Pathology of the CNS in pediatric age. A 9– year study at CIREN.

Bárbara Estupiñán Díaz (MD) [1], María Caridad De Armas Fernández (MD) [2], Carlos Alfonso Sabatier (MD) [2], Gerardo López Flores (MD) [3], Iván García Maeso (MD) [3], Ramsés Fernández Melo (MD) [3], Juan Carlos Rosillo Martí [1]. 1 Department of Pathology, Centro Internacional de Restauración Neurologica (CIREN), Havana, Cuba, Email: baby@neuro.ciren.cu; 2 Department of Pathology, CIMEQ, Havana; 3 Department of Neurosurgery, CIREN.

Primary tumors of the CNS in the pediatric ages represent the second cause in importance after the leukemias and on 18.6% of all the cancers in childhood and the 40 - 50% of all solid tumors, as this incidence ranges between 2 - 5 cases x 100 000 per year. On the other hand the incidence of non tumoral pathology is low and there are scarce reports that offer a precise behavior of this issue.
The objective of this work was to review the pathology of the CNS in a pediatric population assisted at the International Center of Neurological Restoration (CIREN).
Twenty-one children (0 to 15 years) were selected of a total of 272 patients submitted to surgical interventions at CIREN, all with a clinical diagnosis of tumors of the CNS from January 1996 - December 2004. A retrospective - descriptive study was performed with the request of biopsy forms and clinical records of these patients.
Ages range from 1 - 15 years with a 10 year-old media, 13 were males and 8 females. The table resumes clinical data at entrance, as well as location and histological diagnosis. Two patients had pathological antecedents of Neurofibromatosis type 1, one with Syndrome X and Epilepsy, whereas the other had bronchial asthma, the rest presented previous health. Biopsy specimens were fixed in 10 % buffered formalin. Paraffin-embedded tissues were cut at 4 µ thick and stained with hematoxylin and eosin (H&E). Immunohistochemestry was performed on deparaffinized tissue sections using an avidin –biotin peroxidase method and antibodies directed against glial fibrillary acidic protein (GFAP), cytokeratin and epithelial membrane antigen (EMA) in 3 cases in order to precise histogenesis (Glioblastoma, Ependymoma and Giant cell glioblastoma).
It is not habitual to performed the pathology of CNS on children at our institutions. From the 272 studied cases only 7.72 % correspond to children. Tumoral lesions are more frequently diagnosed. Gliomas were the hitological variety most frequently diagnose.

Table: Clinical, localization and histology in 21 patients.

Cases	Symptoms	Localization	Histology
12 / F	Muscular weakness	Right parathalamic	Diffuse Astrocytoma (grade II)
11 / F	Gait disorders	Right cerebelar	Diffuse Astrocytoma (grade II)
13 / F	Convulsion	Right Frontal	Arteriovenous malformation
9 / F	Convulsion	Left Frontal	Diffuse Astrocytoma (grade II)
5 / M	Deviation glance of right eye	Brainstem	Glioblastoma
9 / M	Headache	Right temporoparietal	Arteriovenous malformation
12 / M	Convulsion	Corpus callosum	Diffuse Astrocytoma (grade II)
9 / F	Convulsion and loss consciousness	Right Frontal	Arteriovenous malformation
7 / M	Muscular weakness	Brainstem	Glioblastoma
10 / F	Drowsiness	Left Frontal	Arteriovenous malformation
1 / M	Deviation of right eye	Right thalamus	Ependymoma
6 / M	Drowsiness	Third ventricle	Primitive neuroectodermal tumor
13 / M	Convulsion	Left Parietotemporal	Oligodendroglioma
10 / F	Strabismus	Left thalamus	Anaplastic Astrocytoma (grade III)
13 / F	Headache	Third ventricle	Giant cell glioblastoma
9 / M	Convulsion and instability	Left cerebelar	Pilocytic astrocytoma
10 / M	Gait disorders	Filum terminal	Lipoma
10 / M	Backache	D12 – L1	Epidermoid cyst
15 / M	Headache and vomits	Rachidian bulb	Anaplastic Astrocytoma (grade III)
15 / M	Headache	Hypothalamus	Germinoma
12 / M	Vision disorders	Right Temporal	Diffuse Astrocytoma (grade II)

