenging liver metastases

A young man initially diagnosed with colon cancer and multiple synchronous liver metastases. After responding very well to chemotherapy, he was treated with a hemi-hepatectomy and local resections. In 2023 he had additional resections for new metastases in both the liver and lung. In 2023, he developed two new liver metastases, one next to the main portal vein and very close to he vena cava. As he was not a candidate for additional surgery, it was decided to treat them with MWA assisted by CAS-One IR. The treatment was performed quickly and effectively, with no complications. A 3-month-follow up MRI revealed no LTP.

Initial Condition

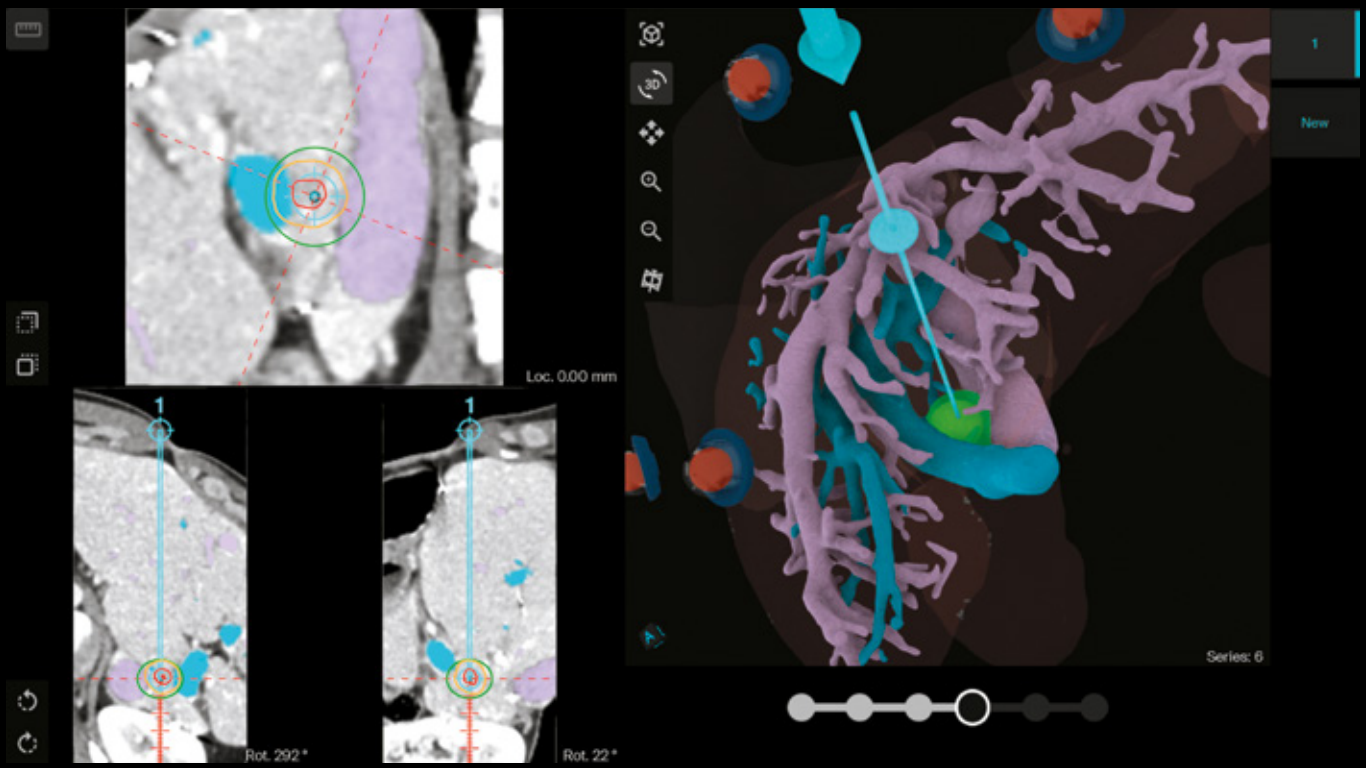
A patient diagnosed with sigmoid colon cancer in 2018 initially received palliative cytostatic treatment with excellent response. Following right hepatectomy and hemicolectomy, the patient developed both liver and lung metastases in 2020, which were resected. October 2023 CT revealed two new liver metastases. The MDT selected microwave ablation using CAS-One IR due to one lesion's challenging location between portal and hepatic veins.

Treatment

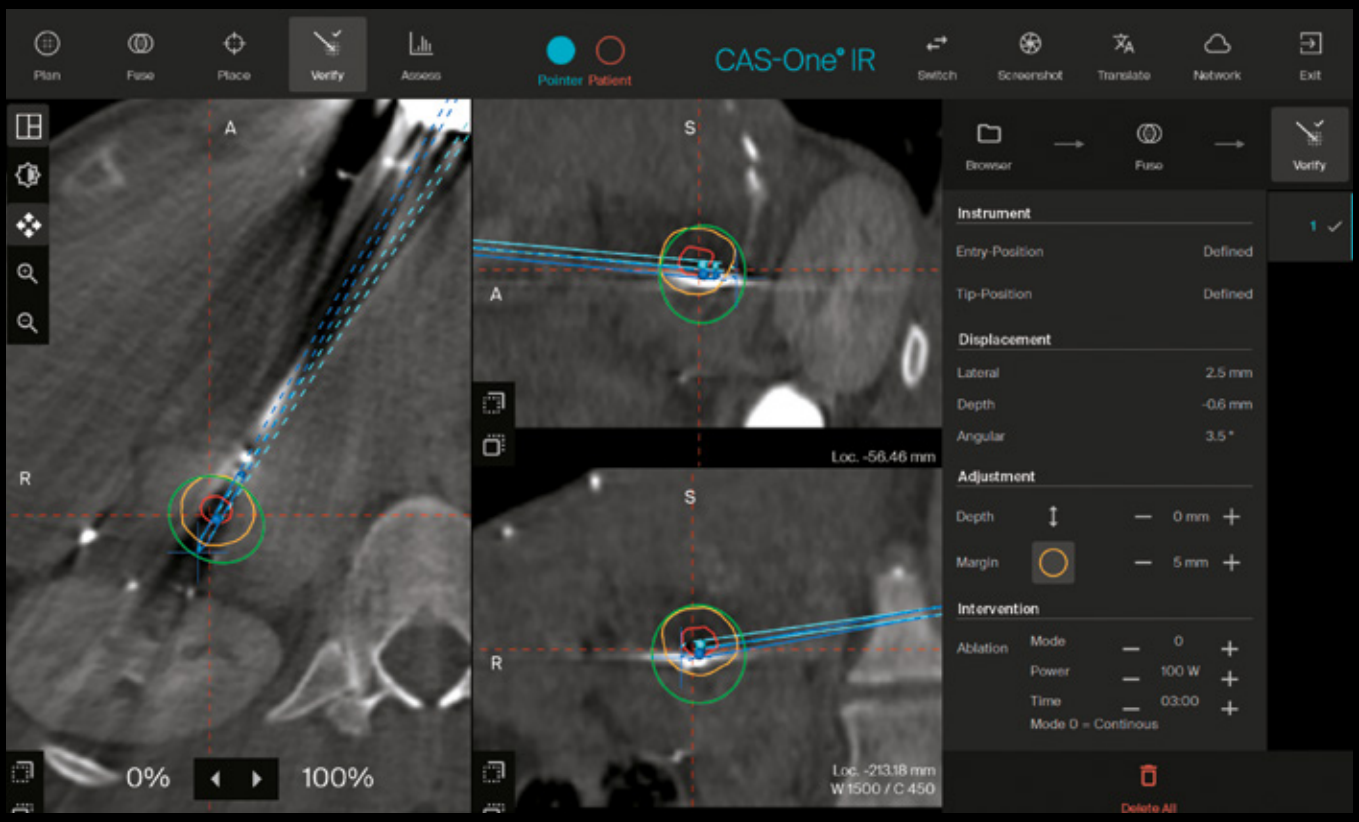
Two trajectories were planned and executed with minimal lateral error (~2mm). Treatment utilized Canyon 15G needles with differentiated protocols: 100W for 3 minutes (smaller lesion) and 100W for 5 minutes (larger lesion). The procedure was performed under general anesthesia with high-frequency jet-ventilation.

Results and Conclusion

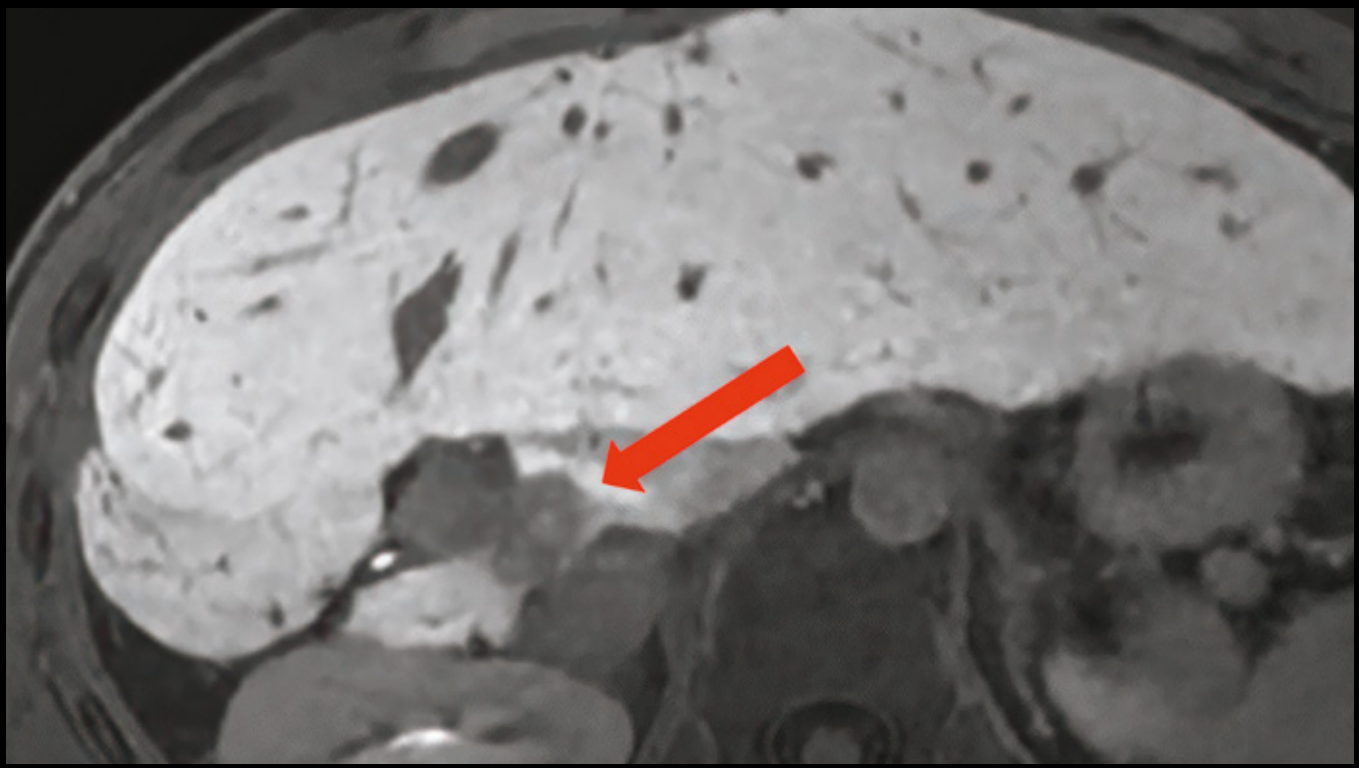
Both lesions were successfully treated, allowing same-day hospital discharge. Three-month follow-up MRI confirmed no local recurrence or complications, with the patient showing good recovery.



Planning scan in the 3D reconstructed view of the segmented liver vasculature



Needle verification scan showing 2.5mm lateral error



3-month follow up MRI showing the more challenging lesion

Case 02

Dr. Ghizlane Touimi Benjelloun
University Hospital of Nîmes, France

41 y ♂ | VI | MW

Immediate reablation of a single MWA in segment VI

A 41 year-old patient diagnosed with colon cancer in October 2023 had a single hepatic metastases discovered in June 2024, which was subsequently treated by MWA. Due to the probable heat-sink effect of the hepatic vein, neither the tumor nor the safety margin were covered enough. This was clearly seen with the AI-driven AblaSure of CAS-One IR. It was therefore an easy decision to do a second MWA on the missed portion immediately thereafter. The second treatment was successful and still showed complete coverage at the 1-month follow-up.

