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# ROLE OF H3K27me3 AND Ki67 LABELLING INDEX IN ASSESSING THE BIOLOGICAL BEHAVIOUR OF MENINGIOMAS

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## Abstract

**Background and objective:** Meningiomas are non-malignant neoplasms primarily originating from arachnoid cells and are classified into three grades [1, 2, and 3] based on histological features according to the WHO classification. However, this classification system is imperfect especially for grade 1 and 2 meningiomas as many grade 1 tumors recur. Meningiomas are hence a histologically diverse class of tumors exhibiting more unpredictable behaviour. Therefore, more improved classification is required, possibly using novel and more dependable biomarkers. In this study, we aim to investigate the role of the H3K27me3 and Ki67 labelling index in assessing the biological behaviour of meningiomas. The study was conceived, with the primary objective of examining the expression of H3k27me3 and Ki67 labelling index in grade 1/2 meningiomas with atypical features to ascertain if this potentially impacts patient prognosis.

**Methodology:** Upon obtaining clearance from the Institutional Ethical Committee (IEC), the authors studied 81 cases of meningiomas including 11 recurrent cases. The study used immunohistochemistry to evaluate the Ki67 index and H3K27me3 immunohistochemistry. The Ki67 labelling Index was determined by counting the positively stained MIB-1 cells and categorizing them into <5%, 5-10% and > 10%. The H3k27me3 staining was evaluated by finding the product of the tumor cells showing positive staining and the intensity of staining. Based on the product of the two, the cases were subdivided into Negative [0], Low [1-4] and high expression [5-9] of H3K27me3.

**Results:** The results showed that presence of atypical morphological features including necrosis and prominent nucleoli in grade 1 meningioma and low expression of H3K27me3 was significantly associated with higher grade, recurrence, and shorter progression-free survival (Kaplan Meier curves showed higher negative slope). The study also found that a higher Ki67 labelling Index was associated with recurrence and poor prognosis. This suggest that the H3K27me3 and Ki67 labelling Index can be useful prognostic markers in meningiomas, particularly in challenging grade 1 and 2 cases and recurrent meningiomas.

**Conclusion:** The study highlights the importance of the H3K27me3 and Ki67 Labelling Index in assessing the biological behaviour of meningiomas. The findings provide valuable insights into the prognosis and treatment of meningiomas, emphasizing the need for further research to validate these markers and develop targeted therapeutic strategies.

**Keywords:** Immunohistochemistry; Kaplan-Meier; atypical; progression; recurrence.

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