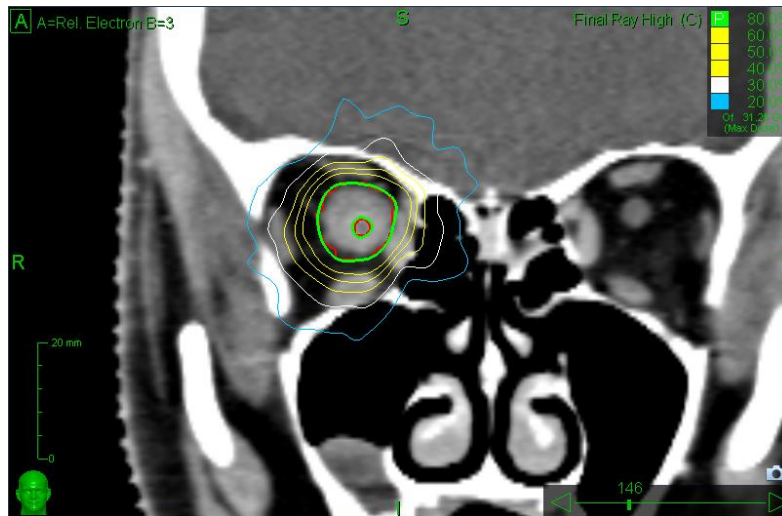


Safety of Cyberknife Radiosurgery in optic nerve sheath meningiomas

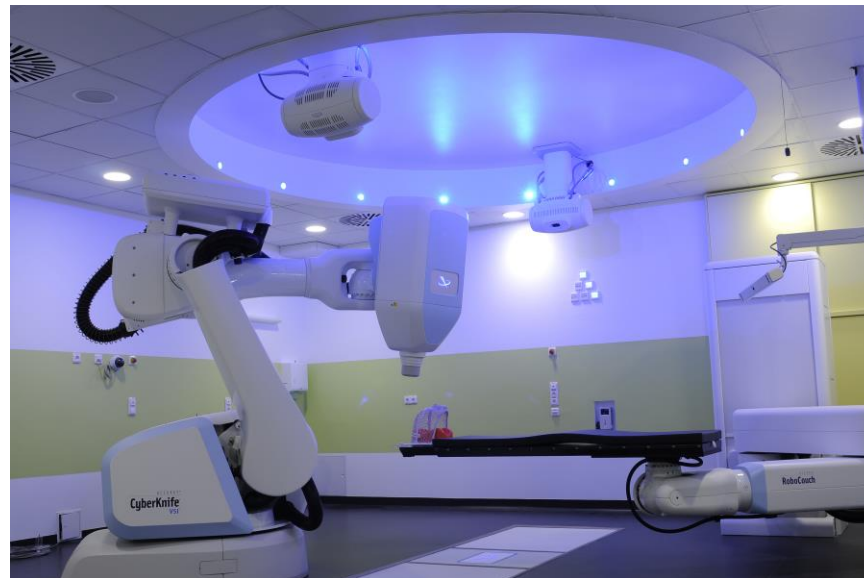


Department of Radiation Oncology
- Charité CyberKnife Center -

Dr. med. Carolin Senger

Introduction

- **In our center...**
 - 2060 treatments
 - 47% cranial
 - 27% meningioma
 - **optic nerve sheath meningiomas 9% (1% of all treatments)**



Literature

- traditional treatment ONSMs include observation, surgery and radiotherapy, to date none of these has become the clear treatment of choice
 - progressive growth can lead to gradual loss of vision and exophthalmos
 - loss of vision following microsurgical resection is not uncommon
 - single session SRS is rarely possible as ONSMs treatment due to the known dose tolerance of the optic nerve

„Retrospective data of multisection radiosurgery treatment of ONSMs are quite promising“

[Multisection radiosurgery for perioptic meningiomas: medium-to-long term results from a CyberKnife cooperative study.](#)

Marchetti M, Conti A, Beltramo G, Pinzi V, Pontoriero A, Tramacere I, Senger C, Pergolizzi S, Fariselli L.

