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Esophageal Carcinoma Metastasis to Cerebellum: A Case Report

Serebellar Yerleşimli Ösefagus Kanseri Metastazı: Olgu Sunumu

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ABSTRACT

Esophageal carcinoma metastatic to the cerebellum and causing cerebellar compression is a rare entity. The authors report on the case of a 54-year-old woman in whom a metastatic cerebellar tumor secondary to esophageal carcinoma was treated. The patient presented with progressively increasing occipital headache. Computerized tomography scanning and magnetic resonance imaging results revealed a mass lesion in the cerebellum. Because of her previous esophageal carcinoma history, metastatic tumor to the cerebellum was assumed, and the patient underwent total resection of the tumor via median suboccipital approach. Histological examination of the specimen showed a metastatic adenocarcinoma of the esophagus. Postoperatively, the patient received 41 Gy radiation as adjuvant therapy. This case represents an addition to the reported literature of such a rare lesion.

The diagnosis, treatment, and pathological findings of this case are presented and the pertinent literature is reviewed.

KEY WORDS: Cerebellum, Esophagus cancer, Metastasis

ÖZ

Ösefagus karsinomunun serebelluma metastaz yaparak basıya neden olması nadir rastlanılan bir durumdur. Bu çalışmada, serebellar metastaza neden olmuş ösefagus kanseri olan 54 yaşındaki bir bayan hasta ve uygulanan tedavi sunulmuştur. Gittikçe artan baş ağrısı şikayeti ile baş vuran hastanın kraniyal BT ve MR tetkiklerinde serebellumda kitle lezyonu saptanmıştır. Hastanın daha önceden olan ösefagus kanseri hikayesinden dolayı serebellar metastaz olarak değerlendirilen hastaya mediyan suboksipital kraniyektomi ile total tumor eksizyonu yapılmıştır. Lezyonun histopatolojik incelenmesi sonucunda ösefagusun adenokarsinoma metastazı olduğu saptanmıştır. Hastaya postoperatif dönemde adjuvant tedavi olarak 41 Gy kraniyal radyoterapi uygulanmıştır. Bu çalışmamız literatürde nadir olarak bildirilen bu tip lezyonlara bir örnek olarak sunulmuştur ve bu tip olguların tanı, tedavi yöntemleri ve patolojik özellikleri mevcut literature eşliğinde tartışılmıştır.

ANAHTAR SÖZCÜKLER: Metastaz, Ösefagus, Serebellum

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INTRODUCTION

The incidence of esophageal carcinoma is approximately 7 cases per 100,000 persons and it has a variable tendency to metastasize to other parts of the body (7). The rates of lymph node and visceral metastases have been reproted as 74.5% and 50% in cases with esophageal cancer (5). Although esophageal carcinoma frequently metastasizes to the lung, pleura, liver, stomach, peritoneum, kidney, adrenal gland, and bone, brain metastases have been infrequently reported in the literature as a few small series and case reports (2, 3, 4, 6, 7, 8, 9). While the metastatic deposits to the brain are infrequent, metastatic disease in the cerebellum is quite rare. Histological examinations have revealed that most of these metastases originated from squamous cell carcinoma. Recently, we encountered a patient harboring a metastasis of esophageal carcinoma in the cerebellum. We report the clinical, radiological, and pathological features of a cerebellar metastasis of esophageal carcinoma and we review the diagnostic and treatment options.

CASE REPORT

This 54-year-old woman was admitted to our hospital due to occipital headache of one-week duration. Her symptoms had gradually worsened in the three days prior to admission, and she had experienced occipital headache with accompanying nausea and vomiting. Her past medical history included an operated esophageal cancer two years prior to developing these symptoms. She had been treated with combined surgery and radiotherapy for her esophageal tumor.

On physical examination, the patient was mildly drowsy and disoriented. Neurological examination revealed ataxia, dysmetria and bilateral papilledema. Other examinations were unremarkable.

