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Repeat Radiosurgery for Breast Cancer Patients with Multiple Brain Metastases

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Introduction

Evidence now supports stereotactic radiosurgery (SRS) as the best method to maintain local control and quality of life (QOL) for patients with brain metastases, reserving WBRT for patients who develop carcinomatous meningitis or miliary brain disease. We investigated neurological outcomes, tumor control, and survival data breast cancer (BC) patients who presented with multiple brain metastases including those who required repeat SRS for additional intracranial metastases.

Methods

From our data base we identified 231 female patients (age range 29-82 , mean age = 53 years) who underwent multiple SRS procedures during a 30 year interval. We evaluated clinical, imaging, and outcomes before and after SRS performed with one or more versions of the Leksell Gamma Knife. Parameters were analyzed using Kaplan-Meier survival curves, and univariate and multivariate Cox regression.

Results

79% of patients were classified as RPA Class II. The median survival after diagnosis of was 19.9 (range 1.5-250) months. The median survival for patients with limited (2-4) and those with > 4 brain metastases was not significantly different. 89 (39%) patients underwent a single additional SRS (SRS-2) treatment, 27 (12%) had two additional SRS treatments (SRS-3), and 21 (9.1%) had three or more additional SRS treatments (SRS-4+). The median survival was 11 months after SRS-2, 24 months after SRS-3, and 13 months after SRS-> 3 times. 15(6.5%) of patients underwent salvage whole brain radiation therapy. The incidence of neurological death was 8%, 20%, 0%, and 12.5% following SRS-1, SRS-2, SRS-3, and SRS> 3 procedures. Although 19 (8%) patients developed symptomatic adverse radiation effects (ARE) related to intracranial-directed therapies, ARE had no significant effect on patient survival.

Conclusions

Repeat SRS provides brain disease control and improves neurological death in patients with breast cancer spread to the brain.

Learning Objectives

By the conclusion of this session, participants should be able to 1) understand the role of repeat GKRS for multiple intracranial breast cancer metastasis,2) Discuss the shortcomings of standalone WBRT for multiple intracranial metastasis,3) identify a treatment algorithm for this patient population

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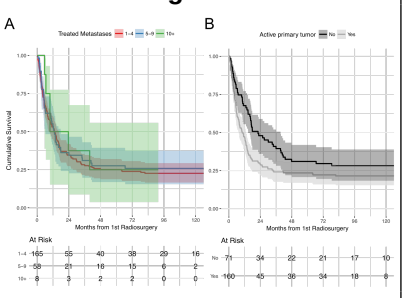
Figure 1



Number of Metastasis treated vs. Survival

Table 1

Factor	Breast Cancer No.
No. of female patients	231
No. of treated lesions	
Total	909
Median	3
Range	1-18
Age at SRS in years	
Median	53
Range	29-82
KPS Score	
Median	90
Range	40-100
No. with ≥90	174 (75)
RPA class	
1	29 (13)
2	184 (79)
3	9 (4)
Pre SRS treatment	
WBRT	167 (71)
Chemotherapy	229 (97)
Immunotherapy	112 (48)
Extracranial radiation	196 (84)
Brain surgery	27 (11)
Radiosurgery	8 (3)
Disease status	
Active primary tumor	160 (69)
Extracranial metastases	212 (92)

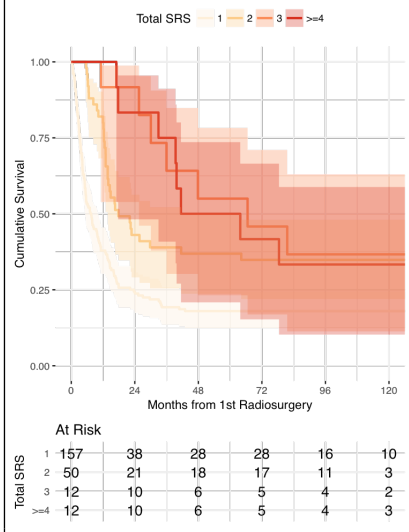
Summary of demographic and patient brain metastasis from female breast cancer patients. Values are presented as the number of patients (%) unless otherwise indicated.

Table 2

Total SRS operations	N	Cox Regression P-value	HR	95% CI	KPS Decease Med. [Range]	Percent Survival (95% CI) 1yr	2 yr	5 yr
Breast Cancer								
1 SRS	168	-	-	-	-	32 (26, 42)	18 (13, 26)	7.7 (4.1, 15)
2 SRS	47	0.000215	0.494	0.34-0.72	0 [-20,30]	71 (59, 86)	31 (20, 50)	21 (11, 40)
3 SRS	9	0.002860	0.356	0.18-0.70	-10 [-20,10]	92 (77, 100)	72 (50, 100)	31 (12, 79)
4+ SRS	11	0.000249	0.261	0.13-0.54	-10 [-20,10]	100 (100,100)	83 (65, 100)	43 (21, 88)

Survival in breast cancer brain metastases with multiple SRS operations. Cox regression compares survival in patients with more than one total SRS operations relative with respect to those who with only one procedure. KPS decreases compare the change in KPS at each subsequent visit.

Figure 2



Number of SRS treatments vs Survival