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Corpus Callosum Gliomas

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Abstract

Gliomas are the most frequent primary neoplasm in the central nervous system. Of these only 3.8% infiltrate white matter structures corresponding to the corpus callosum. Deciding which therapeutic realize in these cases results on a hard debate in the neurosurgery practice. Natural evolution of corpus callosum gliomas determines a progressive neurological deterioration in a short period of time leaving a severely neurological affection, and a short dead afterwards. Aggressive therapeutic prolongs the survival for this patient whit a high risk of neurological deficit.

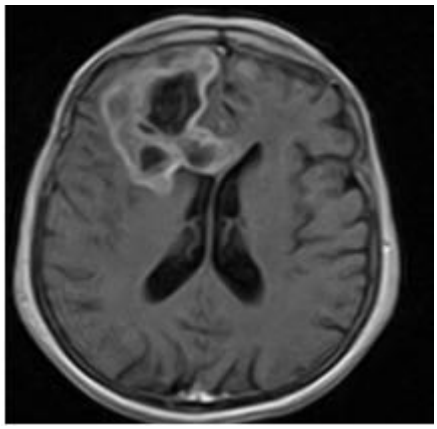
Keywords: Corpus Callosum; Gliomas; Karnosfky; Prognosis; Therapeutics

Introduction

Corpus callosum gliomas are not a frequent pathology in neurosurgery practice but the management has been variable over the decades. These tumors spreads along the whit matter of the Corpus callosum obtaining the name of butterfly gliomas for the reminiscence of a butterfly in MRI images. Early attempts of surgical resection were documented whit poor neurological outcomes and survival, giving the concept of nonsurgical tumors. The risk of neurological deficit leads, in many cases, to take a conservative behavior such as stereotactic biopsy with chemoradiotherapy. In the last years advances in functional images with microsurgical techniques has bring a new perspective on aggressive treatment in particular cases. Poor prognosis and general neurological affection is steel the main problem. In this presentation we demonstrated our experience in these complicated tumors and make a revision of some international presentations trying to unify variables for patient selection and treatment options, mainly on surgical resection.

Clinical Cases

In the period of 2016-2018 at Central MIlitar Hospital, we evaluated 5 cases of lesions that involved the corpus callosum. Age 74-82 (2F3M). The clinical presentation includes headache, dizziness, bradypsychia, abulia and hemianopsy. All patients where admitted for study. Images made showed lesions that involved some part of the corpus callosum. Multidisciplinary evaluation where performed including neurosurgery specialist, oncologist, physiatrist, phonoaudiologist and geriatrician. Decision was taken on the basis of Karnofsky Personal Status (KPS), comorbilities, dominant/no-dominant hemisphere and type of corpus callosum lesion. Three patients were candidates to open surgery **(Figure 1)**, KPS >80 non-dominant hemisphere and invasion of the anterior or posterior portion of de Corpus callosum, subtotal resection was made.



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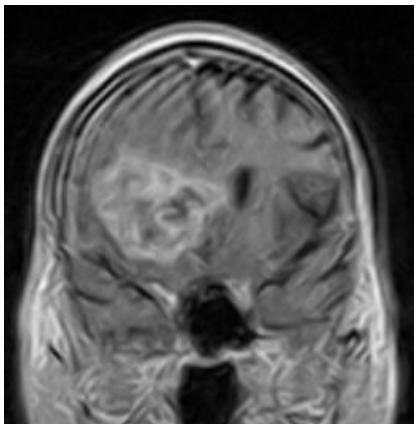

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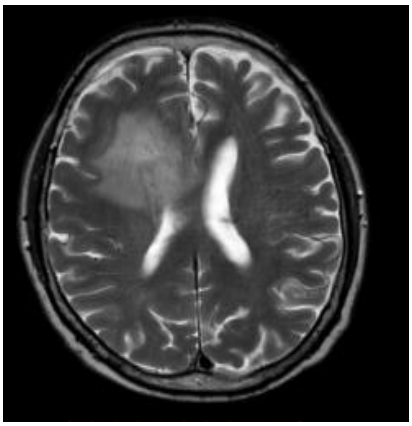

