morphic xanthoastrocytoma were high, but the Ki-67 labeling index was 1%. In the ganglioglioma, the T/N ratio of FLT was low. CONCLUSION: Specialized multiple PET accumulation patterns for tumors are useful for discriminating each tumor.

**INTRODUCTION:** Pediatric low-grade gliomas (pLGG) show clinical and biological features that are distinct from their adult counterparts. Consequently, additional considerations are needed for response assessment in children compared to the established adult Response Assessment in Neuro-Oncology (RANO) criteria. Standardized response criteria in pediatric clinical trials are lacking, complicating comparisons across studies. We therefore established an international committee of the Radiologic Assessment in Pediatric Neuro-Oncology (RAPNO) working group to develop consensus recommendations for response assessment in pLGG.

**METHODS:** Pediatric and adult neuro-oncologists, neuro-radiologists, members of the Radiologic Assessment in Pediatric Neuro-Oncology (RAPNO) working group were identified as experts in imaging informatics and existing radiological criteria. This was achieved by identifying major challenges, reviewing existing literature, and current practice, and developing consensus recommendations through an iterative process.

**RESULTS:** Categories for response assessment include complete response, partial response, minor response, stable disease, and progressive disease. Refractory disease is excluded. Criteria used to determine response assessment and clinical outcomes were evaluated for diagnostic accuracy and clinical utility. The study concluded that this approach is feasible and useful for clinical practice.

**CONCLUSION:** The developed consensus recommendations for response assessment in pediatric low-grade gliomas provide a framework for standardizing response assessment across clinical trials and improving the comparability of clinical trials in this population.
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reduces ADGs in responding tumors, with the percent change in ADC from baseline correlating with deeper RANO responses. CONCLUSION: DWI analysis reveals reductions in ADC values that correlates with treatment response in children treated with 1HAT. Changes in ADC may represent a novel imaging biomarker, reflecting biological response to 1HAT treatment.

**Image 06. Predicting Survival from Perfusion and Diffusion MRI by Machine Learning**

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**INTRODUCTION:** Magnetic Resonance Imaging (MRI) is routinely used in the initial management of pediatric brain tumors. Increased and perfusion on MRI are commonly associated with higher grade but there is a lack of quantitative data linking these parameters to survival. Machine learning is increasingly being used to develop diagnostic tools but its success in survival analysis is rare. In this study we combine key parameters from diffusion and perfusion MRI with machine learning to develop a model of survival for pediatric brain tumours. **METHOD:** 69 children from 4 centres (Birmingham, Liverpool, Newcastle, Oxford) underwent an MRI with diffusion and perfusion (dynamic susceptibility contrast) at diagnosis. Images were processed to form ADC, cerebral blood volume (CBV) and vessel leakage correction (K2) parameter maps. Parameters are valid, standard deviation and heterogeneity measures (skewness and kurtosis) were calculated from tumour and whole brain and used in iterative Bayesian analysis. The features were used for k-means clustering and differences in survival between clusters assessed by Kaplan-Meier and Cox-regression. **RESULTS:** Bayesian analysis revealed the 5 top features determining survival to be tumour volume, ADC kurtosis, CBV mean, ADC and kurtosis CBV mean. These features showed two distinct clusters (high- and low-risk) which bore significantly different survival characteristics (Hazard Ratio = 5.6). **DISCUSSION AND CONCLUSION:** Diffusion and perfusion MRI can be used to aid the prediction of survival in children’s brain tumours. Tumour perfusion played a particularly important role in predicting survival despite being less routinely measured than diffusion.

