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An inexpective adult diffuse astrocytoma. Case report and literature review

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ABSTRACT

Background: Diffuse gliomas in adults also include astrocytoma and isocitrate dehydrogenase deficiency, oligodendrogliomas with 1p/19q deletion, and also glioblastoma, wild type (IDH). As indicated in the European guidelines on low-grade I gliomas, early extensive surgical resection may be associated with a good prognosis. Molecular markers show that IDH1 R132H has a prognostic role in GBM. Temozolomide chemoradiation has shown beneficial results in the survival of patients with astrocytoma.

Case description: A 76-year-old woman presented to our emergency room; according to her family and emergency medical team, the patient fell at home and received a direct blow to the head with loss of consciousness. The patient had a known history of hypertension for a few years and was taking antihypertensive medications periodically. Unspecified leukaemia. Respiratory rate: 16/min; respiratory rate: regular. On clinical examination, the patient is conscious, oriented, and has right-sided weakness. Glasgow GCS (points): 11 points. after a profound, stunning. Contact is very difficult due to speech disorders. (Dysarthria). He has a right hemiparesis of 2 points, with a Positive Babinski sign on the right side.

Conclusion: The case highlights the importance of multimodal management, including early surgical intervention, molecular diagnostics, and postoperative care, in improving outcomes for patients with astrocytomas. A review of prognostic factors, such as age, GCS scores, and molecular markers like IDH1 mutations, emphasises the need for individualised treatment approaches. Although advances in chemoradiation, particularly with temozolomide, have improved survival rates, astrocytomas remain associated with high morbidity and mortality. This report underscores the critical role of early diagnosis, maximal safe resection, and tailored therapeutic strategies in optimising patient outcomes and quality of life.

Keywords
case report,
diffuse astrocytoma,
gliomas,
computer tomography,
survival

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Introduction

The World Health Organization (WHO) has established the fifth classification as the diagnostic criteria for the nomenclature and grading of diffuse gliomas. Diffuse gliomas in adults also include astrocytoma and isocitrate dehydrogenase deficiency, oligodendrogliomas with 1p/19q deletion, and also glioblastoma, wild type (IDH). [1]. Brain tumors are clinically divided into primary and metastatic brain tumors. Primary tumors are due to cells of the central nervous system, accounting for 1% of cancers in the United States and probably 2% of cancer deaths in the United States, mainly with glioma as the primary tumor. [2]. In intrinsic diffuse pontine gliomas, surgical techniques have improved the safe initial biopsy, with a deeper understanding of the biological evolution of the tumor tissue. This has led to the discovery of a recurrent somatic mutation in function leading to the substitution of lysine 27 by methionine [p.Lys27Met, K27M]. Histone 3 is characterized in more than 85% of intrinsic diffuse gliomas, influencing the first epigenomic role of histones in pathogenesis as a specific diagnostic criterion. [3].

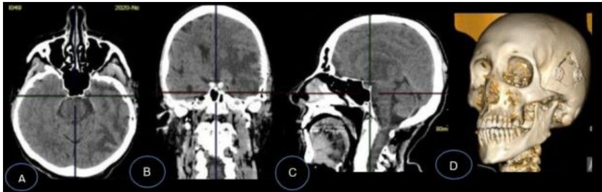

Figure 1. a) Axial negative dynamic CT image of the formation in the left temporal lobe. b) Coronal image of the temporo-parietal-occipital region: significantly increased vasogenic edema on the left; c) Sagittal image, transverse dislocation and edema of the left hemisphere, reversal of pneumocephalus with diffuse atrophic changes in the brain. d) 3D: skull reconstruction after craniectomy in the left temporal region.

Case presentation

A 76-year-old woman presented to our emergency room; according to her family and the emergency medical team, the patient fell at home and received a direct blow to the head. The patient had a known history of hypertension for a few years and was taking antihypertensive medications periodically. Unspecified leukemia. Respiratory rate: 16/min; respiratory rate: regular. On clinical examination, the patient is conscious, oriented, and has right-sided weakness. Glasgow GCS (points): 11 points after profound stunning. Contact is very difficult due to speech disorders. (Dysarthria): He has a right hemiparesis of 2 points, with a positive Babinski sign on the right side. Systolic pressure: 130 mmHg; diastolic pressure: 80 mmHg; pulse: 64/min. Heart rate: not altered. Heart sounds: clear. A CT scan was completed, confirming a space-occupying lesion. The third ventricle. In the parietal-temporo-occipital. The patient was admitted and treated with anticonvulsants and supportive antibiotics. for possible intervention

CT scan of the brain

The midline structures are shifted to the right up to 14 mm (previously up to 7 mm) at the level of the third ventricle. In the parietal-temporo-occipital region on the left, there is a heterogeneous zone, represented mainly by a finger-shaped vasogenic edema zone measuring 68x92x62 mm (previously 61x86x46 mm), against the background of which a group of areas of fluid density of up to 7-10 units of fluid density is formed. Gas and blood inclusions previously identified in the temporal region are not visualized in this study. Periventricular: small areas of leukoaraiosis. Convexital fissures and Sylvian fissures are widened on the right and narrowed on the left; they cannot be traced in the temporal region (they were previously traced). The ventricles of the brain are asymmetrical: the right lateral ventricle is slightly dilated and the left one is compressed. The shunt tank on the right is narrowed. The vendor region is unremarkable. No "fresh" bone traumatic changes were identified.

Procedure

A craniotomy hole is made in the left temporal region, and a 33x38 mm cranioplasty with a bone graft is performed with the presence of metal fixators. Two weeks later, an extended tumor biopsy. See Figure 1-2.

