Atypical meningioma treatment

The treatment of atypical meningioma remains controversial and under-investigated in prospective studies. The roles of surgery, radiation therapy, radiosurgery, and chemotherapy have been incompletely delineated. This has left physicians to decipher how they should treat patients on a case-by-case basis.

First line therapy is surgical resection, with radiotherapy (external beam or brachytherapy) often added both to complete and incomplete resections (see Simpson grade). Radiation has been shown to improve local control and prolongs overall survival.

No effective chemotherapeutic agents have been identified.

In a study, Sun et al. review the English-language literature on the management and clinical outcomes using the WHO 2000/2007 grading criteria. Twenty-two studies for AMs were examined in detail. The authors examined clinical decision points using the literature and concepts from evidence-based medicine. Acknowledging the retrospective nature of the studies, the authors did find evidence for the following clinical strategies:

1) maximal safe resection

2) active surveillance after gross-total resection

3) adjuvant radiation therapy after subtotal resection of AM, especially in the absence of putative radio resistant features [1)].

Zador et al. extracted gene expression profiles for atypical meningiomas (12 samples) and normal meningeal tissue (4 samples) from the Gene Expression Omnibus, which were then used to generate a gene signature comprising of 281 differentially expressed genes. Drug candidates were explored using both the Board Institute Connectivity Map (cmap) and Library of Integrated Network-Based Cellular Signatures (LINCS). Functional analysis of significant differential gene expression for drug candidates was performed with IPA.

They identified multiple, already licensed, drug candidates such as emetine, verteporfin, phenoxybenzamine and trazodone. Analysis with IPA revealed that these drugs target signal cascades potentially relevant in pathogenesis of meningiomas, particular examples are the effect on ERK by trazodone, MAP kinases by emetine, and YAP-1 protein by verteporfin.

Gene expression profiling and use of drug expression profiles have yielded several plausible drug candidates for treating atypical meningioma, some of which have already been suggested by preceding studies. Although our analyses suggested multiple anti-tumour mechanisms for these drugs, further in vivo studies are required for validation.

This is the first study which combines relatively new, yet established computational techniques to

identify additional treatments for a difficult to manage cerebral neoplasm. Beyond proposing already approved drug candidates in the management of atypical meningioma the study highlights the promise held by computational techniques in improving our management strategies [2].

Radiotherapy

Atypical Meningioma Radiotherapy.

1)
Sun SQ, Hawasli AH, Huang J, Chicoine MR, Kim AH. An evidence-based treatment algorithm for the management of WHO Grade II and III meningiomas. Neurosurg Focus. 2015 Mar;38(3):E3. doi: 10.3171/2015.1.FOCUS14757. PubMed PMID: 25727225.
2)
Zador Z, King AT, Geifman N. New drug candidates for treatment of atypical meningiomas: An integrated approach using gene expression signatures for drug repurposing. PLoS One. 2018 Mar 20;13(3):e0194701. doi: 10.1371/journal.pone.0194701. eCollection 2018. PubMed PMID: 29558515.