Initial Condition

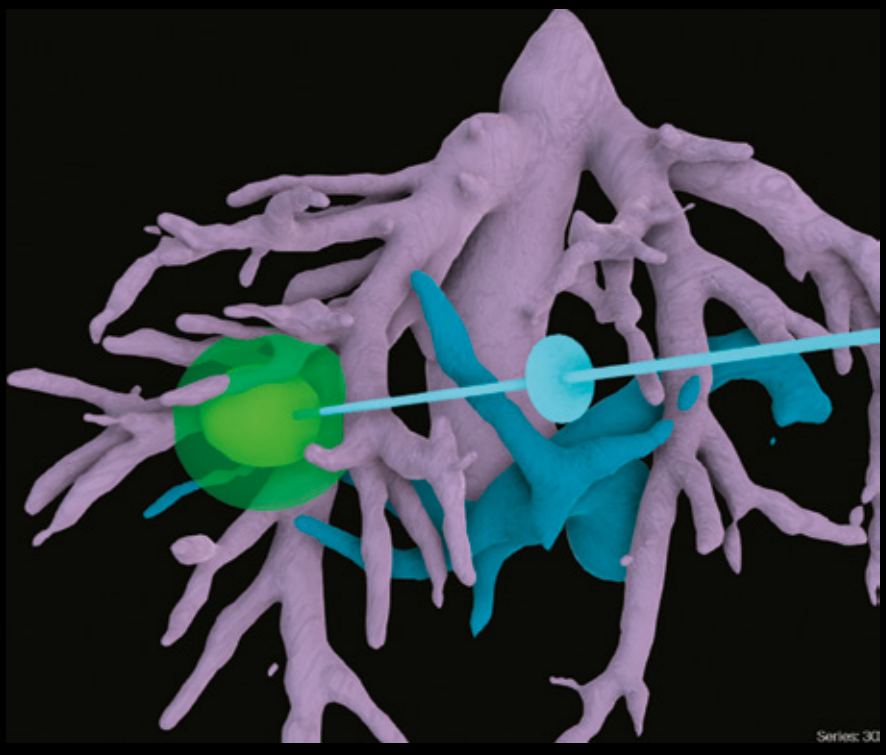
A patient diagnosed with colorectal cancer in October 2023 underwent aortic bioprothesis treatment, followed by colon tumor resection (pT2, N1b, R0). A single hepatic metastasis appeared on CT in March 2024 pre-chemotherapy, with an MRI contraindicated due to abdominal metallic residues. After three cycles of chemotherapy, a new sole liver lesion was discovered in June 2024. The tumor board recommended MWA before proceeding with five adjuvant chemotherapy cycles.

Treatment

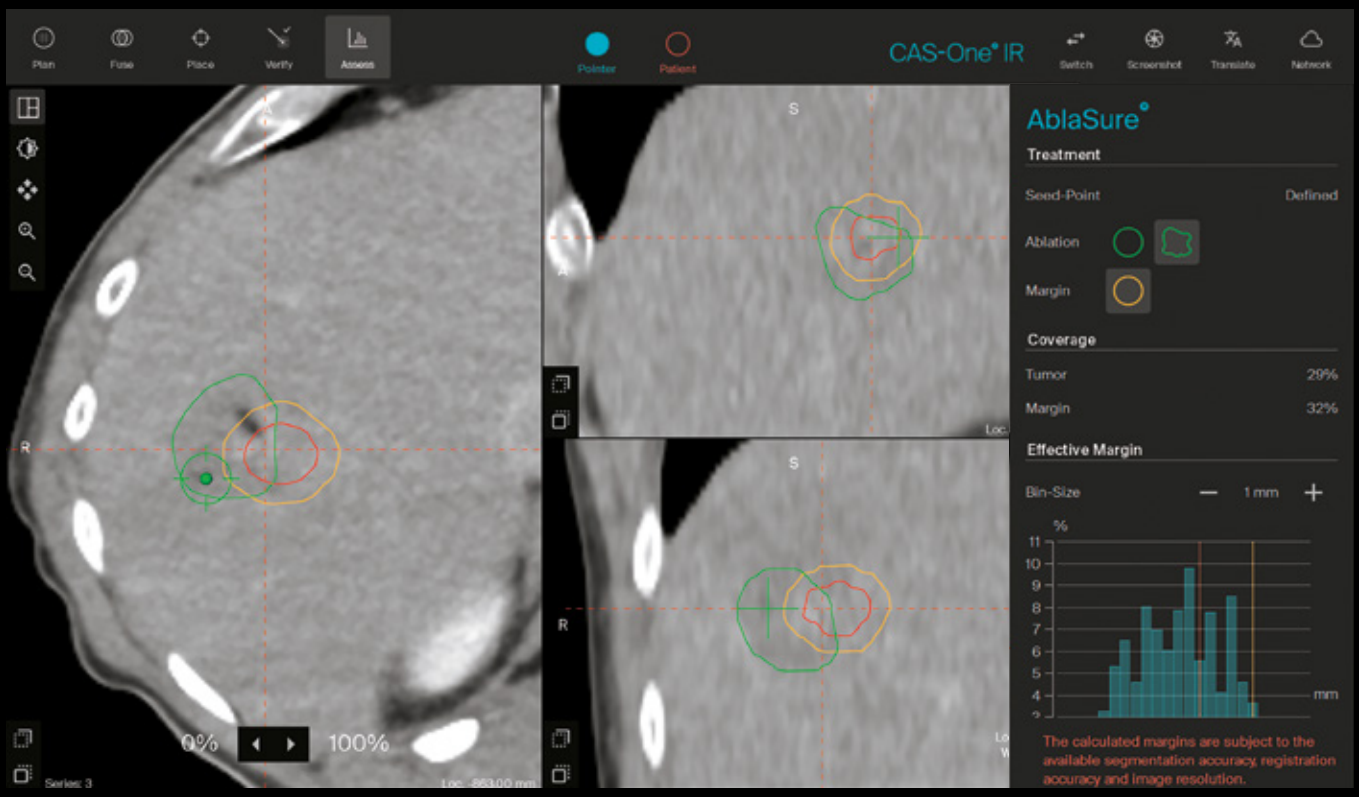
Under general anesthesia with high-frequency jet-ventilation, the procedure began with CT planning fused with diagnostic CT to confirm tumor visibility and its relationship to the hepatic vein. MWA was performed using the Medtronic Emprint system. AblaSure revealed incomplete treatment, likely due to heat-sink effect from the hepatic vein, an immediate retreatment was performed while the patient remained under anesthesia.

Results and Conclusion

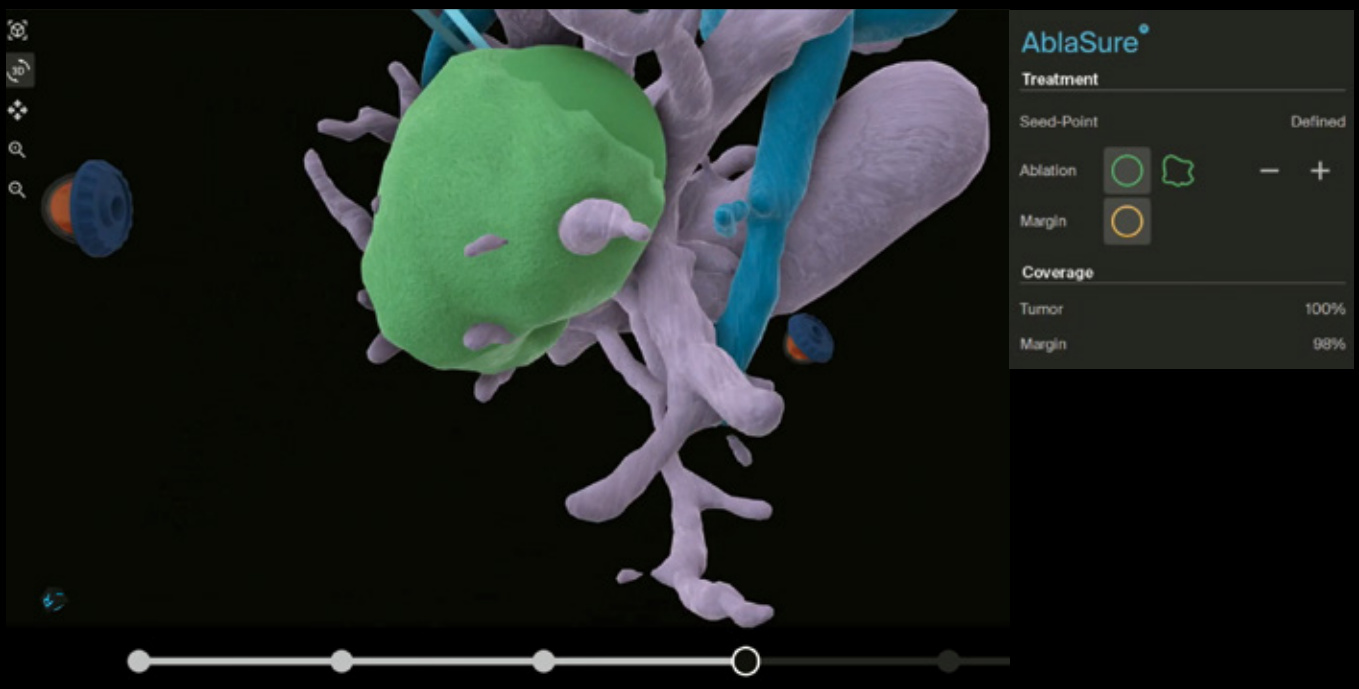
One-month follow-up CT confirmed complete ablation. The case demonstrated CAS-One IR's value in both complex and routine ablations, with AblaSure enabling comprehensive margin assessment regardless of trajectory complexity. As noted by Department head Prof. Julien Frandon, CAS-One IR was implemented for its AI-guided precision in reducing recurrence rates and ensuring optimal patient care, principles well-demonstrated in this case of a seemingly straightforward lesion surrounded by, but not encased in, vessels.



3D reconstruction of the planning scan showing the proximity to the hepatic vein



First treatment result showing an incomplete ablation with only 29% of the tumor covered and 32% of the margin



After the reablation, AblaSure shows 100% tumor and 98% margin coverage likely due to direct contact with the hepatic vein

Case 03

Dr. Andreína Olavarría and Dr. Ruth Romera
Hospital Universitario Ramón y Cajal, Madrid, Spain

77 y ♀ | IV | RFA

RFA of two HCC lesions in segment IV

A 77-year-old woman was diagnosed with an HCC and chronic VHC in 2014. Initially treated with RFA, recurrences were found 10 years later. This was treated with TACE which was effective for three of the five metastasis. The remaining two lesions in segment IV were treated with RFA. Ablation with CAS-One IR was chosen due to the fact the lesions were in difficult positions, encapsulating the portal vein. AblaSure showed a complete treatment, and there were no intraprocedural complications.

Initial Condition

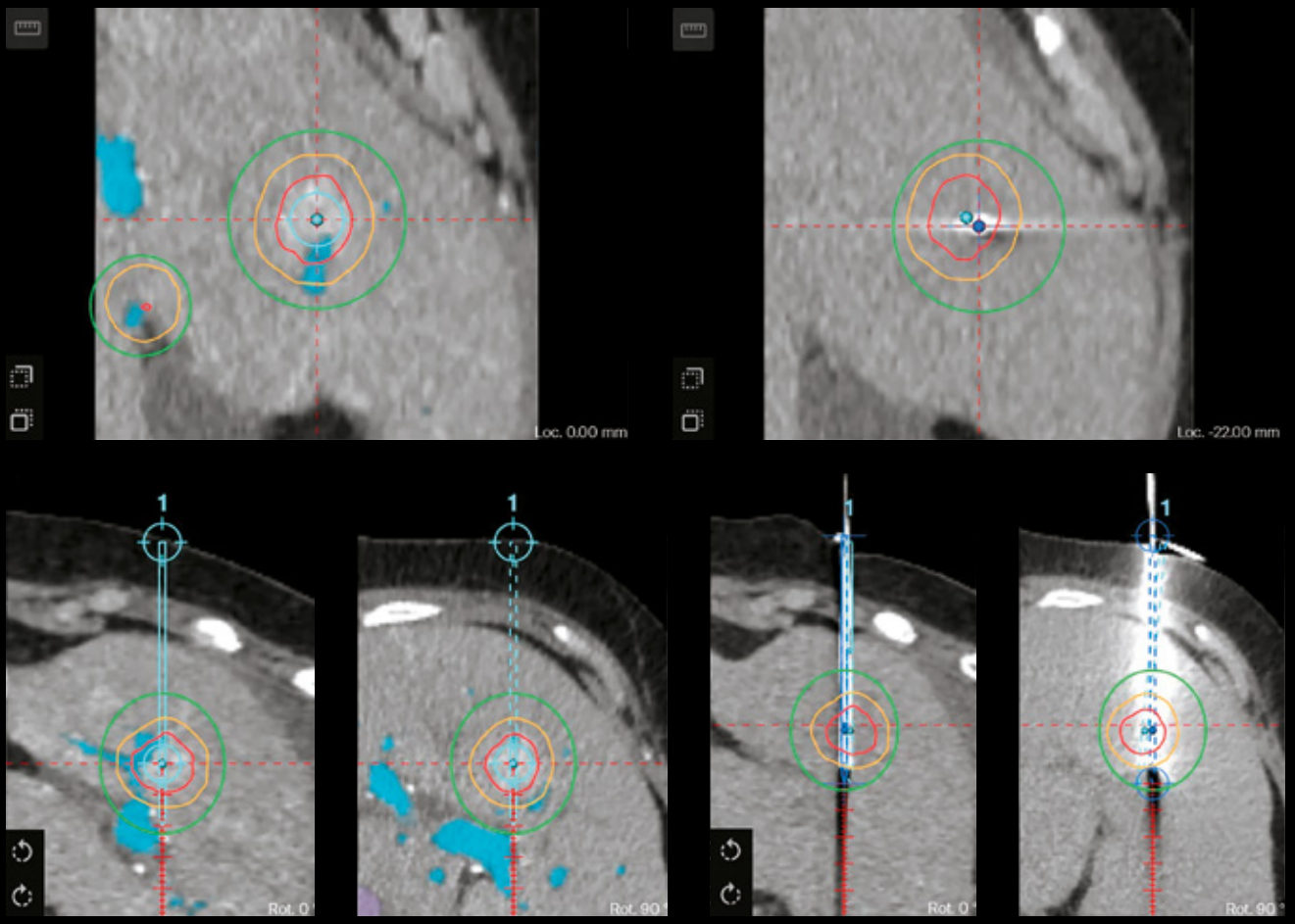
A patient diagnosed with HCC and chronic hepatitis C in 2014 initially received RFA in medial segment IV. In 2024, recurrences were discovered in segments I, III, IV, and VIII. After TACE in February 2024, CT imaging in May showed complete response in segments I, III, and VIII. The MDT then decided to treat two remaining segment IV lesions, showing wash in/wash out on CT, using RFA with CAS-One IR in early June.

