

Temporal lobe ganglioglioma in an epilepsy patient with worsening seizures: case study and future directions

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ABSTRACT

Gangliogliomas are rare brain tumors that have both neuronal and glial components. They hold a better prognosis than other infiltrative glial tumors, but differentiating between them can be challenging. While molecular markers are being studied, it is currently a histologic diagnosis.

In this case, the patient presented with epilepsy and worsening seizures secondary to a medial temporal lobe mass. Radiology report was inconclusive. Surgical resection was achieved and based on histologic examination the lesion was diagnosed as ganglioglioma, WHO grade I.

In this patient, pathological diagnosis of ganglioglioma offers a favorable prognosis and low risk of recurrence. In the future, molecular analysis including determination of IDH-1 and BRAF gene status will allow for more accurate diagnosis in these patients.

INTRODUCTION

Gangliogliomas represent 1% of all central nervous system neoplasia. They are biphasic tumors consisting of both neoplastic ganglion cells and neoplastic glial cells. They are intra-axial, arising in the temporal lobe 79% of the time and patients often present with a seizure disorder such as epilepsy. They are generally benign, indolent tumors that are surgically curable with a low rate of recurrence.

Gangliogliomas have a more favorable prognosis than similar but more aggressive infiltrating gliomas, however distinguishing between them is sometimes difficult. There are currently no molecular markers to definitively distinguish gangliogliomas from other glial neoplasms and the current standard of care diagnosis is achieved by histologic examination.

Common histological features:

- 1) GFAP and Chromogranin stains reveal glial and neuronal tumor cells
- 2) Focal fibrosis with collagen deposition
- 3) Perivascular lymphocytic infiltrate
- 4) Focal microcalcifications
- 5) Bi-nucleated neurons

Inclusion of numbers 2-5 are not required for diagnosis of ganglioglioma, but they are common findings that increase the suspicion of a tumor being a ganglioglioma. In addition, while there are no diagnostic molecular markers, recent studies have shown BRAF V600E and Isocitrate Dehydrogenase-1 (IDH1) can be used to aid diagnosis and in prediction of tumor behavior.

CASE

- Patient presented with epilepsy and worsening left temporal lobe seizures.
- MRI was performed:

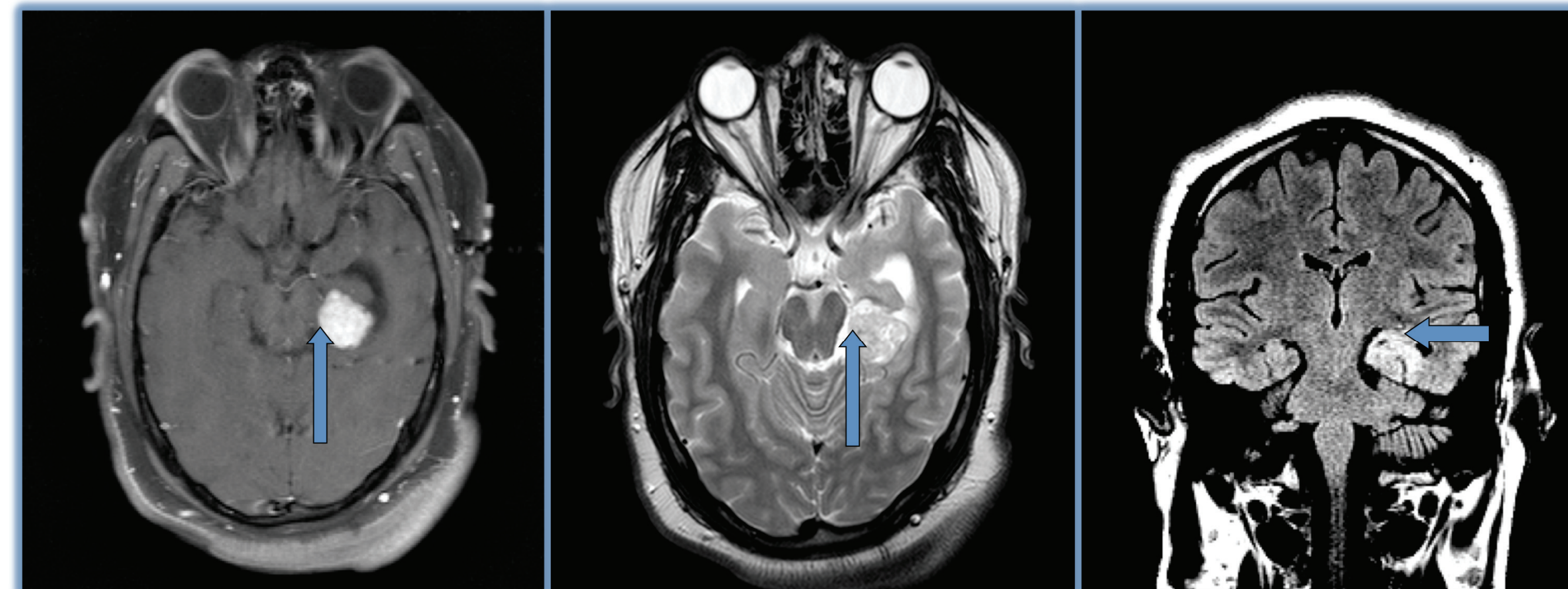


Figure 1: Patient MRI series revealing solid, enhancing mass in medial left temporal lobe. Involvement of left uncus and anterior temporal lobe as well as mass effect on the left hippocampus is seen.

