Comparison of dose escalation using intraoperative radiotherapy (IORT) compared to post-operative stereotactic radiosurgery (SRS) after large brain metastases resection

A brief overview – created by Christopher P. Cifarelli MD, PhD, FAANS, FACS, Director of Gamma Knife Radiosurgery, Assistant Professor of Neurosurgery, WVU Cancer Institute, West Virginia University Hospital in Morgantown on behalf of ZEISS, March 2019.

Please note: Reading this brief overview does not substitute the reading of the original study, but is just giving an abridged insight and is not necessarily reflecting the opinion of notified bodies and/or regulatory authorities, such as the DQS or FDA.

Original title: Feasibility of dose escalation using intraoperative radiotherapy following resection of large brain metastases compared to post-operative stereotactic radiosurgery.

Authors: John A. Vargo, Kristie M. Sparks, Rahul Singh, Geraldine M. Jacobson, Joshua D. Hack, Christopher P. Cifarelli


- In oncology patients, the most common intracranial malignancy, accounting for significant morbidity and mortality are brain metastases.¹
- For the treatment stereotactic radiosurgery (SRS) is normally used, but as this frequently leads to radiation necrosis for larger brain metastases the dose level is limited and mostly the treatment volume is reduced with debulking surgery to enable SRS to deliver an adequate dose.
- Intraoperative radiotherapy (IORT) might be a treatment alternative but so far standardized dose recommendations are not available.
- For this retrospective phase I/II study 27 patients were included. 20 of these patients underwent SRS with a single dose between 10 and 30 Gy and 7 patients were treated with an IORT single dose of 30 Gy.
  - The authors compared both treatment options and found out that for the included patient cohort IORT led to lower radiation doses to near risk areas compared to SRS.
  - With a median follow-up of 6.2 months, no patient developed signs of radiation necrosis and over 85% of patients treated with surgery and IORT achieved local control.
  - The applied dose level of this study is consistent with the recommended dose for IORT in Glioblastomas in the ongoing INTRAGO-II phase-III trial.

Please find further details regarding study design and study results in the original article.