New insights into the genomic landscape of meningiomas identified FGFR3 in a subset of patients with favorable prognoses

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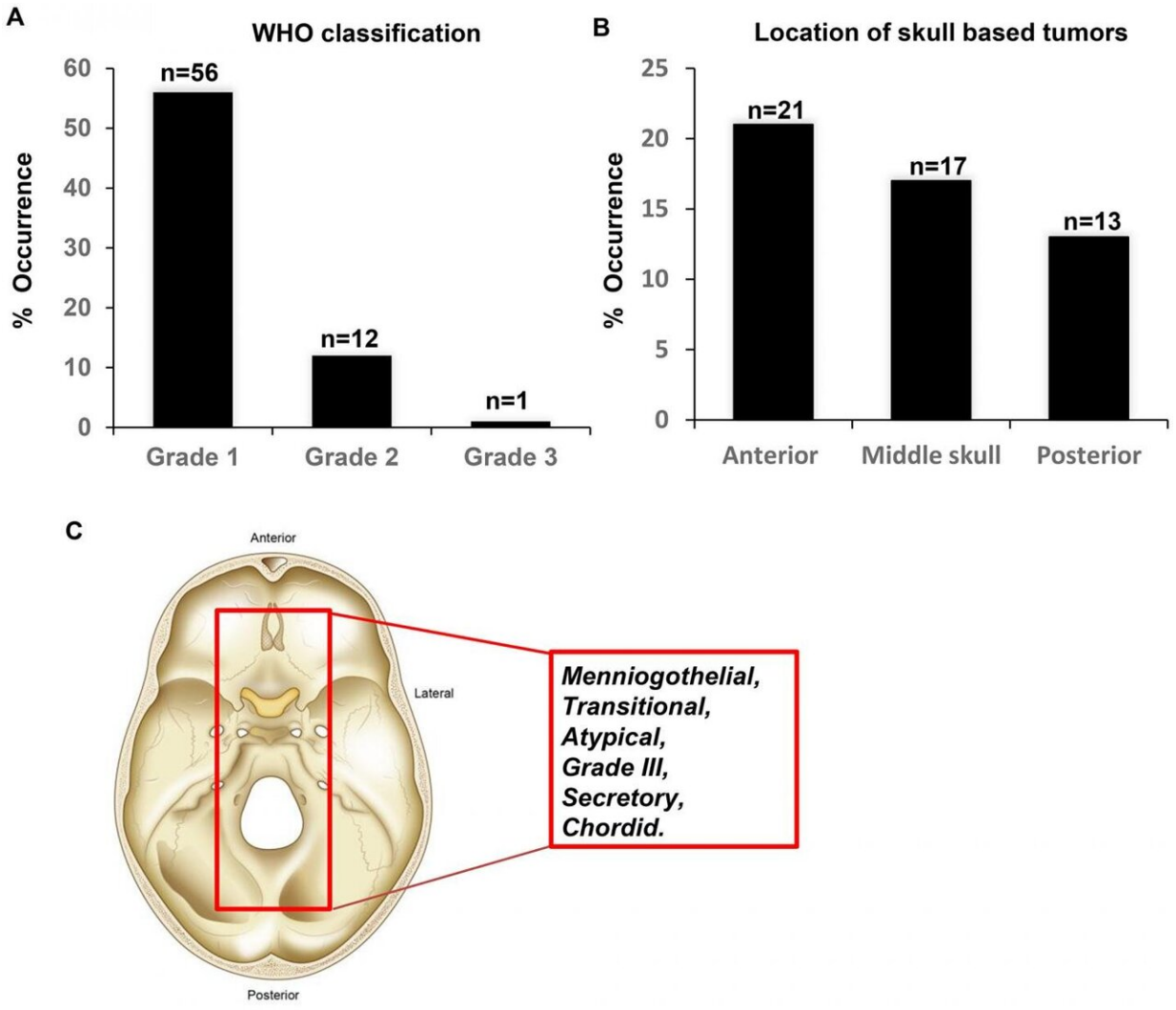

Characteristics of the meningioma's investigated in the study. (A) Tumor grade

according to the most recent WHO classification. (B) Location of the skull based tumors. (C) Schematic demonstrating the histology of the identified tumors from the study cohort. Credit: Malak Abedalthagafi

The identification of oncogenic mutations has provided further insights into the tumorigenesis of meningioma and the possibility of targeted therapy.

Interestingly, the authors identified a number of mutations in non-NF2 genes, including a hotspot TERTp c.

124: G > A mutation that may be related to poor prognosis and FGFR3 mutations that may represent biomarkers of a favorable prognosis as reported in other cancers.

These mutations can enhance diagnostic accuracy and clinical decision-making.

Among the research team's findings were the identification of a TERTp mutation and the first report of FGFR3 mutations that may represent biomarkers for the identification of skull base meningioma patients with a favorable prognosis.

Dr. Malak Abedalthagafi from the Genomics Research Department, Saudi Human Genome Project, King Fahad Medical City and King Abdulaziz City for Science and Technology, Riyadh, Saudi Arabia and the Genetics Department, King Faisal Specialists Hospital and Research Center, Riyadh, Saudi Arabia said, "With a prevalence of 170 000 adults in the US alone, meningioma is now recognized as the most common primary intracranial tumor."

However, for meningiomas, histological features remain the main differentiating factor, as the author's understanding of the genomic aberrations that drive these tumors remains incomplete.

Specific histologies are used to specify tumor grade such as those with clear-cell or chordoid histological morphologies are defined as grade II, whilst papillary meningiomas are classified as grade III. In this regard, Neurofibromin 2 is recognized as the main tumor suppressor gene in meningioma, as it is observed in 40 to 60% of early-stage tumors.

In studies assessing the epidemiology of primary brain tumors in Saudi Arabia, grade I meningiomas are the most commonly diagnosed pathological type, with overall recurrence rates of between 10.5 to 22.0%.

The authors identified novel mutations in non-NF2 skull base tumors that may be related to tumor prognosis including Fibroblast growth receptor-3.

The Abedalthagafi Research team concluded, "Previous studies have highlighted FGFR3 mutations in an array of malignancies, including breast cancer, bladder cancer, prostate cancer, and squamous non-small cell lung carcinoma. Interesting FGFR3 mutations are typically associated with low-grade cancers and favorable prognoses, and patients harboring these mutations had WHO grade I tumors, with no recurrence in our cohort."

More information: , New insights into the genomic landscape of meningiomas identified FGFR3 in a subset of patients with favorable prognoses, *Oncotarget* (2019). DOI: 10.18632/oncotarget.27178

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