- Functional imaging showed right hemisphere dominant language
- Tumor resection and left temporal lobectomy were performed. Gross total resection was achieved.
- Frozen and permanent specimens were sent for pathology

PATHOLOGY

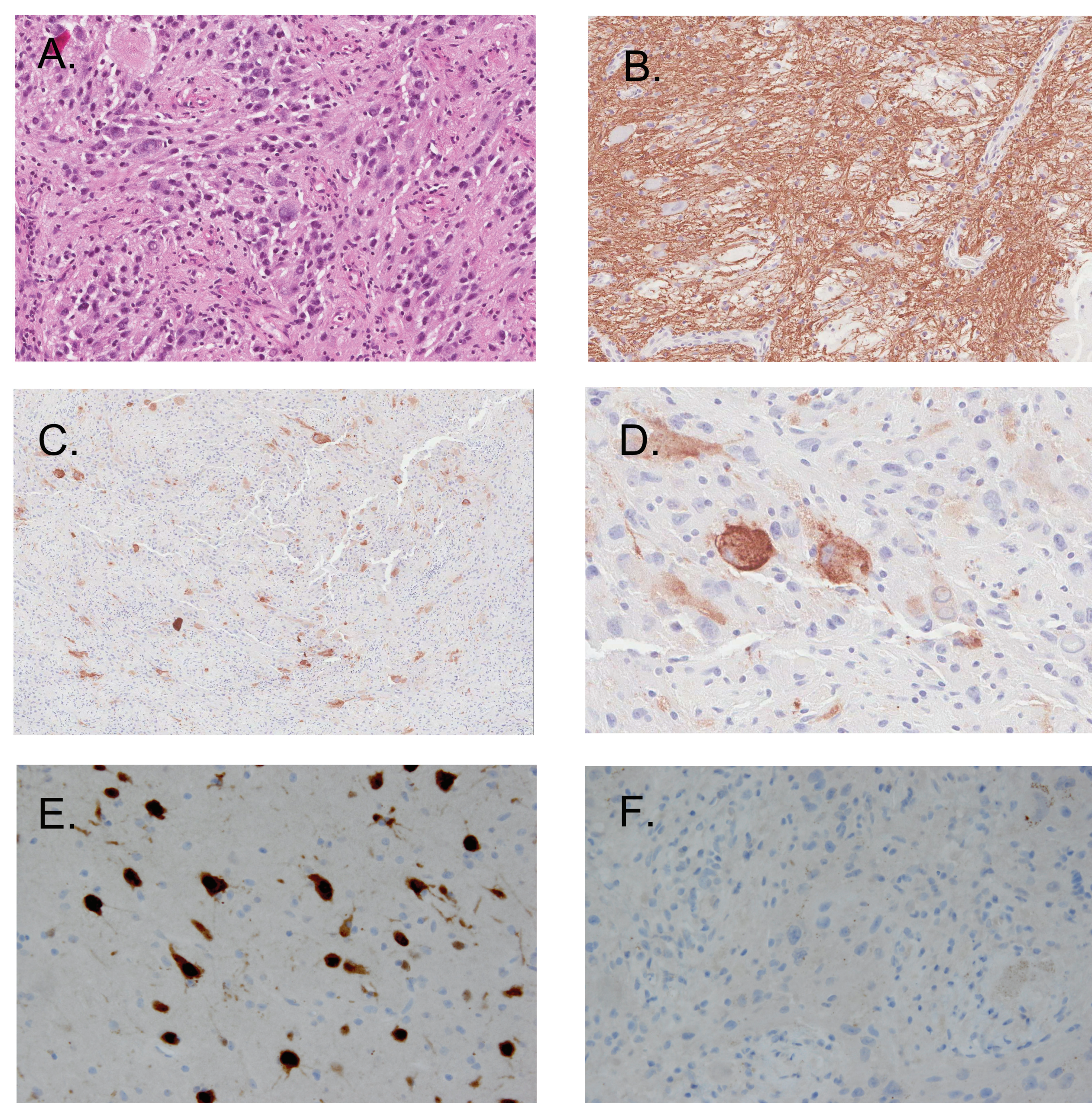


Figure 2:

- A. H&E Stain showing apparent neuronal and glial proliferation
- B. GFAP stain highlights neoplastic glial component
- C. Chromogranin stain highlights dysplastic ganglion cells
- D. Higher magnification of dysplastic ganglion cells
- E. Neu-N staining of temporal lobe resident neurons
- F. Dysplastic ganglion cells are Neu-N negative

