folia medica

Folia Medica 65(5):844-848
DOI: 10.3897/folmed.65.e84810

Case Report

Atypical Clinical and Radiologic Findings in a Patient with Brain Metastatic Lesions

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Received: 28 May 2022 ♦ **Accepted:** 30 June 2022 ♦ **Published:** 31 Oct 2023

Citation: Halil E, Viteva E, Vasilev G, Shukerski K, Atanassova P. Atypical clinical and radiologic findings in a patient with brain metastatic lesions. Folia Med (Plovdiv) 2023;65(5):844-848. doi: 10.3897/folmed.65.e84810.

Abstract

We report the case of a 47-year-old man who was admitted to our clinic with an intractable headache, nausea, and sporadic vomiting, as well as speech difficulties and a 'floating' sensation. This man had no prior medical history. MRI of the brain showed evidence of over 20 supra- and infratentorial capsulated ring-enhancing lesions. All other paraclinical investigations done in our clinic were unremarkable and we excluded our first assumption of neurocysticercosis, as well as other parasitic infections. The patient was then referred to the Oral and Maxillofacial Surgery Clinic for an excisional biopsy of a submandibular formation, which was later verified to represent a lymph node metastasis from a poorly differentiated adenocarcinoma. A chest X-ray failed to demonstrate any significant pathology and the immunohistochemical constellation of the lymph node metastasis excluded the possibility of the primary tumor originating in the lung or the prostate. Due to the unresolved diagnostic query, a whole-body PET/CT was performed demonstrating a formation with malignant characteristics in the basal segment of the left lung, reaching the pleura and the left hilum, as well as solitary enlarged mesenteric and mediastinal lymph nodes. Following clinical consultations, it was determined that the patient was inoperable and chemotherapy and palliative CNS irradiation were recommended.

Keywords

adenocarcinoma, brain metastases, headache, intracranial hypertension, ring-enhancing lesions

INTRODUCTION

The most common neoplasms in the adult brain are brain metastases, which can be up to 10 times more frequent than primary brain tumors.[1] It is estimated that 20% of cancer patients develop brain metastases in the course of their disease. According to the guidelines for diagnosis, follow-up, and treatment of most solid tumors, routine magnetic resonance imaging (MRI) of the brain is not recommended, except for the emergence of new-onset neurologic symptoms. Supposedly, this implies even more incidence of occult brain neoplastic involvement, which is confirmed by autopsy reports of deaths due to neoplastic disorders. Even though any tumor can metastasize to the brain, the five most commonly associated neoplasms with brain metastases are lung carcinoma, breast carcinoma, malignant melanoma, colorectal cancer, and renal cell carcinoma.[2-4]

Brain metastases could frequently be the cause of the first presenting symptoms in patients with still undiagnosed, but already advanced primary tumor[5], as is the example with our patient.

CASE REPORT

A 47-year-old male presented to our clinic with a 1-month history of constant headaches, primarily in his left temporal area, accompanied by nausea and occasional vomiting.

On this background, he reported episodes of intense, sharp, 'shooting' pain with the same localization radiating to the face. The patient claimed his voice had changed, he had developed vertigo, and he had had an unsteady gait for the last month. For 2-3 weeks, he noticed a swelling under his lower jaw on the right. After seeing a private practice neurologist, the patient was given several nutraceuticals in addition to pregabalin 75 mg daily. He claimed to have had no prior medical history or contact with animals. He has been employed by a peat processing plant in Sweden. Admits to smoking cigarettes.

Physical and neurologic examinations

A palpable, painless, and mobile formation with a soft-elastic consistency was found in the right submandibular region, which we assumed to be packed enlarged lymph nodes.

The neurologic examination confirmed:

1. Syndrome of intracranial hypertension – headache, nausea, and vomiting, without visual disturbances.
2. Discoordination syndrome – static ataxia (positive Romberg sign with instability to either side), locomotor and dynamic ataxia with an intentional tremor in finger to nose and heel to shin tests bilaterally, with no asymmetry, as well as horizontal nystagmus in lateral gaze, especially when looking to the right.
3. Bulbar syndrome – dysphonia.
4. Cephalgic syndrome – paroxysmal 'shooting' pain in the region of innervation of V1 and V2 branches of the trigeminal nerve.