Admission magnetic resonance (MR) images revealed a hypointense cystic mass at the vermis (Figure 1). On T1-weighted imaging, the tumor demonstrated a hyperintense, contrast- enhancing rim surrounding a slightly hypointense center in relation to brain parenchyma, with a solid portion located to the left antero-superior portion of the cystic component (Figure 2). There was a thin, marked contrast enhancement at the periphery of the cystic portion after Gd administration (Figure 1). On T2-weighted imaging, the mass demonstrated a hyperintense cystic component, with a heterogeneous intensity in the solid portion (Figure 3).

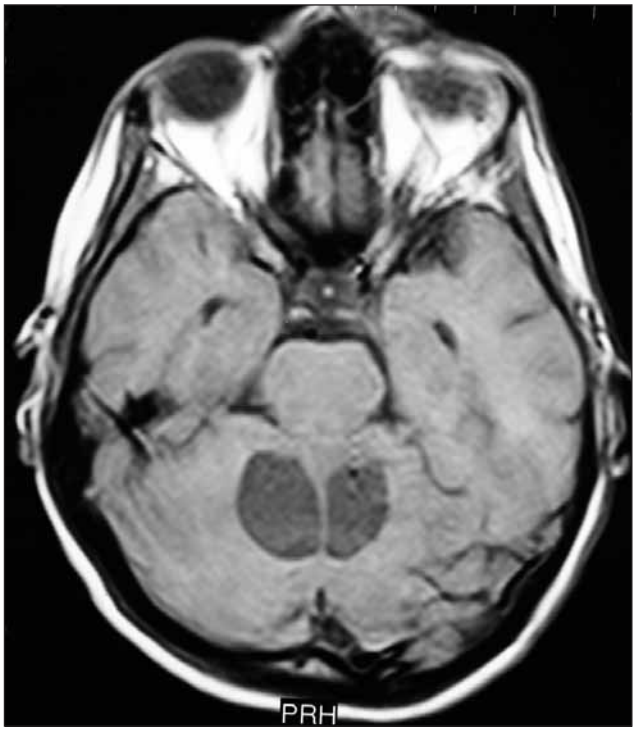

Figure 1: *Axial T1-weighted MRI shows a hypointense cystic mass at the vermis.*

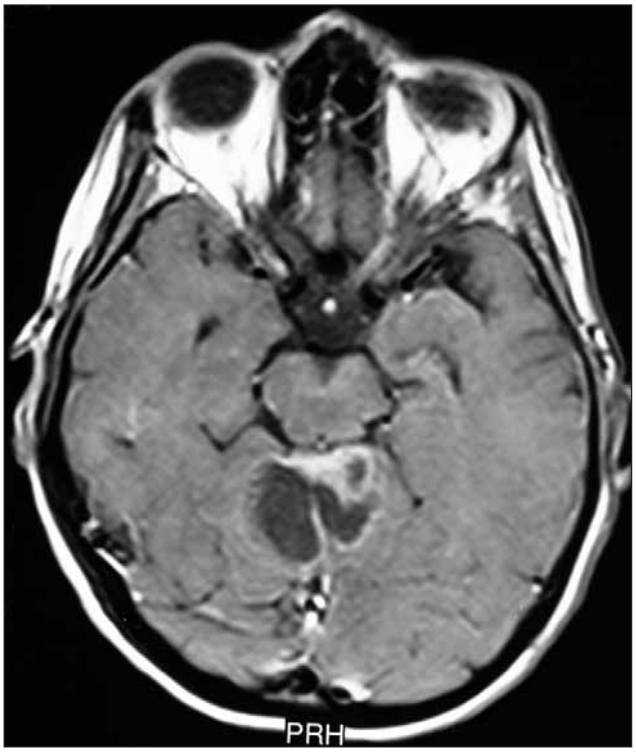

Figure 2: *Axial T1-weighted contrast-enhanced MRI shows a contrast-enhancing rim surrounding a hypointense cystic center, with a solid portion located to the left antero-superior portion of the tumor.*

