Angiocentric glioma (AG) is a rare tumor of the central nervous system (CNS) and a little more than 50 cases have been reported. Based on its indolent behavior, lack of mitotic activity, and low proliferation indices, it was classified as World Health Organization (WHO) grade I. However, few cases showing atypical features have been described. The exact biology of this tumor remains cryptic.

An 18-year-old male presented with complex partial seizures since the age of 4 years. Seizure frequency was 5-6/day and failed for multiple antiepileptic drugs. Electroencephalography (EEG) and interictal single-photon emission computed tomography (SPECT) localized the lesion to the left frontal region. Magnetic resonance imaging showed thickening of left inferior frontal gyrus, isointense on T1WI, and hyperintense on T2WI. The patient had right frontal craniotomy and electrocorticography (ECOG)-guided resection of the lesion. ECOG showed grade IV ECOG changes over the lesion and up to 3 cm in front of it. Lesional area and abnormal area on ECOG were resected. Microscopically, the tumor comprised plump to bipolar cells with eosinophilic cytoplasm, at places showing clearing. Nuclei were monomorphic, rounded to oval, with fine chromatin and indistinct nucleoli. Mitotic figures and nuclear pleomorphism were absent. At places, tumor cells were arranged radially around blood vessels. Where the tumor was infiltrating the cortex, cells were arranged in a palisading fashion parallel to the pial surface. In other areas, they were present perpendicularly along vessel walls, giving a streaming appearance. The tumor was infiltrating the cortex and streaming parallel to the pial surface. Occasional small nests of tumor cells were seen infiltrating between blood vessels and there was subpial spread. Ependymal canals and Rosenthal fibers were absent. On immunohistochemistry, tumor cells showed perinuclear dot-like positivity for epithelial membrane antigen (EMA), variable immunopositivity for glial fibrillary acidic protein (GFAP), vimentin, and S-100 protein, while isocitrate dehydrogenase type 1 (IDH1), synaptophysin, neuron specific enolase (NSE), cytokeratin, and p53 were negative. MIB-1 labelling index (MIB-1 LI) was low (<1%).
Post-surgery, patient was seizure-free and taking one drug for 1 year and it was stopped thereafter.{Figure 1}{Figure 2}{Figure 3}

AG is a novel clinicopathological entity, originally described in association with medically intractable seizures. [1],[2] It is a tumor of children and young adults, accounting for 2.3% of tumors associated with chronic pediatric epilepsy. [5],[6] More than 90% of patients present with medically intractable seizures, which resolve after excision of the tumor. [6] AGs are most frequently located in the superficial frontal and temporal lobes cortex. [5] Radiological features include a solid, well-demarcated cerebrocortical tumor with subcortical extension, hyperintense on T2WI, and lacking contrast enhancement. [4] A cortical rim-like hyperintensity on T1WI and a stalk extending to the ventricular surface on T2WI are characteristic. [1],[2] However, neither of these was seen in our case, precluding preoperative diagnosis. Apart from typical microscopic features as seen in our case, other patterns like fascicular arrangement resembling Antoni-A areas of schwannoma, solid nests of epithelioid-appearing cells, and oligodendroglial-like cells have been described. [2] Cytologic atypia is minimal. Mitoses are infrequent; necrosis and endothelial proliferation are not seen. Recent reports have described occurrence of AG in association with cortical dysplasia (CD). [2],[3],[5],[7] Liu et al., proposed that excision of adjacent dysplastic cortex along with the tumor may be necessary to achieve seizure-free outcome after surgery. [3] Intraoperative ECOG may thus be of value in determining the extent of the epileptogenic area that needs to be resected. Only occasional genetic alterations have been described in AG. IDH1 R132H mutation does not occur in AG; thus, absence of mutant IDH1 protein expression in AG is useful in distinguishing it from diffuse gliomas in limited biopsy samples. [8]

Histogenesis of AG, like that of many newly described neoplasms, remains controversial. Angiocentric growth and dot-like EMA immunopositivity in intracytoplasmic microluminal pattern suggest ependymal differentiation. [2],[4] Ultrastructurally also, AGs have features similar to ependymomas, with intercellular junctions and microlumens filled with microvilli. [2] However, cortical location of AG is contrary to this hypothesis. An origin from neoplastic transformation of radial glial cells during neuronal migration has now been proposed, based on elongated bipolar morphology of tumor cells. [1]

Outcome of AG patients is excellent, with most achieving freedom from seizures following gross total resection, but subtotal resection does not have such good results, with reported seizure-free outcomes of 93% vs 36%. [3],[5] Although benign in nature, one fatality has been attributed to AG, due to progressive disease. [2] The primary tumor showed typical histological features; however, the recurrent tumor displayed increased mitoses and elevated MIB-1 LI (10%), indicating aggressive behavior.

References