# Risk Factors for Brain Metastasis and Their Impact on Survival in Patients With Gastric Cancer: A SEER Database Analysis

Diana Franco[1], Mohammad Rehman[2], Fatima Faraz[2], Zahoor Ahmed[3] , Sajeel Saeed[2], Jawad Basit[2]

[1]Loyola Medicine/MacNeal Hospital, [2]Rawalpindi Medical University, [3]King Edward Medical University

## Introduction

Brain metastasis in gastric cancer (GC) is a rare manifestation associated with poor prognosis and unfavorable outcomes. Identification of risk factors is essential for early detection and treatment. We investigated the incidence, risk factors, and prognostic factors of brain metastasis in GC patients.

## Methods

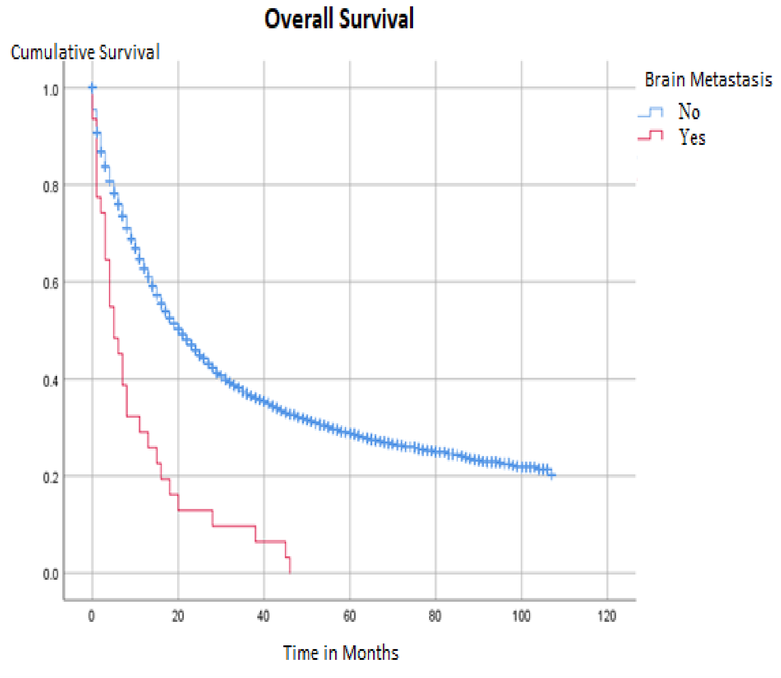
Using SEER data from 2010-2018 we calculated OS and CSS. Descriptive statistics, multivariate logistic regression, and Cox regression were applied using SPSS version 26. Kaplan Meier survival curves were constructed.

