

Brain metastasis research: a late awakening

Matthias Preusser¹, Michael Weller²

¹Department of Medicine I, Comprehensive Cancer Center-CNS Unit, Medical University of Vienna, Vienna, Austria; ²Department of Neurology, University Hospital Zurich, Zurich, Switzerland

Correspondence to: Matthias Preusser, MD. Department of Medicine I, Comprehensive Cancer Center-CNS Unit, Medical University of Vienna, Währinger Gürtel 18-20, 1090 Vienna, Austria. Email: matthias.preusser@meduniwien.ac.at.

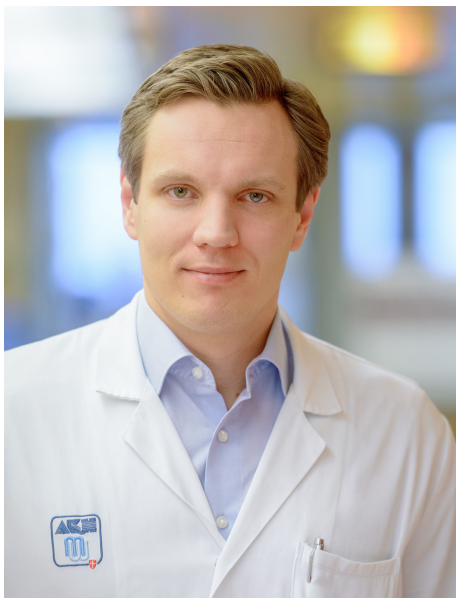
Submitted Mar 17, 2015. Accepted for publication Apr 08, 2015.

doi: 10.3978/j.issn.2304-3865.2015.05.01

View this article at: <http://dx.doi.org/10.3978/j.issn.2304-3865.2015.05.01>

Brain metastases are very frequent and life-limiting complications in cancer patients and are associated with serious neurological and neurocognitive symptoms (1). It is estimated that up to 30% of cancer patients develop brain metastases during their disease course, with lung cancer, breast cancer, melanoma and renal cell cancer carrying the highest risk of central nervous system (CNS) spread. Paradoxically, despite the fact that brain metastases are a common and serious clinical problem in the everyday setting of clinical oncology, relatively little research has been conducted on this issue in the past decades. It is interesting to note that although gliomas are approximately

10-fold less common than brain metastases, the number of papers published on gliomas was around 4-time higher than the number of papers published on brain metastases in the time period 1967 to 2013 (*Figure 1*). Furthermore, the methodology of research on gliomas has in general been far more sophisticated, be it in basic, translational or clinical science. The glioma literature features plenty of papers describing advanced research projects utilizing animal models, molecular biological techniques, next-generation gene sequencing approaches, large multinational randomized clinical trials and other cutting edge methods. In contrast, many brain metastasis papers have major



Guest Editor: Professor Matthias Preusser, MD.



Guest Editor: Professor Michael Weller.

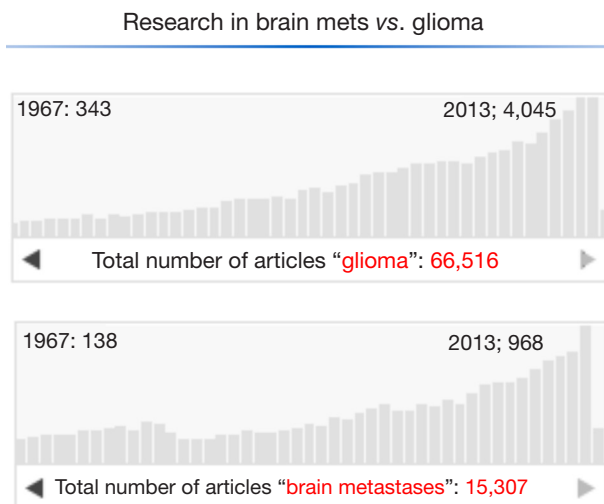


Figure 1 Number of articles published on glioma and on brain metastases in the period 1967 to 2013 (Available online: www.pubmed.gov).

methodological limitations. Only few well established experimental models are available and unfortunately brain metastasis patients have been systematically excluded from most clinical trials of novel agents for patients with solid tumors. Most of the few available clinical trials on brain metastasis patients have included heterogeneous and small patient populations that limit the conclusions that can be drawn. Consequently, there is a lack of understanding many aspects of brain metastasis pathobiology and only very few adequately powered and well-performed clinical studies are available to guide patient management on a high level of evidence. However, in the past few years, there is an increasing interest in brain metastasis research, partly motivated by increasing incidences of brain metastases that come along with increased survival times of cancer patients due to novel and effective oncological therapeutics. Emerging studies are providing novel knowledge on

biological processes of brain metastasis formation and clinical investigations are focusing on specific questions in cohorts of patients with CNS metastases (2,3). It is expected that these activities will lead to improved understanding and clinical management strategies.

In this special issue of *Chinese Clinical Oncology (CCO)*, international experts will in a series of articles provide an overview of the current state and emerging perspectives on various aspects of brain metastasis research. The topics covered include neuroimaging, prognostic scoring systems, neurosurgical and radiosurgical decision making, strategies for preservation of memory function, the inflammatory microenvironment, genomic profiling, novel targeted agents and the management of leptomeningeal carcinomatosis in cancer patients with CNS affection. It is clear that the field of brain metastasis research is finally developing a considerable drive and significant advances are being made in preclinical, translational and clinical science that start to translate into better treatments and improved outcomes of brain metastasis patients.

Acknowledgements

Disclosure: The authors declare no conflict of interest.

References

1. Owonikoko TK, Arbiser J, Zelnak A, et al. Current approaches to the treatment of metastatic brain tumours. *Nat Rev Clin Oncol* 2014;11:203-22.
2. Berghoff AS, Bartsch R, Wöhrer A, et al. Predictive molecular markers in metastases to the central nervous system: recent advances and future avenues. *Acta Neuropathol* 2014;128:879-91.
3. Berghoff AS, Preusser M. Biology in prevention and treatment of brain metastases. *Expert Rev Anticancer Ther* 2013;13:1339-48.

Cite this article as: Preusser M, Weller M. Brain metastasis research: a late awakening. *Chin Clin Oncol* 2015;4(2):17. doi: 10.3978/j.issn.2304-3865.2015.05.01