



# Small brain metastases treated with single isocenter dynamic conformal arc SRS

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## Purpose

A safety and efficacy of single-isocenter SRS (SI-MM-SRS) for small brain metastases is not well defined. Even small inaccuracies or misalignments may result in geographical miss. Our study aim was to determine response to treatment of metastatic lesions after single isocenter SRS using ExacTrack system, especially lesions below 0.5 cm<sup>3</sup>.

Characteristic	
<b>Age (years)</b>	
- median	59
- range	45-77
<b>Sex n (%)</b>	
- man	17 (46 %)
- women	20 (54 %)
<b>Number of treated metastases</b>	
- median	3
- range	2-10
<b>Margins used (mm)</b>	
- median	1
- range	0-2
<b>Dose used (Gy)</b>	
- median	20
- range	16-24
<b>PTV volume of all lesions (cm<sup>3</sup>)</b>	
- mean	2,14
- range	0,15-14,9
<b>PTV volume of lesions below 0,5 cm<sup>3</sup></b>	
- mean	0,37
- range	0,15-0,50

Table 1. The clinical characteristics of the analyzed group

## Materials and Methods

The analysis included a group of 36 patients treated at Department of Neurooncology and Radiosurgery at Franciszek Lukaszczyk Oncology Center between 02.08.2018 r. and 15.09.2020 r. due to multiple brain metastases with a follow-up MRI 6 months after treatment. A total of 195 metastatic lesions were treated, including 71 lesions with PTV volume below 0.5 cm<sup>3</sup>. All patients were treated with the BrainLab Elements MultiMets software using single isocenter Dynamic Conformal Arcs. The ExacTrac system was used to monitor the position during SRS. MRI was analyzed in all patients 6 months after treatment. The clinical characteristics of the group are presented in Table 1,

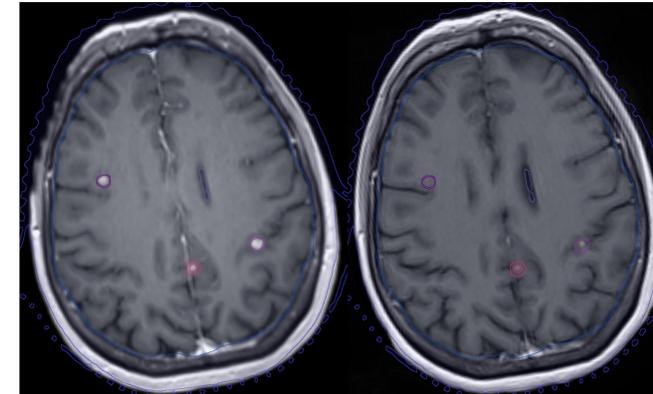


Figure. 1 Treatment effect of small metastases to the brain. 1- MRI for treatment planning, 2- MRI 6 months after treatment

## Results

The patients' median survival was 14.63 months and the median follow-up was 23.45 months. Local control was found in 93% of all metastatic lesions (partial or complete response in 83%); in lesions below 0.5 cm<sup>3</sup> it was 96% (Fig 1.). Tumors with a volume below 0.5 cm<sup>3</sup> did not have a worse response rate ( $p = 0.626$ ) and there was no increased risk of radiation necrosis ( $p = 0.541$ ). Symptomatic radiation necrosis was diagnosed in 1 patient (3%) after 6 months. Twelve lesions (6%) with radiation necrosis were asymptomatic.

## Conclusion

Multiple brain metastases irradiated with a single isocenter technique show a very high local control. Tumors below 0.5 cm<sup>3</sup> have a similar response rate with low risk of radiation necrosis.