tumors. The presence of metastatic seeding is rare and has been reported as an adverse prognostic factor. We present 2 cases of young children with recurrent metastatic DIA/DIG to describe their presentation, therapeutic management and outcome and to highlight the importance of molecular characterization of these rare tumors to guide adjuvant therapy.

CASE DESCRIPTION: The first patient developed metastatic recurrence after initial gross total resection (GTR) of a localized DIA. The disseminated relapse was managed with four cycles of monthly carboplatin and vincristine (CBVR) and total cerebral irradiation (TBI) with a single course of CBVR. The patient received 2 cycles of CBVR/TBI with minimal response and was then switched to Larotrectinib leading to a very good partial response (VGPR) 3 months into therapy and has remained on treatment since then with significant improvement. CONCLUSION: In our 2 cases, recurrence was responsive to adjuvant therapy leading to complete response with conventional chemotherapy in the first one and to VGPR with NTRK inhibitor in the second patient. Early molecular characterization of these being recurrent tumors is critical in case of incomplete resection or metastatic seeding.

RARE-20. RETROSPECTIVE ANALYSIS OF 9 PINEOBLASTOMA
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BACKGROUND: Pineoblastomas (PBs) are rare, supratentorial, primitive neuroectodermal tumors. Little is known with the clinical features and outcome of PBs. PBs are classified as PBs and PBx-PBs. We retrospectively analyzed consecutive patients with PBs who were treated in Guangdong Sanjuy Brain Hospital between December 2006 to May 2020. RESULTS: A total of 9 patients (7 males and 2 females) with PBs were treated in our hospital with a median age of 9 years (range: 2-19 months) and 6 patients who underwent surgery performed SV analysis and 3 patients (33%), partially resection in 4 (44.4%) and biopsy in 1 (11.1%). There were 4 patients with spinal cord metastasis at diagnosis. Five patients received craniospinal irradiation (CSI), with concurrent or adjuvant chemotherapy. The median total CSI dose was 34.8 Gy and the average dose to local tumor bed was 56.08±6.41 Gy. Two patients younger than 3 years old only received chemotheraphy, while 1 patient did not receive any postoperative treatment, and 1 patient was unknown. The median follow-up time was 3 months (range: 3-39 months). At the last follow up, 5 patients were dead, 3 patients were survived, and 1 was lost to follow-up. The median OS was 31 months (95%CI 1.782-60.281). Disease progression occurred in 3 patients during the follow-up period, and the median PFS was 19 months. CONCLUSION: Pineoblastoma is a rare central nervous system malignancy with a tendency for disseminated disease. Comprehensive therapies such as surgical resection, radiation and chemo therapy are effective therapies for PBs.

RARE-21. SOX2 PLAYS AN IMPORTANT ROLE IN CHOROID PLEXUS TUMOR DEVELOPMENT
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Choroid plexus (CP) tumors are rare primary brain neoplasms found most commonly in children and are thought to arise from CP epithelial cells. Sox2 is a transcription factor that not only plays a role in the development in the ventricular zone, CP, and roof plate, but also contributes to cancer stemness, tumorigenesis, and drug resistance. Gene expression studies demonstrate aberrant Sox2 expression in human CP tumors, suggesting a role in tumor development. A subset of CP tumors exhibit abnormal NOTCH pathway activity. Using animal models, we previously show that sustained NOTCH activity leads to CP tumors. Immunofluorescence, RT-qPCR, and RNA scope assays have revealed increased Sox2 expression in NOTCH-driven CP tumors compared to wild type CP. To investigate the role of Sox2 in CP tumors, we eliminated Sox2 expression in NOTCH-driven CP tumors. Loss of Sox2 almost completely blocked NOTCH-driven CP tumor growth in these mice, supporting a role for Sox2 in these tumors. Ciliation regulation is one proposed functional pathway for tumor growth in CP tumors. Using immunofluorescence assays for cilia (ARL13B) and aquaporin transport protein 1 (AQP1) in combination with super resolution microscopy, we observe a stark contrast between wild type CP epithelial cells whose multiciliated and ultra-relopectomy resection was achieved after 15 cycles and the patient has remained in continuous complete remission for 5 years. Post hoc molecular analysis of the tumor revealed a BRAF-RDX fusion. The second patient presented with a disseminated intraventricular metastasis following an incomplete resection in a DIA associated with a SPEC I-NTRK2 fusion. The patient received 2 cycles of CBVR/C with minimal response and was then switched to Larotrectinib leading to a very good partial response (VGPR) 3 months into therapy and has remained on treatment since then with significant improvement.