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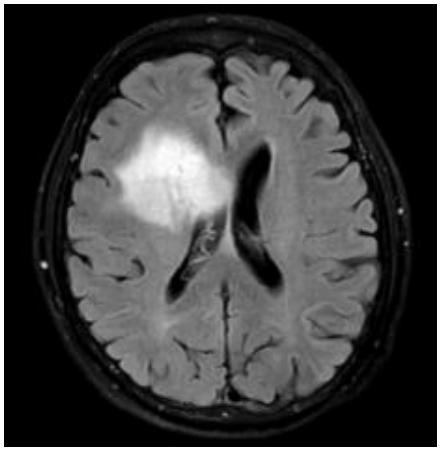

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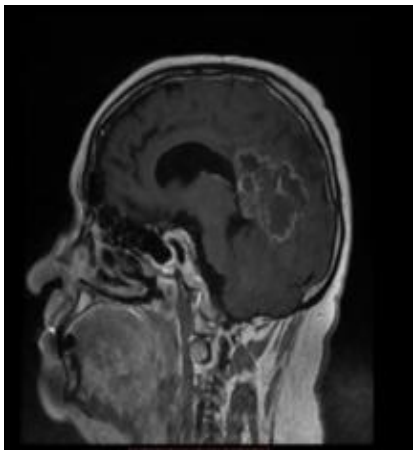

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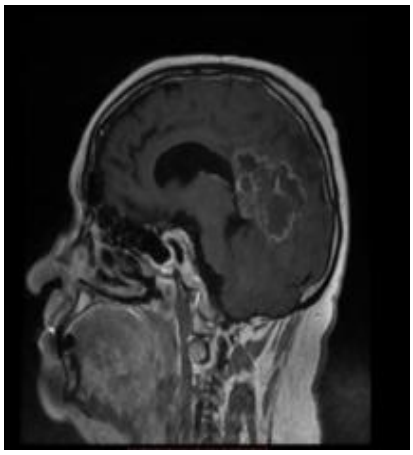

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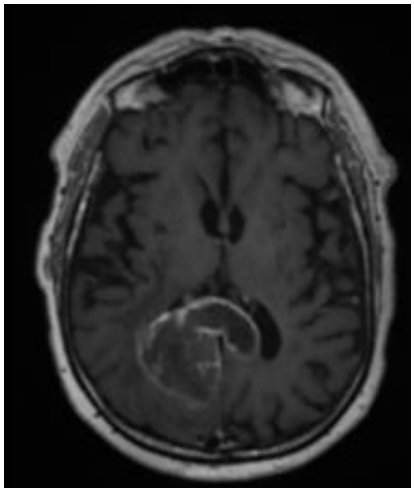

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Figure 1: MRI images shown, right frontal hypointense image with contrast enhancement infiltraiting the genu of the corpus callosum (A,B). Similar images shown hyperintense T2 and FLAIR (C, D). Parieto-occipital lesion hypointense whit contrast enhancement infiltrating de splenium of the corpus callosum and passing to the contralateral hemisphere.

For the other patients stereotactic biopsy was performed **(Figure 2)** because of de invasion of the body of the corpus callosum, KPS < 80 and comorbidities. All patients were control and discharged for adjuvant therapies. None symptoms added by the procedures. One patient present asymptomatic bleeding (biopsy) that was control and discharged. Anatomopathology reveals high grade glioma (Multiform Glioblastoma).