Figure 3: *Axial T2-weighted MRI shows a hyperintense cystic tumor.*

Based on her previous esophageal carcinoma history, clinical presentation and imaging data, a preliminary diagnosis of cerebellar metastasis of the esophageal carcinoma was made. A median suboccipital craniectomy was performed to remove the tumor. A moderately soft, grayish solid lesion was found at surgery after drainage of the cystic portion and was macroscopically completely removed. Light microscopy examination disclosed cells with large eosinophilic cytoplasm and oval vesiculous nucleus. The cells formed solid islands and were atypical epithelial cells showing keratinization (Figure 4). A definitive diagnosis of esophageal carcinoma metastasis was made.

The patient's postoperative course was good and her symptoms were alleviated, with only a positive Romberg sign remaining. The nausea and vomiting completely subsided. The patient received whole-brain fractionated radiotherapy (WBRT) at a total dosage of 41 Gy as adjuvant therapy. She resumed normal daily life two weeks after completing radiotherapy and is currently free of symptoms and of further lesions according to oncological follow-up examinations.

Figure 4: *The tumor consisted of cells with large eosinophilic cytoplasm and oval vesiculous nucleus. The cells formed solid islands and were atypical epithelial cells showing keratinization. The tumor also showed cerebellar cortical invasion (hematoxylin-eosin, X 40).*

DISCUSSION

Neoplasms of the esophagus are among the most challenging oncologic problems. Due to its inaccessible anatomical location, diagnosis is often delayed until late stages. It is well known that esophageal cancer may cause distant metastases. Initially, it tends to spread locally followed by metastasis to the lymph nodes and then to the distant organs. However, brain metastasis attributed to an esophageal cancer may be a rare condition. Despite the high frequency of distant metastasis to the lung, pleura, liver, stomach, peritoneum, kidney, adrenal gland, and bone, only a few small series and case reports of brain metastasis of esophageal carcinoma have been described in the literature (6). Brain metastases are exceedingly rare in clinical series and have been reported at a rate of approximately 1-5% in clinical and autopsy series (1, 2, 5, 6, 9). Gabrielsen et al. stated the incidence of brain metastasis among esophageal cancer patients as 3.6% (2). Weinberg et al. reported 27 patients (1.7%) with brain metastasis in a group of 1588 patients with esophageal cancer (9). Ogawa et al. reported 36 patients (1.4%) with brain metastasis in a series of 2554 patients with esophageal cancer (6). The general opinion is that brain metastasis of esophageal cancer may be encountered more commonly than previously appreciated because of improved survival in patients with esophageal cancer and advanced neuroimaging techniques (3, 6, 9).

Lymphatic and hematogenous metastases of esophageal carcinoma are well documented. The most common mechanism of metastasis to the brain is by hematogenous spread, usually through the arterial circulation (6). At the time brain metastasis appeared, lung metastases were only detected in 31% of the patients (6). Because of the low incidence of lung metastasis at the time of brain metastasis in patients with esophageal carcinoma, it was considered that these hematogenic metastases were not through lung infiltrations but through other routes such as an alternative route from the esophagus to the brain, which Batson experimentally proved and designated the vertebral venous system in 1940 (6).

Of all esophageal cancer subtypes (squamous cell, undifferentiated carcinoma, adenocarcinoma), squamous cell carcinoma and adenocarcinoma are most common subtypes to present as a brain metastasis in the Far East and western countries, respectively (2, 6, 9). There is an increased risk of brain metastasis in patients with findings of local invasion and lymph node metastasis (9). Many authors have reported that brain metastases tend to occur in patients with large primary tumors (6, 2, 9).

The most common presenting signs and symptoms of the patients with esophageal carcinoma metastatic to the brain were motor weakness (58%), headache (28%), seizures (22%), and cerebellar dysfunction (14%) (6).