Treatment

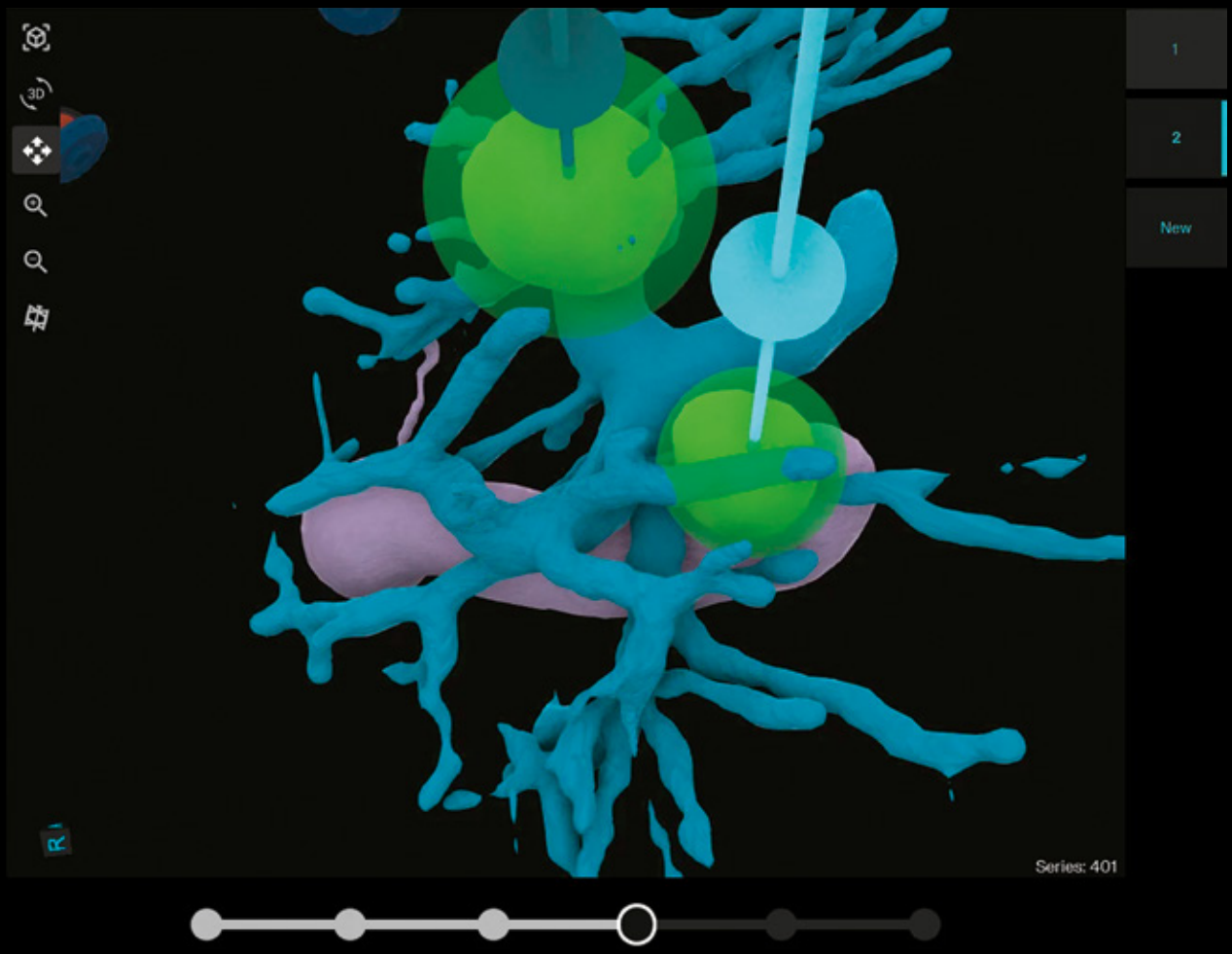
Treatment planning established two trajectories using the VIVA STARmed RF generator. Both lesions were encased in the portal vein, and AI-driven 3D reconstruction made this easy to see. The ablation proceeded without repositioning and avoided portal branch damage. AblaSure evaluation showed good lesion coverage, though with some gaps due to portal vein heat-sink effect, as demonstrated by 3D segmentation.

Results and Conclusion

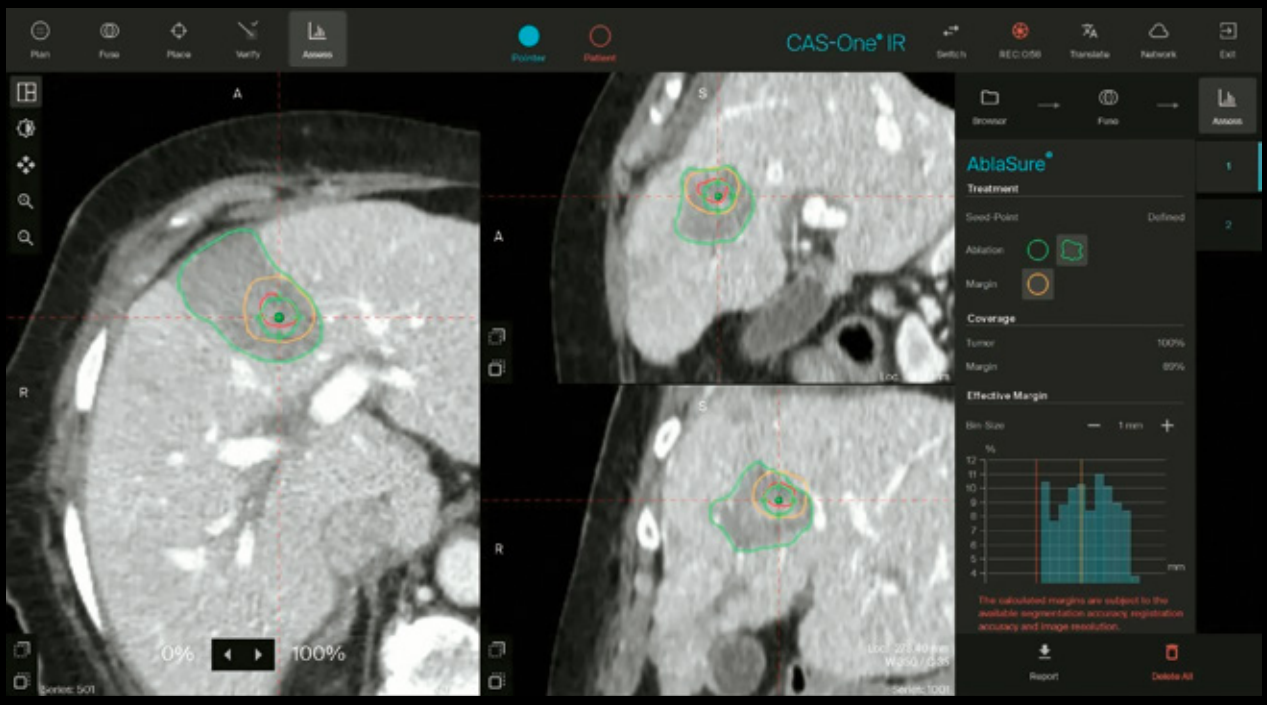
The procedure concluded without complications, and the patient showed good recovery after one month. While late July follow-up CT confirmed complete treatment of both target lesions, it also revealed a suspected new lesion in Segment VII. The case demonstrated successful navigation of portal vein proximity while achieving therapeutic goals.



Planning of the first trajectory showing the tricky path next to the portal vein and the accurate positioning



3D view showing excellent access of both trajectories



A video of Ablation confirmation with AblaSure showing coverage of both lesions and 3D segmentation.
A heat sink effect due to the portal and hepatic vein can be seen, thus making the margin of 100% unattainable

Case 04

Daniel Østergaard &
Åsmund Avdem Fretland
Oslo University Hospital, Rikshospitalet, Norway

76y ♂ | V / VIII | MW

A highly angulated trajectory for a liver dome lesion on the capsule and adjacent to the diaphragm

A 76-year-old man with colorectal cancer and a history of both resection and ablation of liver metastasis presented with 2 CRLMs (Segments V, VIII). Due to the highly challenging location (subcapsular, highly angulated trajectory, adjacent to the diaphragm) of one of the lesions, MWA using CAS-One IR was used to treat the patient. The planning module and the fixed arm of CAS-One IR enabled an effective treatment so close to a critical structure. A 10mm margin was achieved on a follow-up scan and no intraprocedural complications were reported.

Initial Condition

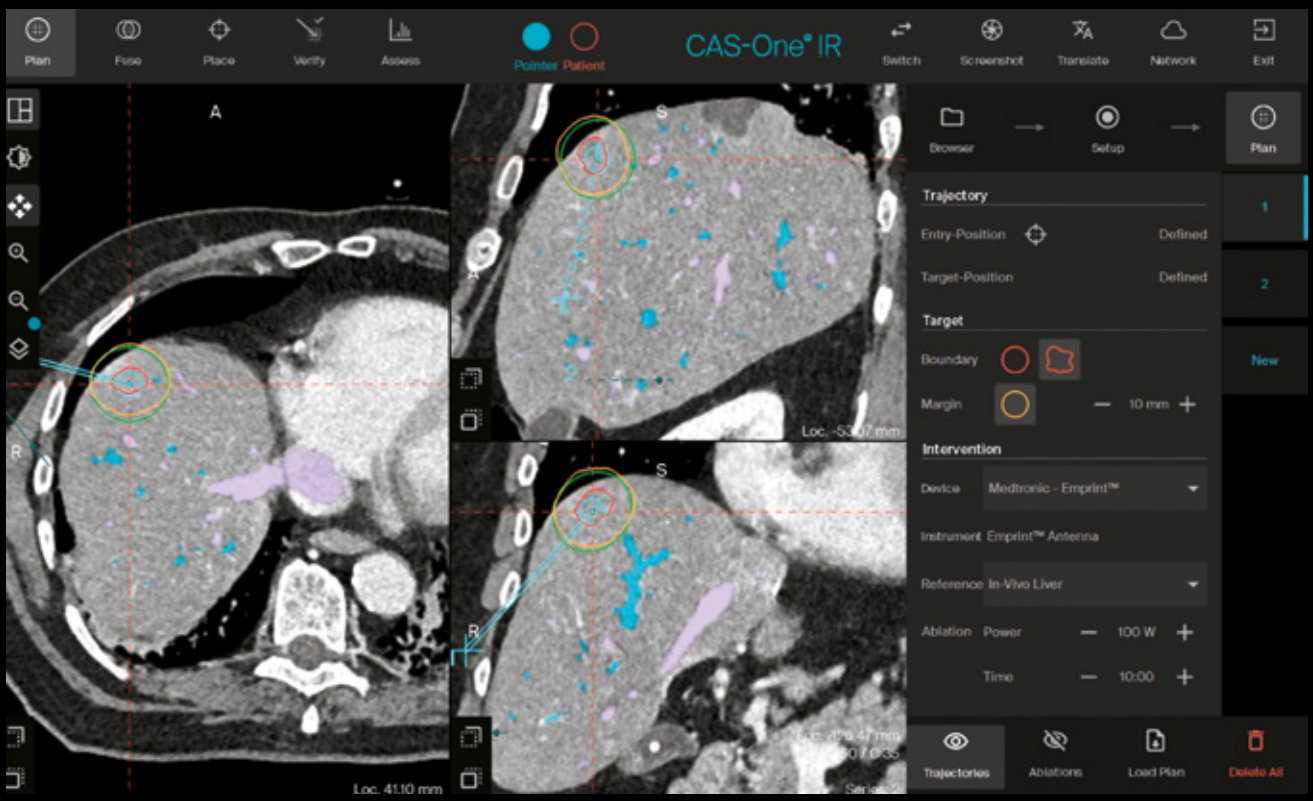
A patient diagnosed with colorectal cancer in 2019, who had previously undergone partial liver resection and ablation, presented with two new liver lesions in segments V and VIII, confirmed by both CT and MRI. The segment VIII lesion, located on the liver dome capsule, posed a significant challenge due to its trajectory requirements and proximity to the diaphragm. CAS-One IR was selected to address both lesions, particularly the challenging dome lesion.

