



Study Protocol

Combined embolization and ablation in an angio-CT interventional suite

Oncology

Combining CT and angiography systems not only has the potential to enable these complex combined techniques, but also to take existing interventional therapies to a new level

Courtesy of

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Supported by

syngo 2D/3D Fusion
syngo Embolization Guidance
syngo 3D Roadmap

System & Software

Angio-CT with Artis Q ceiling
+ SOMATOM Definition Edge
(128 slices)

Case Description

Patient history

59-year-old male with metastatic colorectal cancer to spleen.

Diagnosis

The patient was previously diagnosed with metastatic colorectal cancer to the liver and was successfully treated using CT-guided liver ablation. A new metastasis measuring 1.9 cm was found in the superior aspect of the spleen (Fig. 1). This was treated with percutaneous CT-guided microwave ablation and with a pre-ablation superselective embolization of the feeder vessels to the tumor in order to reduce the risk of bleeding.

Treatment

A catheter was placed in the splenic artery guided by fluoroscopy and DSA was obtained (Fig. 2a). An intra-arterial CT scan with contrast administration was acquired of the splenic artery to map out the tumor feeder vessels.

Multiplanar reformatted (MPR) images from the intra-arterial CT scan clearly illustrated the hypovascular tumor and the vessels supplying the splenic segment harboring the target tumor (Fig. 2b), which were not visible on planar DSA images.

After delineating the feeder vessels, superselective catheterization of the splenic artery branch supplying the area of interest was performed successfully, and the target feeding branches were embolized. (Figs. 2c-2d).

Following the embolization, microwave ablation under CT guidance was performed. In general, the spleen is prone to bleeding due to its rich vascularity. Therefore, femoral access was maintained throughout the ablation procedure to mitigate bleeding under angiography where needed.

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An initial noncontrast CT scan was acquired to plan the ablation needle path.

Prior to inserting ablation probes, hydrodissection of the perisplenic space with separation of the splenic flexure of the colon was performed successfully under CT guidance.

Two microwave antennas were inserted under CT guidance, and microwave ablation was performed. Immediately after the removal of the ablation probes, the patient became tachycardic and hypotensive. A DSA was therefore acquired to exclude any bleeding. Intra-arterial contrast-enhanced CT imaging, also

performed toward the end of the ablation procedure, confirmed the ablation margins and indicated no bleeding from the ablation (Fig. 3).

General comments

Since embolization is an intra-arterial therapy, it is traditionally performed in an angiography suite, while ablation, a percutaneous procedure, is performed using CT or ultrasound imaging. However, the combination of a CT scanner and angiography system allowed us to perform these two procedures in the same setting and with successful interplay of the technical and imaging information between the

two procedures. For example, intra-arterial CT imaging was used to accurately identify the vessels feeding the splenic segment harboring the tumor during the embolization procedure under angiography imaging. Similarly, immediate post-ablation assessment of potential bleeding and ablation margins was performed using DSA and CT imaging acquired with intra-arterial access. As a safety measure, CT-guided hydrodissection was performed to avoid ablation of critical structures, and femoral access was maintained for angiographic detection and embolization of possible bleeding.

Acquisition protocol	Abdominal CT Scan
Tube voltage	120 kV
Tube current	233 mAs
Rotation speed	0.5 s
Gantry tilt	0°
Slice thickness	0.5 mm

Injection protocol

Catheter position	Splenic artery
Contrast medium (CM)	350 mg iodine/mL
Dilution (CM/Saline):	None
Injection volume	42 mL
Injection rate	3.0 mL/s
Duration of injection	14 s
X-ray delay	0 s
Power injector used	Yes

Reconstructions

Reconstructions	Primary
Name	MPR Reformation
Slice thickness	0.8 mm
Slice matrix	431×431
Kernel type	I40

