REDEFINING THE INCIDENCE AND OUTCOMES OF CHILDREN WITH CNS ATYPICAL TERATOID RHABDOID TUMOURS

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Purpose: Atypical Teratoid Rhabdoid Tumour (ATRT) is a rare and highly malignant central nervous system (CNS) embryonal neoplasm, characterized by loss or mutation of the INI-1 tumour suppressor gene (hSNF5/SMARCB1). An antibody test to detect INI-1 loss has been available for pathologists at BC Children's Hospital (BCCH) since 2007. The use of this test has been a diagnostic breakthrough; ATRT's can be indistinguishable from other tumours by routine pathology, and therefore may have been under-diagnosed previously. Our study will apply this test retroactively to determine how many CNS embryonal tumours over the past two decades would be re-classified as an ATRT, and thus redefine what the actual incidence has been at BCCH. Identifying 'cryptic' ATRT's will allow us to better describe the clinical course for this unique tumour, which historically has been reported to have a dismal prognosis. We hypothesize that 10% of all embryonal tumours during this time period will be revealed as 'cryptic' ATRT's using the INI-1 test.

Methods: Paraffin-embedded tissue will be retrieved from storage for all patients who were diagnosed with a CNS embryonal tumour from 1986 – 2006 at BCCH. Tumour samples will be stained using an anti-BAF47/INI-1 antibody as per standard lab protocol. Loss or retention of the antibody will be determined by light microscopy, and compared to external and internal controls.

Results: Approximately 120 patients were diagnosed as having a CNS embryonal neoplasm from 1986 – 2006 at BCCH, with pathology reports describing only two ATRT's. Morphology features and the original immunohistochemical details will be recorded for any specimens demonstrating a loss of INI-1 staining. Non-identifying clinical information will be collected, including age at diagnosis, tumour location and dissemination, extent of resection, chemotherapy or radiation treatment given, and survival from diagnosis. This information will also be collected for the four ATRT's that have been diagnosed since the INI-1 test was routinely implemented (2007 – present).
Preliminary results show that five PNET cases out of 60 samples appear to be 'cryptic' ATRT's by INI-1 testing. Corresponding pathology and clinical data for all patients will be available at the time of presentation.

Discussion: ATRT's are rare pediatric brain tumours, found primarily in infants and young children. Despite the fact that they are reported to be very aggressive with poor overall survival, they have historically been treated with the same protocols used for other CNS embryonal tumours (e.g. medulloblastoma, supratentorial PNET). A better understanding of how many children have had ATRT's, how they have been treated in the past, and their corresponding survival rates is critical for designing better, more specific treatments in the future. As well, capturing ATRT as a separate diagnosis inherently allows a more accurate reporting of the survival and incidence for other CNS embryonal tumours.

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