ARTÍCULO DE CASOS Y SERIES DE CASOS

INTRACRANIAL DURAL METASTESES: CASE SERIES AND LITERATAURE REVIEW

METASTASIS DURALES INTRACRANEALES: SERIE DE CASOS Y REVISIÓN DE LA LITERATURA

METÁSTASE DURAL INTRACRANIANA. SÉRIE DE CASOS E REVISÃO DA LITERATURA

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Resúmen

Introduccion: Las metástasis durales intracraneales se forman por diseminación hematógena. Esta es una patología caracterizada por un pobre pronóstico, ya que el paciente suele evolucionar hasta la muerte.

Materiales y Métodos: Se presentan ocho casos de metástasis durales, asociados a una revisión de la literatura.

Resultados: Se revisaron ocho casos de pacientes diagnosticados de metástasis durales, con una edad media de 61 años, cinco mujeres y tres hombres. Los sitios primarios fueron: mama, pulmón, próstata y linfoma. El tiempo entre el diagnóstico de la lesión primaria y el inicio de la metástasis osciló entre los cinco y los 14 meses, con una media de ocho meses. El período en meses de supervivencia osciló entre cuatro y ocho meses, con una media de 6,25 meses.

Conclusiones: Las metástasis durales tienen mal pronóstico, su presencia indica diseminación metastásica y mal pronóstico.

Palabras clave: duramadre, metástasis, neuroimagen.

Abstract

Introduction: Intracranial dural metastases are formed by hematogenous dissemination. This patology has a poor prognosis, since the patient often evolves to death.

Methods: W present eight cases of dural metastasis, associated with a literature review.

Results: Eight cases of patients diagnosed with dural metastasis, with a mean age of 61 years, were reviewed, five of whom were female and three were male. The primary sites were: breast, lung, prostate and lymphoma. The time between the diagnosis of the primary lesion and the onset of metastasis ranged from 5 months to 14 months, with an average of 8 months. The period in months of survival varied between 4 to 8 months, with an average of 6.25 months.

Conclusions: The presence of dural metástases indicates metastatic dissemination and a poor prognosis.

Keywords: Dura Mater, Neoplasm Metastasis, Neuroimaging.

Resumo

Introdução: As metástases durais intracranianas são formadas por disseminação hematogênica. Sendo o prognóstico desta patologia péssimo, visto que frequentemente o paciente evolui para óbito.

Materiais e Métodos: Apresentar oito casos de metástase dural, associado a revisão da literatura.

Resultados: Foram revistos oito casos de pacientes diagnosticados com metástase dural, com média de idade de 61 anos, sendo cinco do sexo feminino e três masculino. Os sítios primários foram: mama, pulmão, próstata e linfoma. O tempo entre o diagnóstico da lesão primária e o surgimento da metástase foi de 5 meses a 14 meses, com média de 8 meses. O período em meses de sobrevida variou entre 4 a 8 meses, com média de 6,25 meses.

Conclusões: A metástase dural apresenta péssimo prognóstico, sua presença indica disseminação metastática e péssimo prognóstico.

Palavras chave: Dura-máter, Metástases, Neuroimagem.

Introduction

Intracranial dural metastases (IDM) are caused by tumor infiltration or hematogenous dissemination (Lyons et al., 2006), representing 21.3% of abnormal meningeal enhancements (Mera C. et al., 2017), being considered an infrequent lesion considering the other intracranial metastatic lesions (Onen et al., 2017; Tagle et al., 2002). The pathophysiology associated with IDM is characterized by two mechanisms, being venous and arterial dissemination (Bademci, 2008). The most common symptoms are: headache (Tazi et al., 2011), seizures (Gupta et al., 2017), vomiting, gait disorder (Cobo Dols et al., 2005),

sensory abnormalities and increased intracranial pressure, which can be asymptomatic in 11% of cases (Nayak et al., 2009).