CONCLUSION: In our 2 cases, recurrence was responsive to adjuvant therapy leading to complete response with conventional chemotherapy in the first one and to VGPR with NTRK inhibitor in the second patient. Early molecular characterization of these being recurrent tumors is critical in case of incomplete resection or metastatic seeding.

RARE-22. CHARACTERIZING THE LANDSCAPE OF STRUCTURAL VARIANTS IN ADAMANTINOMATOUS CRANIOPHARYNGIOMA
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INTRODUCTION: adamantinomatous craniopharyngiomas (ACPs) are rare brain tumors that primarily occur in children and impact long-term morbidity and mortality. The molecular driver mutations that occur in CTNNB1 and constitute their genetic signature are currently unknown. In this study, we outline the genomic, transcriptomic, and structural variant (SV) landscape in a cohort of 41 ACP samples. METHODS: We sequencing (WGS) and DNA-sequencing and SV ACP samples. Matched normal samples were also characterized by WGS. Mutect2 was used to detect single nucleotide variants (SNVs) and indels, and copy number data was generated using the GATK pipeline. SvABA was used to perform SV analysis and to identify significantly recurrent breakpoints and juxtapositions. DSEEq2 was used to perform differential gene expression analysis based on clinical and molecular annotation data. RESULTS: 2941 (70%) of the ACP samples harbored missense mutations in CTNNB1, all of which have previously been reported in ACP. SV analysis identified a median of 11.5 events per tumor. Overall, 9.7% of events were interchromosomal. Of the remainder, the majority (78.6%) were deletions. No SVs occurred within CTNNB1. A positive correlation (r = 0.533) was observed between the frequency of SVs and SNVs within samples. Analysis of significantly recurring breakpoints (SRBs) did not identify recurrent breakpoint events. Differential gene expression analysis comparing samples with and without CTNNB1 variants identified 2,143 differentially expressed genes with q-value < 0.05. CONCLUSION: These observations identify activating mutations in exon 3 of CTNNB1 in a large cohort of ACP samples. We also integrate SV and transcriptomic data to comprehensively investigate ACP tumor genomes and identify putative novel tumorigenic mechanisms that advance our understanding of ACP biology.

RARE-23. PRESERVATION OF ENDOCRINE FUNCTION AFTER OMMAYA RESERVOIR INSERTION IN CHILDREN WITH CYSTIC CRANIOPHARYNGIOMA
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INTRODUCTION: Children with craniopharyngiomas (CP) can be subjected to significant morbidity caused by radical surgery and/or radiation with deleterious long-term consequences. Ommya reservoir insertion (ORI) into cystic CP represents a minimally invasive procedure allowing immediate decompression and aims to avoid additional injuries. The purpose of this study was to determine the relevance of upfront ORI ( +/- intracystic treat) for preservation of endocrine function. METHODS: We performed a retrospective review of children with CP treated at the Hospital for Sick Children between 01/01/2000 and 15/01/2020 for review of endocrinological outcome after ORI. Endocrine function was reviewed at the time of initial surgery and throughout the course of follow-up. Event-free survival (EFS) was defined as the time to further surgical resection or irradiation. RESULTS: Seventy-nine patients were identified with a median age of 8.3 (range 2.1-18.0) years, 31 were males. Sixty-five patients underwent surgical treatment, including 41 ORI. ORI was performed as upfront treatment in 32 patients, 33 patients underwent partial or total ORI. ACP was 1 and patient died as first treatment. Fifty-five of 79 patients had endocrine follow-up data. Endocrine function remained stable after ORI with a mean of 27.64 (± 5.22) months. Surgical resection was associated with worsened endocrine function postoperatively with an EFS of 5.48 (± 1.74) months (p< 0.001). CONCLUSIONS: Upfront ORI ( +/- intracystic treat-
Abstracts

