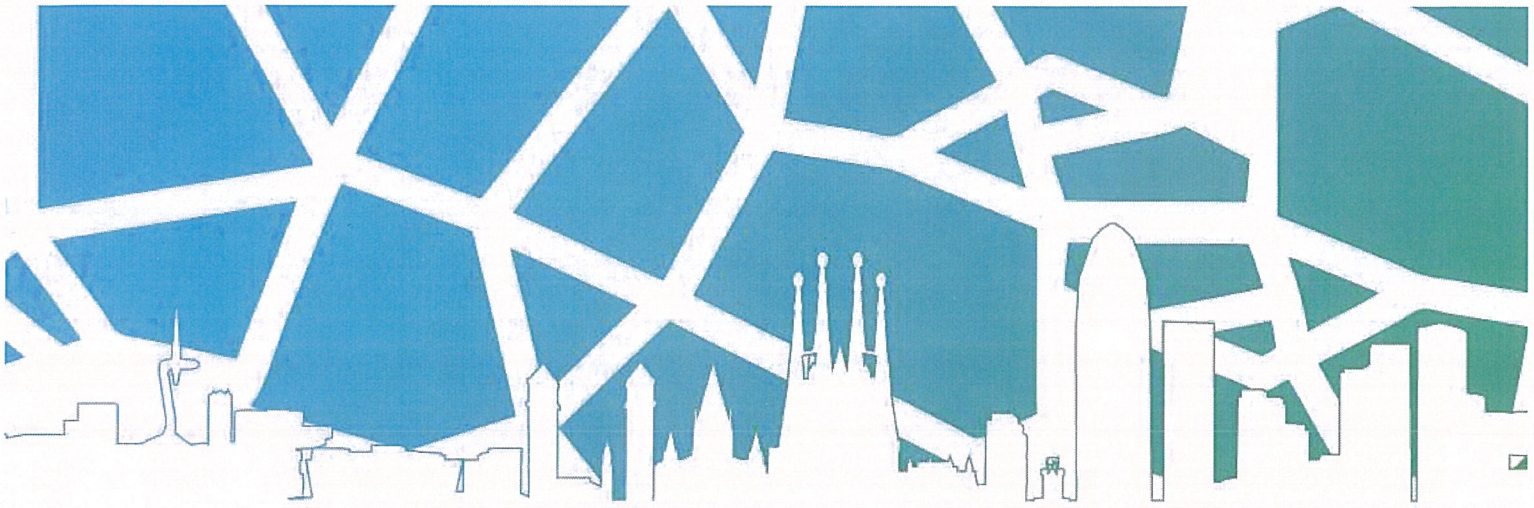

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ABSTRACT BOOK

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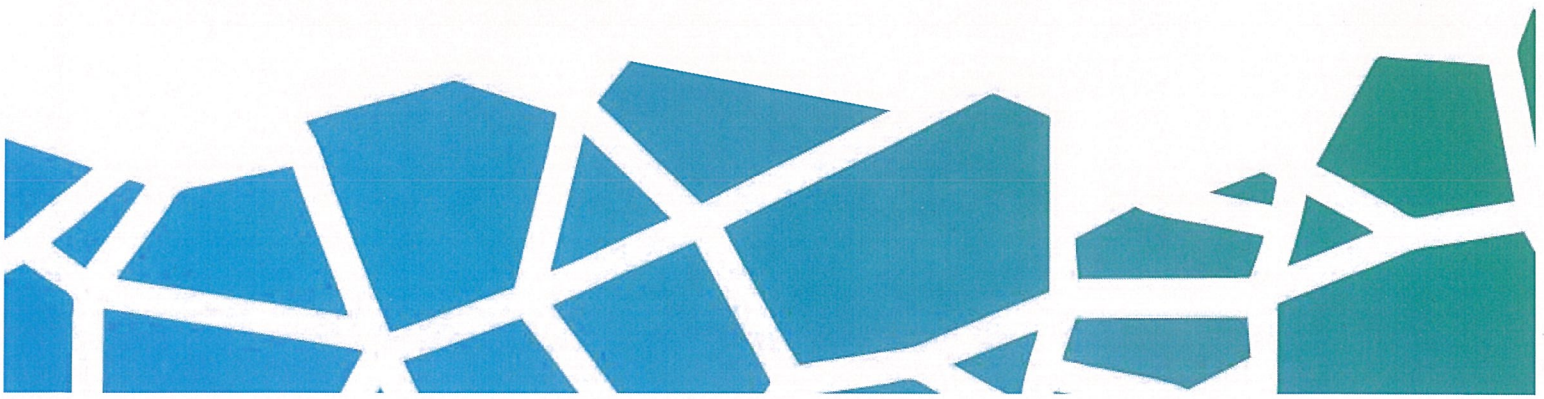

EXPERIMENTAL EVALUATION OF THE ACCURACY OF TARGETING OF A ROBOTIC ULTRASOUND IMAGING-GUIDED HIFU ABLATION DEVICE FOR TREATING SOLID TUMORS IN SMALL ANIMALS

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OBJECTIVES
We have designed and built a robotic ultrasound imaging-guided HIFU ablation device (USIgHIFU) for preclinical trials on small animals. Before the device is used, a series of experimental studies on tissues *ex vivo* were needed to evaluate its targeting accuracy. The objective of this studies was to estimate the targeting accuracy using *ex vivo* pork loin samples embedded in a cylindrical reference chamber. Treated volume was predetermined as a smaller cylinder located coaxially with the chamber at an intended depth below the tissue surface.
METHODS
Experiments were carried out using a 64-mm HIFU transducer (f-number 0.98) operating at a 1.08-MHz or 3.21-MHz frequency. HIFU beams of 108W acoustic power, 0.3s pulse duration, 0.6 duty-factor were propagated in two-layer media: water/tissue (50mm/40mm) and focused at a 12.6-mm depth below the tissue surface. Multiple thermal lesions were created by moving the chamber using a computer-controlled precise positioning system. For treated cylindrical volumes of about 6-mm or 10-mm diameter the ratio of necrotic lesion cross-sections to those intended for treatment was determined using different visualization methods.
RESULTS
The determined ratio was higher than 90%. The accuracy of targeting of the proposed device was found to be around 1 mm.
CONCLUSIONS
The developed device created well-defined necrotic lesions in the targeted volume within the tested tissue without damaging surrounding tissues. It suggests that this device will be effective and useful for treating solid tumors implanted into small animals and for testing new anticancer drugs.
ACKNOWLEDGEMENTS
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