Treatment

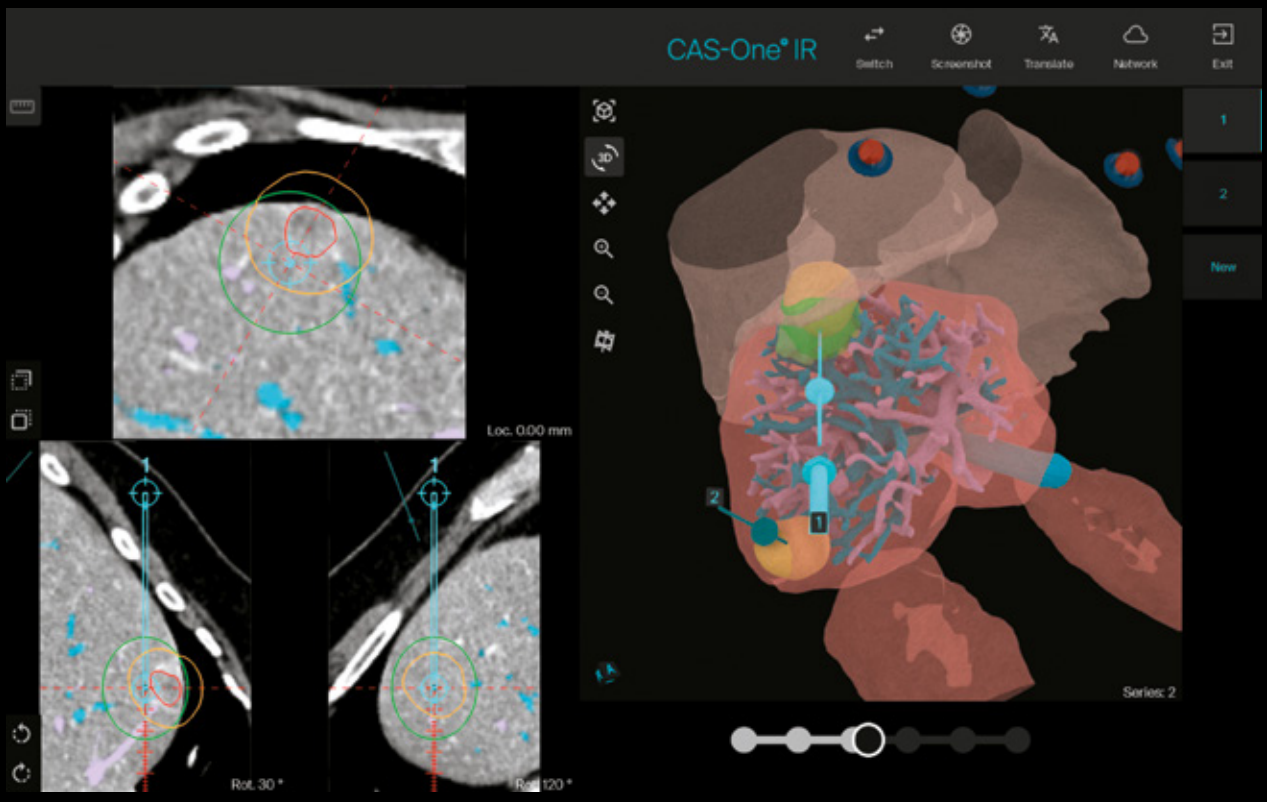
Two trajectories were planned and executed with manual adjustment of the planned ablation zone in CAS-One IR software to account for diaphragm proximity. During critical phases, apnea was implemented to minimize movement. While needle verification showed minimal lateral error, depth adjustment was necessary. The procedure was completed using the Medtronic Emprint HP generator with a 15 cm needle.

Results and Conclusion

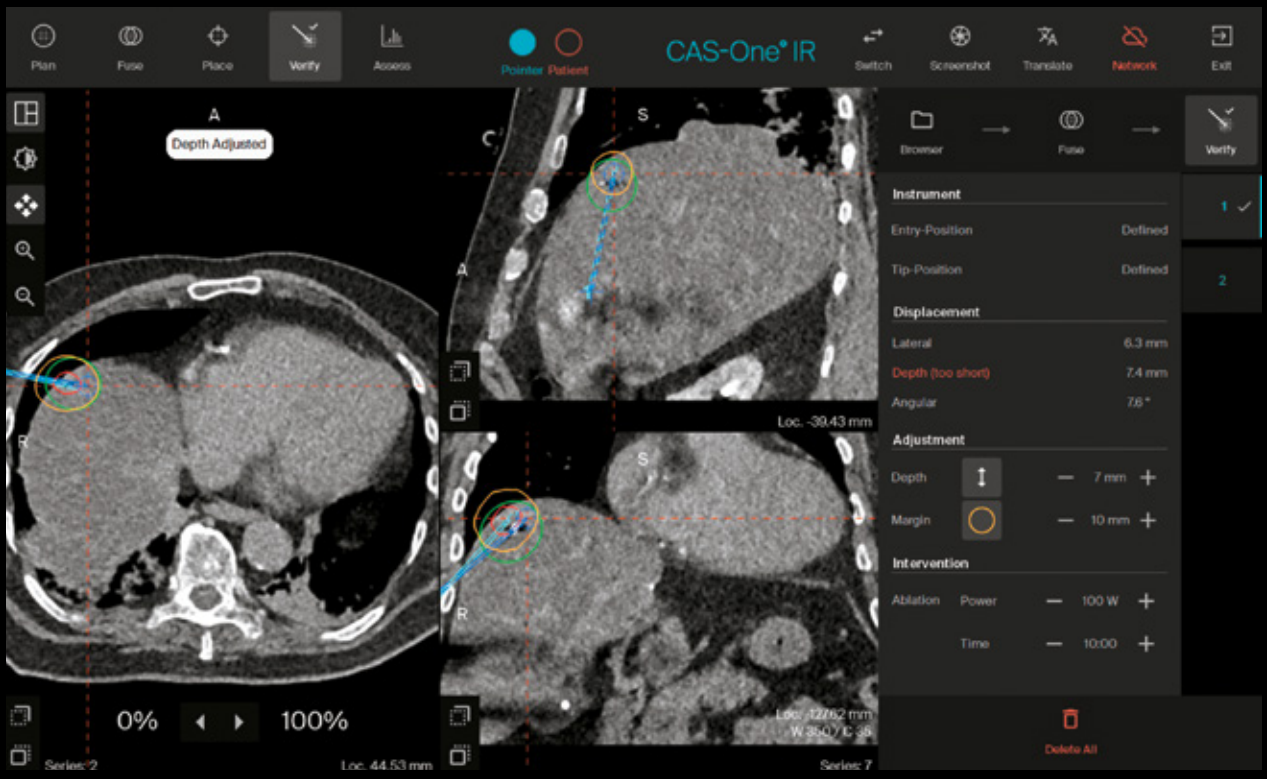
Stereotactic MWA treatment achieved sufficient ablation margins for both lesions without intraprocedural complications. The case demonstrated successful management of a challenging subcapsular location with diaphragm proximity. A 6-month follow-up scan was scheduled to assess long-term outcomes.



Planning scan in MPR view with vessel segmentation and planned trajectory on the more challenging lesion visible



Planning scan in the 3D reconstructed view of the segmented liver vasculature. The trajectory and estimated ablation zone was moved to avoid the lung



Needle verification scan showing 6mm lateral error, due to the challenging position of this trajectory, only the depth was adjusted

Case 05

Dr. Ádám Zoltán Farkas
Semmelweis University, Budapest, Hungary

70 y ♀ | L | MW

Two-probe MWA of RCC lesions in different locations

A 70-Year-old obese female patient diagnosed with cystic RCC in 2016 was treated with surgery. In 2023 a small local recurrence near the abdominal wall was detected and a new lesion near the renal hilum also appeared. The MDT decided for a CT- guided double microwave ablation assisted with CAS-One IR to ensure a quick, accurate procedure.

Initial Condition

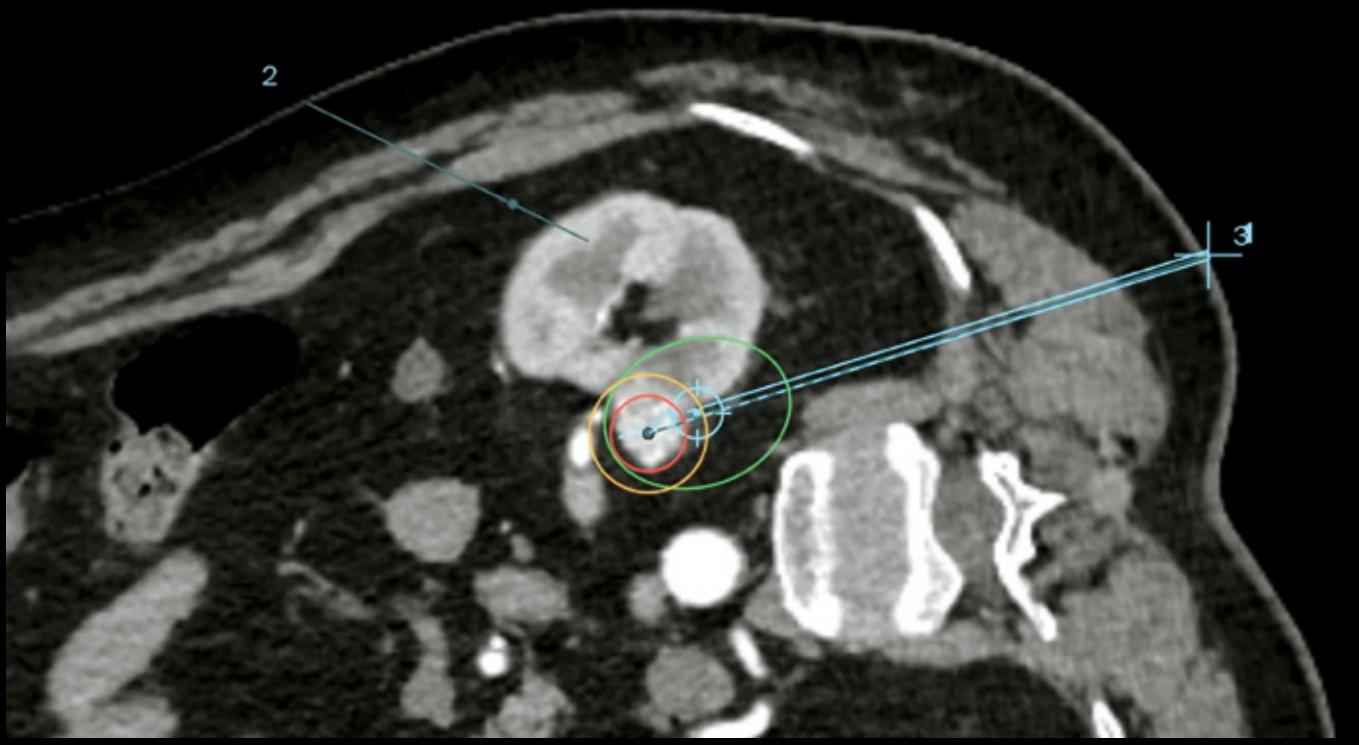
A patient diagnosed with cystic RCC on the left kidney in 2016 underwent open surgery with lumbotomy approach and remained tumor-free until 2023. January 2023 follow-up MRI revealed a 15mm local recurrence and a new 23.5 x 20.5mm lesion near the hilum. Due to the patient's obesity affecting visibility and the lesion's proximity to critical structures (hilum and renal artery), the MDT opted for CT-guided MWA using CAS-One IR for precise planning and navigation.

Treatment

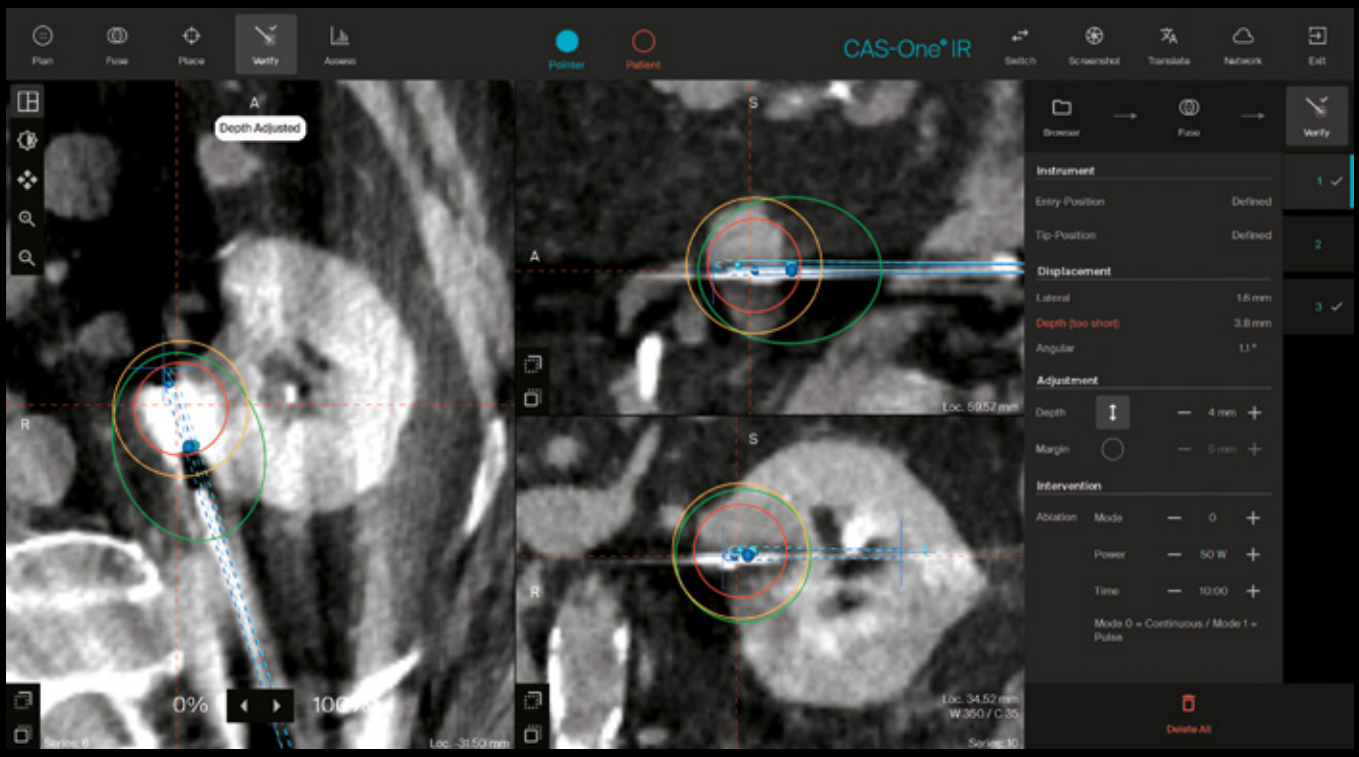
Both lesions were treated with the ECO MWA system. CAS-One IR's planning capabilities enabled maximal preservation of healthy tissue while maintaining treatment efficacy.