J Neurooncol. 2019 Jul;143(3):597-604. doi: 10.1007/s11060-019-03196-x. Epub 2019 May 22.

PMID: 31119480

[Similar articles](#)

[Optic Nerve Sheath Meningioma: Preliminary Analysis of the Role of Radiation Therapy.](#)

Jin J, Joo JD, Han JH, Yang HK, Hwang JM, Kim YJ, Kim IA, Kim CY.

Brain Tumor Res Treat. 2018 Apr;6(1):8-12. doi: 10.14791/btrt.2018.6.e2. Epub 2018 Apr 2.

PMID: 29644809 **Free PMC Article**

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[Single- and Multi-Fraction Stereotactic Radiosurgery Dose Tolerances of the Optic Pathways.](#)

Milano MT, Grimm J, Soltys SG, Yorke E, Moiseenko V, Tomé WA, Sahgal A, Xue J, Ma L, Solberg TD, Kirkpatrick JP, Constine LS, Flickinger JC, Marks LB, El Naqa I.

Int J Radiat Oncol Biol Phys. 2018 Jan 31. pii: S0360-3016(18)30125-1. doi: 10.1016/j.ijrobp.2018.01.053. [Epub ahead of print]

PMID: 29534899

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Methods & Patient characteristics



Methods

- retrospective analysis, all patients with ONSMs until 02/2019
- treated by stereotactic radiosurgery (SRS) using Cyberknife
- Patients were evaluated for tumor growth control and visual function

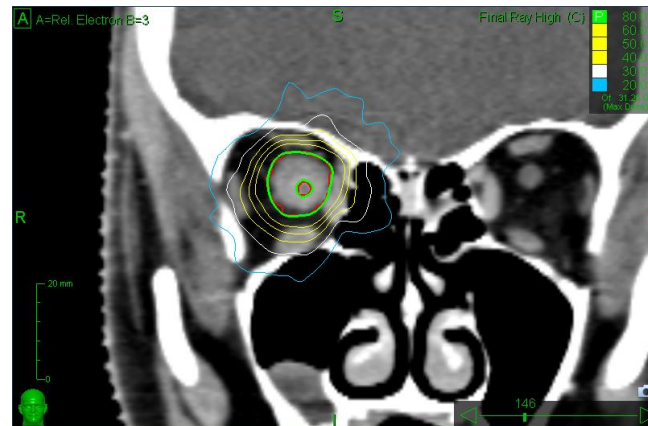
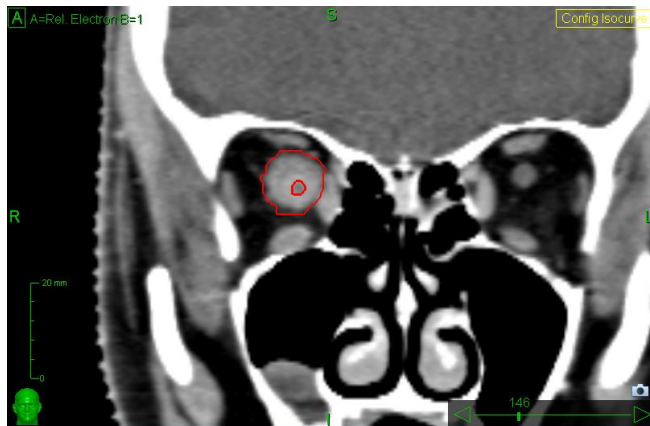
Patient characteristics

- 20 patients with 21 ONSM
- mean follow up time: 2.3 ± 1.6 years (range: 4 months to 5 years)
- 8 patients (38%) were operated previously with optic canal decompression
- prior to SRS 25% of the patients suffered from blindness

Results

Treatment characteristics

- mean tumor volume $2.01 \pm 3 \text{ cm}^3$ (range: 0.33 – 14.10)
- mean prescribed dose $19.9 \pm 3.2 \text{ Gy}$
 - 4-5 fractions each 5 Gy in 81% of the cases (70-85% isodose)
 - 19% a single fraction with a dose of 14-15 Gy (70% isodose)



