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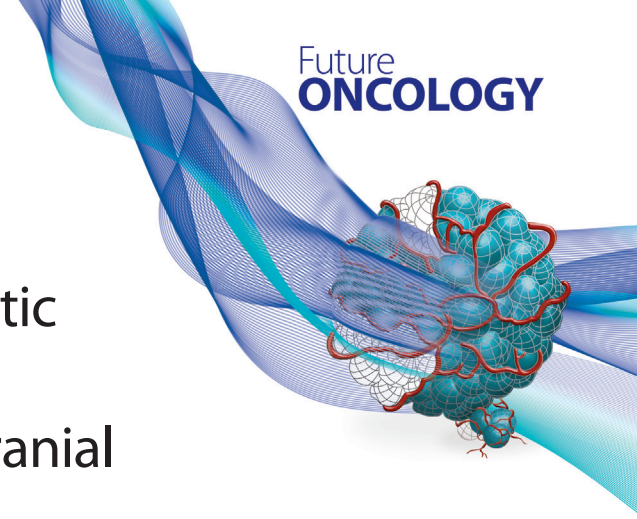

CONFERENCE SCENE

Best of the Radiosurgery Society® Scientific Meeting 2014: stereotactic radiosurgery/stereotactic body radiotherapy treatment of extracranial and intracranial lesions

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The SRS/SBRT Scientific Meeting 2014, Minneapolis, MN, USA, 7–10 May 2014

The Radiosurgery Society®, a professional medical society dedicated to advancing the field of stereotactic radiosurgery (SRS) and stereotactic body radiotherapy (SBRT), held the international Radiosurgery Society Scientific Meeting, from 7–10 May 2014 in Minneapolis (MN, USA). This year's conference attracted over 400 attendants from around the world and featured over 100 presentations (46 oral) describing the role of SRS/SBRT for the treatment of intracranial and extracranial malignant and nonmalignant lesions. This article summarizes the meeting highlights for SRS/SBRT treatments, both intracranial and extracranial, in a concise review.

KEYWORDS
• brain metastasis • cervical cancer • head and neck • lung • pancreas • prostate • radiosurgery• stereotactic body radiotherapy

Lung

The VU Medical Center, Amsterdam, The Netherlands, presented their institutional experience treating primary lung tumors with stereotactic ablative body radiotherapy (SABR, an alternative terminology for stereotactic body radiotherapy [SBRT]) [1]. The study included 801 patients with T1-T2N0 non-small-cell lung cancer (NSCLC) treated with 60 Gy in three, five or eight fractions. Local failure at 5 years was 8.3% and overall survival (OS) at 2 and 5 years was 66.3 and 34.3%, respectively, similar to published studies. Toxicities were minimal and included 1% acute grade 3, 5% late grade 3 and 1% late grade 4 toxicity. Results from 87 patients with high-risk lung tumors (tumors >7 cm, abutting normal tissues or previously irradiated) treated with 60 Gy in 12 fractions were also presented. Local control (LC) and OS at 2 years was 85 and 47%, respectively. In a matched pair analysis between operable patients receiving SABR or video-assisted thoracoscopic surgery (VATS) lobectomy, SABR improved LC. The authors concluded that SABR is now a

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standard of care for medically or surgically inoperable early-stage NSCLC. The role of SABR for operable patients remains an area of active research to define its ultimate role.

Medbery and colleagues presented outcomes of 723 patients with T1-T2N0M0 NSCLC enrolled in the international RSSearch® Patient Registry [2]. Patients were treated with a median SBRT dose of 54 Gy delivered in a median of three fractions. Two-year OS for T1 and T2 tumors was 63 and 52%, respectively. One- and 2-year LC was 88 and 76%, respectively. Local failure was associated with BED_{10} less than 105 Gy for T2 tumors; however, a similar dose response was not observed for T1 tumors, suggesting higher doses are needed for larger tumors. This study demonstrates the consistency of survival data in SBRT lung studies and also the feasibility of using the RSSearch Patient Registry as a tool for reporting treatment management practices and clinical outcomes from a large number of SBRT-treated patients.

Prostate

The role of SBRT with or without external beam radiation therapy (EBRT) for the treatment of organ-confined (cT1–2c) high-risk (Gleason ≥8 or PSA >20 or multiple risk factors including T2b–T2c, Gleason 7, PSA 10–20) prostate cancer was presented [3]. Patients were treated with either 36.25 Gy in five fractions or 45 Gy to the pelvis followed by 18–21 Gy in three fractions. The 5-year biochemical disease-free survival was 69% for both groups. Grade 2 gastrointestinal (GI) toxicity was greater in patients who received EBRT plus SBRT compared with SBRT alone. The authors concluded that SBRT alone is a safe and effective treatment for organ-confined high-risk prostate cancer. The use of EBRT adds GI toxicity, but does not improve biochemical disease-free survival for high-risk patients.

Lanciano *et al.* presented a study comparing SBRT (36.25–37.5 Gy/5 fractions) versus intensity-modulated radiation therapy (IMRT; 75.6–78 Gy/39 or 42 fractions) for organ-confined prostate cancer [4]. The 5-year freedom from biochemical failure (FFBF) was 91 and 93% for IMRT and SBRT, respectively. When stratified by the National Comprehensive Cancer Network risk group, FFBF was similar across all risk groups. There were no grade 3 or higher genitourinary or GI toxicities. The authors concluded that toxicity and FFBF are equivalent for SBRT and IMRT at 5 years. Further follow-up and multi-institutional studies are needed to confirm the long-term stability and generalizability of these findings.