Clinical Images

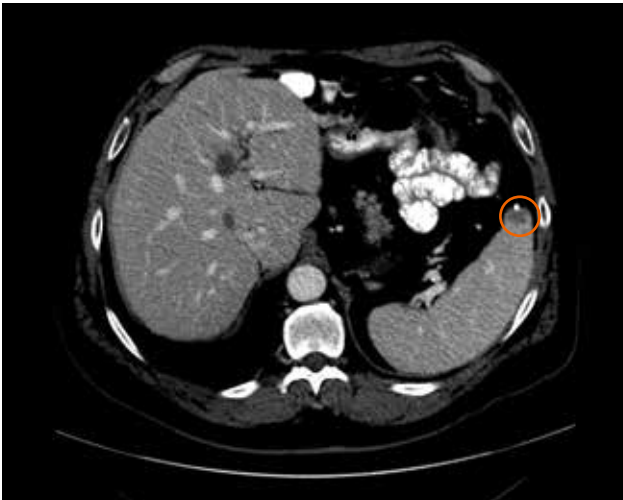


Figure 1: Diagnostic CT scan showing metastasis to spleen

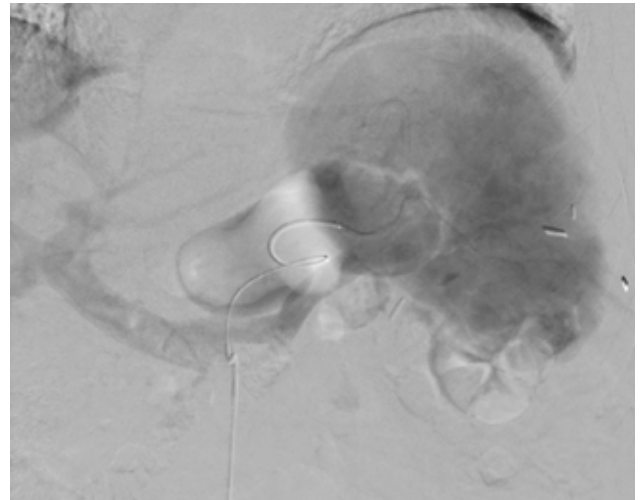


Figure 2a: Planar DSA to depict splenic vasculature

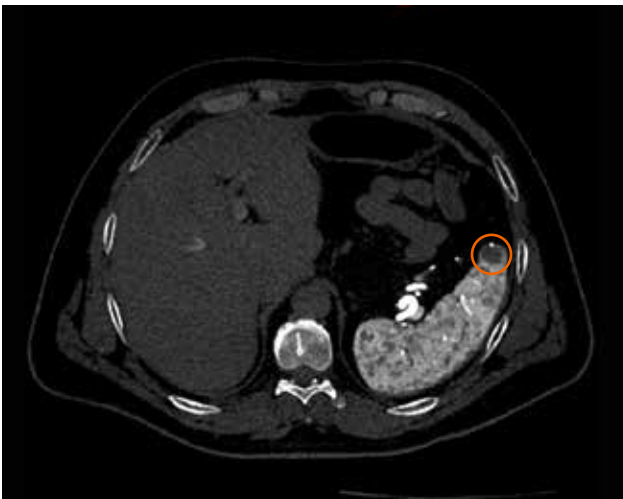


Figure 2b: Axial slice of intra-arterial CT image showing splenic lesion

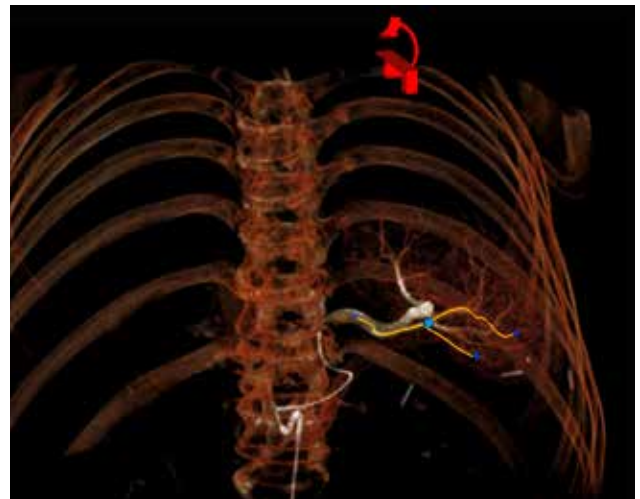


Figure 2c: Identification of tumor vessels using syngo Embolization package

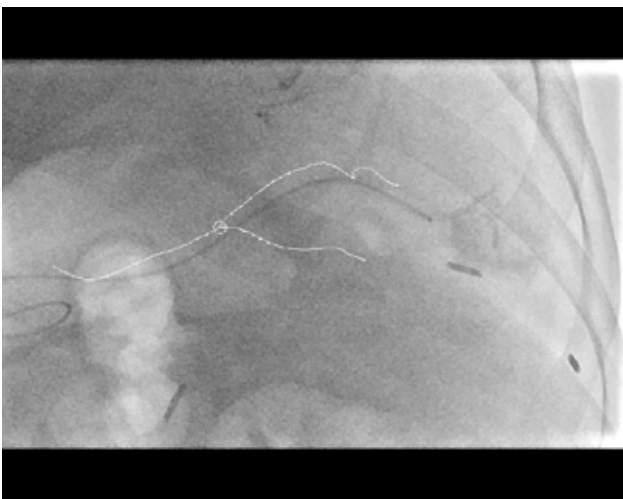


Figure 2d: Fluoroscopic image of the point of embolization, vessel path overlaid from intra arterial CT scan