- Optic pathway dose constraints: for 1/5 Fx $\leq 0.2 \text{ cm}^3$ of the optic pathway could receive 8/23 Gy with a max. point dose of 10/25 Gy in $\leq 0.035 \text{ cm}^3$

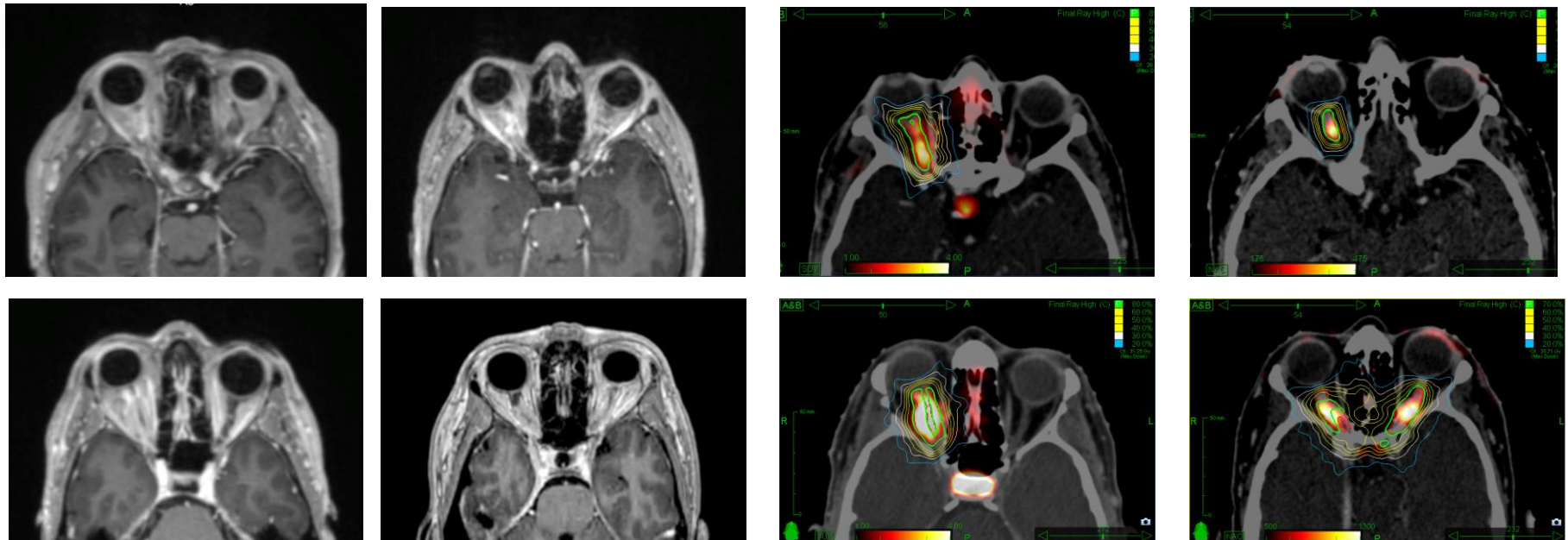
Results

Therapy efficacy and safety

- 0% tumor progress, while a remission was achieved in 12%
- overall the vision
 - remained the same in 50%
 - improved in 42%
 - deteriorated in only one patient (8%)
- 2018-2019 all 4 patients received a DOTATOC-PET-MRI prior SRS

DOTATOC-PET-MRI

- treatment planning was based on a contrast enhanced planning CT (0.75 mm) and co-registered 68Ga-DOTATOC PET/MRI datasets (T1-weighted MPRAGE, attenuation corrected PET)



Conclusion

- Cyberknife SRS offers good local control / stabilize tumor volume
- preservation of vision could maintain visual acuity
- which treatment is the more effective modality must be confirmed by prospective studies and longer follow-up
- further analysis:
 - impact of DOTATOC-PET-MRI on SRS planning
 - optic nerve movement during treatment

Thank you!