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Pachymeningeal metastasis from squamous cell carcinoma of the uterine cervix with involvement of the optic nerve: case report and review of the literature

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Abstract

This report describes the case of a 50-year-old woman with carcinomatous meningitis from squamous cell carcinoma of the uterine cervix. Ultrasound showed an irregular hypoechoic mass in the cervix. Contrast enhanced computed tomography imaging revealed intense linear enhancement along the falx cerebri suggestive of pachymeningeal metastasis with involvement of the optic nerve. To our knowledge this is the first reported case of imaging features of isolated metastatic dural involvement from cervical carcinoma. Moreover, this is the first case of its kind in which dural involvement was diagnosed at presentation in a locally confined tumour.

Keywords: Carcinomatous meningitis; leptomeningeal metastases; optic nerve; pachymeningitis; squamous cell carcinoma; uterine cervix.

Introduction

Involvement of the central nervous system (CNS) in patients with carcinoma of the uterine cervix is rare and published studies state that only 1% of patients with cervical carcinoma develop CNS metastases^[1,2]. Most of the reports in the literature on CNS metastases from cervical carcinoma are metastases to cerebral or cerebellar parenchyma^[1,3]. Isolated pachymeningeal involvement in cervical carcinoma is extremely uncommon. More common metastatic sites of cervical carcinoma include lymph nodes, liver and lungs.

Meningeal metastases from the uterine cervix with histological variants of squamous cell carcinoma^[4–6], adenocarcinoma^[7], adenosquamous cell carcinoma^[8] and neuroendocrine carcinoma^[9,10] have been reported. Metastasis to the dura is less frequent and cervical carcinoma metastatic to dura is extremely rare^[11]. In this report, we describe a case of isolated pachymeningeal metastases (dural metastases) from squamous cell carcinoma of the uterine cervix with involvement of dura as well as the optic nerve.

Case report

A 50-year-old woman presented to our hospital with the chief complaint of bleeding per vaginum for 2 months. She also complained of severe headache, which had worsened in the weeks preceding presentation. Her general condition was satisfactory. She was pale on physical examination and there were no enlarged lymph nodes palpable. There was no tenderness or abnormal mass detected on abdominal examination. Pelvic examination revealed a bulky, friable growth in the cervix and a presumptive diagnosis of carcinoma of the cervix was made. No neurological defects were detected and ophthalmic evaluation revealed a normal fundus with no impairment of ocular movement. Routine haematological evaluation revealed low haemoglobin levels; the rest of the parameters were normal. A cervical smear showed malignant squamous cells. As part of the routine work up, ultrasound scan of the abdomen and pelvis was performed. This showed an irregular hypoechoic mass in the cervix (Fig. 1a). There was no infiltration of the parametrium or adjacent structures. No enlarged lymph

nodes were detected. The tumour was staged as FIGO 1b by clinical examination. Since her headache had increased in severity, contrast enhanced computed tomography (CT) scan of the brain was performed (Fig. 1b). The CT study revealed intense linear enhancement along the falx cerebri involving the dura. A lobulated enhancing lesion was also seen in the left orbit involving the dural surface of the optic nerve (Fig. 1c). These findings were suggestive of pachymeningeal metastases. No lesions were seen in the cerebral or cerebellar parenchyma nor

was there any cerebral oedema, mass effect, or midline shift. No enhancement was seen along the cerebral sulci or in the basal cisterns. Cerebrospinal fluid (CSF) was obtained for cytological analysis and this revealed the presence of malignant squamous cells, thus confirming the diagnosis of pachymeningeal metastases.