Results and Conclusion

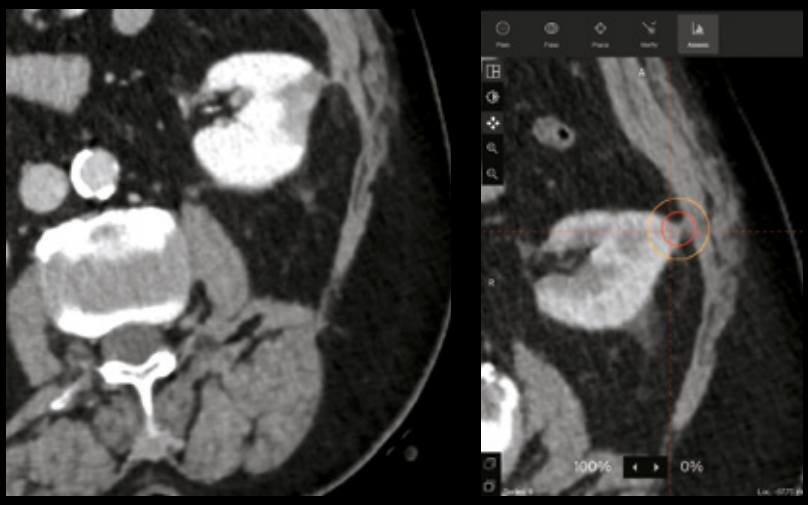
The procedure achieved complete ablation of both tumors with clinical margins, and the patient was discharged the next day without complications. Two-month follow-up MRI confirmed complete treatment without local recurrence at either ablation site. The case demonstrated CAS-One IR's value in challenging scenarios where ultrasound guidance was impossible due to obesity, successfully enabling precise treatment while protecting critical structures like the renal artery and ureter.



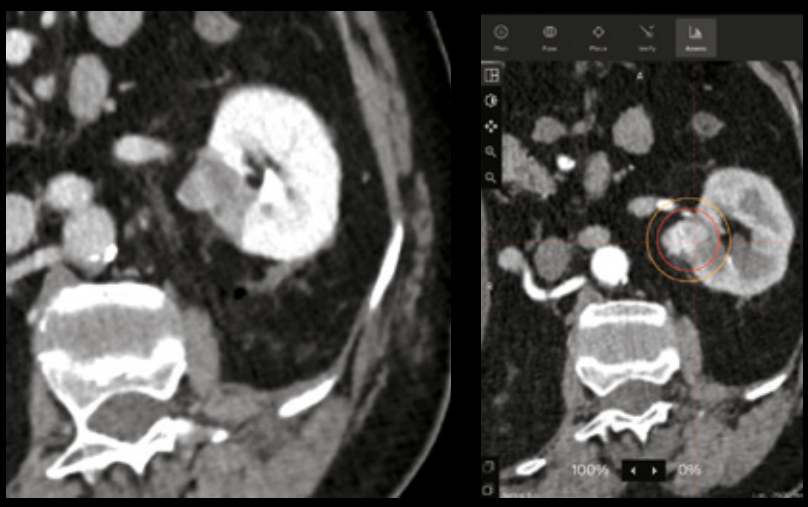
Planning scan with the 2 trajectories in MPR view



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



Follow-up scan showing full treatment of the first lesion (left), compared to the planning scan (right)



Follow-up scan showing full treatment of the second lesion (left), compared to the planning scan (right)

Case 06

Prof. Dr. Attila Kovács,
Prof. Dr. Michael Pinkawa
Robert Janker Klinik, Bonn, Germany

♂ | V/VI/VII | BRT

Quality Ablation redefined: precision brachytherapy with CAS-One IR

Patient with multiple resections and chemotherapy in early 2023 presented in December 2023 with two hypoperfused CRLMs in segments V/VI and V/VII. Interstitial HDR brachytherapy with a palliative intent was decided over ablation to both preserve as much liver tissue as possible, and to avoid a secondary bilioma. In an innovative, first-ever scenario, four applicators were placed with CAS-One IR to ensure optimal placement. A follow-up MRI was performed 2 days afterwards to confirm there were no intraprocedural complications.

Initial Condition

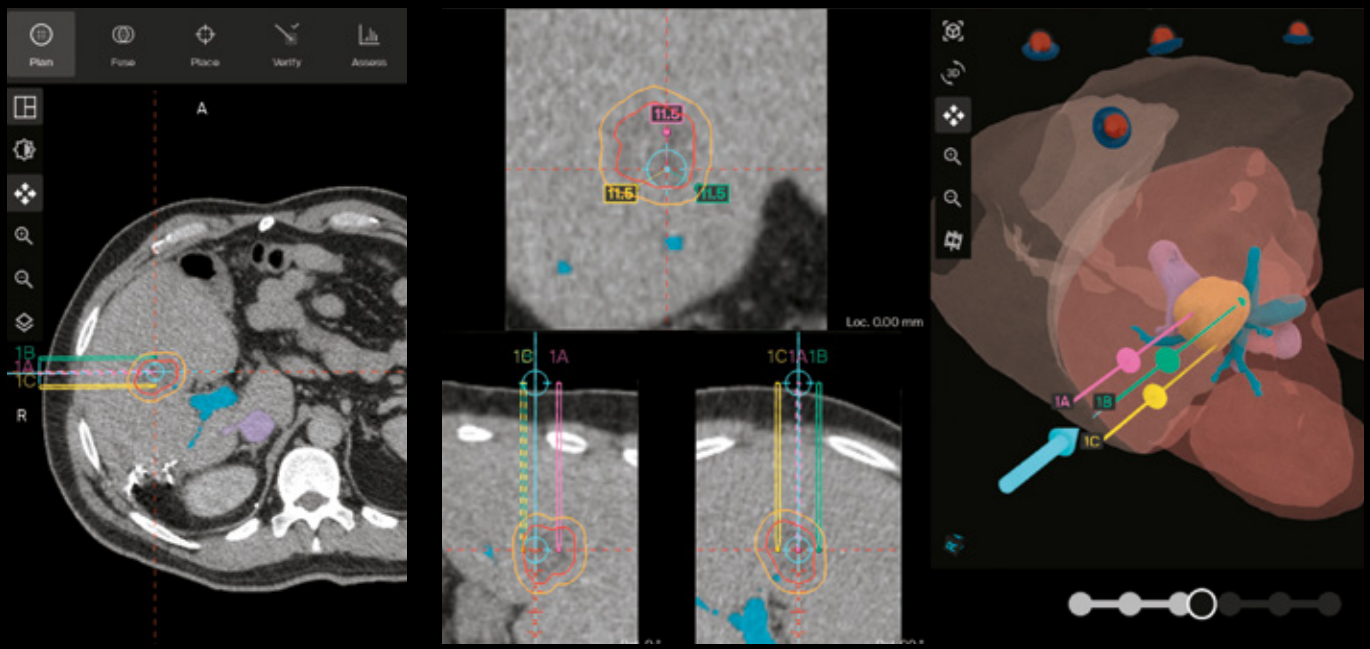
A patient diagnosed with Rectal Carcinoma (cT3 cN2 pM1) in December 2022 presented with two primary liver metastases. After hemihepatectomy, metastasectomies, neoadjuvant chemotherapy, and primary tumor resection, continued systemic therapy was required due to additional liver metastases. November 2023 MRI revealed two hypoperfused metastases in segments V/VI and V/VII (15-25 mm) without hepatic secondary complications.

Treatment

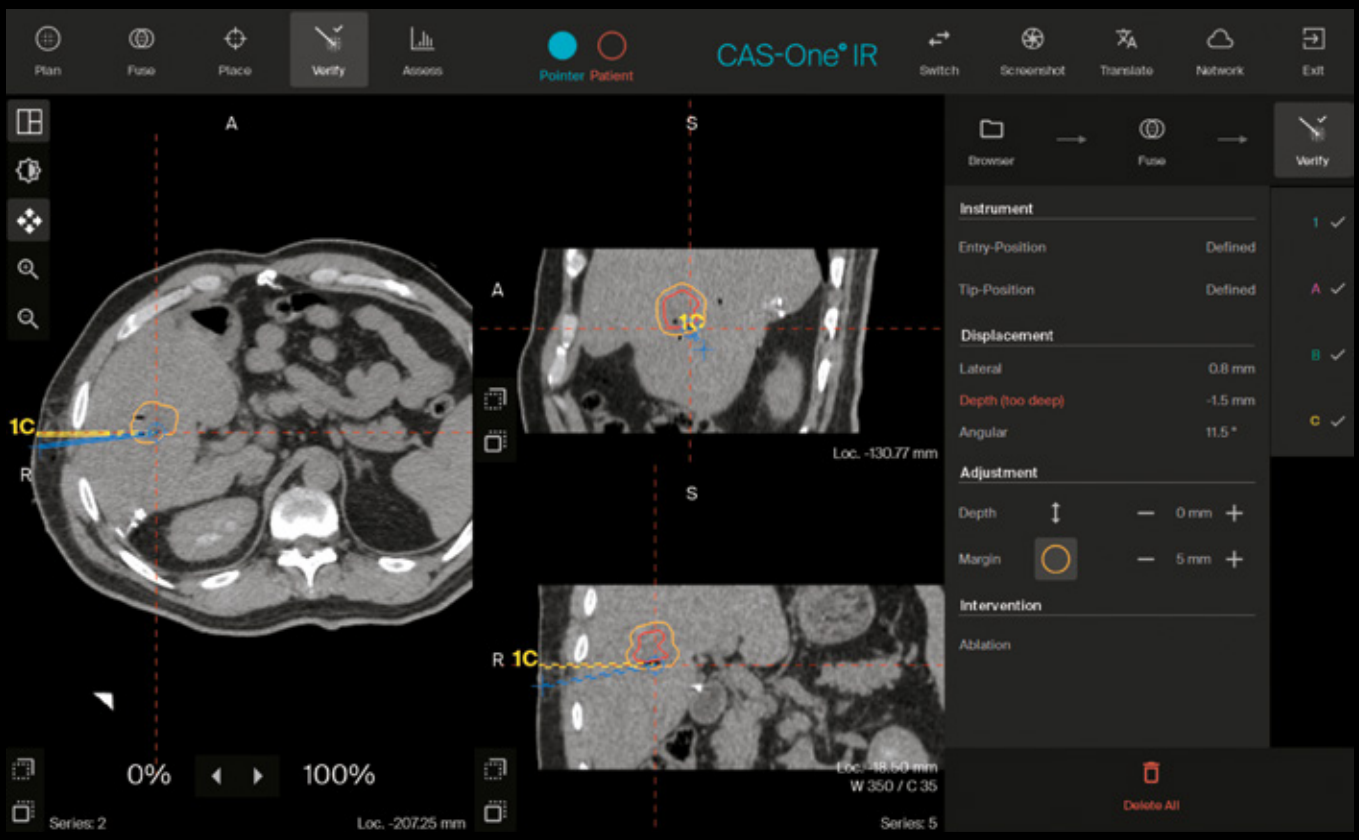
In December 2023, interstitial HDR-Brachytherapy was chosen over thermal ablation for its advantages in treating larger metastases while preserving healthy liver tissue and avoiding secondary bilioma risk. Using intraprocedural CT, trajectories were planned for a tumor-encapsulating dose of 20 Gy (IR 912). Four applicators were positioned with sub-millimeter precision under CAS-One IR guidance.

