

Are brain metastases curable? Case report and a brief review of the literature

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ABSTRACT Background: Most of the times the prognosis of the patients with cancer who develop brain metastases remains incurable and hopeless with a median survival that goes between 2.7 and 15.07 month according to Grade Prognostic Assessment (GPA) Score for brain metastasis. **Case summary:** The following is a case report of a 33-year-old patient that presented with breast cancer and after one year of follow-up she developed one single brain metastases treated aggressively with surgery, whole brain radiotherapy (WBRT) 30 Gy in 10 Fractions and Stereotactic Radiosurgery (SRS) 22 Gy who achieved complete response and after more than 6 years since treatment the patient continues free of disease. **Conclusion:** An aggressive treatment for brain metastases in well-selected patients provides long periods of free intracranial disease, with acceptable results in the quality of life.

KEYWORDS Fractionated Stereotactic radiotherapy, POEMS Syndrome, spinal cord compression

Introduction

Brain metastases are a significant cause of morbidity in cancer patients, estimating that between 20-40% of cancer patients will develop them during their evolution [1]. The primary tumours that usually cause brain metastasis are lung cancer in 50% of cases, followed by breast cancer in 15-25% and melanoma in 5-20% [2]. Treatment for brain metastases includes surgical resection followed by stereotactic radiosurgery (SRS) or whole-brain radiotherapy in a limited number of lesions. However, the optimal treatment remains controversial [3].

Case report:

A 33-year-old woman from Zapopan Jalisco with no relevant medical history, which began her condition with a 2 cm palpable right breast lesion during self-examination, she went to a doctor who requested a mammogram which turned out as BI-RADS IV B with the presence of microcalcifications in the upper external quadrant of the right breast. A biopsy was subsequently performed with a histopathological result of invasive ductal carcinoma with no specific SBR pattern. A modified radical mastectomy was performed with a definitive histopathological report of infiltrating ductal carcinoma SBR 8, tumour size 2.7 cm, LVI ++ 6 lymph nodes out of 12 positives for malignancy, Immunohistochemistry: Estrogen receptors +++, Progesterone receptors +++, Her two neu negative, KI 67 60%. After surgery, the patient received eight cycles of adjuvant chemotherapy, and at the end of chemotherapy, 50 Gy of adjuvant RT was given in 25 fractions in tangential and supraclavicular fields. After a one year follow-up, she began to suffer from a headache, accompanied by nausea and vomiting. She later suffered generalised tonic-clonic seizures. A simple and contrasted CT scan of the brain was done, observing a single lesion at the level of the left parietal cortex measuring 33 mm x 38 mm, with abundant perilesional oedema enhancing to contrast (Figure 1).

The patient underwent surgical resection of the lesion with a

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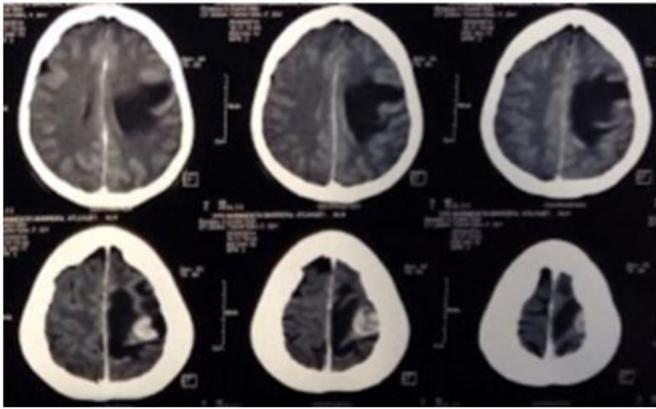


Figure 1: Contrast-enhanced CT is showing single lesion in the left parietal cortex with abundant perilesional oedema.

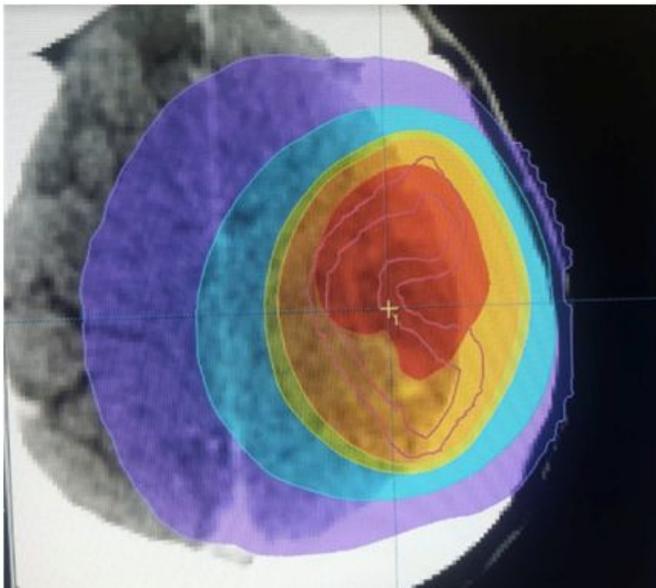


Figure 2: Treatment planning dose for SRS of the single lesion in the left parietal cortex.

