control rates and may ultimately improve OS. The combination of surgery followed by RT appears to be the current standard of care.

EP-1115
Stereotactic radiosurgery for brain metastases: neuropathological report of three autopsy cases
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Purpose or Objective: To elucidate the radiobiological effects of stereotactic radiosurgery (SRS) on brain metastases using autopsy cases.

Material and Methods: From 1995 to 2013, 9 brain specimens from 3 patients were available. They underwent autopsy after SRS in our hospital. These specimens were all brain metastases. The timing of autopsy was from 7 days to 20 months (median 10 months) after SRS. The 9 tumors received a margin dose of 16-20 Gy (median 20 Gy) at the 40-75% isodose line (median 40%), with a maximal dose of 16-50 Gy (median 45 Gy). Histopathological investigations were performed. The specimens were fixed in 20% neutral buffered formaldehyde and embedded in paraffin. Hematoxylin-eosin, Azan-Mallory, and Bodian stains were used. Immunohistochemical reactions included glial fibrillary acidic protein, alpha-smooth muscle actin, CD34, and CD68 antigens. Ki67 and p53 reactions were also used.

Results: The first case was a 59-year-old man diagnosed with 2 brain metastases from renal cell carcinoma. Both lesions were irradiated with SRS. He received SRS 4 times after the first SRS. At 1 week after the last SRS, he died from carcinomatous lymphangiosis. The second case was a 63-year-old man diagnosed with 2 brain metastases from lung cancer. Both lesions were irradiated with SRS plus whole brain radiotherapy (WBRT). Seven months later, he died from carcinomatous peritonitis. The third case was a 35-year-old woman diagnosed with 2 brain metastases from breast cancer. Both lesions were irradiated with WBRT plus SRS. When one of the lesions enlarged 1 year later, repeated SRS was performed. At 7 months after reirradiation, she died from carcinomatous lymphangiosis. In the first case, necrosis and viable tumor cells were observed mainly in the center of the lesion at 1 week after SRS, while apoptosis and fibrosis were observed in a small part of the lesion. Glial cells and neutrophilic leukocytes had accumulated around the lesion. In the lesions at 2 months after SRS, tumor cells and fibrosis were not observed; only macrophages and glial cells were observed in the SRS irradiated field. In the second case, fibrosis was observed at the periphery of the center necrotic region at 7 months after SRS. In the third case, almost all parts of the lesions were replaced with fibrosis at 19 months after SRS, while small foci of viable tumor cells, a large number of glial cells, and macrophages were observed around the fibrotic area.

Conclusion: In the tumors, apoptosis was only observed at 1 week after SRS. The time of fibrosis initiation varied in each case. Around the tumors, neutrophilic leukocytes and glial cells accumulated within 1 week after SRS. Macrophages accumulated at least 2 months after SRS. Stromal changes remained for a considerable period of time. It was remarkable that fibrosis occurred very soon after SRS, and other observations were generally compatible with previous reports.

EP-1116
Staged radiosurgery for petroclival meningiomas: preliminary results
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Purpose or Objective: The goal of surgical treatment of meningiomas is the total resection of the tumour. The complete removal of petroclival meningiomas can be difficult because of their proximity to cranial nerves. Stereotactic radiosurgery (SRS) is a well-established treatment for many patients with intracranial meningiomas, either in the exclusive or adjuvant setting. However, SRS of large meningiomas might be associated with significant morbidity. Under these circumstances s-SRS has the potential to deliver sharply focused high doses per fraction without increasing the risk of toxicity. The aim of this study is to prospectively evaluate the feasibility of s-SRS for petroclival meningiomas, including large volume lesions.

Material and Methods: Between September 2011 and October 2013 at our Institute, s-SRS using the CyberKnife was prospectively performed on 30 patients (24 women and 6 men, mean age 57 years) with petroclival meningiomas. Patients with atypical or malignant meningiomas and those who had received prior radiotherapy were excluded. The average tumor volume was 11.86 cm³ (range 2.2-126.3 cm³); the average tumor prescription dose was 24.4 Gy, the number of fraction was 4 or 5.

Results: After a median follow-up of 30 months (range 13-36 months) the overall tumor control rate was 100% (25 patients with stable disease, 3 patients with partial response and 2 patients with complete response). Tumor control rates at 2 and 3 years were 100%. Among 28 patients who were asymptomatic before staged radiosurgery, neurological follow-up showed an improvement in 43%, stable clinical course in 43% and a persistent deterioration of clinical symptoms in 14% of the patients. A transient neurological deterioration was observed in 11% of patients within the first year after treatment.

Conclusion: Our findings show that s-SRS using the CyberKnife is a safe and effective option in the treatment of large-volume petroclival meningiomas. A good tumor control and a low morbidity rate was achieved in our series, either as a primary or adjuvant approach. Long-term follow-up is warranted to confirm these results.

EP-1117
Frameless radiosurgery for acoustic schwannoma: a five-year experience
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Purpose or Objective: Frameless radiosurgery (SRS) plays an important role in the management of acoustic neuromas. This retrospective study aims to evaluate tumor control using this technique.

Material and Methods: Thirty-four patients with unilateral acoustic neuromas (vestibular schwannomas) who underwent linear accelerator-based frameless SRS at low dose (12 Gy) to the tumor from July 2008 to February 2015 were evaluated. Twenty-one patients were male and 13 patients were female. The median age was 62 years (range 23-84) with a median follow-up period of 12.4 months (range 1-60). Treatment volume was 0.1 to 3.8 cm³ (median 0.93 cm³).

Results: Preliminary results from follow-up magnetic resonance imaging (MRI) showed: the tumor of 15 patients decreased in diameter, no changes was found in 14 and the tumor increased slightly in only one patient. All patients are alive, except for 1p who died from intercurrent disease 2 years after radiosurgery. Among 23p with acufen, full improvement was demonstrated in four. There were no reported complications related to treatment.