Award ID:
RP150164

Project Title:
Using imaging and computational tools to improve risk stratification in children with bone cancer

Award Mechanism:
Individual Investigator Research Awards for Cancer in Children and Adolescents

Principal Investigator:
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Entity:
The University of Texas Southwestern Medical Center

Lay Summary:

Osteosarcoma is the most common bone cancer in children and young adults but at least 40% of patients die of this disease. There is an urgency and critical need to identify accurately and as early as possible those patients at high risk of dying. Basic features of tumor spread and if the tumor is surgically removable identify such patients, while poor tumor response to 10 weeks of chemotherapy is another high-risk feature. Unfortunately identifying these features has not yet allowed effective change in therapy to improve patient survival. Yet, since tumor response in other childhood cancers allows effective tailoring of therapy, we believe that the inability to achieve improvements for patients with osteosarcoma may be the result of a semi-quantitative process to evaluate response that is available too late to make any meaningful change. However modern technologies address these two fundamental problems. Whole slide imaging allows virtual pathology evaluation of an entire tumor sample and computer-based systems can be developed to automate the identification of subtle changes in a tumor representing features of response. Also computer software can merge pathology images with images from non-invasive radiology techniques such as magnetic resonance imaging (MRI). The benefits of this include firstly more precise identification of subtle changes by MRI and secondly, and more importantly, earlier identification of these predictive changes than is possible currently. We predict that early identification of MRI features will correlate closely with pathological features of responding tumors and that this will transform a clinical practice that has been unchanged for decades. Accurate and early identification of tumor characteristics that predict high-risk will allow greater specificity in biopsies, allow greater confidence in predicting patients at highest-risk and potentially allow tailored therapy to the needs of individual patient with osteosarcoma.