5TH INTERNATIONAL CONFERENCE ON ONCOLOGY AND CANCER RESEARCH

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Development Of A Novel Large Diamater Cryoprobe For Cavity Treatment Following Breast Cancer Tumor Resection.

Cryoablation is an effective treatment for breast cancer (BC), yet use remains limited. Recent advancements, including an alternative to post-lumpectomy radiation, are positioning cryoablation as a key innovation in BC treatment. Whether applied as a primary or adjunctive treatment, one must achieve a lethal dose (minimal lethal temperature (MLT)) of -20°C to -40°C to achieve destruction. Complicating this is the need to deliver the MLT 1cm into tissue when used as a post-lumpectomy treatment. This study evaluated the performance of a novel cryoprobe for post-lumpectomy cavity treatment.

A 2cm cylindrical cryoprobe was developed to enable efficient, targeted circumferential freezing (ablation). Cryoprobe performance was evaluated in heated phantom gel and heat loaded ex vivo porcine tissue models. Single 3 and 5 min freeze protocols were employed.

Studies demonstrated that the 2cm cryoprobe created a 3.7cm and 4.6cm diameter ice ball in the heated gel model in 3 and 5 mins, respectively. Penetration of the -20°C isotherm (MLT for BC) from the probe surface was 0.9cm (±0.12) and 1.3cm (±0.1) following 3 and 5 mins, respectively. The -40°C isotherm penetrated 0.7cm (±0.13) and 1.1cm (±0.11) at 3 and 5 mins, respectively. Tissue studies revealed the 0, -20, and -40°C isotherm penetration from the probe into the surrounding tissue to be 1.25cm (±0.06), 1.0cm (±0.08), and 0.7cm (±0.09), respectively, following a 3 min freeze and 1.57cm (±0.06), 1.36cm (±0.08), and 1.04cm (±0.09), respectively, following a 5 min freeze.

This study demonstrated that novel 2cm cryoprobe was able to effectively freeze targeted tissue (tissue cavity) delivering the -20°C and -40°C isotherms greater than 1cm deep into tissue following a 3 or 5 min freeze, respectively. Although further studies are needed, the results suggest advanced cryotechnologies have the potential to be used as an adjunct to surgery offering an alternative to post-lumpectomy radiation therapy.

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Biography

Dr. John M. Baust, Ph.D., is a pioneer in cryomedicine. His research on the molecular mechanisms of cell death and low temperature stress has been instrumental in advancing the field of cryoablation. Baust's efforts have resulted in the identification of a significant molecular stress response component to freezing injury which is responsible for the differential sensitivity of various cancers to freezing. He has developed numerous cryoablation devices for the treatment of cancer as well as for improved cell cryopreservation. Dr. Baust has founded 4 companies; >100 publications; >75 patents; serves on several editorial boards and is President-Elect of the Society for Cryobiology.

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