RARE-24. THE USE OF NOVEL IN VITRO MODELS TO STUDY ADAMANTINOMATOUS CRANIOPHARYNGIOMA DISEASE BIOLOGY AND DRUG RESPONSE
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BACKGROUND: Challenges around the design and investigation of cell culture models of adamantinomatous craniopharyngioma (ACP) have arisen from the cellular heterogeneity and morphologic and functional polymorphisms that harbor disparate requirements in culture. Novel approaches to in vitro modeling of ACP are needed. METHODS: Intraoperatively collected tumor specimens were mechanically digested and plated under conditions tailored to the cell population of interest. ACP tumor-derived fibroblasts and epithelial cells were isolated using serum-containing and keratinocyte-specific media respectively. ACP-derived epithelial cells were immortalized via SV40 virus transfection and puromycin treatment for stable cell-line generation. Cell line identification and characterization were performed, including immunofluorescence for the cell population of interest. RNA sequencing of cell lines was compared to ACP transcriptome reference data. Cell typing was conducted using short tandem repeat sequencing. RESULTS: ACP fibroblasts and ACP epithelial cells maintained spindle-like and cobblestone morphologies respectively, even after 4 passages. Immunofluorescence staining confirmed high levels of Vimentin expression in ACP-derived fibroblasts, and panCK and B-catenin in ACP-derived epithelial cells. Point mutation in exon 5 of the CTNNB1 gene was identified in ACP-derived epithelial cells, CONCLUSION: Initial lines related to the disease development in ACP may be addressed through the isolation and culture-specific ACP cell populations. This experience demonstrates the maintenance of validated markers of the cell populations of interest ex vivo. While preliminary, such cell lines offer promise as tools for the identification and study of potential therapeutic vulnerabilities in ACP.

RARE-25. PRIMARY INTRACRANIAL EWING SARCOMA IN A CHILD: CASE REPORT
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Ewing sarcoma is a rare childhood tumor which accounts for 3% of all pediatric malignancies. More so, primary intracranial involvement with meningeval attachment is even rarer, accounting for only 1% of all Ewing sarcoma. We report a case of a 5-year-old boy who presented with headache, vomiting, and left-sided weakness that rapidly progressed over a period of three months. Cranial MRI showed a 7.1 x 6.7 x 8.6 cm multilobulated, heterogeneously enhancing, mixed solid and cystic extra-axial tumor consistent with Ewing sarcoma. Histopathologic examination revealed a spindle cell neoplasm that exhibited diffuse membranous staining for CD99. Fluorescence in-situ hybridization confirmed Ewing gene rearrangement, consistent with Ewing sarcoma. Three months after his surgery, the patient subsequently received 56 Gy of radiation therapy. At twelve months post-op, he remains fully awake and is back in school. He has residual left hemiparesis, but with antigravity movement. A multidisciplinary team involving Pediatric Oncology, Pediatric Neurology, Neurosurgery, Pathology, Radiation Oncology, and Rehabilitation Medicine is essential for patients with rare central nervous system tumors, to maximize effective treatment strategies despite limited resources.

RARE-26. EVALUATING THE CLINICAL UTILITY OF DNA METHYLATION PROFILING FOR CHOROID PLEXUS TUMORS
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INTRODUCTION: Choroid plexus tumors (CPT) are rare, potentially aggressive CNS tumors with defined histologic criteria for grading. In recent years, several practices within our practice have demonstrated discordance between histological diagnosis and clinical behavior. DNA methylation profiling has emerged as a potential diagnostic adjunct for aiding clinical planning and treatment approach. In this study, we sought to retrospectively evaluate the clinical utility of DNA methylation profiling within our cohort of patients with CPT. METHODS: We performed a retrospective chart review of all patients with choroid plexus tumors treated at Dana-Farber / Boston’s Children’s Cancer and Blood Disorder Center between 1990-2021, evaluating the histology, treatment approach, and clinical outcome. Available tissue samples were sent to the National Institute of Health for DNA methylation profiling. RESULTS: Seventeen patients with CPT were identified. Median age at diagnosis was 1.8 years (range: 0.4-27.7). Histologic diagnosis included choroid plexus papilloma (CPP, n=4), choroid plexus carcinoma (CPC, n=8) and choroid plexus papilloma with features classified as pediatric type A by methylation, and is without evidence of disease after initial complete resection. Survival outcomes based on histologic diagnosis and molecular subgroups are comparable. CONCLUSION: DNA methylation profiling is a useful tool for the diagnosis of CPT and may have the potential to guide clinical planning and management.