The average time of diagnosis of IDM since the discovery of the primary neoplasia is 37 months (Nayak et al., 2009). On imaging exams it presents as metastasis, and the macroscopic appearance of these tumors during surgery is often indistinguishable from meningioma (Tagle et al., 2002). On imaging exams, IDM can present through only one neoplastic, multinodular nodule or plaque lesion (Nzokou et al., 2015). The prognosis of IDM is poor, as it indicates systemic spread of primary site neoplasia (Zheng et al., 2011), often the patient progresses to death (Cone et al., 2006).

The authors aim to analyze eight cases of IDM, presenting imaging characteristics, treatment and prognosis.

Methods

We describe a case series involving eight patients diagnosed with intracranial dural metastasis, aged 44 to 75 years, admitted to the Emergency Hospital (Aracaju-Sergipe), from 2009 to 2014. Aspects such as: age, sex, laterality of the lesion, primary lesion, imaging tests, treatment and prognosis.

The literature review was performed according to the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA). The inclusion criteria were studies and case reports with a time frame between 1997 and 2019, with individuals of any given age group, diagnosed with intracranial dural metastasis with primary lesion from any organ as the source, observational studies and original case reports published in English. Studies not developed in humans, published in databases with no abstract, systematic reviews and letters to the editor, were excluded.

The literature review was performed on September 14, 2020, in the following databases: PubMed, ScienceDirect, SciELO, Lilacs and TripDataBase, using the terms: “Neoplasm Metastasis” and “Dura Mater”. Duplicate studies were removed, resulting in a total of 29 articles that met the inclusion criteria taking into account their citations and their respective impacts.

Results

Eight cases diagnosed with IDM, with a mean age of 60 years, five females and three males. The primary sites were: breast (three), lung (three), prostate (one) and lymphoma (one). The time between the diagnosis of the primary lesion and the onset of metastasis ranged from five months to 14 months, with an average of eight months. All patients underwent cranial computed tomography (CT) (Figures 1 and 2) and two magnetic resonance imaging (MRI). Three patients were treated with chemotherapy, one with radiotherapy and one with both chemotherapy and radiotherapy, one with resection of the lesion associated with radiotherapy, one with surgery and chemotherapy and other with palliative treatment due to the poor general condition. The survival period ranged from four to eight months, with a mean of 6.25 months (Table 1).

Table 1. Ct - Chemotherapy; Surg - Surgery; Rdt - Radiotherapy.

Case	Sex	Age (years)	Primary Site	Treatment	Mortality (Months of survival)
1	Feminine	44	Breast	Rdt + Ct	6 months
2	Male	62	Lung	Surg + Ct	8 months
3	Feminine	54	Breast	Rdt	4 months
4	Feminine	59	Breast	Ct	6 months
5	Male	66	Lung	Surg + Ct	8 months
6	Male	68	Prostate	Ct	8 months
7	Feminine	75	Lymphoma	Ct	5 months
8	Feminine	52	Lung	Palliative	5 months

