Extending the Neuroanatomic Territory of Diffuse Midline Glioma, K27M-Mutant: Pineal Region Origin

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INTRODUCTION

- Diffuse Midline Glioma, H3 K27M-mutant (DMG-K27M), is a newly described infiltrative glioma that commonly involves the brainstem (especially the pons), thalamus and spinal cord1.
- Only one pineal DMG-K27M in a 65 year old man has been previously reported2.
- We present the second tissue-confirmed case of DMG-K27M arising in the pineal gland, which is also the first case reported in a child and the first case with documented preoperative MRI.

CLINICAL PRESENTATION

- The patient was a 12-year-old girl who presented with a 2-month history of worsening headaches and was found to have a pineal gland mass on magnetic resonance imaging (MRI) (Fig. 1) and spectroscopy (MRS) (Fig. 2).
- The patient underwent biopsy and later subtotal resection of a partially-necrotic neoplasm that appeared to originate in the pineal gland.

MATERIALS & METHODS

- Routine Hematoxylin and Eosin (H&E) stained slides and immunohistochemical staining was performed.

RESULTS

- Histopathological examination showed Grade IV astrocytoma, H3-K27M immunopositive (Fig.3).
- Next generation sequencing identified TP53 mutations, and CDKN1 and CDK4 amplification.
- No MGMT promoter methylation was detected by methylation-specific real-time PCR.

DISCUSSION

- DMG-K27M is a devastating, molecularly-different subtype of diffuse glioma with a grim prognosis and average survival <1 year3.
- The majority of pediatric high grade gliomas (HGGs) arising in midline structures contain K27M mutation in genes encoding H3 histone proteins crucial for appropriate chromatin function and gene expression1,3.
- The WHO 2016, which codified DMG-K27M in its newly revised 4th edition, notes that K27M mutation is present in midline structures including most brainstem gliomas, about half of thalamic and spinal cord HGGs, and few cerebellar gliomas1.

CONCLUSIONS

- We present the second tissue-confirmed occurrence of pineal DMG-K27M and first reported case in a child.
- This case, in addition to a prior report in an adult2, defines a broad age range of DMG-K27M onset (12-65 years) and establishes the pineal gland as a bona fide site of DMG-K27M origin - a site not currently acknowledged in the WHO 20161.

REFERENCES