

TREND OF INCREASING AGE OF PATIENTS WITH INTRACRANIAL TUMORS BY HISTOLOGICAL SUBTYPES DURING 14 YEARS PERIOD (1989-2002)

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SUMMARY – The aim of this study was to analyse distribution and proportion of intracranial tumors from data obtained at “Ljudevit Jurak” University Department of Pathology from 1989 to 2002. The data from our computer database were analysed according to the histological diagnosis, patient age (four groups), and sex.

There were 2403 intracranial tumors, out of which 667 (27,8%) were malignant gliomas (anaplastic astrocytomas and glioblastomas), 593 (24.7%) meningiomas, 328 (13.6%) pituitary adenomas, 159 (6.6%) schwannomas and the others 13.7%. Metastatic intracranial tumors were diagnosed in 326 (13.6%) patients. We found a statistically significant trends of increasing incidence over time in the oldest age group (over 65 years of age) for meningiomas in women, and for malignant gliomas for both sexes.

The observed distribution and proportion of intracranial tumors are predominantly in accordance with the recent European, North American, and Japanese reported studies.

Key words: intracranial tumors, incidence, increasing age, computer database

Introduction

The introduction of modern neuro-imaging techniques, as well as various environmental factors, have been changing the incidence and proportion of the types of clinically diagnosed intracranial tumors.

The incidence of intracranial tumors in adults increases with age, up until 65-75 years. An analysis of data from a large number of population-based cancer registries around the world demonstrated that although levels of incidence may vary, the rate at which incidence increases with age is remarkably similar for males and females across widely different population^{1,2}.

Also, data from clinical series and from small population-based studies suggest that tumors of different histological types have different age distribution. The aim of this study was to analyze distribution and proportion of intracranial tumors from the tumor register database at our institution.

Patients and methods

Patients data were obtained from the computer based intracranial tumor registry at the “Ljudevit Jurak” University Department of Pathology, for the period between January 1, 1989 and December 31, 2002. A total of 2403 tumors were analyzed according to the histological diagnosis, patient age, and sex. Recurrent tumors were not included in this study. Patient age was divided in four groups; 0-19 years (childhood), 20-39 years (young adults), 40-64 years (middle age) and over 65 years (old age). To establish whether the observed trends were statistically significant χ^2 test was used

Results

There were 2403 intracranial tumors during the 1989-2002 period. Out of these, 667 (27.8%) were malignant gliomas, 87 (3.1%) diffuse astrocytomas and oligodendro-

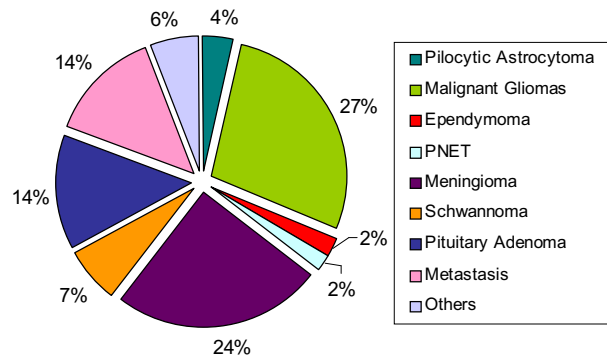


Figure 1. Proportions of intracranial tumors during the period 1989-2002 in our institution

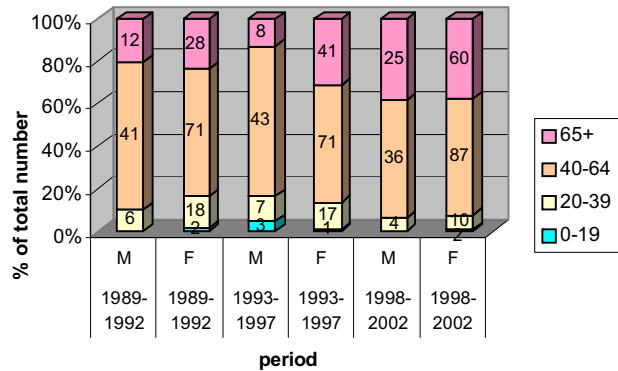


Figure 3. Proportional incidence of meningiomas according to the age groups, sexes, and time periods

gliomas, 593 (24.7%) meningiomas, 328 (13.6%) pituitary adenomas, and 159 (6.6%) schwannomas. Metastatic intracranial tumors were diagnosed in 326 (13.6%) patients (Fig.1).

In the observed period there were 1240 (51.6%) female, and 1163 (48.4%) male patients. The majority of the patients 1279 (53.2%) were between 40 and 64 years old, followed by the oldest age group with 469 (19.5%) and group between 20 and 39 with total of 434 (18.0%), while there were 221 (9.2%) patients under 20 years of age. We have noticed a linear increase of patient age for malignant gliomas and meningiomas during the observed period. Also, we have find higher proportion of patient over 65 at the end of observed period. To establish whether this higher proportion of elderly patients at the end of the examined period is significant, we have divided this time frame in 3 parts (1989-92, 1993-98, and 1998-2002).

