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Lung carcinoma metastasis presenting as a pineal region tumor

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Summary

The pineal region is an unusual site for brain metastasis and most metastatic pineal lesions are asymptomatic. A 53 year-old man presented with severe headache, limitation of upward gaze and diplopia. The patient's neurological examination was unremarkable. Magnetic resonance imaging (MRI) scans of the brain demonstrated a 1,5 x 2 cm well demarcated solitary mass in the pineal region with hydrocephalus. Surgery was performed and adenocarcinoma was diagnosed. A systemic investigation revealed adenocarcinoma of the lung as primary lesion. Although rare, metastatic tumor should be considered in the differential diagnosis of pineal region tumors.

KEY WORDS. Pineal region. Metastasis. Lung carcinoma. MRI. Pineal tumor.

Metástasis del carcinoma de pulmón que se presenta como tumor de la región pineal

Resumen

La región pineal es un sitio inusual para el depósito de metástasis y la mayoría de las metástasis pineales son asintomáticas. Un hombre de 53 años debutó con una cefalea intensa, limitación en la supraversión y diplopia. La exploración neurológica fue irrelevante. La resonancia magnética (RM) cerebral demostró una lesión solitaria de 1,5 x 2 cm bien delimitada, en la región pineal con hidrocefalia. Fue intervenido quirúrgicamente siendo el diagnóstico anatomopatológico de adenocarcinoma. Un estudio sistémico descubrió un adenocarcinoma de pulmón como tumor primario. Aunque muy raramente, las metástasis deben considerarse en el diagnóstico diferencial de tumores de la región pineal.

Introduction

Pineal region neoplasms are rare and compose only %1 of all intracranial tumors[27,30,32]. Pineal region metastasis is even rarer and accounted for only 1.8% to 4% in literature[3,8,22,29]. In approximately half of reported cases, the pineal gland was the only site of intracranial metastasis with variable sizes[1,2,16,17,25,28,33,35]. The most common site of primary origin is lung carcinoma, followed by breast carcinoma and malignant melanoma[33]. The mechanism of pineal metastasis seems most probable via the bloodstream.

Here we report a patient with a pineal region metastasis proven to be from adenocarcinoma of the lung mimicking a primary pineal region tumor.

Case report

A 53-year-old man suffered sudden onset severe headache and diplopia. He had developed progressively worsening visual and consciousness disturbance. He had no history of any systemic disease. The patient's neurological examination was unremarkable, except limitation of upward gaze and bilateral Babinski sign. Standard blood work-up was normal. A computed tomography (CT) scan showed hydrocephalus and a hyperdense space-occupying lesion located in the pineal region with perifocal edema. MRI revealed a 1,5 x 2 cm well demarcated solitary mass in the pineal region. MRI demonstrated the tumor to be hyperintense on both T1 and T2-weighted images and to enhance heterogeneously after administration of contrast. (Figure 1a,1b). The patient underwent a supracerebellar infratentorial approach with total microsurgical resection of the pineal region mass following a ventriculoperitoneal shunt operation. Histological examination of the tumor specimen taken from the central part of the tumor revealed atypical epithelial cells arranged in papillary patterns with coagulation necrosis. (Figure 2a, 2b) Based on the histological characteristics of the tumor cells, the mass was diagnosed as lung carcinoma metastatic to the pineal body. The patient suffered pulmonary complications and died.

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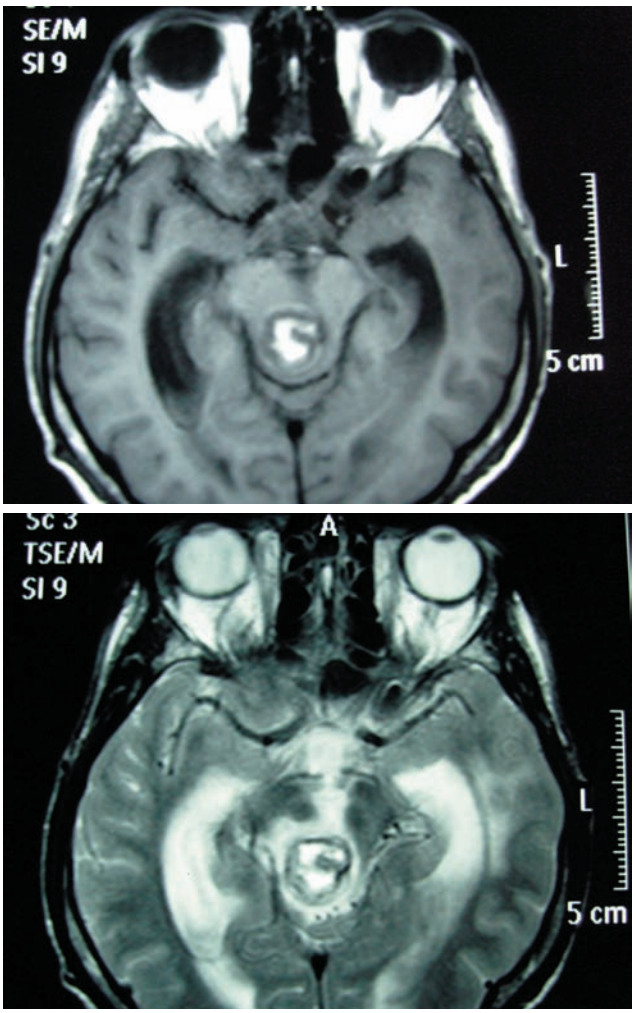

