# *Abstract Id: 1121/PS1-07-01* | Outcomes of 1-3 brain metastases treated with Stereotaxy in Metastatic Breast Cancer: A Single Institutional Experience from Eastern India

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## INTRODUCTION

Patients with metastatic breast cancer (MBC) behave differently with receptor status.[1]
Stereotaxy is recommended in treatment of 1-3 brain metastases usually in patients with disease specific graded prognostic assessment (DS-GPA) calculated median survival time (MST) of more than 6 months.[2]

## PURPOSE

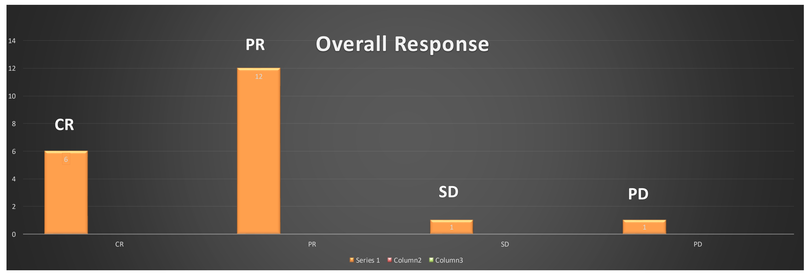
To assess the outcomes of 1-3 brain metastases treated with stereotaxy in MBC in terms of **Time to Progression (TTP) in brain** and **Overall Survival (OS)** along with their relationship with **receptor status and DS-GPA.**

## METHODS

- **22** MBC patients (from January 2020 – May 2025) with **1-3 brain metastases** with **DS-GPA (score 1.5 – 3.5)** calculated **MST more than 6 months** of different receptor status **(ER/PR and Her2)** treated with **Stereotaxy 30 Gy/5 fractions** were analyzed.
- Intracranial responses were recorded as per **RANO-BM response assessment (Response Assessment in Neruro Oncology Brain Metastases)** at 3 months post radiation with MRI of brain.
- **Time to progression (TTP) in brain** was calculated as time between completion of radiation to brain and radiologically detectable new brain lesion (in months).
- **Overall survival (OS)** was calculated as the time between completion of radiotherapy and death of the patient.
- **Acute radiation toxicities** were assessed as per **RTOG (as per embedded in CTCAE v2.0) criteria. .**

## RESULTS

**MRI Brain was done at 3 months of treatment completion. 2 out of 22 patients were lost to follow up at 2 months – CR - 6 (30%), PR – 12 (60%), SD – 1 (2.5%), PD – 1 (2.5%)**



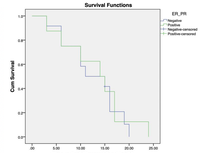

## RESULTS: SURVIVAL OUTCOMES

### ER/PR STATUS

**Median time to brain progression (TTP: 14.0 months, 95% CI: 7.07–20.93) in ER/PR +ve patients was higher compared to ER/PR-negative patients (11.0 months, 95% CI: 2.51–19.49), though this was not statistically significant (log-rank p = 0.711).**

**Means and Medians for Survival Time**

| ER_PR | Mean[a] | | | | Median | | |
|---|---|---|---|---|---|---|---|
| | | | 95% Confidence Interval | | | | 95% ... |
| | Estimate | Std. Error | Lower Bound | Upper Bound | Estimate | Std. Error | Lower Bound |
| Negative | 12.479 | 1.643 | 9.258 | 15.700 | 11.000 | 4.330 | 2.513 |
| Positive | 13.250 | 2.374 | 8.598 | 17.902 | 14.000 | 3.536 | 7.070 |
| Overall | 12.821 | 1.346 | 10.182 | 15.461 | 14.000 | 2.981 | 8.156 |




**Median overall survival (OS) was higher in the ER/PR-positive group (median OS: 19.0 months, 95% CI: 7.12–30.88) versus ER/PR-negative (17.0 months, 95% CI: 10.36–23.64; p = 0.653).**

### Her2 STATUS

**Patients with Her2Neu-positive disease had longer median TTP (16.0 months, 95% CI: 8.42–23.58) compared to Her2Neu-negative (10.0 months, 95% CI: 4.16–15.84), with a trend toward significance (p = 0.067).**

**Means and Medians for Survival Time**

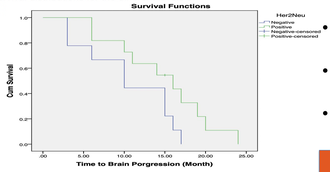
| Her2Neu | Mean[a] | | | | Median | | |
|---|---|---|---|---|---|---|---|
| | | | 95% Confidence Interval | | | | 95% ... |
| | Estimate | Std. Error | Lower Bound | Upper Bound | Estimate | Std. Error | Lower Bound |
| Negative | 10.556 | 1.849 | 6.931 | 14.180 | 10.000 | 2.981 | 4.156 |
| Positive | 14.745 | 1.831 | 11.157 | 18.334 | 16.000 | 3.869 | 8.418 |
| Overall | 12.821 | 1.346 | 10.182 | 15.461 | 14.000 | 2.981 | 8.156 |

**Overall Comparisons**

| | Chi-Square | df | Sig. |
|---|---|---|---|
| Log Rank (Mantel-Cox) | 3.357 | 1 | .067 |

Test of equality of survival distributions for the different levels of Her2Neu.