Results and Conclusion

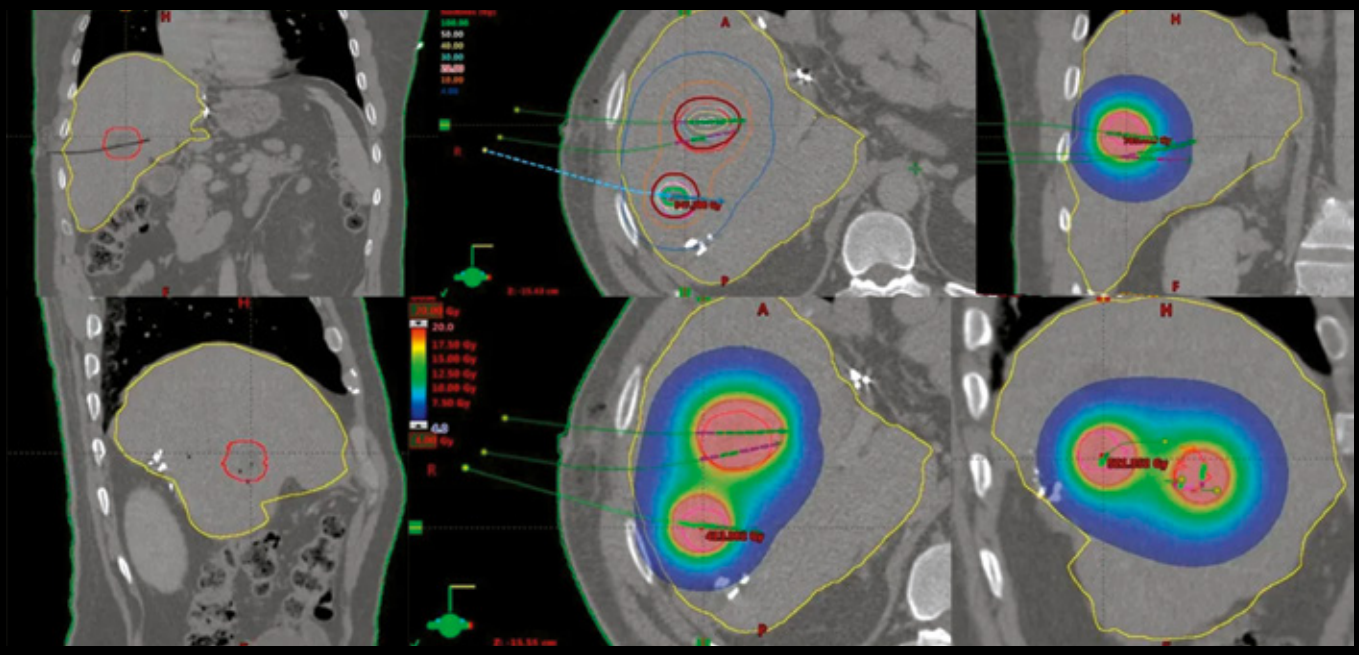
Successful applicator insertion and treatment administration was confirmed by follow-up MRI two days post-procedure, which showed no complications. The case effectively demonstrated CAS-One IR's capability to support precise applicator positioning in Brachytherapy, enabling highly localized treatment delivery.



3-applicator planning of the first treatment in MPR view



Applicator verification of the first treatment with <1mm lateral error



Dose planning of the two treatments (first planning - top row, second planning - bottom row)

Dr. Simon Smith
East Suffolk and North Essex NHS, Ipswich, UK

18 y ♀ | LUNG | MW

MWA of an osteosarcoma metastasis after a lung resection

Patient initially diagnosed with an Osteosarcoma in her left proximal fibula. Patient underwent above knee amputation. During a control CT of the lungs, several lymph nodules and a sclerotic lesion is visible. It was decided during a MDT meeting that the best treatment for this lung lesion was stereotactic lung ablation.

Initial Condition

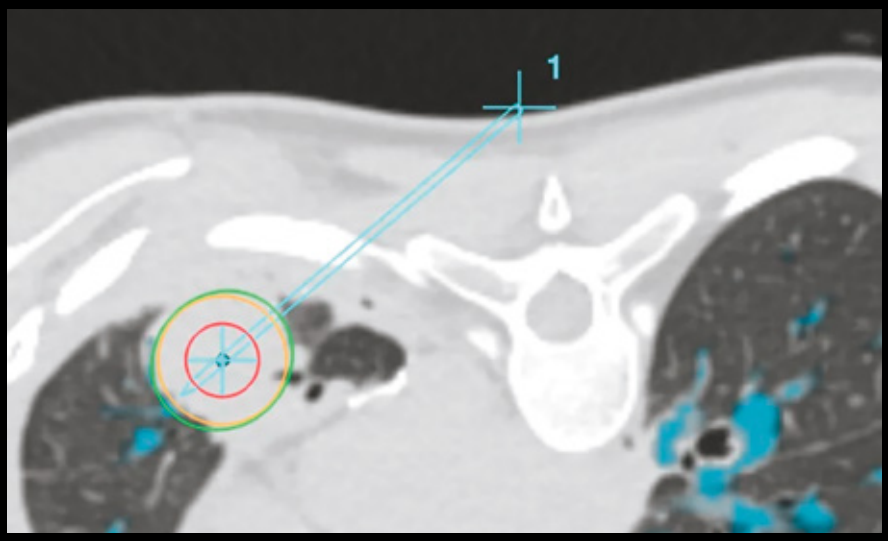
A patient diagnosed with osteosarcoma in the left fibula in 2021 underwent above-knee amputation followed by chemotherapy. After discovering multiple lung lesions in July 2022, quarterly CT follow-ups were implemented during ongoing chemotherapy. Following left lobectomy for metastatic sarcoma in April 2023, follow-up CT revealed a new lung lesion that showed significant growth two weeks prior to planned ablation.

Treatment

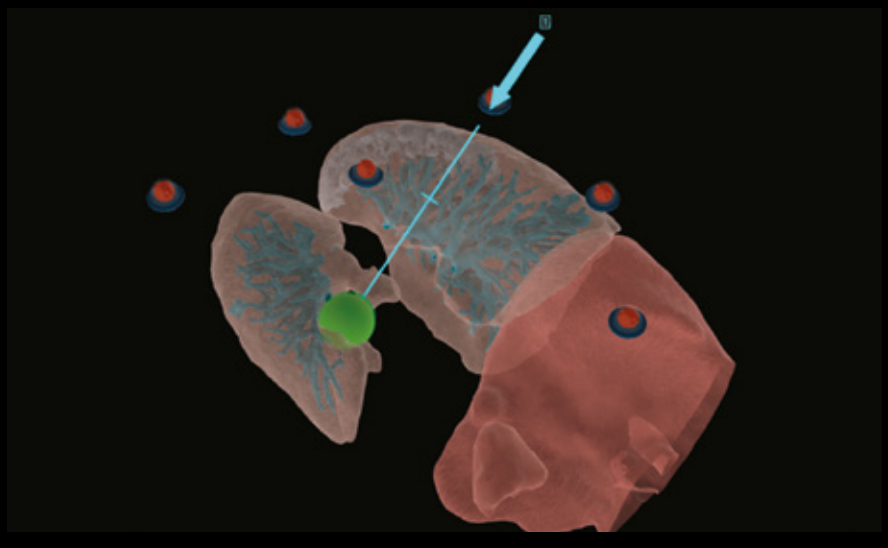
The procedure utilized a Medtronic Emprint HP generator with the patient in prone position for posterior lung access. Treatment consisted of a 6-minute ablation using a 15 cm needle placed with 2 mm precision.

Result

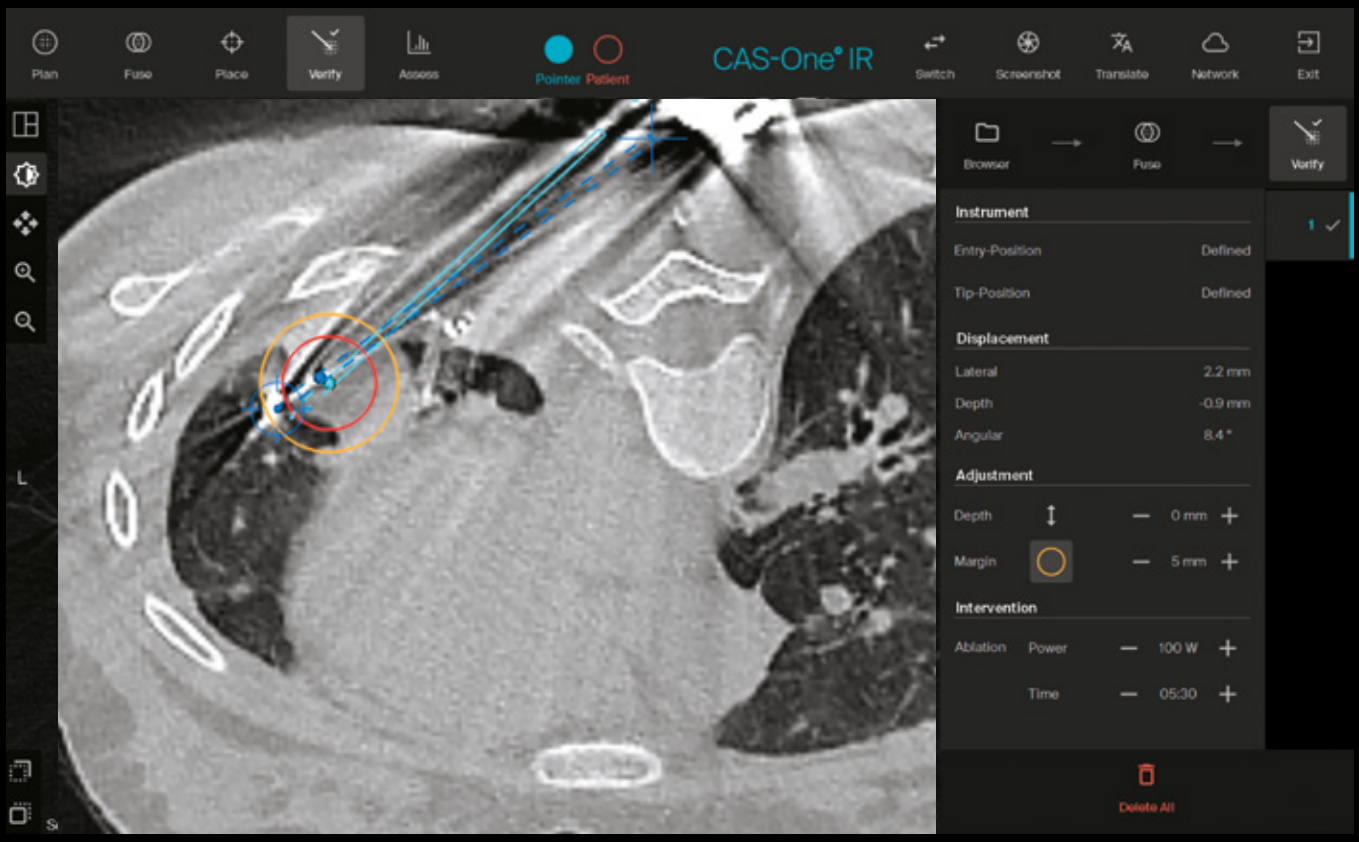
The stereotactic MWA achieved sufficient ablation margins, with three-month follow-up imaging confirming adequate treatment results.



Planning scan in axial view
with lung vessel segmentation in blue



Planning scan in the 3D reconstructed view
of the segmented lung vasculature



Needle verification scan showing 2.2mm lateral error

Post-ablation CT scan confirming coverage of the lesion and margin

Case 08

Dr. Marie Beermann
Danderyd Hospital, Stockholm, Sweden

59 y ♂ | VI / III | IRE | MW

Patient treated with IRE and several MWA in the same session

A 59-year-old male, diagnosed with CRC in 2022 was considered a palliative patient. However, due to good response with chemo it was decided to treat the patient's liver lesions. Knowing the advanced capabilities of CAS-One IR, the tumor board decided for treatment of the liver lesions using IRE and MWA in the same session. The procedure was performed efficiently, with precision and effectiveness.

Initial Condition

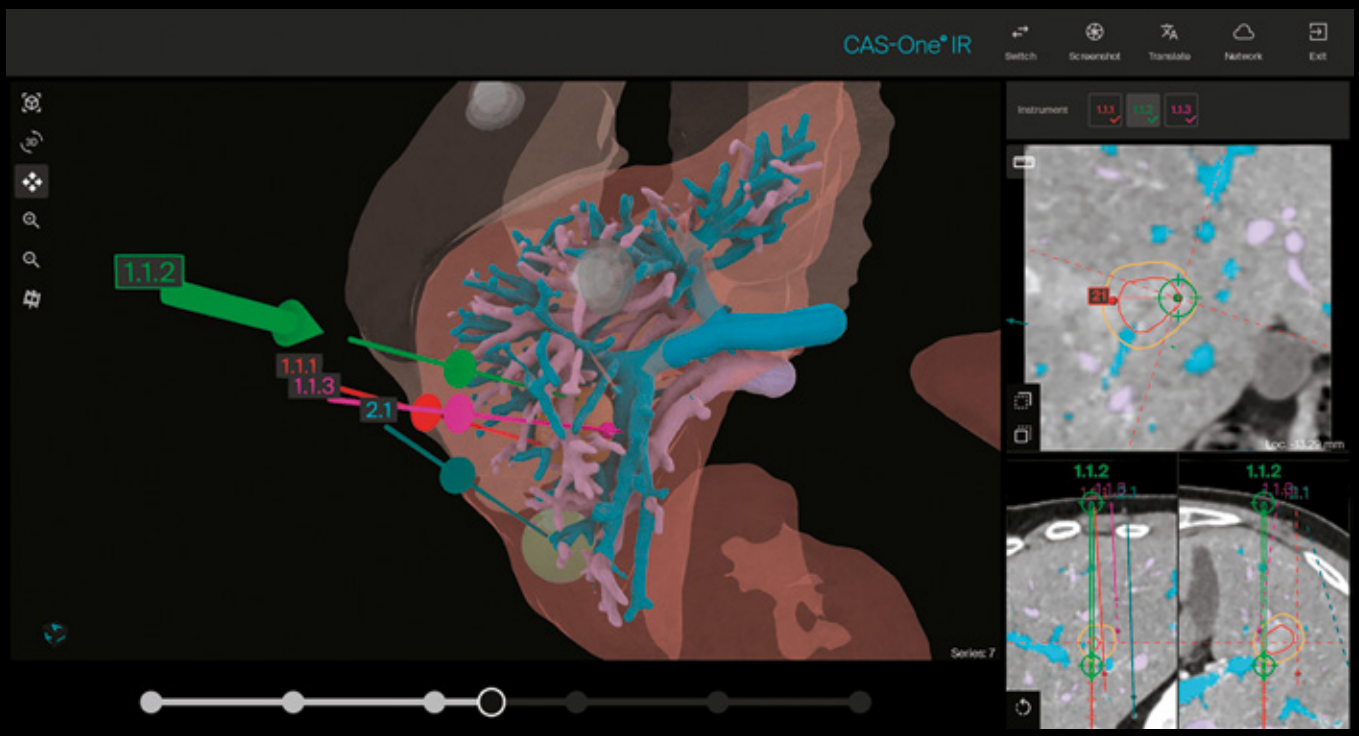
A patient diagnosed with colorectal cancer in 2022 initially received palliative chemotherapy. Due to positive treatment response, the approach shifted to targeting liver metastases. While initial tumors showed positive treatment progress on MRI, in July 2024, four new liver metastases were discovered. The tumor board determined these could be treated with ablation using CAS-One IR. Given the critical location of one lesion in the central liver, IRE was selected for that specific lesion, while MWA was chosen for the remaining three lesions.

