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Abstract

Published 03/05/2025

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Evolution of Craniotomy Rates for Brain Metastases After the Introduction of Immunotherapy

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Categories: Medical Physics, Radiation Oncology

Keywords: brain metastases, craniotomy, immunotherapy

How to cite this abstract

Pelcher I, Sistiaga I L, Begley S L, et al. (March 05, 2025) Evolution of Craniotomy Rates for Brain Metastases After the Introduction of Immunotherapy. *Cureus* 17(3): a1422

Abstract

Objectives:

In light of the increased efficacy of immunotherapy in treating primary cancers and its increased use in brain metastases treatment, we sought to determine whether the rates of craniotomies have changed since the first FDA approval of immunotherapy for use in melanoma brain metastases in 2011.

Methods:

Institutional data were obtained through the pathology department from 2011-2022. A total of 873 cases from 776 patients were included in the study. A subset of patients were analyzed to evaluate only immunosensitive primary cancers (non-small cell lung cancer [NSCLC], renal cell carcinoma [RCC], and melanoma), which was a total of 445 cases with 339 unique patients. National data was gathered from the NSQIP database from 2011-2022 for a total analytic sample of 14,494. A Craniotomy for Metastases Index (CMI) was generated to demonstrate the change of craniotomies overtime.

Results:

The most common institutional primary cancers were lung (46.1%), breast (17.4%), and gastrointestinal (10.1%), with the most common lung cancer being adenocarcinoma (57.7%). The institutional CMI had a non-significant decrease in craniotomies across all time ranges ($p=0.47$) and between 2011-2016 and 2017-2022 ($p=0.46$). The immunosensitive subset also had a non-significant decrease in craniotomies across all time ranges ($p=0.56$) and between years ($p=0.655$). The national CMI demonstrated a significant increase in craniotomies between 2011-2016 and 2017-2022 ($p=0.005$).

Conclusion(s):

Despite the integration of immunotherapy in the treatment regimens for brain metastases and its efficacy in improving overall survival, the number of craniotomies had no change institutionally and increased nationally. Longer overall survival of patients, improvement of surgical techniques, and variable response of patients to stereotactic radiosurgery (SRS) may account for these findings. Future studies should be conducted to determine the effect of SRS. Surgery continues to remain the mainstay in the treatment of brain metastases.