

## Regarding the Epidemiology Issue of Intracranial Tumours

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### Abstract

The goal of the research was to study the frequency of intracranial tumors in the diagnosis of sex and age. Operating material - 219 cases have been studied. It is found that intracranial tumors in the region (Georgia) are more frequent (16,9%) in women than in men. (the first degree malignancy tumor (39,7%) are prevalent among women, most of which are meningiomas ( 18,2%). Fourth degree of malignancy, metastatic tumors are more common in men than in women 5 times.

**Keywords:** Intracranial tumors etc.

### Study

According to WHO data the incidence of malignant tumors has significantly increased over the recent years, particularly in developing countries. Prognosis is rather concerning – it is estimated that by 2020 oncological disorders will exceed cardiovascular diseases by incidence and take the first place in the list. Up to 14 million new cases of neoplastic disorders are diagnosed annually worldwide, including up to 7000 cases per year in Georgia.

The given statistics imposes quite serious problem for such small country as Georgia (with population of 4.5 million) (Gagua R., 2015; Todua P., 2016). In addition, significant increase in CNS tumors has been observed throughout the world, further emphasizing the necessity of finding new practical resolutions to haunt this process. The greater importance is given to epidemiologic studies according to particular regions respectively, in the aspect of geographic pathology (prevalence), the results of which should determine the strategy of planning respective measures for timely diagnosis and effective treatment (Bondy M.L. *et al.*, 2008; Rozumenko V.D., 2008; Mermanishvili T., 2009).

The literature data about incidence of cerebral and meningeal tumors vary in different countries (Lanthos P.L. *et al.*, 1996; pPathology, 1997; Neuropathology, 1998). For instance, in USA oligodendrogliomas compose 9.4% of primary cerebral tumors in adults and 4.0% in children, respectively. In Russia, the mentioned tumors account for 4 - 5% of primary cerebral tumors (Olyushin V. E., Louis *et al.*, 2005; 2007; Pathology, 2007).

The aim of the study was to investigate the incidence of intracranial tumors in accordance with the patients'

age and sex. Post-surgery material taken during the last 5 years was studied, in total – 219 cases. All patients had been operated with excision of intracranial tumors of different locations. Neutral 10% formalin solution was used for fixation of post-surgical specimens. The sections were paraffin-embedded.

The sections of 5-6  $\mu\text{m}$  thickness prepared by rotational microtome were stained by Hematoxylin Eosin and Picrofuxin (by Van Gieson). The immunohistochemistry was used in case if needed. The grade of malignancy for tumors was defined according to WHO classification provided in 2007. In order to identify the age variability of patients, we divided the study cohort into 6 groups: I group - > 30 years ; II group – 30 – 39 years; III group – 40 – 49 years; IV group – 50 – 59 years; V group – 60 – 69 years and VI group – 70 years and above.

Distribution of intracranial tumors and their relapsing forms was studied in above mentioned groups, according to their histological patterns, frequency, patients' age and sex. Acquired data were treated statistically. The material was processed using mathematical statistics, computer software package SPSS – 21. Frequency distribution of the difference between the statistics were used to test the credibility of the Pearson Hi – square criterion.

As demonstrated by the analysis of our material, from 219 patients 128 were females (58.4%) and 91 – males (41.5%). The tumors with first grade of malignancy (pilocytic astrocytoma, subependymoma, ganglioglioma, neurinoma, meningothelial meningioma, fibrous meningioma, transient meningioma, psammomatous meningioma, hemangioblastoma, cavernous angioma, mature teratoma, pituitary adenoma) were found in 87 cases (39.7%).

Among the disease cases, females were 67 and males – 20, respectively. The tumors with second grade of malignancy (fibrillar astrocytoma, oligodendroglioma, oligoastrocytoma, atypical meningioma) were found in 24 cases – 10.9% (12 females, 12 males); the tumors with third grade of malignancy (anaplastic astrocytoma, anaplastic oligodendroglioma, anaplastic oligoastrocytoma, anaplastic ependimoma, anaplastic meningioma, choroid carcinoma, anaplastic hemangioendothelioma, angiosarcoma, germinoma) were found in 33 cases – 15.0% (17 females, 16 males).