Treatment

Under general anesthesia with high-frequency jet ventilation, the procedure began with the central liver lesion using three IRE needles. Needle verification scan confirmed excellent parallel alignment and precision. The IRE protocol consisted of 10 test pulses followed by 90 treatment pulses with increasing energy. Subsequently, MWA was performed on the segment VI lesion (4 minutes, 100 watts), followed by two additional trajectories in the dorsal region of segment VI and one in segment III. MRI fusion guided the targeting of CT-invisible lesions. A contrast-enhanced CT scan evaluated the final results.

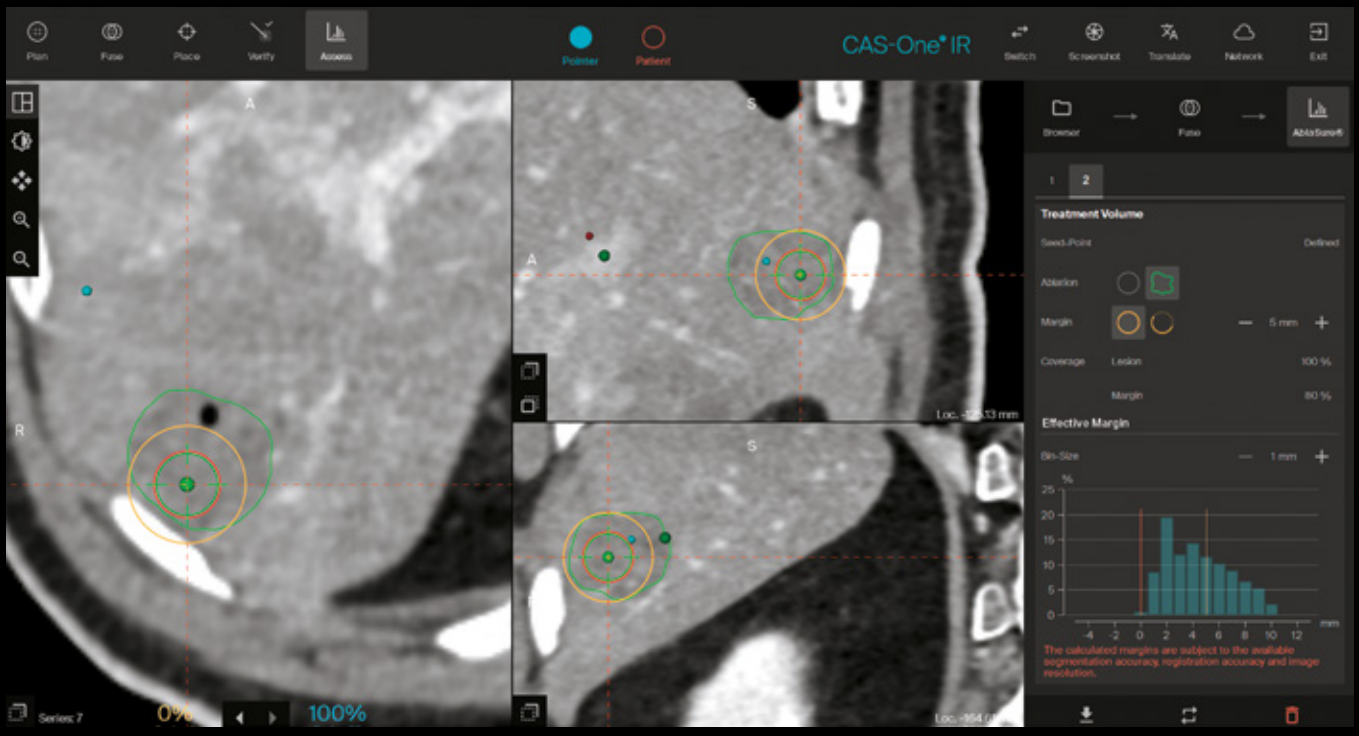
Results and Conclusion

The IRE-treated central lesion showed adequate results, though ablation zone visualization required follow-up MRI for confirmation. AblaSure assessment of the segment VI MWA zone demonstrated complete tumor coverage with full margins, while the remaining lesions showed sufficient margins. CAS-One IR successfully enabled treating four lesions in one session using multiple ablation modalities. The system's precise IRE needle placement planning and automatic separation detection enhanced physician confidence. A one-month follow-up MRI confirmed no tumor progression in any treated lesions.



3D reconstruction of the planning scan highlighting the 21mm needle separation for the IRE

Needle verification scan of all 3 IRE needles with as low as 0.1mm lateral error



AblaSure of the MWA showing 100% lesion coverage and sufficient margin coverage

Case 09

Dr. Ádám Zoltán Farkas
Semmelweis University, Budapest, Hungary

57 y ♂ | VI / VIII | MW

Quality Ablation of 5 rectal cancer liver metastases

A 57 year old patient diagnosed with rectal cancer in 2022 had surgery and chemotherapy. In January 2024 the patient met the criteria for the MWA of the remaining 5 liver metastasis, requiring 6 trajectories with CAS-One IR. The procedure was performed with excellent accuracy, and AblaSure showed good coverage of the lesions and the chosen margin.

Initial Condition

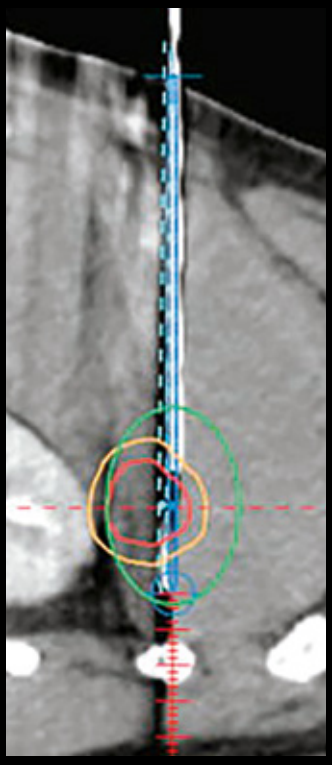
A patient diagnosed with rectal carcinoma and multiple liver metastases in 2022 underwent DIXON surgery with positive lymph node resection in July 2022, followed by panitumumab therapy and Folfox chemotherapy until 2023. Early 2023 showed 10 liver metastases with size and metabolic regressions and negative tumor markers. After progression in July 2023, treatment switched to Folfirinox chemotherapy and Cetuximab. By January 2024, five liver metastases were identified as candidates for microwave ablation using the ECO system with CAS-One IR assistance.

Treatment

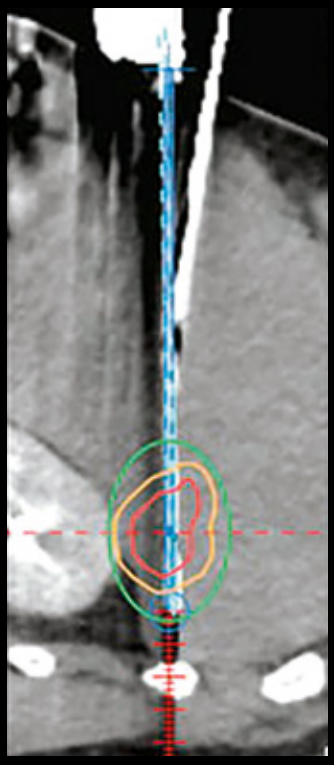
The procedure was performed under general anesthesia, considering multiple comorbidities. All five CT-visible lesions were treated using six trajectories, with overlapping treatment required for the largest lesion in segment VI. The ECO system delivered consistent treatment parameters of 60 W for 10 minutes across all probes.

Results and Conclusion

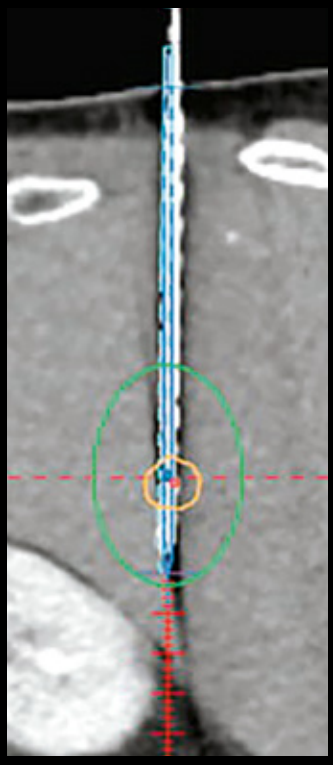
AblaSure confirmed satisfactory ablation of all five lesions, and the patient was discharged the next day. While a minor post-ablation fever resolved spontaneously, three-month MRI revealed complete ablation of all target lesions but showed a new segment VIII lesion and an asymptomatic biloma at the segment VI ablation site. By July 2024, the segment VIII lesion was successfully ablated, with the original five lesions remaining recurrence-free. However, a new lesion at the segment V/VIII border grew beyond thermal ablation eligibility, necessitating a return to chemotherapy and ECT referral.



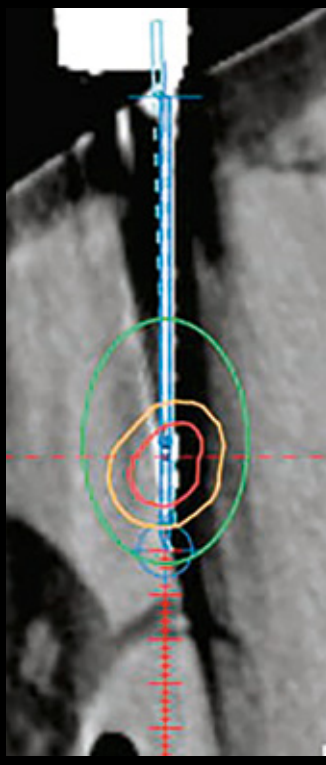
Displacement
Lateral
3.3 mm
Needle view 1



Displacement
Lateral
1.2 mm
Needle view 2

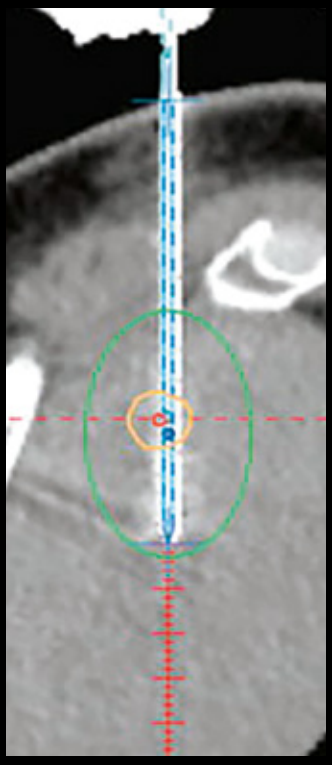


Displacement
Lateral
2.5 mm
Needle view 3

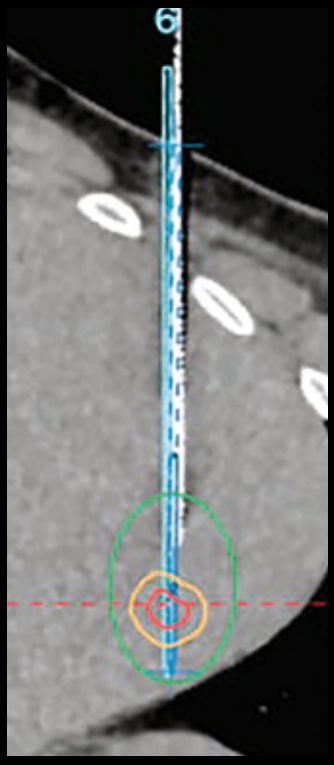


Displacement
Lateral
1.2 mm
Needle view 4

AblaSure showing 100% coverage with 1 cm safety margins of the large lesion in segment VI.



Displacement
Lateral
3.7 mm
Needle view 5



Displacement
Lateral
1.8 mm
Needle view 6

Verification scans of the 6 needles.
2 needles were positioned manually due to a shift in the liver post ablations.

Dr. Gerhard Gruber
Barmherzige Brüder, Vienna, Austria

68 y ♀ | L | Cryo

A large renal cell carcinoma treated with cryoablation

Female patient with a history of breast cancer had a 39 mm Renal Cell Carcinoma. Due to ongoing chemotherapy, cryoablation with the assistance of CAS-One IR was decided as opposed to a partial nephrectomy. 3 cryoablation probes were planned and navigated to successfully cover and ablate the lesion. No complications were observed and the patient awaits the 3-month follow-up.