Discussion

Brain metastases from squamous cell carcinoma of the uterine cervix are uncommon and isolated dural metastases extremely rare. Carcinomatous meningitis occurs when cancer cells gain access to CSF pathways, travel to CNS sites, settle there and grow. The proposed routes for metastases to get access to the dura include perineural, perivascular, and haematogenous spread or through direct invasion from bony deposits^[12]. An isolated case of meningeal metastasis secondary to advanced squamous cell carcinoma has been reported^[4]. Weithman *et al.*^[15] describe the cytological features of meningeal metastases from cervical squamous cell carcinoma. In both cases, the patient survived for only 2 weeks. Contrast enhanced CT and gadolinium enhanced magnetic resonance (MR) imaging techniques have been used in the diagnosis of leptomeningeal metastases and all neuroimaging features of the disease have been discussed in detail^[13,14]. Contrast enhanced CT remains a widely used technique in the diagnosis of leptomeningeal metastases. Gadolinium enhanced MR is superior to contrast enhanced CT in detecting meningeal abnormalities when most of the enhancement lies against the skull vault^[14]. Calvarial metastases from cervical carcinoma inducing a dural tail adjacent to the tumour have also been studied using gadolinium enhanced MR imaging^[15]. Gadolinium enhanced MRI studies of carcinomatous meningitis secondary to large cell cervical neuroendocrine carcinoma have shown diffuse pachymeningeal enhancement^[9]. Benign conditions may cause leptomeningeal (pia and arachnoid) enhancement with a similar appearance to leptomeningeal metastases and these include infective and inflammatory meningitis, and iatrogenic causes (surgery and chemotherapy). In contrast, carcinomatous meningitis causes pachymeningeal enhancement that is intense and linear, and thickening of the meninges along the inner surface of the calvarium, falx or tentorium without extension into the cortical gyri and basal cisterns^[16]. In our case, contrast enhanced CT exhibited thickening of the dura and intense linear enhancement along the falx cerebri suggesting pachymeningeal metastasis. The enhancing mass in the left orbit was seen to involve the dural covering of the optic nerve. All these features are suggestive of pachymeningeal metastasis from squamous cell carcinoma of the uterine cervix involving the dural covering of the brain and optic nerve. Methotrexate (MTX) is the most commonly used intrathecal chemotherapeutic agent for the

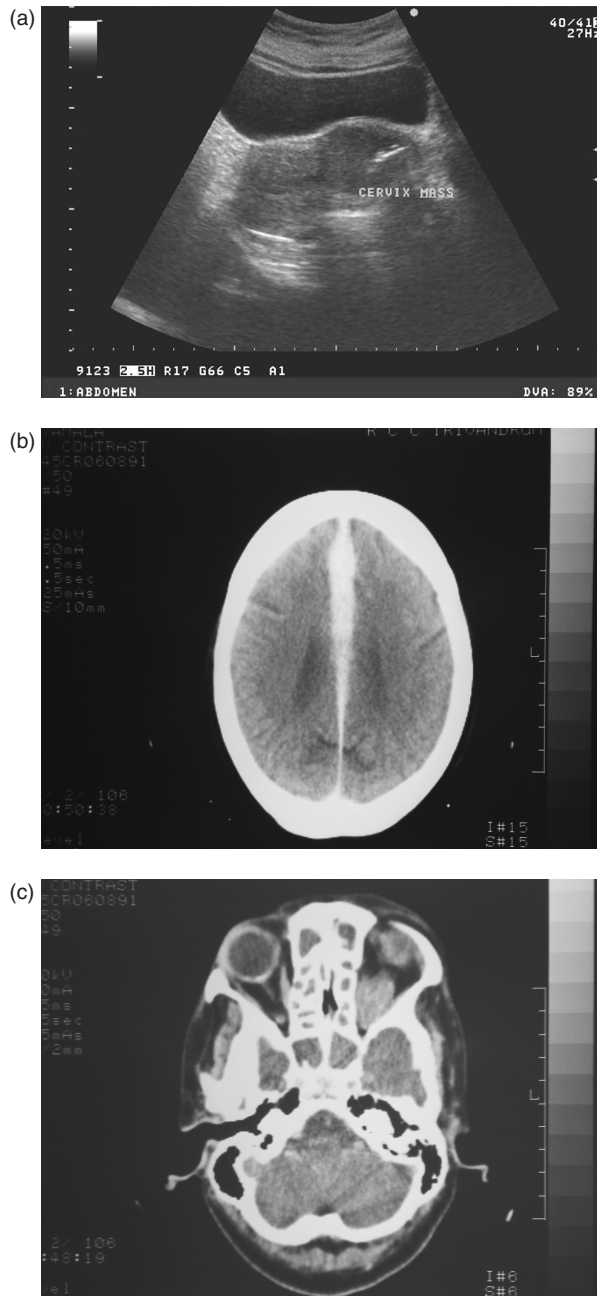


Figure 1 (a) Ultrasound image showing the mass in the cervix; (b) contrast enhanced CT showing enhancement along the falx cerebri; (c) contrast enhanced CT showing a lobulated mass in the left orbit involving the optic nerve.

treatment of carcinomatous meningitis from cervical carcinoma in addition to radiation therapy.

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