Avoiding nephrectomy and consecutive hemodialysis by single-fraction radiosurgery using cyberknife for the treatment of renal cell carcinoma: Initial results

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**Introduction:** We report on patients with renal cell carcinoma (RCC) who were treated with single fraction high-dose local stereotactic radiosurgery (SRS) using the robotic Cyberknife system to avoid nephrectomy and consecutive hemodialysis.

**Methods:** Fifty-two patients with histologically confirmed RCC and median age of 63.6 years (43.6-86.5) with the indication for renal surgery and highest risk for consecutive hemodialysis were entered into a prospective case control study of single fraction SRS with 25Gy. Tumor response, renal function, survival, and adverse events were estimated every three months with a follow-up of at least six months.

**Results:** R.E.N.A.L. score was low in 1, moderate in 30 and high in 21 patients. 28 patients had singular renal units. Median follow-up was 26.9 months (1.8 - 52.6). Local tumor control nine months after SRS was 98% (95% CI: 89-99%). 43 lesions showed a measurable tumor size reduction including six complete remissions and 33 partial remissions. Renal function remained stable with a median serum creatinine at baseline of 1.10 mg/dl (0.4 - 2.0) and 1.11 mg/dl (0.8 - 2.2) at follow-up. In one patient grade I erythrodermia, in three patients grade I fatigue and in two patients grade I nausea occurred. In all patients nephrectomy was avoided.

**Conclusions:** Single-fraction SRS as an outpatient procedure is a treatment modality with short-term safety and efficacy to avoid treatment-related loss of renal function and hemodialysis in selected patients with RCC. Short term follow up of oncological and functional results so far is excellent. Further studies are needed to determine the limits of SRS in this setting and long term results.