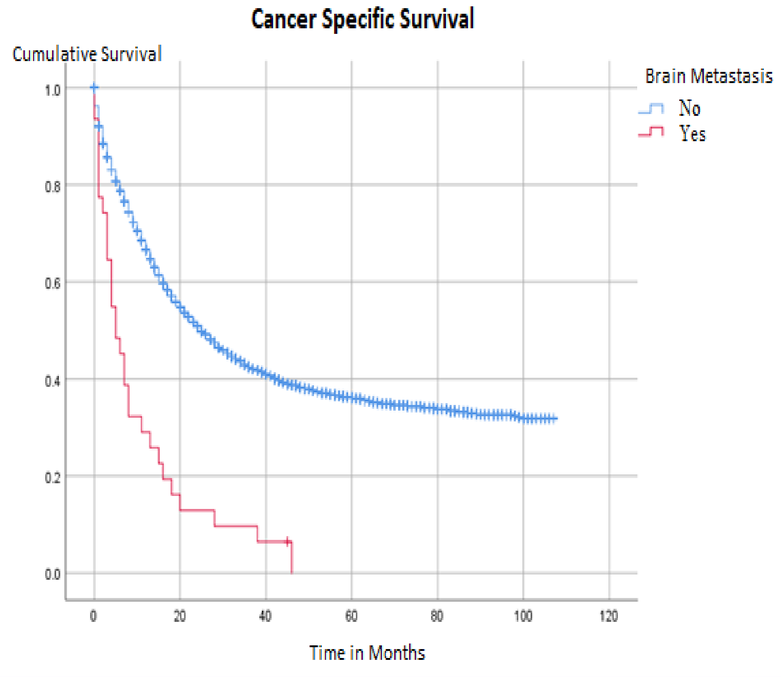
## Table. 1

| Features | Brain Metastasis, n (%) | No metastasis, n (%) | *P*-value |
|---|---|---|---|
| Total | 31 (100) | 7929 (100) | |
| Race | | | 0.068 |
| Caucasian | 27 (87.1) | 5390 (68.0) | |
| African American | 2 (6.5) | 850 (10.7) | |
| Other | 2 (6.5) | 1689 (21.3) | |
| Sex | | | 0.709 |
| Male | 19 (61.3) | 5122 (64.6) | |
| Female | 12 (38.7) | 2807 (35.4) | |
| Age, years | | | 0.046* |
| Less than 50 | 3 (9.7) | 862 (10.9) | |
| 50-75 | 24 (77.4) | 4476 (56.5) | |
| More than 75 | 4 (12.9) | 2591 (32.7) | |
| T Stage | | | 0.597 |
| 0 | 0 (0) | 23 (0.29) | |
| 1 | 10 (32.2) | 2478 (31.3) | |
| 2 | 1 (3.2) | 1009 (12.7) | |
| 3 | 13 (41.9) | 2775 (35.0) | |
| 4 | 7 (22.6) | 1644 (20.7) | |
| N Stage | | | 0.527 |
| 0 | 12 (38.7) | 4034 (50.9) | |
| 1 | 12 (38.7) | 2221 (28.0) | |
| 2 | 4 (12.9) | 901 (11.4) | |
| 3 | 3 (9.7) | 773 (9.7) | |
| Surgery | | | < 0.001 |
| Yes | 2 (6.4) | 4439 (56.0) | |
| No | 29 (93.5) | 3490 (44.0) | |
| Bone Metastasis | | | < 0.001 |
| Yes | 10 (32.3) | 231 (2.9) | |
| No | 21 (67.7) | 7698 (97.1) | |
| Liver Metastasis | | | < 0.001 |
| Yes | 11 (35.5) | 811 (10.2) | |
| No | 20 (64.5) | 7118 (89.8) | |
| Lung Metastasis | | | < 0.001 |
| Yes | 10 (32.2) | 222 (2.8) | |
| No | 21 (67.7) | 7707 (97.2) | |

## Results

We included 7,960 patients with GC. Brain metastasis was reported in 31 (0.39 %) patients. On logistic regression, patients who had undergone surgery were at reduced risk for brain metastasis (Adjusted odds ratio (aOR) 0.086, P< 0.001). Increased risk of brain metastasis was reported in patients who had concurrent metastasis to bone (aOR 4.973, P < 0.001) and lung (aOR 5.816, P < 0.001). The median OS was significantly lower in patients with brain metastasis (5 months) compared to those without brain metastasis (21 months, P < 0.05). The median CSS was significantly lower in patients with brain metastasis (5 months) compared to those without brain metastasis (25 months, P < 0.05). On Cox regression, significantly reduced OS was reported in patients at T3 (AHR 7.549) and T4 stage (adjusted hazard ratio (aHR) 19.394). OS was prolonged in patients who had undergone surgery (aHR 0.043). CSS was significantly reduced in patients at T3 (aHR 6.234) and T4 stage (aHR 17.148). Patients who had undergone surgery had longer CSS (aHR 0.04).




## Conclusion

Metastasis to the brain was reported in only 0.39% of GC patients. Brain metastasis is associated with worse OS and CSS in GC, particularly in patients with advanced tumor stage and those who did not undergo surgery.

LOYOLA MEDICINE