Laboratory investigations

Hematologic tests and biochemical analyses of the patient did not reveal any notable deviations. Following a lumbar puncture, CSF samples were taken for cytology, biochemistry, and microbiology examination. The microbiological samples remained sterile, while the biochemical results were unspecific – a double increase of IgG and a slight hyperproteinorachia. Additionally, serologic tests for toxoplasmosis, echinococcosis, toxocariasis, and cysticercosis via the ELISA method were negative, as were the stool cultures for amebiasis, VDRL for syphilis, and HIV-ELISA.

Neuroradiology

An MRI of the brain registered numerous (over 20) supra- and infratentorial lesions, heterogeneous in their shape and size – primarily oval, some of them grape-like, with a solid capsule and a non-homogenous intralesional structure, presenting isointense as the brain parenchyma in T2 sequence and hypointense in T1, as well as discreet perifocal vasogenic edema **(Figs 1, 2)**. After contrast agent administration, a peripheral, 'ring enhancement' **(Fig. 2)** of lesions was documented, while new punctiform and lacunar lesions were visualized. The vermis, the left cerebellar hemisphere, the frontoparietal subcortical white matter bilaterally, the right thalamus, and the occipital cortex bilaterally were all particularly marked. The imaging department concluded that those findings correlated mostly with 1. neurocysticercosis in predominantly colloidal phase, 2. tuberculomas, and 3. hematogenous spread of an occult neoplasm.

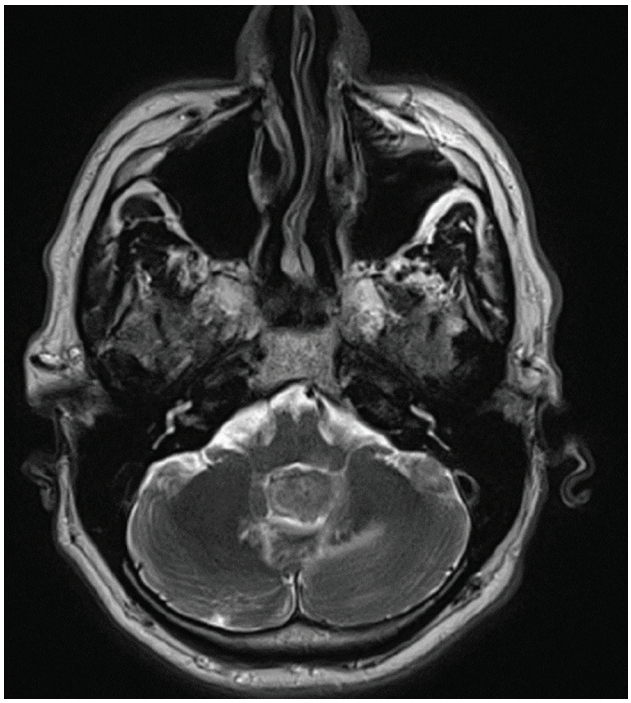

Figure 1. A solid lesion in the cerebellar vermis leading to the fourth ventricle compression.

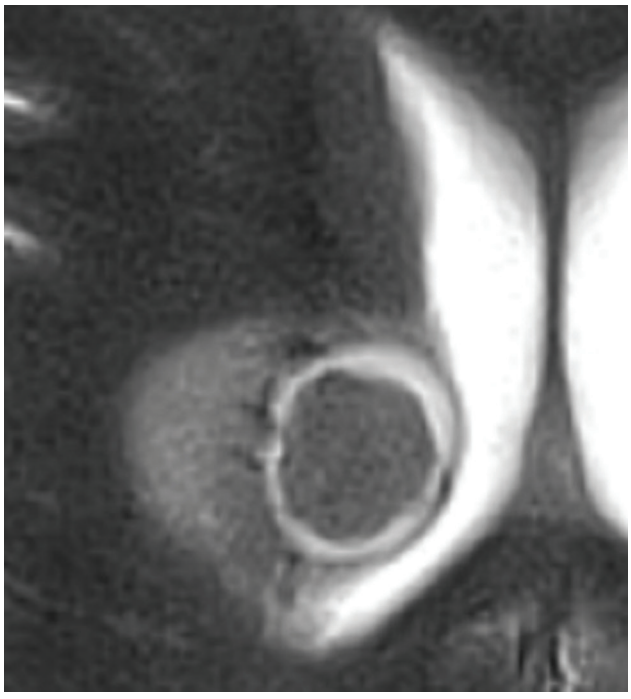

Figure 2. A circular lesion in close proximity to the right lateral ventricle with peripheral ring-enhancing characteristic after contrast agent administration.