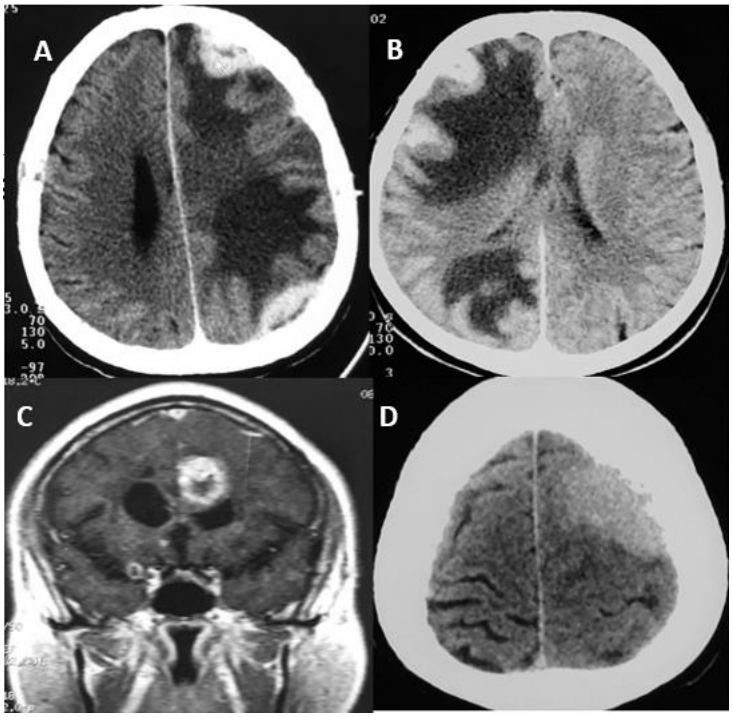

Figure 1. A. Contrast-enhanced axial headl CT showing a hyperdense left parietal and frontal lesion with perilesional edema. **B.** Axial head CT showing multiple nodular lesions attached to the dura, associated an intense perilesional edema and deviation of midline structures. **C.** MRI, coronal, in the phase T2 showing a left parasagittal nodular lesion with mixed density, associated homolateral ventricle compression. **D.** Head CT showing a hyperdense lesion in the left frontal region, adhered to the dura mater.

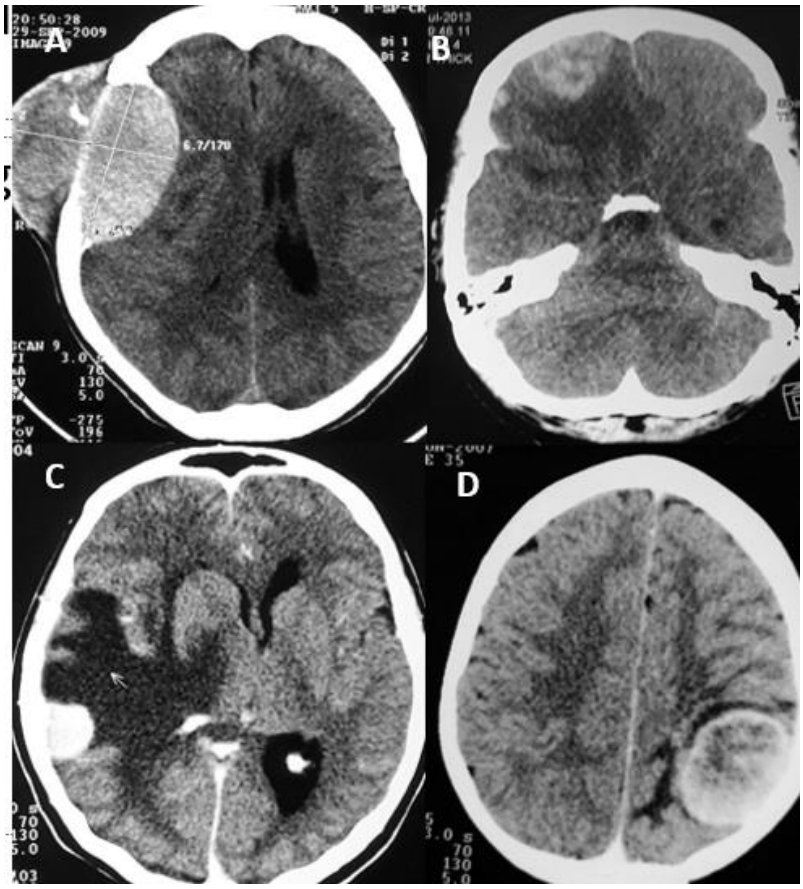

Figura 2. A. Axial cranial CT showing a hyperdense extracranial and extra-axial lesion, associated a bone and dural involvement and mass effect. **B.** Axial cranial CT with heterogeneous lesion in the right frontal region with perilesional edema. **C.** Axial cranial CT showing a hyperdense right parietal lesion, with marked perilesional edema and deviation of midline structures, simulating a meningioma. **D.** Axial cranial CT showing a heterogeneous lesion in the left parietal region, associated with a perilesional edema.