For malignant gliomas in males the observed difference was statistically significant between the first and the third

part of the observed period ($p=0.044$) and for females the difference was even more significant ($p<0.001$) (Fig. 2).

The trend of linear increase in age of onset was also established for meningiomas. For females the difference between the combined first and second parts compared with the third part was statistically significant ($p=0.003$). For male patients this observed difference did not reach statistical significance ($p=0.059$) (Fig. 3).

Metastatic tumors which were almost twice more common in male patients (Fig. 4), also demonstrated a similar trend, but the observed difference was not statistically significant ($p=0.3$ for males and $p=0.58$ for female patients).

Schwannomas as a group have expectedly showed continuous female preponderance (Fig. 5). The same is true for pituitary adenomas in the first four years of the observed period, but in the last few years occurrence in our bioptic material was similar for both sexes (Fig.6).

We have also observed a linear decrease in number of PNETs, as well as ependymomas, but the numbers were too small for statistical analysis (Fig. 7).

This analysis presents the persistent trend of increasing age in patients with intracranial tumors during examined period. (Fig.8).

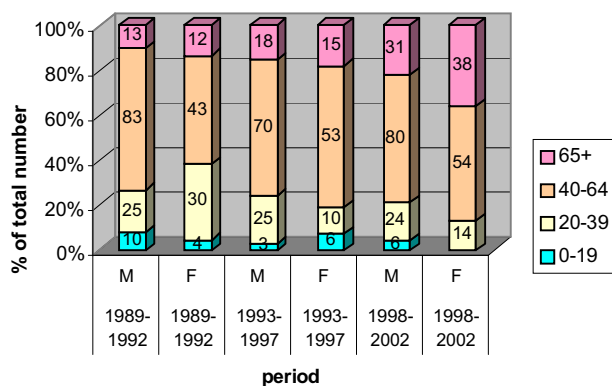


Figure 2. Proportional incidence of malignant gliomas according to the age groups, sexes, and time periods

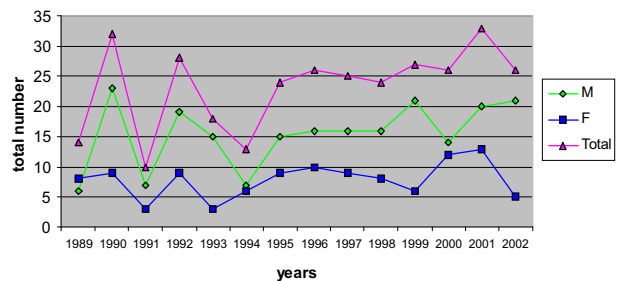


Figure 4. Frequency of metastatic tumors during the observed period – total and according to sex

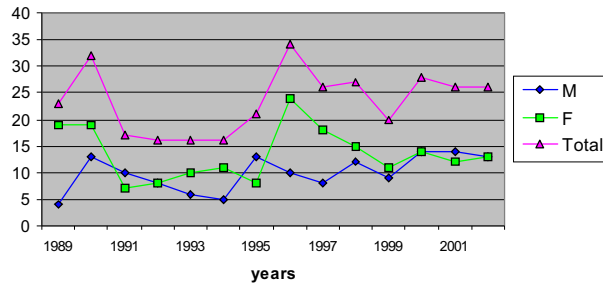


Figure 5. Frequency of pituitary adenomas during the observed period – total and according to sex

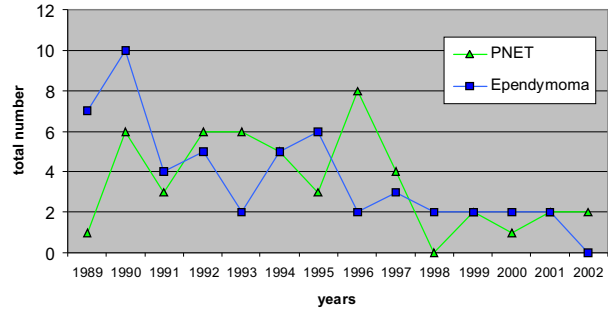


Figure 7. Frequency of PNETs and ependymomas during our study period.

Discussion and conclusion

The distribution of intracranial tumors over histologic types as observed in the present data is generally consistent with epidemiological surveys conducted in several other countries⁴⁻⁸. A recent study from Japan revealed a higher percentage of meningiomas among intracranial tumors compared to Western countries, which may be attributable to ethnical and cultural differences.

Similar to the previous reports, our study detected a higher rate of gliomas in males, while meningiomas and schwannomas occurred more frequently in female patients¹.