**Image 07. Gadolinium is Not Necessary for Surveillance MRI Imaging in Children with Chiasmatic-Hypothalamic Low Grade Glioma**

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**BACKGROUND:** Patients with chiasmatic-hypothalamic low grade glioma (CHLGG) have frequent MRIs with gadolinium based contrast agents (GBCA) for disease monitoring. Cumulative gadolinium deposition in children is a potential concern. The purpose of this research is to establish whether MRI with GBCA is necessary for determining tumor progression in children with CHLGG. **METHODS:** Children with progression defined as defined increase in lesions between 2003-2019. Pre- and post-contrast MRI sequences were separately reviewed by one neuroradiologist who was blinded to the clinical course. Three dimensional measurements and tumor characteristics were collected. Radiographic progression was defined as a 25% increase in size (product of two largest dimensions) compared to baseline or best response after initiation of therapy. **RESULTS:** A total of 28 patients with progressive CHLGG including 683 MRIs with GBCA (mean 24 MRIs/patient; range: 10–43 MRIs) were reviewed. No patients had a diagnosis of NF1. Progression was observed in 92% (251) MRIs (mean 8.9 years). At 10 (97.8%) on noncontrast imaging. Sixty-seven radiographic and/or clinical progressions necessitating management changes were identified in all (100%) noncontrast sequences and 66 (98.3%) contrast sequences. Tumor growth ≥2 mm in any dimension was observed in 184/187 (98.4%) on noncontrast and 80 (97.8%) on contrast imaging. Non primary metastatic disease was seen in seven patients (25%), which were better visualized on contrast imaging in 4 (57%). **CONCLUSION:** MRI without GBCA effectively identifies patients with progressive disease. One should consider eliminating contrast in imaging of children with CHLGG with GBCA reserved for monitoring those with metastatic disease.

**Image 08. Unusual Imaging Findings in Two Cases of Paediatric Low Grade Glioma**

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Low grade gliomas (LGGs), including pilocytic astrocytoma (PAC), are the commonest paediatric brain tumours and their behaviour is well understood, typically following a benign course. BRAF fusion is common, particularly in PCA of the cerebellum and optic pathway. Here we present two patients whose LGG behaved in an unusual fashion. The first patient was observed with 1LGG2 with vincristine for a tectal lesion was identified on routine imaging to have local tumour progression and underwent completion staging. This showed a new enhancing soft tissue abnormality within the spinal cord at the level of L2. Due to the biological disability this was biopsy confirmed and the involvement of molecular analysis, confirming LGG of the tectal plate and finding the spinal lesion to be a myxopapillary ependymoma. The second patient presented with acute hydrocephalus following a 2 year history of neurocognitive impairment of large, complex tumour centred in and expanding the bodies of both lateral ventricles with significant mass effect. Radiologically this was most in keeping with a central neurocystic but histological analysis confirmed it to be a PCA with KIA1549-BRAF fusion. This first case demonstrates the utility of molecular analysis in confirming two distinct tumour types in one patient, in a situation where metastases would not be expected and would significantly alter treatment and prognosis. The second is an example of how imaging can be misleading in a KIA1549-BRAF fused PCA presenting as an intraventricular mass.

**Image 09. Response Assessment in Diffuse Intrinsinc Pontine Glioma (DIPG): Recommendations from the Response Assessment in Pediatric Neuro-Oncology (RAPNO) Committee**

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Optimizing the conduct of clinical trials for diffuse intrinsic pontine glioma (DIPG) involves use of consistent, objective disease assessments and standardized response criteria. The Response Assessment in Pediatric Neuro-Oncology (RAPNO) committee, an international panel of pediatric and adult neuro-oncologists, clinicians, radiologists, radiation oncologists, and neurosurgeons, was established to address unique challenges in assessing response in children with CNS tumors. A subcommittee of RAPNO was formed to specifically address response assessment in children and young adults with DIPG and to develop a consensus on recommendations for response assessment. Distinct issues related to the response assessment of DIPG include its extremely poor outcome, difficulty detecting and imaging response data, the phenomena of pseudoprogression, and measuring response in the era of focal drug delivery. The committee has recommended response be assessed using magnetic resonance imaging (MRI) of brain and spine, neurologic examination, and use of supportive medication, i.e. steroids and anti-angiogenic agents. Clinical imaging standards and imaging quality control