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Anatomopathology

Role of Beta Catenin, GAB1, YAP1 and P53 Antibodies in the Molecular Classification of Medulloblastoma: Analysis of a Series of 68 Cases

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Abstract **Original Research Article**

Medulloblastoma can occur at any age, but most commonly occurs during childhood. It is the second most common CNS malignancy in children. It's must now be classified according to a combination of molecular and histopathological features. There are 4 genetically defined groups and 4 histologically defined groups: Genetically defined: WNT activated, SHH activated (either TP53 mutant or TP53 wild type), non-WNT / non-SHH, Histologically defined: classic, desmoplastic / nodular, medulloblastoma with extensive nodularity and large cell / anaplastic medulloblastoma. We report a retrospective study, spread over 68 months covering 21 cases Colligated at the CHU Mohammed VI of Marrakech between January 2018 and August 2023.

Keywords: Beta catenin, GAB1, YAP1 and P53 antibodies, molecular classification, Medulloblastoma.

INTRODUCTION

Medulloblastoma is the second most common malignant tumor of the central nervous system in children, after high-grade glioma [1] and it accounts for around 20% of all intracranial tumors in this age group [2]. Now it s should be classified according to a combinaison of molecular and histopathological features. The aim of this work is to study the epidemiological, anatomopathological and molecular profile of medulloblastoma by presenting a series of 68 patients diagnosed at the Mohammed VI university hospital center in Marrakech.

MATERIALS AND METHODS

We report a retrospective study, spread over 68 months covering 21 cases Colligated at the CHU Mohammed VI of Marrakech between January 2018 and August 2023. The specimens were morphologically analyzed and classified after immunohistochemical study.

RESULTS

The results of our series showed the median age of our patients was 11 years, with age extreme incidence from 3 to 17 years. The M/F sex ratio was 1,2. Intracranial hypertension isolated or associated with a cerebellar syndrome, was the main symptom revealing the disease. All our patients benefited from neuroimaging whose appearance was in favor of a l Medulloblastoma (Figure A). Morphological and immunohistochemical studies showed classical medulloblastoma in 19 cases and desmoplastic/nodular medulloblastoma in two patients. Molecular classification by anti-Beta cathenin, anti-YAP1, anti-GAB1 and anti-p53 antibodies, realized in 16 patients of our series, showed a medulloblastoma of SSH-activated p53 wildtype with classical morphology (Figure B) in 14 patients and with desmoplastic/nodular morphology in two patients.

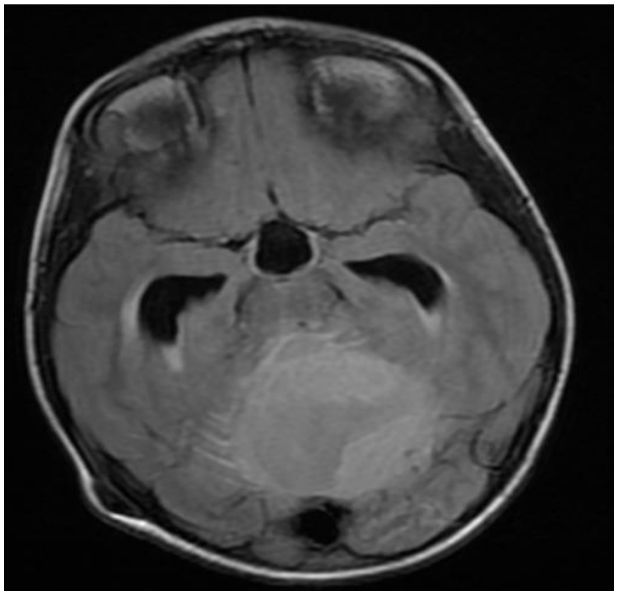

Figure A: Hyperintense, homogeneous, contrast-enhancing masses with midline localization of the posterior brain foss