A study on pituitary adenomas from the United Kingdom showed a constant and sizable predominance of females for all examined time periods and age groups. In our study this is true for the first four years of the observed period, but during the last four years the occurrence in males and females was surprisingly similar, which is in accordance with the study from Japan. We do not have a clear explanation for this discrepancy, other than that some of the influencing factors may be similar in our population and Japan. The most common pituitary tumors are microadenomas, out of which prolactinomas are by far the predominant form, and they are particularly frequent in

females. At our institution, most of these neoplasms in females are treated conservatively, and therefore they are not included in our bioptic material. In contrast, male patients have usually presented with macroadenomas, and underwent surgery. This could explain the similar frequency of pituitary adenomas in both sexes in our study, even though pituitary adenomas are certainly more common in females. In addition, we have found a trend of increasing incidence of pituitary adenomas in males during the last four years of the observed period, but it did not reach statistical significance.

Decreasing number of PNETs in our material coincides with a previously noted decline in the incidence of medulloblastomas^{9,13}. We have also found a decline in frequency for ependymomas, which is in contrast with a previously reported study, which demonstrated an increasing incidence of these neoplasms¹⁰. The trends in incidence of these tumors in our population remain to be established over a longer time period.

Probably the most important trend that we have established is a trend of increasing patient's age at the onset, for both malignant gliomas and meningiomas, which is in the accordance with recent surveys. It has been shown that

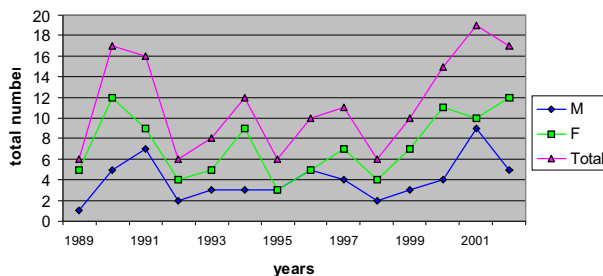


Figure 6. Frequency of schwannomas during the observed period – total and according to sex

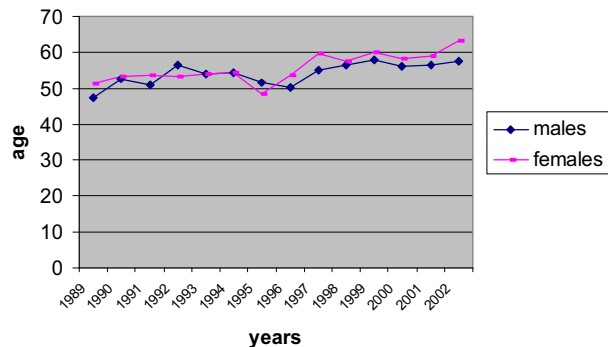


Figure 8. Trend of increasing age in patients with intracranial tumors during 14 years period

malignant gliomas seem to be increasing in elderly people, while reasons for this phenomenon remain unknown^{9,14,15,16}. It has been proposed that the increased utilization of modern neuro-imaging techniques, as well as improved medical services available to the elderly, may, at least in part, explain the higher incidence found in many socio-economically advanced societies^{8,17}. Our study also have detected trend of increasing incidence of all types of intracranial tumors in all age groups, but particularly among elderly. This finding is in accordance with recent reports from literature^{7,18}. We want to highlight that even with this trend of increasing incidence in the elderly, the mean age of patients with malignant gliomas at the end of the observed period was 49.6 years for males and 54.2 years for females, which is in accordance with reported studies from other countries. Therefore, the trend of increasing age in our study period may actually be due to a very young age of patients with malignant gliomas during the first and second part of the observed period.

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Sažetak

TREND PORASTA DOBI BOLESNIKA S INTRAKRANIJALNIM TUMORIMA PREMA HISTOLOŠKOJ PODJELI
TIJEKOM 14 GODIŠNJEG RAZDOBLJA (1989-2002)

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Cilj istraživanja bio je analizirati distribuciju i udio pojedinih histoloških grupa intrakranijskih tumora prema podacima Kliničkog zavoda za patologiju "Ljudevit Jurak" u vremenskom razdoblju od 1989.-2002.

Podaci o pacijentima iz naše kompjutorske baze podataka analizirani su prema histološkim dijagnozama, spolu i dobi (4 grupe) pacijenata.

Od ukupno 2403 intrakranijalna tumora, 667 (27,8%) činili su maligni gliomi, 593 (24,7%) meningeomi, 328 (13,6%) adenomi hipofize, te 159 (6,6%) schwannomi.

U ispitivanom razdoblju opažen je statistički značajan trend porasta učestalosti intrakranijalnih tumora u starijoj životnoj dobi, i to za grupu meningeoma kod žena, te za grupu malignih glioma u oba spola.

Distribucija i proporcionalni udio pojedinih grupa intrakranijskih tumora u materijalu naše institucije većim je dijelom u skladu s posljednjim europskim, japanskim, te sjevernoameričkim studijama.

Ključne riječi: *intrakranijalni tumori, distribucija, registar tumora*