Diagnosis: Tumour (diffuse astrocytoma) of the left temporal lobe.

Postoperative CT control

In the soft tissues of the occipital region, there is a hematoma measuring 4x0.7x5 cm. Condition after craniotomy in the left temporal region. In comparison with a CT scan of the brain, negative dynamics of the formation in the left temporal lobe were noted in the form of an increase in the zone of

vagogenic edema in the temporo-parietal-occipital region. On the left, transverse dislocation and edema of the left hemisphere. Reversal of pneumocephalus. Diffuse atrophic changes in the brain. Shown in Figure 1.

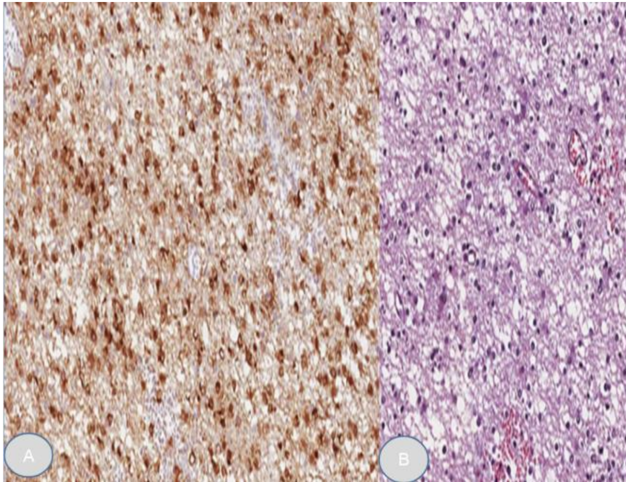

Figure 2. a) Diffuse astrocytoma exhibiting diffuse IDH1 immunoperoxidase staining; original magnification 150x; b) Grade 2 astrocytoma, IDH mutant. Demonstrating a low-cellularity astrocytic neoplasm comprised of inconspicuous, mitotically dormant cells featuring ovoid hematoxylin and eosin-stained nuclei; original magnification 150x.

Follow up, UCI, condition at discharge

The patient's condition is relatively satisfactory; there are no respiratory or hemodynamic disturbances. In neurological status: level of wakefulness—clear consciousness, GCS 15 points. Contact is difficult due to sensorimotor aphasia. A minimal right-sided hemiparesis persists.

Discussion

Our case report is of a patient who was symptomatic for a space-occupying mass after losing consciousness and being brought in via emergency. Imaging and laboratory markers are standard to confirm the diagnosis prior to biopsy. It also shows how this cluster of symptoms presents once the patient has brain dislocation, loss of consciousness, and even hemiparesis, such as a stroke. A retrospective study of 64 patients was conducted to predict the survival of those diagnosed with diffuse astrocytoma as a low-grade glioma. Cox regression models were analyzed, and subsequently a monogram was performed for the prediction of survival by three significant factors. Age ≥ 60 years at hazard ratio (HR) = 5.8 and 95% confidence interval (CI): 2.09-15.91 and Glasgow Coma Scale motor response score < 6 [HR = 75.5, 95% CI: 4.15-1.369.4 and biopsy HR = 0.45 and 95% CI: 0.21-0.92, where mortality will be shown in the monogram at one year from diagnosis. [4]. [9]. [10]. As indicated in the European guidelines on low-grade gliomas, early extensive surgical resection may be associated with a good prognosis. As in the European and American guidelines, they agree that the best therapeutic option is maximum resection, also taking into account observation in already selected patients. [5]. [11]. Molecular markers show that IDH1 R132H has a prognostic role in GBM. Therefore, they tend to have better survival than tumors with PDFGFRA expression with a P=0.066. Therefore, proneural and mesenchymal molecules showed a better benefit in the addition of chemotherapy and radiation therapy. [6]. [12]. Although radiation therapy and chemotherapy have improved survival, mortality remains high in patients with astrocytomas. Remember that each year in the United States, a brain tumor is diagnosed in 51,000 individuals per year, and that more than 75% will die within the first 5 years after diagnosis. Recent studies have shown that, because they are related to suppressive symptoms, the quality of life in patients with astrocytomas decreases. [7]. [8]. [13]. Temozolomide chemoradiation has shown beneficial results in the survival of patients with astrocytoma. IDH is a grade 2 mutation. This chemoradiation can be postponed until the time of progression in younger patients, using extensive or massive resection. Therefore, in high-risk patients, treatment should be earlier. . [14]. [15]. [16].

Conclusion

Our patient had a relapse due to syncope and lack of cerebral oxygenation due to herniation by the space-occupying mass of origin under investigation, which a biopsy determined to be a diffuse astrocytoma. It is worth highlighting the dysarthria caused by this, probably due to further impact. The altered blood pressure, the onset of cerebral infarction, would influence the hemiparesis, affecting his right limbs. The patient after surgery During treatment in the intensive care unit (ICU), positive results were observed, from the recovery of alertness to a clear and partial regression of the aphasia and hemiparesis. The patient was discharged without

complications. He will continue conservative treatment and rehabilitation and will remain under observation for a complete recovery after referral to the neurology clinic.

Author Contributions

Conceptualization,. BC.JJA, JFH. , D.E.S.; methodology, D.E.S., .; software, D.E.S., and .; validation, .. I.B., and B.C; formal analysis, G.C., and DRC.; investigation, D.E.S. resources, EC and E.S. Data curation, EC. G.S.; writing—original draft preparation, D.E.S., writing—review and editing, IB, D.E.S., visualization, JJA. JFH. supervision, I.B. MP. ES.

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