

# Stereotactic Radiosurgery or Radiotherapy for Spinal Metastases, with or without Initial Open Surgical Decompression and Stabilization

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## Patient Demographics

	SRS + Surgery	SRS alone	TOTAL
# of Lesions (%)	21 (30.4)	48 (59.6)	69
Mean Age (range)	58.9 (35-79)	59.8 (29-81)	59.5 (29-81)
Sex (%)			
-Male	47.6	41.7	43.5
-Female	52.4	58.3	56.5
Mean Follow-up -Months (range)	14.5 (2.2-34.5)	10.4 (1.3-24.4)	11.6 (1.3-34.5)
Median pre KPS (range)	80 (60-100)	80 (60-100)	80 (60-100)
Prior EBRT (%)	6 (28.6)	24 (50)	30 (43.5)

## Introduction

Treatment of spinal metastases has evolved significantly over the last decade. Initial surgical decompression and stabilization, as opposed to radical oncologic resection, provides a margin around the spinal cord that facilitates subsequent treatment with high-dose (16-24 Gy) adjuvant stereotactic radiosurgery (SRS). If a safe margin exists between tumor and spinal cord on initial imaging, then high-dose SRS may be used as the primary therapy, eliminating the need for surgery. This approach has shown greater efficacy of tumor control, neurologic outcome and duration of response when compared to external beam radiotherapy, regardless of tumor histology. This study evaluates the efficacy of this treatment approach at our institution in a series of consecutive patients.

## Local Tumor Progression by Radiosurgical Dosing Scheme

Local Failure Status	Single Fraction (16-23Gy)	Hypofractionated (9Gy x 3, 6 Gy x 5, 10Gy x2)
Alive w/o Local Failure (%)	14 (36.8)	8 (25.8)
Dead w/o Local Failure (%)	22 (57.9)	19 (61.3)
Local Failure (%)	2 (5.3)	4 (12.9)

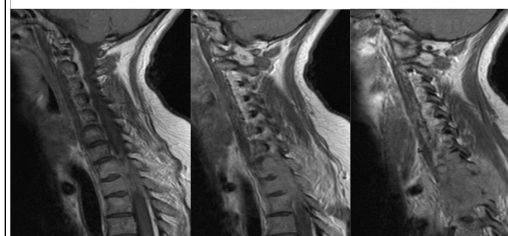
## Methods

Patients treated for spinal metastases between 2007 and 2011 on the Varian Trilogy Linear Accelerator were identified retrospectively. Each received SRS, with or without initial surgical decompression and instrumentation. Medical records were reviewed to assess neurologic outcome and surgical or radiation-induced complications. MRI images were obtained for each patient at 3 month intervals post-treatment and radiographic response assessed as regression, stable or progression. Endpoints were neurologic outcome and local radiographic disease control at death or latest follow-up.

## Results

Fifty-seven patients with 69 lesions were treated with SRS for spinal metastases. Forty-eight (69.5%) patients were treated with SRS alone, and 21 (30.5%) underwent surgery prior to SRS. A single-fraction was delivered in 38 (55%) patients, while a hypofractionated scheme was done in 31 (45%) cases. The most common histologies were renal cell, breast and lung carcinomas. No radiation induced myelopathy was observed. Surgical complications included two subclinical CSF leaks and one pedicle screw requiring repositioning. Radiographically, local disease was unchanged or regressed in 63/69 tumors (91.3%). Frankel score improved or remained stable in 68/69 (98.5%) patients.

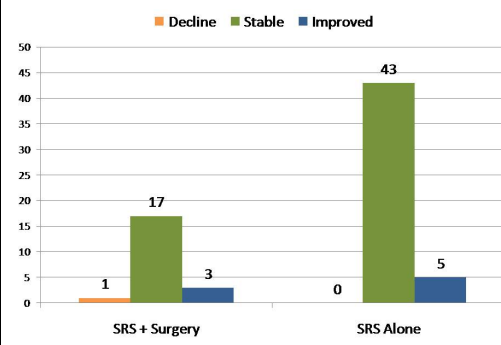
## Superior Sulcus Mass



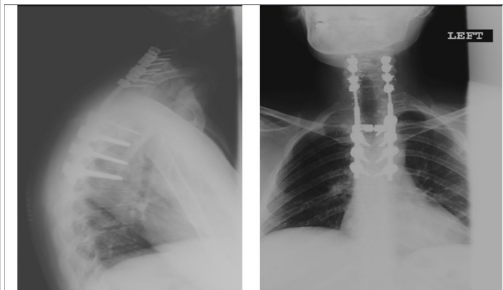
## Case Example

35yo WF p/w RUE weakness and difficulty with ambulation. She has unbearable mechanical pain. She is 4 months s/p R upper lobectomy for superior sulcus tumor. Initial surgery felt to be GTR with negative nodes  
PE: Atrophy of R hand intrinsic, decreased sensation in R C7/C8/T1, R tricep 3/5, R wrist flex/ext 1/5, 4 beats clonus bilateral  
The patient underwent surgical debulking and spinal instrumentation Postoperatively she was treated with SRS, delivering high-dose radiation to tumor while sparing neural structures.

## Neurologic Outcome (Frankel)



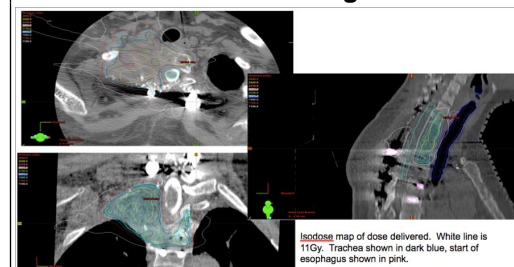
## Spinal Instrumentation and Debulking



## Conclusions

Stereotactic radiosurgery, alone or as an adjunct following surgical decompression, provides durable local radiographic disease control while preserving or improving neurologic function. This less-invasive alternative to radical spinal oncologic resection appears to be effective regardless of tumor histology without sacrificing durability of radiographic or clinical response.

## SRS Planning



Delivers cyto-toxic radiation dose to GTV while sparing toxicity to vital structures