Gastrointestinal

The Johns Hopkins group presented a retrospective analysis of 88 patients with pancreatic cancer treated with 25–33 Gy in five fractions [5]. Pre- and post-SBRT chemotherapy included gemcitabine-based (76%) and FOLFOX/FOLFIRINOX-based (24%) regimens. Median OS from the time of diagnosis was 18.4 and 13.7 months from SBRT initiation. The 1-year LC was 61.7% and 1-year progression-free survival was 39.7%. Three patients experienced acute grade 3 GI toxicity, one patient had acute grade 4 GI bleed and seven patients had grade 3 hematological toxicity. This report showed minimal late toxicity and favorable OS and LC for pancreatic patients treated with SBRT compared with historical outcomes using chemoradiation. The authors continue to explore integration of SBRT with chemotherapy regimens to further improve outcomes.

The use of SBRT for reirradiation of the pelvic region in patients with recurrent colorectal cancer was presented by Dagoglu *et al.* [6]. Twenty-five colorectal cancer patients with 28 recurrent pelvic colorectal lesions were treated with 24–40 Gy in three to six fractions. Median follow-up was 38 months. 1-, 2- and 3-year OS was 76.8, 65.9 and 59.3%, respectively. LC at 1, 2 and 3 years was 100, 93.7 and 85.9%, respectively. The most common toxicity was fatigue: there was one grade 3 weakness and numbness, one grade 3 hydronephrosis and one grade 4 small bowel perforation. Overall, the results show minimal toxicities with favorable LC rates. This series also included reirradiation of lesions of the central pelvis, which has not been previously explored.

Head & neck

A Phase II study of concomitant stereotactic reirradiation and cetuximab for patients with inoperable, recurrent or new primary head and neck cancer was presented [7]. A total of 56 patients received concomitant cetuximab plus a total of 36 Gy delivered in six fractions. Median follow-up was 11.4 months. At 3 months, the response rate was 58.4% and disease control was 91.7%. The 1-year OS was 47.5%. Toxicity was acceptable with one death from hemorrhage and denutrition. This study suggests that short SBRT delivery time (12 days) with cetuximab is an

effective salvage treatment with good response in patients with previously irradiated head and neck cancer.

Ghaly *et al.* presented a Phase I dose-escalation study for SBRT in intermediate and high-risk oropharyngeal cancer [8]. Patients with high-risk oropharyngeal cancer received concurrent cisplatin and 60 Gy IMRT followed by SBRT boost of 8 or 10 Gy. Acute post-SBRT toxicities remained limited to grade 1–3 with no grade ≥4 toxicities. Late grade 3–4 toxicities secondary to tumor necrosis occurred in four patients treated with 10 Gy and one patient treated with 8 Gy. Local-regional control was 81 and 94% for patients treated with 8 and 10 Gy, respectively. The authors concluded that SBRT boost offers a viable treatment option for unfavorable oropharyngeal patients with moderate toxicities and functional preservation.

Gynecological

A Phase II study of SBRT for the treatment of inoperable primary or locally recurrent endometrial and cervical cancers was discussed [9]. Patients with contraindications to surgery or brachytherapy were treated with either SBRT alone (40 Gy in five fractions) or 45 Gy IMRT plus SBRT (40 Gy in five fractions). Median follow-up was 52 months; 82.6% had negative post-SBRT biopsy at 3 months. The 2-year LC rate was 76.9%. There were no grade ≥3 toxicities and patient reported quality-of-life measures (FACT-G Domain) did not significantly decline after SBRT treatment. SBRT provided good local disease control, did not produce toxicities requiring invasive interventions and preserved quality-of-life measures.

Intracranial

The Stanford University group presented a large series of repeat SRS in patients with new brain metastasis following an initial course of SRS [10]. In this retrospective study, 95 patients with 652 brain metastases were treated with two or more courses of SRS, in lieu of whole brain radiation therapy. With a median follow-up of 15 months, the 2-year local failure rate was 10% in patients who underwent radiation to a resection cavity compared with 6% in patients who underwent radiation to an intact solid metastasis. Median OS from the date of the first course and second course of SRS was 18 and 11 months, respectively. Radiation necrosis was seen in 14% of patients. The authors concluded that additional courses of SRS can be safely delivered following SRS, and may help identify patients in whom deferral of whole brain radiation therapy may be most beneficial.

The University of Pittsburgh group presented their experience using salvage SRS for brain metastasis in patients who had previously underwent preoperative SRS and surgical resection [11]. The median time from resection to repeat SRS was 1.75 months. The 1-year LC and OS rate was 12.5 and 50.8%, respectively. There were no grade 3 or higher toxicities. They concluded that repeat SRS represents an appropriate salvage therapy for patients with locally-recurrent brain metastasis in the setting of prior SRS and surgical resection.

CyberKnife Center (Munich-Grosshadern, Germany) presented their experience treating 244 patients with uveal melanoma with a single fraction of SBRT (range: 17–22 Gy, mean dose: 20.3 Gy) [12]. Retrobulbar anesthesia for complete akinesia of the globe, followed by MRI and CT scan for treatment planning and delivery was all completed within 3 h. LC at 1, 2 and 4 years was 98, 92 and 78%, respectively. The 3-year eye retention rate was 86.7% and eye nucleation was reported in only 26 patients. Median reflectivity improved in patients after SBRT treatment. The authors concluded that SBRT is a safe and effective treatment option for patients with a medium-to-large uveal melanoma that are generally more difficult to treat.

In summary, presentations at the SRS/SBRT Scientific Meeting 2014 identified areas of promise for the use of SRS and SBRT, particularly in the management of thoracic, genitourinary, gastrointestinal, gynecological, head and neck and intracranial malignancies.

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