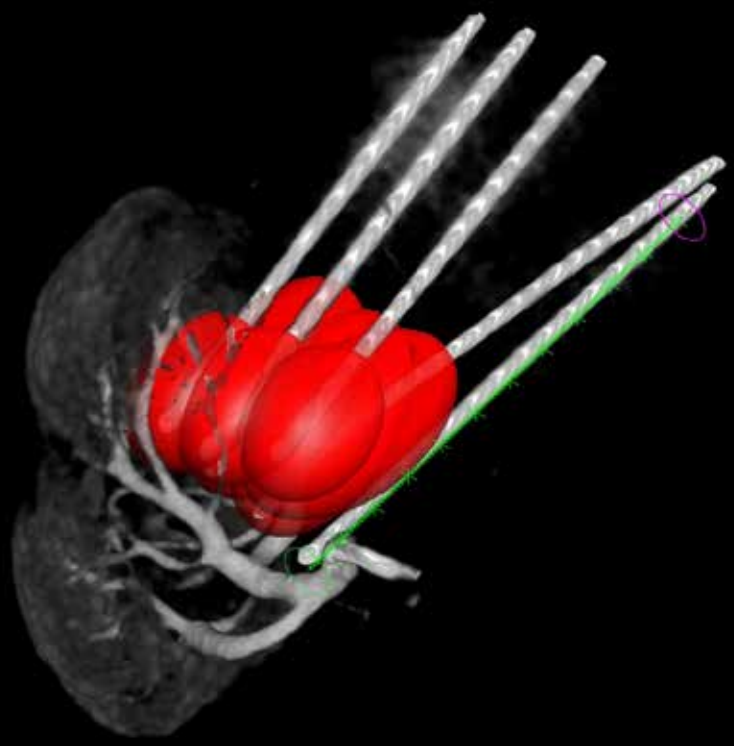
PHILIPS

Image guided therapy

XperGuide Ablation



Treatment planning and live needle guidance tool

Cryo ablation of kidney tumor with XperGuide Ablation*

Patient history
77-year-old male, previously diagnosed with solid malignant lesion in left kidney. Referred by urologist after patient has indicated his preference for cryo-ablation.

Procedure
Before the actual procedure starts the already existing CT is loaded into the interventional workstation where the needle planning already can be performed. To treat this tumor it was decided to use 3 IceSphere® and 2 IceRod® applicators from Galil Medical (a BTG International group company). The specifications of the ablation needles as described in the instructions for use can be entered in the Applicators tab of XperGuide Ablation. The parameters for the applicator can be changed as needed and saved for subsequent examinations.

The patient is positioned prone on the table of the Philips interventional X-ray system. The C-arc is positioned at head side. To ensure that during the procedure all movements can be performed, one rotation is executed around the patient.

After securing the left kidney is in the iso-center of the C-arc an XperCT is acquired. The lesion can be segmented to enhance visibility during planning and actual needle progression.

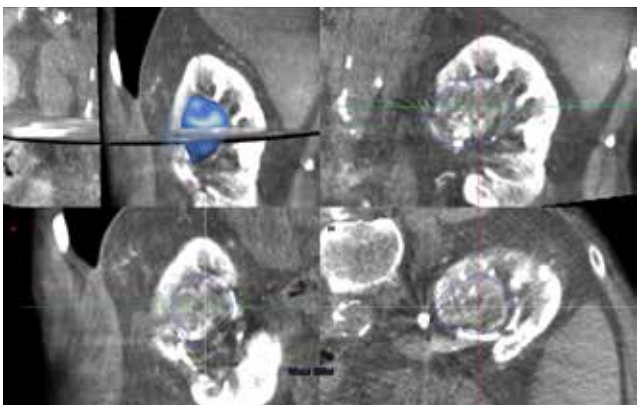


Figure 1: XperCT in MPR view with segmented lesion

* XperGuide Ablation is a feature of XperGuide

After that, the first three needle trajectories are planned using XperGuide Ablation. Besides planning the needle trajectories, this tool also visualizes the effective area of the ablation needle. So after drawing the first needle trajectory, the second needle trajectory is positioned is such a way that the effective zone of the needles overlap and cover the segmented area.