**Median OS was notably higher in the Her2Neu-positive cohort (31.0 months) versus 17.0 months for Her2Neu-negative patients (95% CI: 12.84–21.16), though the difference was not statistically significant (p = 0.304).**




### DS-GPA

**Patients with DS-GPA 3.5 had the most favorable survival (median TTP: 20.0 months; OS: 31.0 months), whereas those with DS-GPA 1.5 had the poorest (TTP: 6.0 months; OS: 7.0 months), p=0.058**
**OS differences did not reach statistical significance (p = 0.303).**

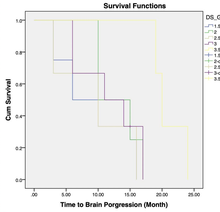
**Means and Medians for Survival Time**

| DS_GPA_Cat | Mean[a] | | | | Median | |
|---|---|---|---|---|---|---|
| | | | 95% Confidence Interval | | | |
| | Estimate | Std. Error | Lower Bound | Upper Bound | Estimate | Std. Error |
| 1.5 | 10.000 | 3.240 | 3.649 | 16.351 | 6.000 | 6.000 |
| 2 | 13.000 | 1.780 | 9.512 | 16.488 | 10.000 | . |
| 2.5 | 9.667 | 3.756 | 2.304 | 17.029 | 10.000 | 5.715 |
| 3 | 11.833 | 2.099 | 7.720 | 15.947 | 11.000 | 4.899 |
| 3.5 | 21.000 | 1.528 | 18.006 | 23.994 | 20.000 | .816 |
| Overall | 12.821 | 1.346 | 10.182 | 15.461 | 14.000 | 2.981 |

**Overall Comparisons**

| | Chi-Square | df | Sig. |
|---|---|---|---|
| Log Rank (Mantel-Cox) | 9.133 | 4 | .058 |

Test of equality of survival distributions for the different levels of DS_GPA_Cat.




## NUMBER OF BRAIN METS

**Patients with fewer brain metastases (1 lesion) had longer median TTP (15.0 months) and OS (19.0 months) compared to those with 2 (TTP: 16.0; OS: not estimable) or ≥3 lesions (TTP: 6.0; OS: 12.0). Overall difference was not statistically significant for TTP (p = 0.258) or OS (p = 0.367)**

## AGE

**Using a median split at 58 years, patients aged ≥58 years had a numerically higher median TTP (15.0 vs. 11.0 months) and OS (27.0 vs. 17.0 months), though differences were not statistically significant (TTP p = 0.873; OS p = 0.382).**

## OVERALL TTP AND OS ANALYSIS TABLE

| Variable | Median TTP (months) | Median OS (months) | TTP Log-Rank p | OS Log-Rank p |
|---|---|---|---|---|
| ER/PR | 11.0 | 17.0 | 0.711 | 0.653 |
| Her2Neu | 10.0 | 17.0 | 0.067 | 0.304 |
| DS-GPA | 6.0 | 7.0 | 0.058 | 0.303 |
| No. of Brain Mets | 15.0 | 19.0 | 0.258 | 0.367 |
| Age Group (< 58 vs >58) | 11.0 | 17.0 | 0.873 | 0.382 |

## DISCUSSION

- **HR+ve patients showed numerically longer time to brain progression and overall survival**, indicating a biologically less aggressive phenotype despite non-significant p-values.
- **Her2Neu positivity correlated with improved survival trends,** aligning with the clinical benefit seen from Her2-targeted systemic and intracranial therapies.
- **DS-GPA remained a consistent prognostic discriminator**—patients with higher GPA (≥3.5) demonstrated nearly fourfold longer survival than those with low GPA (≤1.5).
- Patients with **limited brain metastases (single lesion) experienced better outcomes**, reinforcing the survival advantage of oligometastatic presentation.
- **Older patients (≥58 yrs) did not fare worse;** slightly improved outcomes may reflect selection bias or better baseline DS-GPA, highlighting the importance of performance status over chronological age.

## CONCLUSION

- **DS-GPA and molecular subtype** continue to be the most relevant prognostic markers for survival in breast cancer brain metastases treated with Stereotaxy
- **Her2Neu-positive and hormone-receptor–positive** subsets show favorable trends, underscoring the impact of systemic control on intracranial outcomes.
- Findings emphasize the need for **integrated management strategies**—combining local therapy with molecularly guided systemic treatment—to optimize survival.

## REFERENCES

1. Raghavendra AS, Ibrahim NK. Breast Cancer Brain Metastasis: A Comprehensive Review. JCO Oncology Practice. 2024 Oct;20(10):1348-1359
2. Sperduto PW, Kased N, Roberge D, Xu Z, Shanley R, Luo X, Sneed PK, Chao ST, Suh J, Bhatt A, Jensen AW, Brown PD, Shih HA, Kirkpatrick J, Gaspar LE, Fiveash JB, Chiang V, Knisely JPS, Maria Sperduto C. Summary report on the Graded Prognostic Assessment: an accurate and facile diagnosis-specific tool to estimate survival, guide treatment, and stratify clinical trials for patients with brain metastases. Journal of Clinical Oncology. 2012 Feb 1;30(4):419-425.

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