Further diagnostic evaluation of the etiology of lesions

A chest X-ray was performed and was described as lacking significant signs of pulmonary disease. An abdominal ultrasound showed evidence of hepatic steatosis without focal lesions. An ultrasound of the cervical region confirmed submandibular lymphadenopathy on the right. Electroencephalography registered non-specific slow-wave abnormalities in the left parietal area. An ear, nose, and throat specialist documented paresis of the left true vocal cord via indirect laryngoscopy. A CT scan of the cervical region documented degenerative changes and intervertebral disc protrusions at levels C3/C4 and C4/C5, which did not correlate clinically with our patient's history and physical examination.

The patient was then referred for surgical exploration of submandibular lymphadenopathy. The excised material was sent for histological analysis, which documented that all lymph nodes in the sent material had been engaged by a poorly-differentiated adenocarcinoma. According to the conclusion of the pathologist, the immunohistochemical constellation of CK7 (+/–), CK20 (–) neg., p63 (–) neg., TTF-1 (–) neg., PSA (–) neg., and CD56 (–) neg. excluded the possibility of the primary tumor being located in the lungs or the prostate, and assumed the possibility of it being in the breast.

Due to the unresolved diagnostic queries, a decision was made to perform a whole-body PET/CT scan, which visualized a spiculated lesion in the 10th left lung segment, engaging the pleura, extending to the left hilum, and converging with a pack of mediastinal lymph nodes. The whole formation had the dimensions of 5.3×5.3 cm and demonstrated increased metabolic activity with a SUVmax – 12.38 **(Fig. 3)**. Single paratracheal and hilar lymph nodes also showed evidence of a higher metabolic rate with a SUVmax – 12.84. Another metabolically active lesion, 0.7 cm in diameter, was found in the mesentery next to the descending colon, and one more, 1.7 cm in diameter, on the midline of the pelvic inlet.

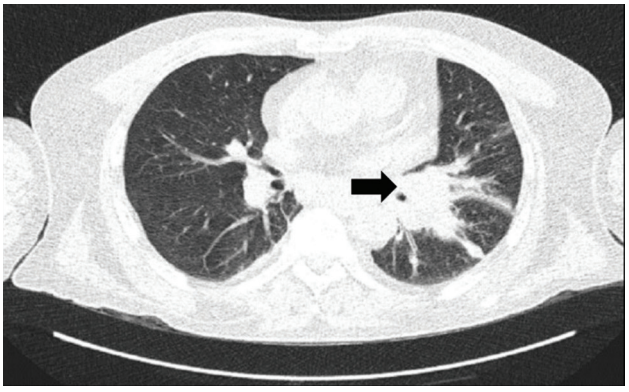

Figure 3. A spiculated lesion in the left lung, engaging the pleura, extending to the left hilum and converging with a pack of mediastinal lymph nodes.

Therapy

Treatment with mannitol and dexamethasone was administered as anti-edema measures, combined with analgesic therapy with pregabalin and tramadol, which alleviated the patient's subjective symptoms.

Following multiple consultations with a pulmonologist, thoracic surgeon, and neurosurgeon, the patient was deemed inoperable and was referred for chemotherapy and palliative CNS irradiation.

DISCUSSION

The present case report provokes interest because of the clinical and radiological heterogeneity of the brain metastatic lesions that have become a diagnostic challenge for a great number of medical specialists. The first clinical symptoms of the advanced malignant process are associated with brain metastases, coupled with the conflicting evidence provided by the laboratory and radiological investigations, which could direct the clinician's thinking in the wrong direction.

The relevant scientific literature contains cases of similar diagnostic conundrums. A case report published in the British Medical Journal by Barbone et al.[6] described a 50-year-old female patient with numerous supra- and infratentorial circular cystic lesions found on CT and MRI of the brain due to symptoms of vertigo and upper extremity weakness. The CT lesions were hypodense, partially calcified, while the T2-sequence of MRI demonstrated a characteristic for neurocysticercosis, the 'hole in the dot' feature, which after contrast agent administration acquired a peripheral, 'ring-enhancing' contrast pattern. The final diagnosis is reached after a whole-body CT scan registered a proliferative process in the upper right pulmonary lobe.

