Case Reports

Breast cancer metastasis to the medulla oblongata: A case report

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Summary

Breast cancer metastasis to the brain stem is uncommon. Because of the rarity of the condition, the clinical course of such patients is not known. The case of a 41-year-old woman with advanced-stage carcinoma of the breast involving the medulla oblongata is presented and the literature concerning management, including patient outcome, is reviewed.

Key words: Breast cancer; Metastasis; Medulla oblongata; Brain stem.

Introduction

Breast cancer (BCa) follows only lung cancer as the most common source of brain metastasis (BRM) [1].

In a study of metastatic patterns in 154 BCa patients, systemic spread of disease was found in bone in 51%, lung in 17%, and brain in 16% of cases [2]. In another study, an autopsy investigation of 193 BRM cases from BCa found 13 women with a metastatic deposit in the medulla oblongata (five of whom had been clinically diagnosed) [3]. It is important to clinically detect such secondary tumors because some patients can be successfully palliated with treatment, and perhaps can even survive for a long time.

We present a rare case of a woman with Stage IV BCa who was treated by radiation for neoplastic spread to the medulla oblongata. Interestingly, the patient did not develop ill effects immediately following treatment.

Case Report

A 41-year-old woman presented in January 2003 with a 2-week history of numbness of the right hand. Magnetic resonance imaging (MRI) of the brain revealed suspect parenchymal metastases.

She had been treated 18 months earlier with chemotherapy for Stage IV breast carcinoma. The tumor in the right breast (which was fixed to the chest wall) measured approximately 10 cm; also, involved lymph nodes were present in the axilla. Computed tomography of the chest and abdomen showed mediastinal adenopathy and metastases in the lung and liver. Immunohistochemical study disclosed non-expression of estrogen and progesterone receptors. Chemotherapy (consisting of taxotere and CDDP) had been administered for four months. Stable disease was noted upon assessment of tumor response in December 2002.

Cranial irradiation (30 Gy/10 fractions) completed in February 2003 effected resolution of the hand numbness. Because of symptomatic metastatic tumor in the cerebellum, stereotactic gamma knife radiosurgery with concurrent corticosteroid therapy was implemented in December 2003; the prescribed marginal dose to the medulla oblongata and cerebellar lesions at the 50% isodose line was limited to 14 Gy. Comparison of pretreatment and post-treatment (March 2004) MRI scans (Figures 1A and 1B) showed enlargement of the lesion in the medulla oblongata (radiation edema) and disappearance of cerebellar metastasis. Since, April 2004 the patient (with speech impairment and ataxia) has been under Hospice care.

Discussion

The infrequent occurrence of brain-stem metastasis (Table 1) and the scarcity of published reports about metastatic disease in the medulla oblongata in BCa patients [3, 4, 7] make it important to document the outcome of afflicted women and the possible helpful and harmful effects of treatment.

Our case is consistent with the data in the literature which reveal the occurrence of BRM mostly in women younger than 60 years of age [8], the prevalent location of BRM in the supratentorial compartment [7], and the presence of additional metastatic deposits in other parts of the brain [3, 9] and outside of the cranial cavity [8].

The clinical diagnosis of neoplastic spread to the brain stem in a BCa patient may be suggested by the development of progressive cranial nerve palsies with crossed pyramidal tract signs [10, 11]. Now, however, involvement of the medulla oblongata by metastatic tumor is revealed with the aid of computed tomography or magnetic resonance imaging (MRI).

It is difficult to refrain from recommending treatment when one considers that the median survival of individuals with untreated BRM is approximately one month [12], that the median survival (6 mos.) is best in patients who have been irradiated for metastatic BCa to the brain [1, 9], and that therapeutic responders live longer than poor or non-responders [9]. On the other hand, justified concern that radiation-induced edema might occur creates a management dilemma. In the presented case, radiotherapy did not result in a neurologic deficit-free patient, complete resolution of brain-stem metastasis or absence of untoward treatment sequelae.