PATHOLOGY

- Additional classic ganglioglioma findings:

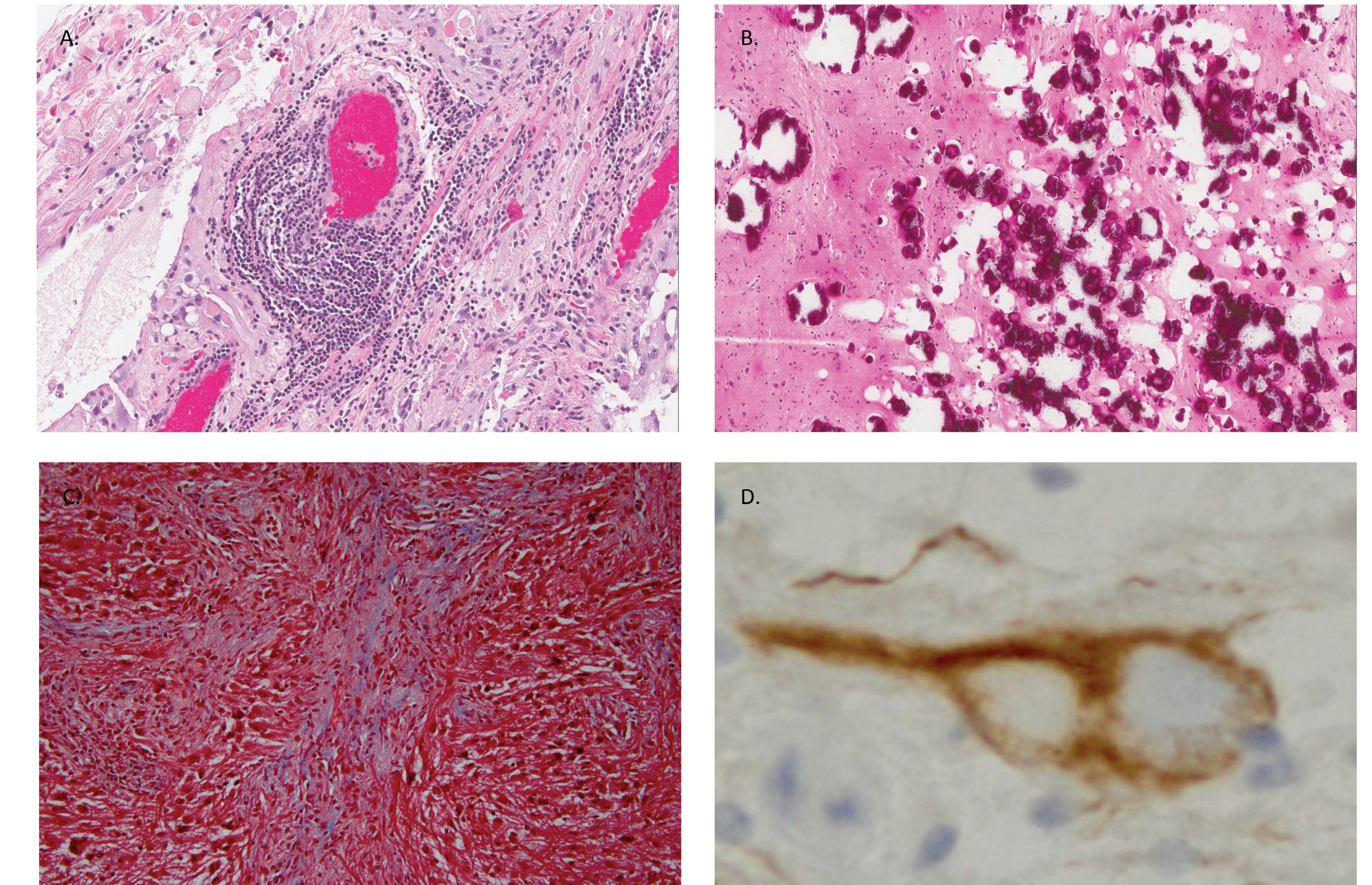


Figure 3:

- A. Perivascular lymphocytic infiltrate
 - B. Microcalcifications
 - C. Focal fibrosis and collagen deposition
 - D. Binucleated neuron
- While these features are not specific or necessary for the diagnosis, they are common pathologic findings in ganglioglioma

DISCUSSION

This case offered a classic clinical and pathological features of a ganglioglioma. The confirmation of this diagnosis by pathology allows for a good prognosis with minimal risk of recurrence. However, many cases are not as typical as this, and the lack of molecular markers may inhibit one from differentiating between this and a more aggressive glioma.

There are currently studies looking into the potential use of molecular markers in the diagnosis of gangliogliomas. Specifically, the BRAF V600E mutation has been found more often in these tumors than in more aggressive gliomas. In contrast, the presence of an IDH1 mutation has been shown to correlate with increased recurrence and malignant transformation. Future genetic analysis of these tumors may give insight into the origin of these interesting tumors and their association with epilepsy.

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