Typically, computerized tomography (CT) scans with contrast medium reveal a hypodense lesion encircled by a well-defined enhanced rim (8). Most of these lesions exhibit a typically thin-appearing cyst wall which is isointense to slightly hyperintense compared to the brain parenchyma and enhances by gadolinium diethylenetriamine penta-acetic acid (Gd-DTPA) on T1-weighted images (8). On T2-weighted images, the tumor rim is hyperintense compared with the brain parenchyma (8). The content of the cystic cavities is hypointense on T1-weighted images and hyperintense on T2-weighted images and resembles the cerebrospinal fluid (CSF) (8). In the presented case, the cyst wall was hyperintense on T1-weighted contrast-enhanced images. Takeshima et al. reported that cyst formation may be a characteristic of metastatic esophageal carcinoma to the brain in patients with squamous cell carcinoma (8).

Due to the lesion's rarity, there are no treatment guidelines for these patients. Multimodal therapy including surgery, radiation, and chemotherapy is now generally recommended for treatment of brain metastases of esophageal cancer. Total resection of lesions should be aim of surgical therapy. As recommended for typical brain metastases, we performed gross total resection and adjuvant WBRT.

The length of time between initial diagnosis of the esophageal cancer and diagnosis of the brain metastasis and the number of metastatic foci in the brain have been reported as the indicative parameters for prognosis in previous reports (8, 9). The previous reports indicate that achieving local control in the brain improves survival in selected patients (4, 6). Ogawa et al. reported survival rates at 12 months and 24 months as 14% and 3%, respectively (6). They reported median survival as 9.6 months for patients treated with surgery plus radiotherapy versus 1.8 months for patients who received only radiotherapy (6).

CONCLUSION

The possibility of esophageal cancer should be kept in mind in patients with thin-walled cystic brain tumors and unidentified primary cancer sites. Because of the improved survival in patients with single lesions who underwent surgery and received WBRT, aggressive treatment including radical surgery and WBRT should be employed in suitable patients.

REFERENCES

1. Anderson LL, Lad TE: Autopsy findings in squamous-cell carcinoma of the esophagus. Cancer 15: 1587–1590, 1982
2. Gabrielsen TO, Eldevik OP, Orringer MB, Marshall BL: Esophageal carcinoma metastatic to the brain: Clinical value and cost-effectiveness of routine enhanced head CT before esophagectomy. AJNR 16: 1915–1921, 1995
3. Khuntia D, Sajja R, Chidel MA, Lee SY, Rice TW, Adelstein DJ, Carlson TP, Saxton JP, Barnett GH, Suh JH: Factors associated with improved survival in patients with brain metastases from esophageal cancer: a retrospective review. Technol Cancer Res Treat 2: 267-272, 2003
4. Koga H, Mukawa J, Miyagi K, Nakasone S, Kinjo T, Miyazato H, Ishikawa Y, Ito K, Higa Y: Treatment of metastatic brain tumor from esophageal carcinoma—report of four cases. Neurol Med Chir (Tokyo) 31: 518–522, 1991
5. Mandard AM, Chasle J, Marnay J, Villedieu B, Bianco C, Roussel A, Elie H, Vernhes JC. Autopsy findings in 111 cases of esophageal cancer. Cancer 48: 329–335, 1981
6. Ogawa K. Brain metastases from esophageal carcinoma: natural history, prognostic factors, and outcome. Cancer 94: 759–764, 2002

7. Roth J, Putnam J Jr, Rich T, Forastiere A: Cancer of the esophagus. In: DeVita V Jr, Hellman S, Rosenberg S, (eds), Cancer. Principles and Practice of Oncology. Volume 2, New York: Lippincott-Raven, 1997: 980–1021
8. Takeshima H, Kuratsu J, Nishi T, Soyama N, Miura M, Masumitsu T, Ushio Y. Metastatic brain tumours from oesophageal carcinoma: neuro-imaging and clinicopathological characteristics in Japanese patients. Acta Neurochir (Wien) 143: 31-36. 2001
9. Weinberg JS, Suki D, Hanbali F, Cohen ZR, Lenzi R, Sawaya R: Metastasis of esophageal carcinoma to the brain. Cancer 98: 1925-1933, 2003