Discussion

Epidemiology

The primary neoplasic origins of IDM are: kidney 5,6, breast (34%), prostate (17%), lung (13%), head and neck carcinomas (10%), hematologic malignancies (8%), neuroblastoma (4 %), gastrointestinal carcinoma (4%) (Nayak et al., 2009), myeloid leukemia (Cobo Dols et al., 2005), liver (Jang et al., 2015), colon (Higuchi et al., 1997), ovary (Kiymaz et al., 2010) and non-Hodgkin's lymphoma

(Mera C. et al., 2017). Kleinschmidt-DeMasters (Kleinschmidt-DeMasters, 2001) in a study with 27 autopsies identified 18.5% with breast as the primary site, 25.9% prostate, 11.1% lung, 11.1% cervical carcinoma, 14.8% lymphomas, 3.7% laryngeal squamous cell carcinoma, 3.7% adenosquamous bladder carcinoma, 3.7% intravascular lymphomatosis, 3.7% Ewing's sarcoma and 3.7% ocular melanoma. In the present case series, the primary sites were breast, lung, prostate and lymphoma.

Clinical Manifestations

The neurological signs and symptoms correspond to the brain area affected by the mass effect caused by the lesion (Lyons et al., 2006). The symptoms of IDM can manifest as headache (Tazi et al., 2011), progressive hemiparesis, decreased visual acuity (Kapoor et al., 2015), seizures (Gupta et al., 2017), vomiting, generalized hyperreflexia, paralysis of the VII cranial nerve, gait disorder (Cobo Dols et al., 2005), cranial neuropathy, change in mental status, sensory abnormalities and increased intracranial pressure, which may be asymptomatic in 11% of 9 cases. It may present as a visible solid extracranial mass in the external region of the head corresponding to the location of the dural lesion (Kiymaz et al., 2010; Tazi et al., 2011).

Diagnosis

On imaging exams, IDM may show metastasis of the overlying skull (70%), dural tail (44%), vasogenic edema (53%), cerebral invasion (34%), bone erosion (33%), sinus venous compression (20%), subdural effusion (2%) (Nayak et al., 2009) and intracerebral hematoma (Jang et al., 2015). At CT, the IDM is visualized as a hyperdense, diffuse or mass-like thickening. On MRI in phase T1 and T2 it is hypointense but variable. Other features in imaging are local invasion with osteolytic destruction. Hypervascular metastases such renal and melanoma may resemble meningiomas (Lyndon et al., 2019).

Kunii N et al (Kunii et al., 2005) reported a case of a patient diagnosed with breast cancer, who presented, during the cranial CT examination, a solid lesion adhered to the inner surface of the skull, associated with a subdural hematoma. IDM in MRI T1 phase showed an abnormal uptake of contrast, which associated with chronic subdural hematoma, edema and manifestation of vessels in the affected cerebral hemisphere, corresponds to group 2 of meningeal

carcinomatosis 20. Through imaging, the metastatic lesion is often associated with a subdural hematoma (Zheng et al., 2011).

The analysis of the cerebrospinal fluid can show positive cytology for neoplastic cells (Karakolevska-Ilova et al., 2014), with the lesion final diagnosis being made through histological findings (Ohba et al., 2004).

Differential diagnoses for IDM are: meningioma (Gupta et al., 2017; Kapoor et al., 2015; Ohba et al., 2004; Rahmathulla et al., 2014) due to the presence in some cases of the "dural tail" sign (Kuo et al., 2014), epidural hematoma (Ashish et al., 2014), chronic subdural hematoma (Shamim et al., 2005) and schwannoma (Kim et al., 2008).

Treatment

Due to the frequent rapid progression of symptoms caused by the presence of IDM, craniectomy associated with resection of the neoplastic lesion is performed (Kuo et al., 2014). Although surgical excision of the lesion can lead to temporary neurological improvement, progressive deterioration due to malignancy or recurrent bleeding presents if frequently (Zheng et al., 2011). In some cases, there is only drug administration of corticosteroids, associated with radiotherapy (Cone et al., 2006). Of the patients in this series, three patients underwent chemotherapy, one radiotherapy, one chemotherapy and radiotherapy, one lesion resection associated with radiotherapy, surgery followed by chemotherapy and palliative treatment. In the presence of acute or chronic subdural hematoma, the treatment is hematoma drainage (Jang et al., 2015), however, hematoma recurrence may occur (Comănescu et al., 2008; Knieling et al., 2017).

Conclusions

The presence of IDM indicates dissemination of the primary neoplasm. In most cases, they evolve to death within a few months after diagnosis. It has a bad prognosis.

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