Initial Condition

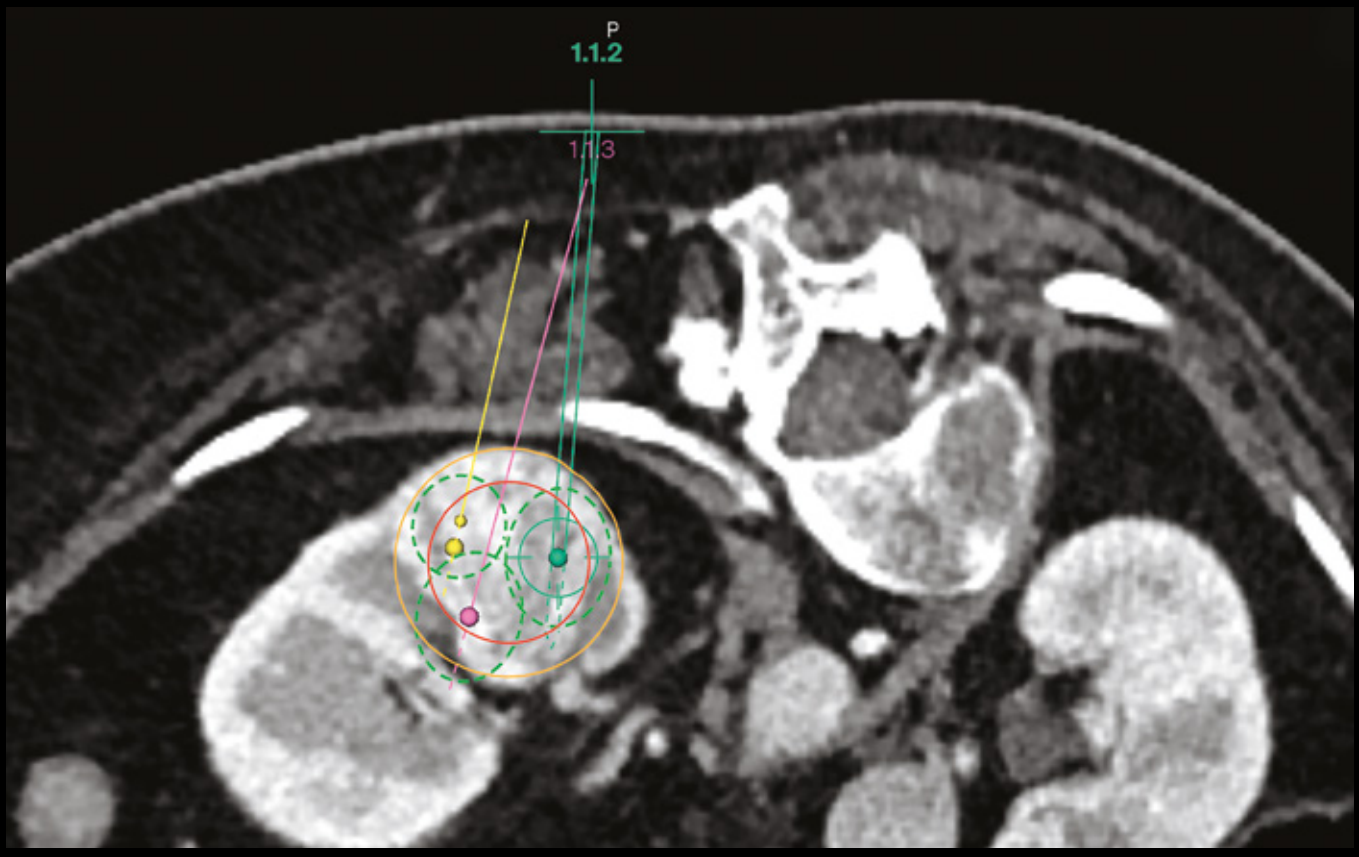
A 39 mm kidney lesion was identified via CT scan in a patient who had been initially diagnosed with breast cancer in December 2023. The case was discussed at the MDT meeting to evaluate different treatment approaches. Given that the patient was currently undergoing chemotherapy for breast neoplasia, the team determined that cryoablation would be preferable to a partial nephrectomy.

Treatment

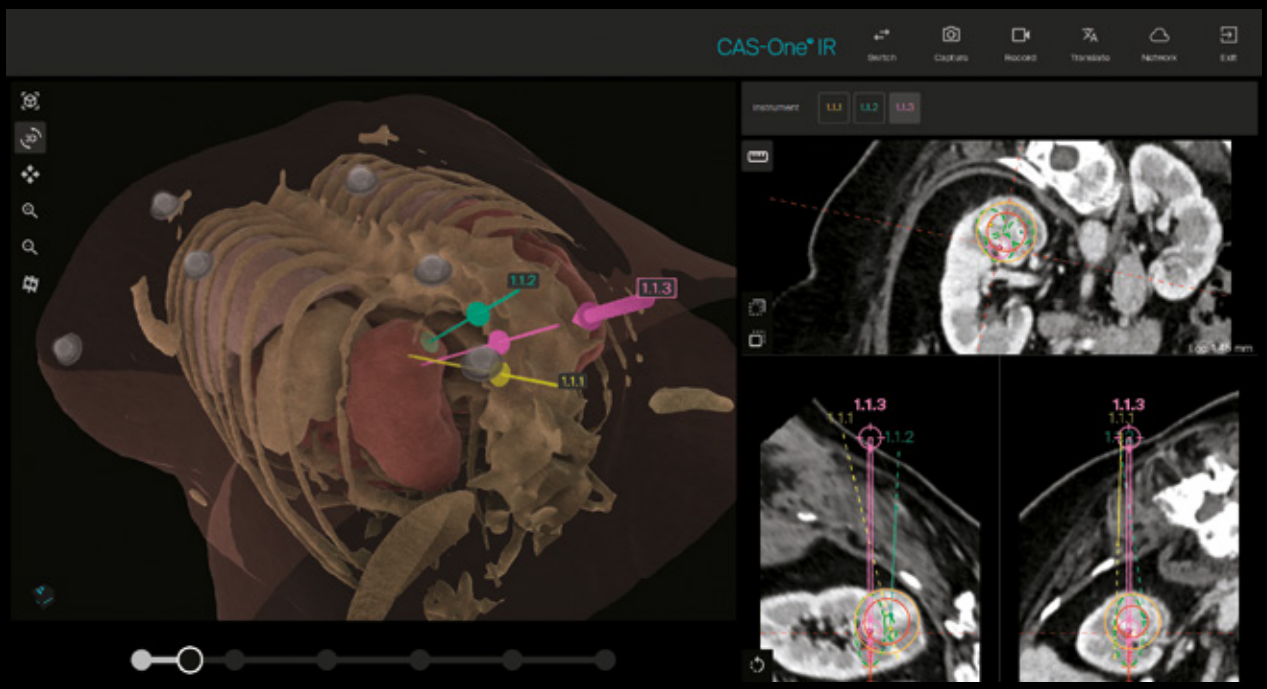
The patient underwent treatment under general anaesthesia. The lesion was visible on CT imaging, leading to the planning of a 3-needle cryoablation treatment to ensure tumor coverage. The procedure was performed using three IceRod probes (Boston Scientific). Planning the needle trajectories proved challenging due to the patient's specific anatomy. However, through careful analysis using MPR views and 3D models, the medical team successfully planned and executed a safe approach. The procedure achieved high precision, with all three needles placed with lateral error measurements of less than 3 mm.

Results and Conclusion

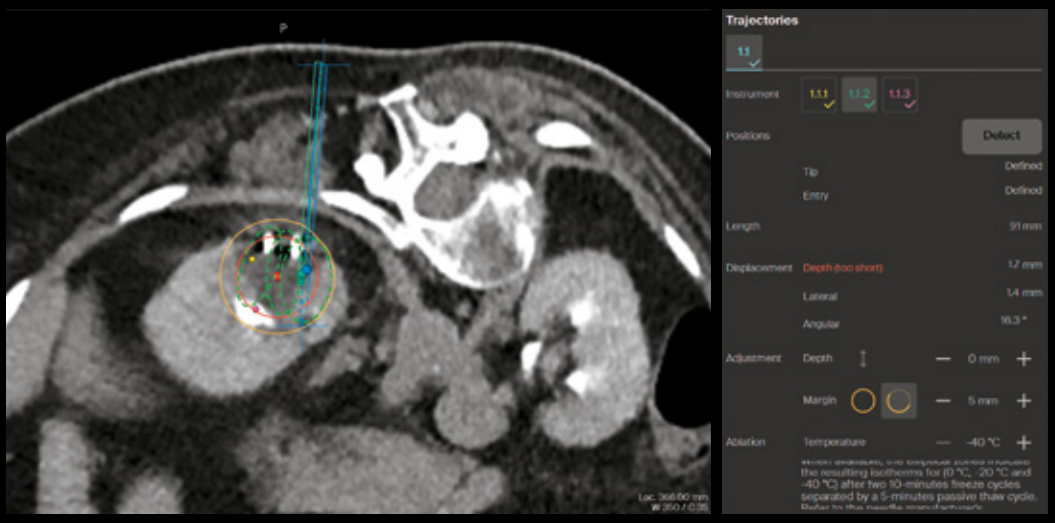
The lesion was successfully treated and iceballs were evaluated on post-ablation scans. Although no complications occurred, the patient chose to remain as an inpatient following the procedure. Follow-up plans include a CT scan and renal function tests scheduled for three months post-procedure.



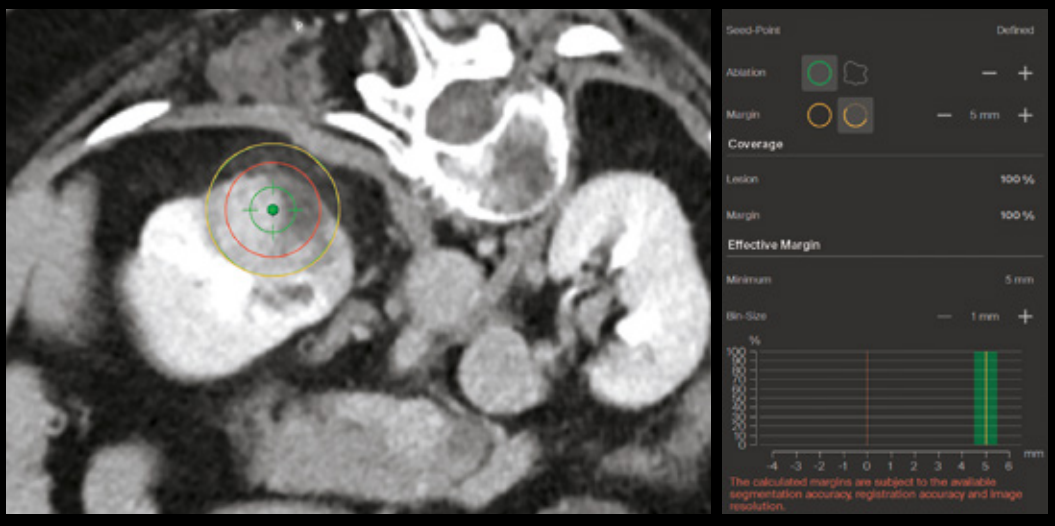
Planning scan with 3 cryoablation needles planned to cover tumor and margins



3D reconstruction of the planned needles



Needle verification scan showing accurate (<2 mm) needle placement for all 3 needles

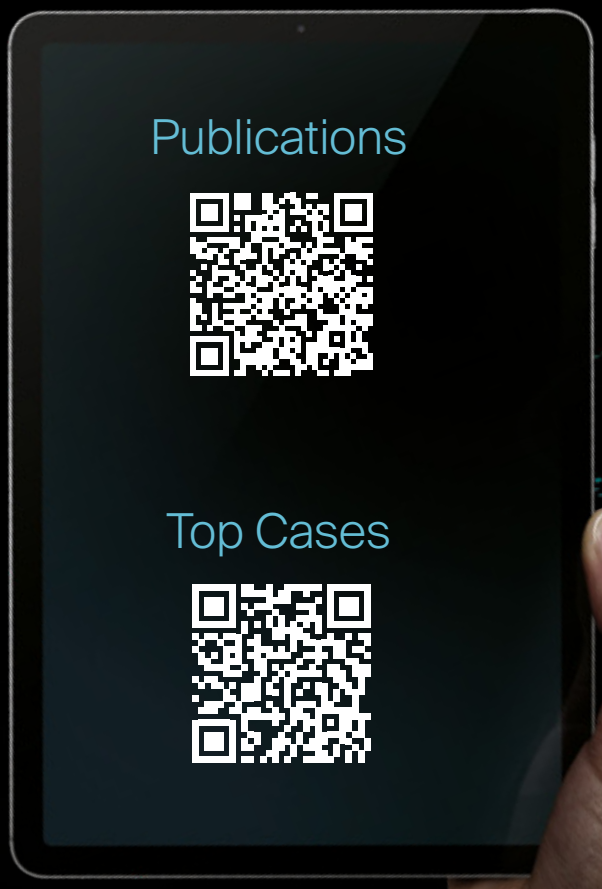


AblaSure showing a good result of the ablation zone after treatment

Clinical evidence publications and cases

For over a decade, CAS-One IR has revolutionized percutaneous tumor treatment, validated through rigorous scientific research and clinical studies. None of these studies were sponsored by the company.

Discover our comprehensive publication database and monthly spotlight on exceptional cases, showcasing CAS-One IR's expertise in percutaneous tumor ablation.



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