positive histopathological result for malignancy of high-grade ductal adenocarcinoma. Subsequently, she received treatment with Whole-brain radiotherapy 30 Gy in 10 fractions followed by single dose radiosurgery (SRS) of 22 Gy to the Isocenter (Figure 2)

After six years of follow-up, the patient is free of disease and without neurological sequelae. Follow-up magnetic resonance imaging showed no data of tumour activity in the CNS, only changes after neurosurgical treatment and stereotactic radiosurgery (SRS) (Fig. 3)

DISCUSSION

In this patient, three different treatment modalities were used (surgery + whole-brain radiotherapy + stereotactic radiosurgery), which resulted in a complete image response. In a prospective study conducted by Patchell et al., an increase in local control, overall survival and recurrence-free survival was reported when comparing surgery + whole brain radiotherapy versus radiotherapy alone in the treatment of solitary lesions [4]. Kondziolka et al. reported 1-year local failure rates of 100%

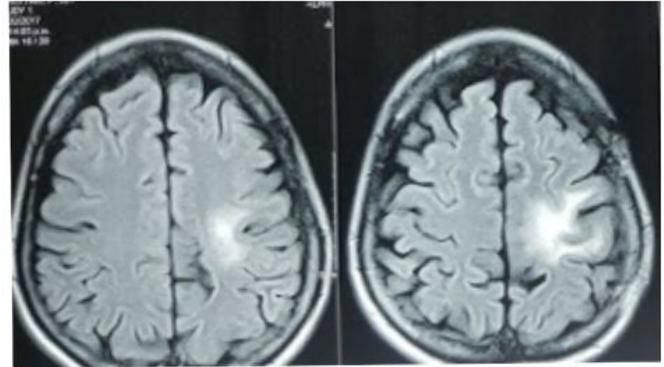


Figure 3: Magnetic resonance six years after surgical treatment and radiotherapy without evidence of tumour activity

in patients treated with whole brain radiotherapy versus 8% in patients undergoing radiotherapy to whole brain radiotherapy plus SRS in patients with 2-4 metastatic central nervous system lesions, although no benefit was reported regarding survival [5]. In a meta-analysis by May Tsao, the more significant benefit in local control was reported when patients with a limited number of metastases were treated with WBRT plus SRS compared to WBRT alone or SRS alone, without differences in overall survival when compared treatment options [6]. At present, the guidelines of the American Society for Radiation Oncology (ASTRO) supports treatment with Radiosurgery alone as level 1 of evidence, in patients with some up to 4 metastatic lesions. Yamamoto reported average survival rates of 13.5 months in patients treated with radiosurgery alone, with no statistically significant difference in survival when comparing patients with four metastatic lesions against 5-9 lesions [7]. Brown et al, reported a global survival of 10.4 months in patients with 1-3 metastatic lesions when patients were treated with SRS, compared to 7.4 months in patients treated with radiotherapy to whole brain + radiosurgery, without a statistically significant difference, however, the intracranial progression was more significant in patients undergoing Radiosurgery alone with an accumulated incidence at 12 months of 49.5% against 15%. Smith, performed a retrospective analysis of 150 patients with an average of 2.5 lesions, treated with complete resection plus radiosurgery, Reporting an average survival of 13.2 ± 1.9 months, Survival at 1 and two years was 52% and 33%, respectively. The progression-free survival was 4.0 months after Radiosurgery, and 17% of all patients were free of disease at one-year post-treatment [9]. In a retrospective series conducted by Kotecha, 1953 patients with brain metastases treated with WBRT, surgery and/or radiosurgery with a potential follow-up of 10 years were analyzed, reporting a mean survival of 6.4 months for the total cohort, and a rate of Survival of 3% and 1.3% at 5 and 10 years respectively. The factors that were associated with worse survival were male patients, more than one lesion, those not taken to surgery or radiosurgery treatment. Of the 10-year survivors, 6 had an intracranial recurrence within the first ten years after the first treatment, nine were described as symptom-free, and none documented death due to neurological causes. Concluding that patients alive after ten years of treatment can be considered cured of intracranial disease [10].

CONCLUSION:

In well-selected patients like the one that we present in this report, aggressive treatment with surgery, stereotactic radiosurgery with or without whole brain radiation therapy may result in an increase in the survival rate, with the probability of reaching cure in 1.2% of these patients with acceptable toxicity related to the treatment.

Authors' Statements

Competing Interests

The authors declare no conflict of interest.

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