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Fig. 1A

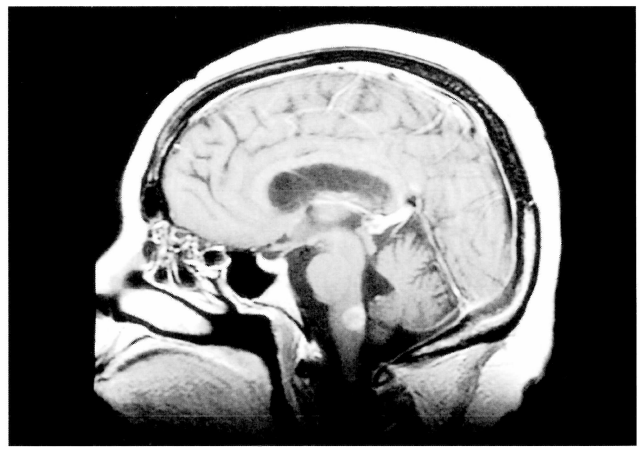

Fig.

Figures 1A and 1B. — Pretreatment and post-treatment magnetic resonance imaging demonstrate resolution of metastatic disease in the cerebellum and enlargement of the tumor in the medulla oblongata.

Table 1. — *Brain-stem metastasis from breast cancer: Review of the literature.*

No. of patients	Age (years)	Site	Brain-stem metastasis manifestations	Treatment*	Survival (mos)	Reference
1	66	Midbrain	Bilateral lid ptosis, diplopia	None	< 6	[6]
3	46-75	Pons	Hemiparesis, **cranial nerve palsy, ataxia	GKRS (12 to 20 Gy); WBRT	8 to 33	[5]
6	44-72	Medulla Oblongata; Pons; **; Midbrain	–	GKRS (8 to 15 Gy)	Overall 4.9	[4]
1	41	Medulla oblongata	Hand numbness	WBRT (30 Gy/10 fractions); GKRS (14 Gy) 10 months later	4 Alive	This report

*WBRT = Whole brain radiation therapy; GKRS = Gamma knife radiosurgery.
**The most commonly noted disease manifestation or site.

Metastatic BCa involving the medulla oblongata is an extremely unusual event. After analyzing all the reported cases and our personal experience, we conclude that RT is appropriate treatment because palliation and improvement in the quality of life are the main therapeutic goals. The exception would be selected cases of widespread disease in debilitated and unconscious patients. There is little information about surgery or chemotherapy for this particularly situated neoplastic secondary.

References

[1] Fitzpatrick P.J., Keen C.W.: "The Princess Margaret and Ontario Cancer Foundation Experience". In: Weiss L., Gilbert H.A., Posner J.B. (eds.), Brain Metastases. Boston, GK Hall, 1980, 286.
[2] Patanaphan V., Salazar O.M., Risco R.: "Breast cancer: metastatic patterns and their prognosis". *South. Med. J.*, 1988, *81,* 1109.
[3] Tsukada Y., Fouad A., Pickren J.W., Lane W.W.: "Central nervous system metastasis from breast carcinoma. autopsy study". *Cancer,* 1983, *52,* 2349.
[4] Shuto T., Fujino H., Asada H., Inomori S., Nagano H.: "Gamma knife radiosurgery for metastatic tumors in the brain stem". *Acta Neurochirur.*, 2003, *145,* 755.
[5] Huang C., Kondziolka D., Flickinger J.C., Lunsford L.D.: "Stereotactic radiosurgery for brainstem metastases". *J. Neurosurg.*, 1999, *91,* 563.
[6] Stevenson G.C., Hoyt W.F.: "Metastasis to the midbrain from mammary carcinoma: cause of bilateral ptosis and ophthalmoplegia". *J. Am. Med. Assoc.*, 1983, *186,* 514.
[7] Takakura K., Sano K., Hojo S., Hirano A.: "Metastatic tumors of the central nervous system". Tokyo, Igaku-Shoin, 1982, 11.
[8] DiStefano A., Yap Y., Hortobagyi G.N., Blumenschein G.R.: "The natural history of breast cancer patients with brain metastases". *Cancer,* 1979, *44,* 1913.
[9] Brady L.W., Bajpai D.: "The Hahnemann Experience". In: Weiss L., Gilbert H.A., Posner J.B. (eds)., Brain Metastases. Boston, GK Hall, 1980, 269.
[10] Hunter K.M.F., Rewcastle N.B.: "Metastatic neoplasms of the brain stem". *Can. Med. Assoc. J.*, 1968, *98,* 1.
[11] Weiss H.D., Richardson E.P.: "Solitary brainstem metastasis". *Neurology*, 1978, *28,* 562.
[12] Lang E.F., Slater J.: "Metastatic brain tumor: results of surgical and nonsurgical treatment". *Surg. Clin. North Am.,* 1964, *44*, 865.

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