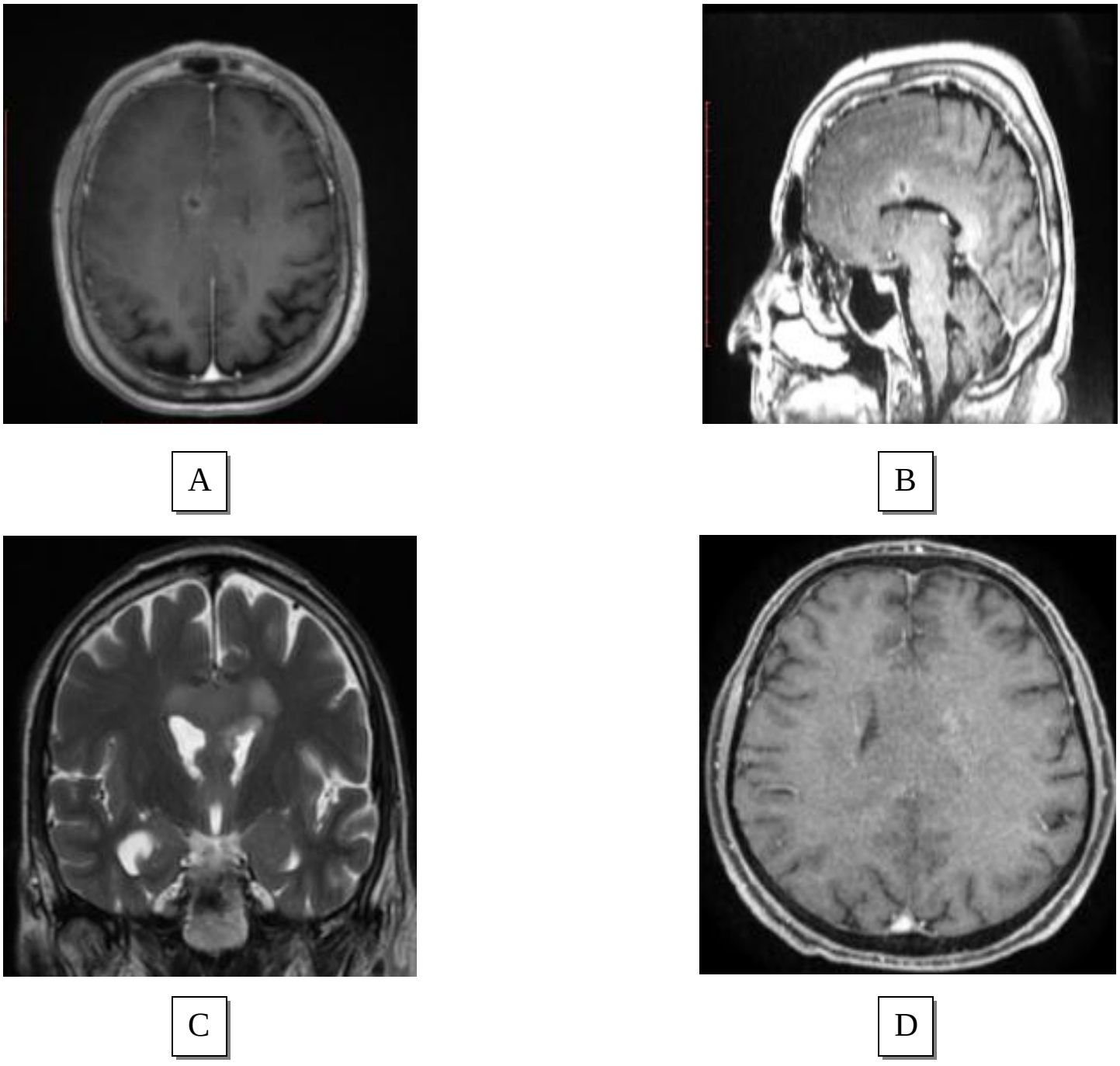

Figure 2: MRI images shown a right frontal lesion hypointense in T1 with contrast enhancement located in the body of the corpus callosum. (A,B). Left frontal lesion hyperintense in T2 with minimum contras enhancement. Periventricular hyperintense could correspond to neoplasm infiltration (C,D).

All patients continued control and treatment with Oncology Department. Survival of 3 month was observed in the biopsy group.

The patients who had surgery where controlled adding symptoms between the 6 and 7 month with a rapidly progression of neurological deficit leading to dead around the eleven and fourteen month.