RARE-27. TREATMENT AND OUTCOMES IN ATYPICAL CHOROID PLEXUS PAPILLOMA: A SINGLE INSTITUTION EXPERIENCE
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BACKGROUND: Atypical choroid plexus papillomas (aCPP) are rare central nervous system (CNS) tumors often occurring in very young children. While surgical resection has been a mainstay of treatment, the role of adjuvant chemotherapy and consensus and limited data on the treatment of relapsed or metastatic tumors. METHODS: Retrospective review of the treatment and outcome of patients diagnosed with aCPP since 2011 was performed. RESULTS: Of the seven patients, 4 were male and 3 were female with a median age of 3.8 years at diagnosis (range: antenatal to 18 years old). All non-metastatic patients (six) were treated with surgery and all achieved gross total resection. Two patients had diffuse leptomeningeal contrast enhancement on diagnosis MRI that resolved after resection of primary tumor alone. One patient developed local relapse underwent re-resection with a GTR then was treated with 4 cycles of chemotherapy based on CPT-SIOP-2000 protocol (carboplatin, etoposide) and has not had further relapse in 24 months. One patient had metastatic disease at the time of diagnosis. They were treated with adjuvant chemotherapy, which stabilized disease for 36 months until they had progression. Additional four cycles were given and has again stabilized disease now 8 months from completion of that therapy. One non-metastatic patient died of unknown cause 28 months from diagnosis. CONCLUSION: Of the tumors with concerning features was classified as pediatric type A by methylation, and is without evidence of disease after initial complete resection. Survival outcomes based on histologic diagnosis and molecular subgroups are comparable. CONCLUSION: DNA methylation profiling is a useful tool for the diagnosis of CPT and may have the potential to guide clinical planning and management.

RARE-28. THE USE OF SUBCUTANEOUS INTERFERON IN PATIENTS WITH CRANIOPHARYNGIOMA: AN INSTITUTIONAL RETROSPECTIVE REVIEW
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INTRODUCTION: Craniopharyngioma (CPP) is a rare pediatric intracranial tumor that affects children in the first two decades of life. It is an anterior, suprasellar, sellar, or parasellar mass arising from the remnants of the Rathke pouch. The pathogenesis of this tumor remains unclear, as many patients with CPP have no family history of the condition. We report on a series of patients with CPP who were treated with interferon alfa (IFN) as adjuvant therapy following surgery.

METHODS: We retrospectively reviewed the medical records of all patients with CPP treated at our institution between 1995 and 2016. Patients were included if they had received IFN as part of their treatment regimen. The primary outcome measure was disease progression, defined as any radiographic or clinical evidence of tumor regrowth or metastasis. Secondary outcomes included changes in endocrine and visual function, as well as any adverse events related to IFN therapy.

RESULTS: Of 125 patients with CPP treated at our institution during the study period, 6 patients received IFN as part of their treatment regimen. The median age at diagnosis was 10 years (range: 4-20 years). Five patients were male and one was female. The median follow-up time was 6 years (range: 3-12 years). Two patients had a complete surgical resection, while four patients had a subtotal resection. None of the patients experienced disease progression during follow-up. One patient developed diabetes insipidus, while another patient developed hypothyroidism. No patients experienced severe adverse events related to IFN therapy.

CONCLUSION: The use of subcutaneous interferon alfa as adjuvant therapy following surgery for craniopharyngioma appears to be safe and effective in the treatment of this rare pediatric tumor. Further studies are needed to determine the optimal duration and dosing of IFN therapy for CPP.

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