Figure 1a,1b. *T1-weighted (a) and T2-weighted (b) images in the transaxial plane showing solitary mass in the pineal region.*

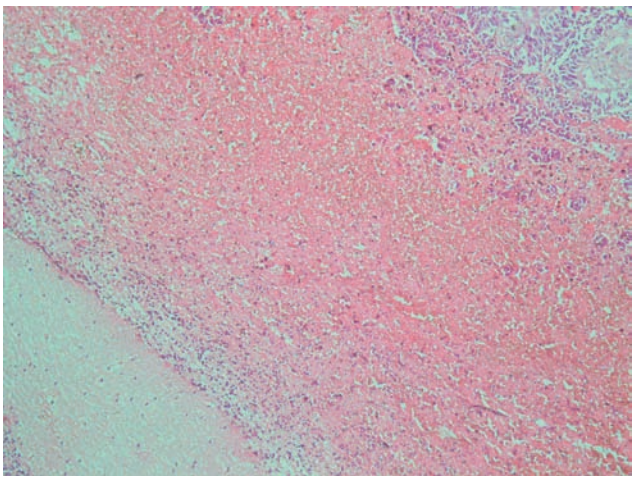

Figure 2a. *Photomicrograph of pineal glandular tissue and tumoral tissue (hematoxylin & eosin staining, magnification x100).*

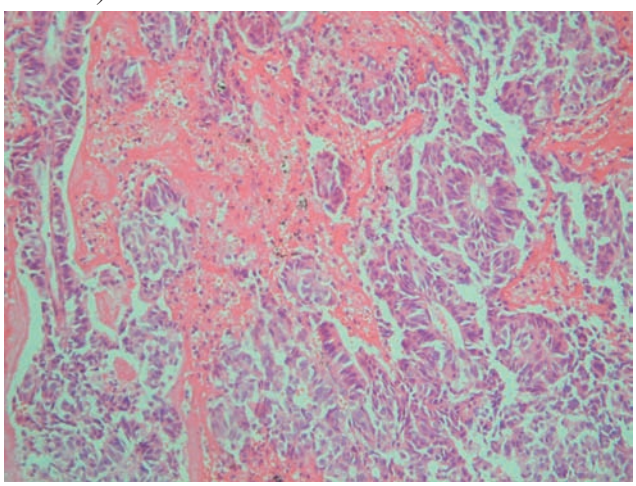

Figure 2b. *Photomicrograph of sheets of highly pleomorphic malignant cells with epithelial characteristics. Note glandular formation. (hematoxylin & eosin staining, magnification x200).*

Discussion

Metastasis to the pineal region is a rare manifestation of malignancy and was first reported in a patient with carcinoma of the lung[7]. Pineal metastasis used to be found at autopsy[3,10,14,16,22] in older cases but more recently due to better diagnostic imaging, CT and/or MRI has detected such lesions[1,14-17,19,25,28,33,35] which would previously have been subclinical. A literature review suggested that lung carcinoma was the most frequent primary lesion responsible[1,2,10,16,17,22,23,33,35]. In these cases, histologically small cell carcinoma[1,16,17,23,35] and undifferentiated carcinoma[10,22,33] are frequently seen, although other histological types including squamous cell carcinoma[10] and adenocarcinoma[14,22] have also been reported. Carcinomas in other organs, such as breast[22], stomach[13-15,36], esophagus[19,22], rectum[19,25] and kidney[19,23] have been reported as primaries. Occasionally plasma cell leukemia[12,31], lymphoma, multiple myeloma, melanoma[6,22,33], melanocytoma[4] and frontal sinus malignancy constituted a solitary tumor mass in the pineal region. Although Ortega et. al suggested hematogeneous spread to the pineal body through the posterior choroidal arteries[22], the mechanism of metastasis is still unclear.

The differential diagnosis of a pineal region mass in elderly patients would include the various histological types of primary pineal tumors[11], however, metastasis should also be considered, especially in patients with a history of malignancy. In these patients approximately 90% of all supratentorial lesions represent metastasis[34].

There are more than 17 different pathological tumor types in the pineal region[5] and therapeutic approach differs for each[21]. The correct histopathological diagnosis of a

neoplasm arising in the pineal region often cannot be determined on the basis of imaging characteristics or cerebrospinal fluid sampling[30]. So the primary objective of surgical management of pineal region tumors is the establishment of an accurate histological diagnosis by examination of the tissue obtained by surgical intervention. Stereotactic biopsy rather than open surgery may be adequate investigation of a pineal region mass[18,24,26] in patients with poor medical condition.

The present tumor represented adenocarcinoma, and that seems to be a rare histological type observed in cases with lung cancer metastatic to the pineal body. It is well known that germ cell tumors of the pineal gland can undergo malignant transformation into enteric type adenocarcinoma[9,20]. In such cases, glandular epithelium of enteric character may retain αFP expression[9]. In the present case no germ cell tumor elements or no α-FP-positive cells were found in mass.

Conclusion

Although rare, solitary metastasis to the pineal gland is one of the possible diagnosis when dealing with a mass in this region. Careful examination for systemic malignant disease will be needed. For an accurate histological diagnosis, sample tissue should be obtained by surgical intervention from the mass. Stereotactic biopsy rather than open surgery may be adequate only for establishing the histological diagnosis of pineal tumors[18,26,33]. Therapeutic approach can be determined based on histopathological diagnosis. Selection of open surgery, stereotactic biopsy, or radiotherapy for the treatment of pineal tumors should give full consideration to the patient's medical history and the imaging diagnosis.

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