Intensity modulated radiotherapy (IMRT)

consist of a multifield techniques with intensity modulated individual beams, improving dose conformality especially to complex shapes in very close vicinity to sensitive organs at risk (OAR).

A wide range of publications has documented the value of external beam radiation for the treatment of meningioma. However clinical practice is more likely to show that only those cases suffering from complex meningioma are referred to radiotherapy. This included patients with relapse after surgery, large tumors or complexly growing tumor. Thus the treating physician is frequently faced with the dilemma to spare as much of critical normal tissue without missing gross tumor. The use of highly conformal treatments including IMRT even increases the need for optimal target volume delineation.

Treatment planning comparisons have shown the benefits of IMRT compared to other 3D-treatments for several indications. For meningiomas, this holds true especially for larger volumes with complex anatomy [1)].

In terms of Planning Target Volume (PTV) coverage, there is an advantage in using IMRT for all target shapes, but especially for irregularly shaped and and concave volumes. In some cases, IMRT can reduce dose to OAR, however, in total the volume of normal tissue receiving a low dose can be larger than with Fractionated stereotactic radiotherapy (FSRT) [2)]

1)
Pirzkall A, Carol M, Lohr F, Hoss A, Wannenmacher M, Debus J. Comparison of intensity-modulated radiotherapy with conventional conformal radiotherapy for complex-shaped tumors. Int J Radiat Oncol Biol Phys. 2000;48:1371–1380. doi: 10.1016/S0360-3016(00)00772-0.
2)
Baumert BG, Norton IA, Davis JB. Intensity-modulated stereotactic radiotherapy vs. stereotactic conformal radiotherapy for the treatment of meningioma located predominantly in the skull base. Int J Radiat Oncol Biol Phys. 2003;57:580–592. doi: 10.1016/S0360-3016(03)00587-X.