During live guidance the needles were inserted. Due to tumor tissue the exact needle trajectories couldn't be achieved. An additional XperCT was performed and the already planned trajectories were adapted to the real position of the needles. Now the additional 2 needles were planned securing complete tumor coverage.

The ascending colon appeared to come close to the ablation zone. To avoid the risk of a thermal injury of the colon CO_2 dissection was applied.

Furthermore, in this particular case, renal artery came close to the ablation zone. A path for thermocouple needle was planned and inserted just in-between the ablation zone and the renal artery.

A final XperCT (Figure 5) was acquired with all the needles observed to be positioned as planned and cryoablation was performed.

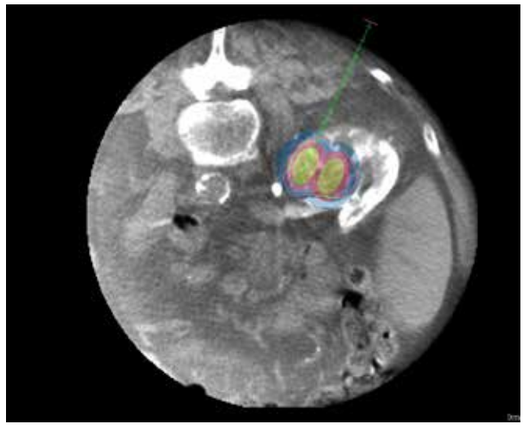


Figure 2: XperGuide Ablation planning: Trajectory of second needle showing ablation zone of needle 1 and needle 2 within segmented area

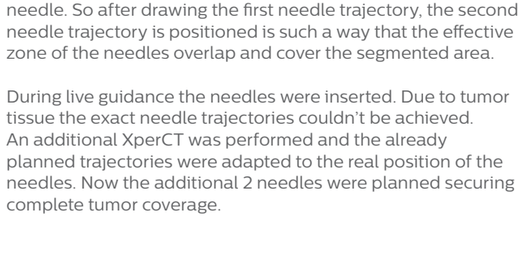


Figure 3: XperGuide Ablation planning: Entry Point View of three ablation needles

Figure 4: Graphical representation of multiple needle positions and CO_2 dissection

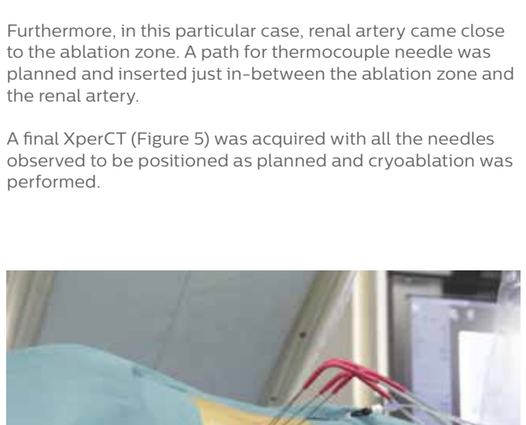


Figure 5: Final XperCT with al needles and ablation zones in 3D - notice the thermocouple exactly in-between renal artery and ablation zone

Dr. Marco van Strijen,

St. Antonius Ziekenhuis, Nieuwegein (NL), interventional radiologist, reports on results from XperGuide Ablation, a live 3D guidance tool he is using for cryo ablation procedures.

Conclusion

Using conventional methods, it is difficult to visualize the ablation zone with a high degree of accuracy. The unique XperGuide ablation software visualizes the specific ablation zones and distance between the planned ablation needles in 3D based on the manufacturer's specification of each needle. This visualization shows the isotherm of each needle on an XperCT. It assists in planning the optimal placement of the ablation needle to cover the targeted lesion. During procedure planning XperGuide Ablation visualizes the specific needle isotherms in relation to the patient's anatomy to help reduce risk of compromising adjacent organs or other structures. During the procedure XperGuide shows the progression of the needles in real-time and assists in reaching the target area as planned.

All images courtesy of Dr. Marco van Strijen St. Antonius Ziekenhuis, Nieuwegein (NL)

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