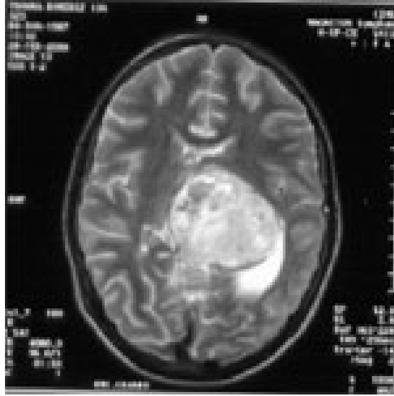

Figure 1: T2-weighted MRI of a Giant cell glioblastoma of third ventricle with periphery necrosis and mass effect.

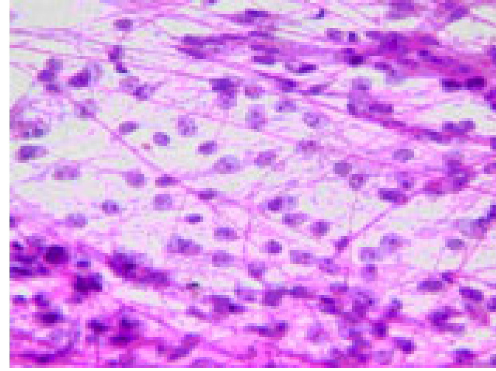

Figure 2: Diffuse astrocytoma (grade II). Smear showing atypical astrocytes. Note the fibrillary background. H&Phloxine B X 20.

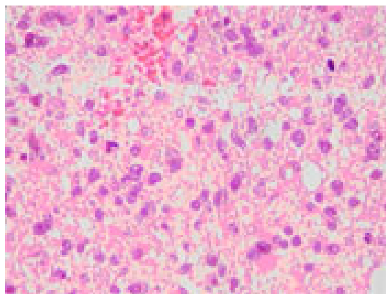

Figure 3: Anaplastic astrocytoma with nuclear atipia and mitosis. H&E X 20.

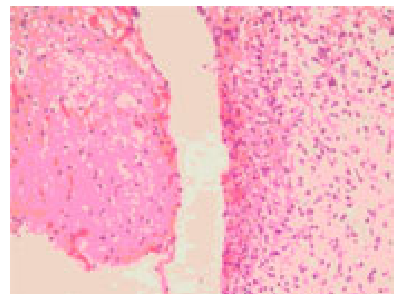

Figure 4: Typical biphasic pattern of compact fiber and Rosenthal fiber (left) and loose textured multipolar cells with microcyst (right). H&E X 10.

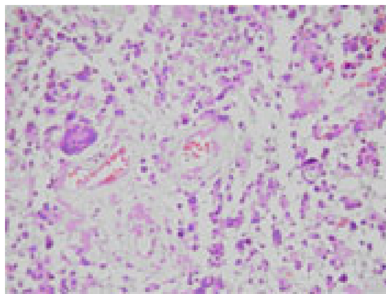

Figure 5: Glioblastoma with high degree of anaplasia and microvascular proliferation. H&E X **40**.

References:

1.- Pollack IF. Pediatric brain tumors. Semin. Surg. Oncol. 16: 73-90 (1999).
2.- Tumor of the Central Nervous System. [monograph on CD-Rom]. Burger PC, Scheithauer BW, eds. Fasc. 10. Washington DC: Armed Forces Institute of Pathology; 1994. pp. 317-20.
3.- Kleihues P and Cavenee WP. Pathology & Genetics. Tumours of the Nervous System. World Health Organization Classification of Tumours. IARCPress Lyon; 2000. pp. 112-4.