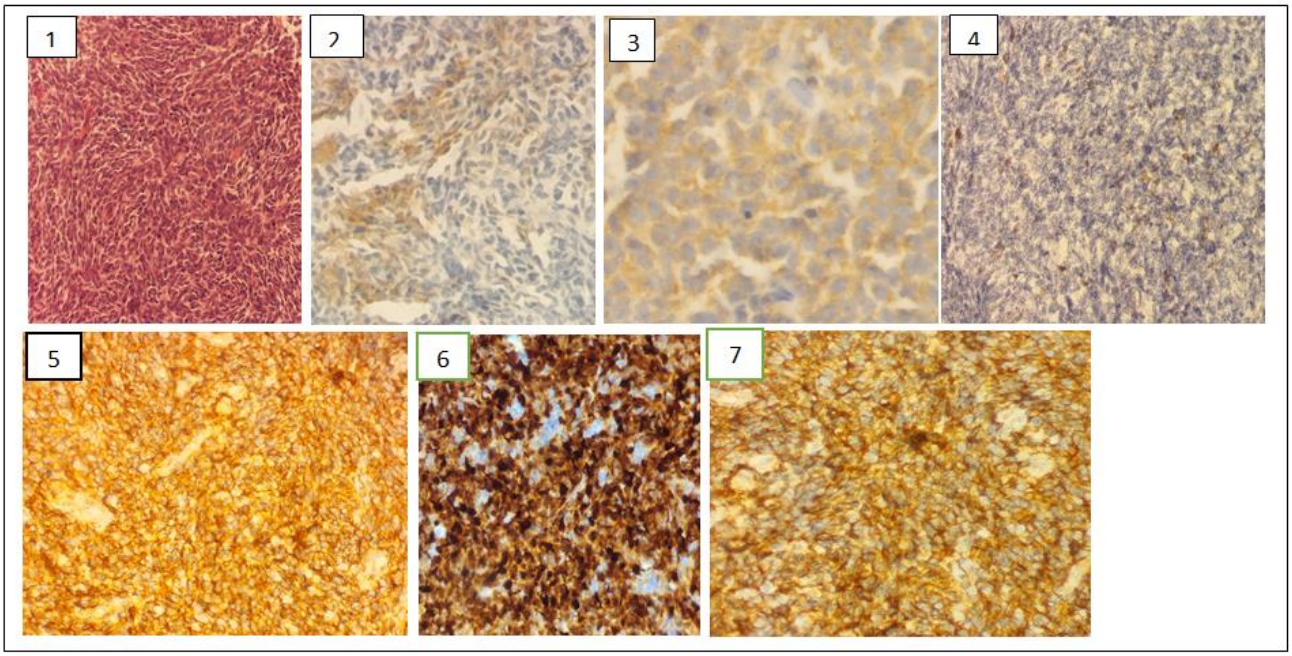

Figure B: 1) Hyperchromic round cell tumor proliferation; 2) Cytoplasmic expression of anti synaptophysin antibody; 3) Cytoplasmic expression of anti chromogranin antibody; 4) Weak to moderate nuclear immunoreactivity for p53 (wild type); 5) Membrane expression of anti- Beta cathenin antibody; 6) Nuclear expression to anti YAP1 antibody; 7) Membrane expression of anti-GAB1 antibody

DISCUSSION

Medulloblastoma is considered a WHO grade 4 embryonal tumor of the central nervous system. Its classification is being rectified by integrating molecular characteristics with histological characteristics. Morphologically, it is classified into 4 morphological groups (classic, desmoplastic/nodular, with extensive nodularity and anaplastic). IHC has been shown to be of great value in classifying medulloblastomas into 4 molecular groups. These groups demonstrate specific associations with the morphological patterns. Nearly all WNT activated tumours and most non WNT/non SSH have a classic morphology [1]. Most SHH activated p53 wildtype have desmoplastic/ nodular morphology [1]. This is not consistent with our study, where this group was found to have classic morphology. This can be explained by the reduced size of our series. Diffuse anaplasia occurs in approximately 70% of SSH-activated and TP53-mutant [1].

CONCLUSION

The classification listing molecularly defined medulloblastomas while also recognizing morphological patterns with clinopathological utility is intended to encourage an integrated approach to diagnosis and provide optimal prognostic and predictive information. Now, the cur rates can reach as high as 60% with current therapeutique modalities [3].

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