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MRI based navigated cryosurgery of extra-abdominal Desmoid tumors using skin fiducials markers

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Abstract

Background: Extra-abdominal Desmoid Tumors (EDTs) are soft tissue tumors for which image-guided percutaneous cryosurgery (CRA) has emerged as a valid treatment modality. Computer-guided MRI navigation for soft tissue tumors remains a challenge due to lack of a fixed bony landmark for registration

This study, presents a novel approach of MRI based CRA using skin fiducial marker registration protocol as treatment option for symptomatic or progressive ED.

Methods: Eleven EDT patients were treated with CRA using intraoperative MRI navigation. 15 cryoablation procedures were performed according to personalized pre-operative plans. We compared total tumor size, necrotic and viable portions, and evaluation of subjective health pre and post-operation.

Results: All CRAs adhered 100% to the plan. Tumor size decreased significantly (p -value=0.02), except in one patient. Four patients required additional CRAs. . There was significant reduction in viable tissue, (p -value=0.03), but not necrotic tissue (p -value=0.66). One participant experienced muscle necrosis, a mild adverse event (AE) according to SIR AE classification guidelines,. Both physical and mental scores improved significantly (p -value (physical)=0.002; p -value (mental)

Conclusion: These findings demonstrate the feasibility and efficacy of performing percutaneous cryosurgery using skin fiducial marker registration and MRI-computed navigation to treat EDTs.