Discussion

Butterfly Glioblastomas (bGBM) are high grade neoplasm that involved some part of the corpus callosum. M g Yasargil **[1]** published a series of cases evaluating corpus callosum lesions, encountering that the most frequent type of lesion correspond to high grade of gliomas **(Table 1)** and classificate all lesions in Type 1 A/B and Type 2 according if the involved anterior/posterior or the body of the corpus callosum respectively. The evaluation of the patient is an important step in the decision of surgery vs. biopsy. While aggressive resection has been shown to improve survival for patients with GBM, bGBM have historically been thought of as poor candidates for surgery given the high risk of damage critical anatomical structures and the resultant devastating neurological deficits. More recently, advances in operative techniques and intraoperative cortical mapping have made these lesions safer to resect.

Table 18.1a Localization and histologic types of all callosal and septal tumors (n = 47)

	Glial tumors							Other tumors					
	Astrocytoma		Glioblastoma	Ependymoma		Mixed	Oligodendroglioma	Lymphoma	Lipoma		Cavernoma	Metastasis	Total
	I–II	III	IV	I	II	III	III						
1 a Callosal genu	1	1	13	–	–	–	1	2	1	1	1		21
1 b Splenium	1	3	4	–	–	1	1	–	–		–	–	10
2 Callosal body and septum pellucidum	–	2	2	5	6	1	–	–	–		–	–	16
	2	6	19	5	6	2	2	2	1	1	1		47

Neuroepithelial callosal–septal tumors (n = 42):
Benign 7 cases (15%)
Malignant 35 cases (83.3%)

Table 1: In our cases, we evidence all localization types (2 cases-1a, 1 case-1b, 2 cases-2). And being histological characterized as Multiform Glioblastoma.

Karnofsky Personal Status (KPS) is a widely use score to assess the functional capacity of the patient at the entrance of the consultation and in the months before the onset of symptoms. These give the information if we are in front of autonomous patient or in need of assistance for daily life. Different authors had proof that KPS > 80 shown a better outcome if surgical resection is decided. Other factor to take in count is dominant or no-dominant hemisphere, being the second ones best candidates for surgery. MD Opoku-Darko et al. **[2]** present twenty nine cases of bGBM analyzing different variables for choosing open surgery candidates. KPS > 70 was taken in concern for the understanding of the patient about the treatment. Surgical result was better in anterior and posterior infiltration of the corpus callosum, observing an improve survival.

Surgical techniques and technologies had advance in the last decades given the surgeon important evaluation pre operative and in the procedure. Functional images with tractography for the corticospinal tract, superior longitudinal fasciculus, accurate fasciculus, occipitofrontal fasciculus, optic pathways and others in the attempt to preserve them, vascular anatomy to localize anterior cerebral artery and their branches making a complete surgical planning reducing de morbidity in these approaches. These makes Type 1 A/B candidates for safe resections.

Different studies evaluated awake versus general anesthesia, but both choices have good results. The extension of the resection is one of the most important variables that impact in patient's survival. F. Dayani et al. **[3]** present a review of 39 patients with bGBM. Multi variants analysis was performed, tumor volume and treatment approach were independent factors regardless of the patients specific characteristics (age and KPS at diagnosis). Resection was found to confere a better prognosis vs. biopsy whit a minimum extend of citoreduction over 86% followed by chemoradiation therapy. In our cases, we observed the same behavior on resection patients taking in count the KPS preoperative and the localization of the tumor for aggressive surgery. Other factors were excluded as tumor volume.

Conclusion

bGMB are complex lesion that surgeons have to confront. In the recent years the concept of aggressive treatment had prolonged the survival of these patients. Although life expectancy maintains poor.

Some variables should be taken in count at the moment of deciding biopsy or surgical resection. KPS >80, no-dominant hemisphere, Tipe 1 A/B and extensive resection with adjuvant therapies decreases the tumor progression. Further studies in different fields will add better outcome for these patients.

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