A clinical case from the International Journal of Clinical Oncology describes a 47-year-old male with bilateral neurosensory hearing loss, tinnitus, and a discoordination syndrome. The CT and MRI of the brain demonstrated multiple supra- and infratentorial well-defined oval cystic lesions, without evidence of vasogenic edema and no contrast enhancement. At first, the lesions are assumed to represent the vesicular phase of neurocysticercosis, but later, a CT of the thorax, as well as bronchoalveolar lavage cytology, and a transbronchial biopsy confirm a pulmonary adenocarcinoma with brain metastases.[7]

Another case from the British Medical Journal presents a 41-year-old female with focal motor seizures with secondary generalization. CT and MRI of the brain reveal over 10 cystic formations with discreet peripheral contrast enhancement, with a solid and liquid component found in some of them, without evidence of vasogenic edema and mass effect. The engagement of the subependymal space of the lateral ventricle, the presence of multiple cystic lesions with calcifications, coupled with the absence of brain edema lead the medical team to neurocysticercosis as the most probable diagnosis. However, subsequent CT of the

thorax and video-assisted thoracoscopic surgery found multiple pulmonary nodules, histologically verified as squamous-cell metastases from primary cervical cancer.[8]

Less than 10% of patients manage to survive 2 years after diagnosis, indicating that the lethality of brain metastases remains high despite advancements in neoplastic disease therapy.[9] Despite this, the average survival time for patients with brain metastases from breast cancer and pulmonary adenocarcinoma has increased recently and is now 15 to 16 months.[10]

With the present case report, we would like to highlight the challenges that face the clinicians in the process of diagnosing malignant neoplasms despite the access to contemporary laboratory and imaging facilities and even in cases of already advanced disease. The timely diagnosis remains of utmost importance for successful treatment and improved prognosis of cancer patients.

Acknowledgements

The authors have no support to report.

Funding

The authors have no funding to report.

Competing Interests

The authors have declared that no competing interests exist.

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Атипичные клинико-рентгенологические данные у пациента с метастатическим поражением головного мозга

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Дата получения: 28 мая 2022 ♦ **Дата приемки:** 30 июня 2022 ♦ **Дата публикации:** 31 октября 2023

Образец цитирования: Halil E, Viteva E, Vasilev G, Shukerski K, Atanassova P. Atypical clinical and radiologic findings in a patient with brain metastatic lesions. Folia Med (Plovdiv) 2023;65(5):844-848. doi: 10.3897/folmed.65.e84810.

Резюме

Мы сообщаем о случае 47-летнего мужчины, который поступил в нашу клинику с неизлечимой головной болью, тошнотой и спорадической рвотой, а также с трудностями речи и ощущением „плавания“. У этого человека не было предшествующей истории болезни. МРТ головного мозга показала наличие более 20 супра- и инфратенториальных капсулированных поражений, усиливающих кольцо. Все остальные параклинические исследования, проведённые в нашей клинике, были без особенностей, и мы исключили наше первое предположение о нейроцистицеркозе, а также о других паразитарных инфекциях. Затем пациент был направлен в клинику челюстно-лицевой хирургии для проведения эксцизионной биопсии подчелюстного образования, которая, как позже было подтверждено, представляет собой метастаз в лимфатические узлы низкодифференцированной аденокарциномы. Рентгенография грудной клетки не выявила какой-либо значимой патологии, а иммуногистохимическая совокупность метастазов в лимфатических узлах исключила возможность первичной опухоли, возникающей в лёгких или простате. В связи с нерешённостью диагностического вопроса была проведена ПЭТ/КТ всего тела, обнаружившая в базальном сегменте левого лёгкого образование со злокачественными характеристиками, достигающее плевры и ворот левого лёгкого, а также одиночные увеличенные мезентериальные и медиастинальные лимфатические узлы. После клинической консультации было установлено, что пациент неоперабелен, рекомендована химиотерапия и паллиативное облучение ЦНС.

Ключевые слова

аденокарцинома, метастазы в головной мозг, головная боль, внутричерепная гипертензия, кольцевидные поражения