The tumors with fourth grade of malignancy (glioblastoma, medulloblastoma, primitive neuroectodermaltumor, melanoma) were found in 40 cases – 18.2% (16 females, 24 males); relapsing tumors (meningothelial meningioma, transient meningioma, atypical meningioma, anaplastic astrocytoma, anaplastic ependimoma, glioblastoma, choroid carcinoma, primitive neuroectodermaltumor) were found in 15 cases – 6.8% (7 females, 8 males).

Metastatic cancers (from breast carcinoma, lung carcinoma, renal carcinoma) were found in 12 cases – 5.4% (2 females, 10 males); Different pathologies (eosinophilic granuloma, arterial-venous malformation, cholesteatoma) were found in 8 cases – 3.6% (6 females, 2 males).

Thus, according to our material, most of the cases (39.7%) demonstrated intracranial tumors with first grade of malignancy. In addition, meningeal tumors were dominating amongst them (different histological patterns of meningioma). It's notable that number of females exceeded males in 3.5 times. The above mentioned tumors were mostly observed in III, IV and V age groups in females, and in III age group in males, respectively.

Pituitary adenoma (13 cases) and neurinoma (10 cases) took the second and third places among the tumors with first grade of malignancy respectively. Neuroepithelial tumors (pilocytic astrocytoma, subependimoma, ganglioglioma) were presented only in 8 cases.

Neuroepithelial tumors (fibrillar astrocytoma, oligodendroglioma and oligoastrocytoma) have been found to prevail among the tumors with second grade of malignancy – 13 cases, with atypical meningioma taking the second place (11 cases). The analysis of the material found no essential differences by the patients' age and sex criteria. Neuroepithelial tumors (anaplastic astrocytoma, anaplastic oligodendroglioma, anaplastic oligoastrocytoma, anaplastic ependimoma) also have been found to prevail among tumors with third grade of malignancy (18 cases), with anaplastic meningioma taking the second place (11 cases).

This group also demonstrated the cases of choroid carcinoma, angiosarcoma, anaplastic hemangioendothelioma and germinoma, 1 case per each diagnosis. Similar to the group of tumors with second grade of malignancy, also the third group by patients' age and sex, did not show any significant differences.

The absolute majority of tumors with fourth grade of malignancy (35 cases from 40) were presented with glioblastoma. Males slightly prevailed among the patients while the age range for both sexes was between 50 – 69 years.

As mentioned before, the relapsing tumors were demonstrated in 15 cases (6.8%), with almost same occurrence in both males and females. Neuroepithelial tumors with third and fourth grade of malignancy (anaplastic astrocytoma, anaplastic oligodendroglioma, anaplastic oligoastrocytoma, anaplastic ependimoma, glioblastoma, choroid carcinoma, primitive neuroectodermaltumor) were prevailing among relapsing tumors – 10 from 15 cases. Different histological patterns of relapsing meningioma (meningothelial, transient, atypical) were found in 5 cases involving only female patients.

Age of the patients with relapsing tumors mostly ranged between 40 – 59 years.

The absolute majority of metastatic tumors (5.4%, 10 from 12 cases) were found in males aged 30 – 69 years. In addition, the primary tumor in 8 cases was lung carcinoma, and in 2 cases – renal carcinoma, respectively. In females (2 cases), the primary tumor site was found in breast.

Based on the results of our study we can make the following conclusions:

- 1) Incidence of intracranial tumors are much higher in females (16.9%), compared with males in Georgia
- 2) The tumors with first grade of malignancy significantly prevail in the common spectrum of intracranial tumors (39.7%), the absolute majority of which are presented by different histologic patterns of meningioma.
- 3) The tumors with fourth grade of malignancy take the second place by incidence (18.2%) and their absolute majority is presented by glioblastoma. In addition, males slightly prevail over females by number in this group.
- 4) The incidence of metastatic tumors in males is 5 times higher compared with females. Lung carcinoma was found to be the primary tumor in the majority of cases.

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