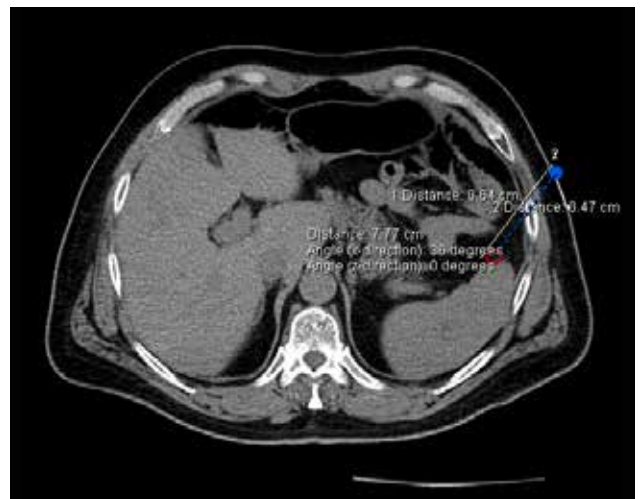


Figure 3a: Axial slices showing the path planning on CT images (3a) and the ablation probe (3b)

Clinical Images



Figure 3b



Figure 3c: Immediate post-ablation intra-arterial CT highlighting the ablation margin (3c). Immediate post-ablation DSA confirming no evidence of bleeding (3d)

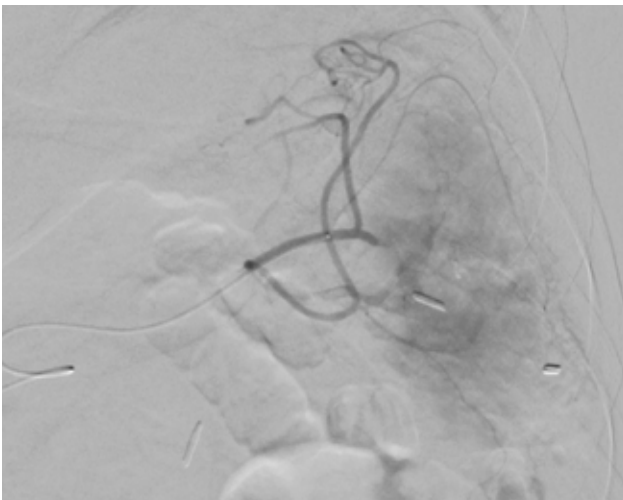


Figure 3d

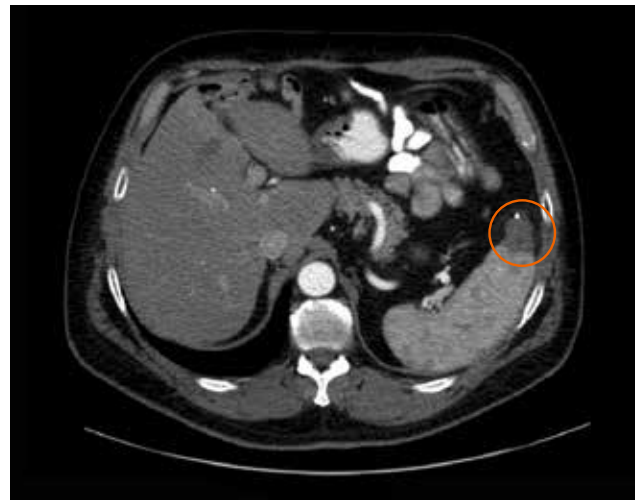


Figure 4: Follow-up CT imaging showing successful ablation of the splenic metastasis

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