ORIGINAL ARTICLE

REVISTA ENFERMAGEM ATUAL IN DERME

EPIDEMIOLOGICAL PROFILE AND FACTORS RELATED TO THE DEATH OF PATIENTS UNDERGOING MICROSURGERY FOR INTRACRANIAL TUMORS

PERFIL EPIDEMIOLÓGICO Y FACTORES RELACIONADOS CON LA MUERTE DE PACIENTES SOMETIDOS A MICROCIRUGÍA POR TUMORES INTRACRANEALES

PERFIL EPIDEMIOLÓGICO E FATORES RELACIONADOS AO ÓBITO DE PACIENTES SUBMETIDOS A MICROCIRURGIA PARA TUMORES INTRACRANIANOS

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ABSTRACT
Introduction: The patient with a Tumor of the Central Nervous System (CNS) after diagnosis goes through a long road to start and maintain treatment. The SUS Hospital Information System (SIH) enables the construction of important indicators, which are useful for monitoring and evaluating health care. **Aims**: to analyze the hospitalizations recorded for microsurgery for intracranial tumors in the state of Rio de Janeiro in 2019 and 2020 and correlate the death outcome with the factors age group, ICU admission, type of injury and nature of hospitalization. **Method**: quantitative, cross-sectional, retrospective and analytical study. **Results**: 342 microsurgeries for intracranial tumors were registered within the scope of the SUS in the state of Rio de Janeiro. Of the total surgeries, 211 (61.7%) were female and 131 (38.3%) were male. Of the total number of patients undergoing surgery in the period, 35 died (10.23%). Regarding age, 95 (27.8%) were between 36 and 53 years old, 152 (44.4%) were between 54 and 71 years old and 48 (14.1) were between 72 and 88 years old. With regard to race/color, the majority of microsurgeries for both sexes were concentrated among whites and mixed race, with 117 (78.5%) women and 76 (86.3%) men. **Conclusion**: The study highlighted the importance of the health information system in the State of Rio de Janeiro, for developing strategies that can facilitate the early diagnosis of CNS tumors and the scheduled and/or elective and rapid programming of microsurgeries for patients. intracranial tumors.
Keywords: CNS tumor; mortality; demographic profile.

RESUMO
Introdução: O paciente portador de Tumor do Sistema Nervoso Central (SNC) após o diagnóstico perpassa por um longo caminho para início e manutenção do tratamento. O Sistema de Informações Hospitalares (SIH) do SUS possibilita a construção de importantes indicadores, que são úteis para a monitoração e avaliação da assistência à saúde. **Objetivos**: analisar as internações registradas para microcirurgia para tumores intracranianos no estado do Rio de janeiro no ano de 2019 e 2020 e correlacionar o desfecho óbito aos fatores faixa etária, internação na UTI, tipo da lesão e caráter da internação. **Método**: estudo quantitativo, transversal, retrospectivo e analítico. **Resultados**: Foram registradas 342 microcirurgias para tumores intracranianos no âmbito do SUS no estado do Rio de Janeiro. Do total das cirurgias, 211 (61,7%) foram do sexo feminino e 131 (38,3%) do sexo masculino. Do total de pacientes submetidos a cirurgia no período, 35 evoluíram para óbito (10,23%). Quanto a idade 95 (27,8%) tinham entre 36 e 53 anos, 152 (44,4%) entre54 e 71 anos e 48 (14,1) entre 72 e 88 anos. No que se refere a raça/cor, a maioria das microcirurgias para ambos os sexos esteve concentrada entre brancos e pardos sendo 117 (78,5%) mulheres e 76 (86,3%) homens. **Conclusão**: O estudo evidenciou a importância do sistema de informação em saúde no Estado do Rio de Janeiro, para elaboração de estratégias que possam facilitar o diagnóstico precoce do tumor de SNC e a programação de maneira agendada e/ou eletiva e rápida das microcirurgias para os tumores intracranianos.
Palavras-chave: Tumor SNC; Mortalidade; Perfil Demográfico.

RESUMEN
Introducción: El paciente con un Tumor del Sistema Nervioso Central (SNC) luego del diagnóstico recorre un largo camino para iniciar y mantener el tratamiento. El Sistema de Información Hospitalaria (SIH) del SUS permite la construcción de importantes indicadores, que son útiles para el seguimiento y evaluación de la atención en salud. **Objetivos**: analizar las hospitalizaciones registradas por microcirugía de tumores intracraneales en el estado de Río de Janeiro en 2019 y 2020 y correlacionar el desenlace de muerte con los factores grupo etario, ingreso en UTI, tipo de lesión y naturaleza de la hospitalización. **Método**: estudio cuantitativo, transversal, retrospectivo y analítico. **Resultados**: Se registraron 342 microcirugías para tumores intracraneales en el ámbito del SUS en el estado de Río de Janeiro. Del total de cirugías, 211 (61,7%) fueron femeninas y 131 (38,3%) masculinas. Del total de pacientes intervenidos quirúrgicamente en el período, 35 fallecieron (10,23%). En cuanto a la edad, 95 (27,8%) tenían entre 36 y 53 años, 152 (44,4%) tenían entre 54 y 71 años y 48 (14,1) tenían entre 72 y 88 años. En cuanto a raza/color, la mayoría de las microcirugías para ambos sexos se concentraron entre blancos y mestizos, con 117 (78,5%) mujeres y 76 (86,3%) hombres. **Conclusión**: El estudio destacó la importancia del sistema de información en salud en el Estado de Río de Janeiro, para el desarrollo de estrategias que puedan facilitar el diagnóstico precoz de tumores del SNC y la programación programada y/o electiva y rápida de microcirugías para pacientes con tumores intracraneales.
Palabras clave: Tumor del SNC; Mortalidad; Perfil Demográfico.

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INTRODUCTION

Cancer is the leading public health problem in the world, and is currently among the four leading causes of premature mortality in most countries. For Brazil, the estimate for each year of the 2023-2025 triennium is 704,000 new cases of cancer, with non-melanoma skin cancer being the most common, affecting around 483,000 people, followed by breast and prostate cancer (73,610 and 71,730 cases, respectively)[1].

Regarding new cases of Central Nervous System (CNS) cancer for the same period, 6,110 new cases in men and 5,380 in women are expected in Brazil, totaling 11,490 new cases in the country[2].

After diagnosis, patients with Central Nervous System (CNS) tumors go through a long and arduous path to start and maintain treatment, with numerous medical appointments, biopsies, exams, appointments with the interdisciplinary team, chemotherapy, radiotherapy, and surgery, resulting in a tangle of actions that the patient and family need to unravel and undertake to remain on the therapeutic path and maintain the continuum of care[3].

The CNS is made up of the spinal cord and brain. Approximately 88% of CNS tumors develop in the brain. The symptoms, treatment, and prognosis of these tumors will depend on the histological type of the lesion, the exact location where it is growing, and the patient's age. These tumors can be primary, when they originate from cells in the CNS itself, and can have indolent or aggressive behavior, depending on the histopathology, with meningiomas and gliomas being the most common, or secondary (metastatic) tumors from extracranial tumors[2,3].

Patients with CNS tumors present with variable clinical presentations, which may present focal or generalized impairments, the most frequent being nausea, vomiting, and seizures that usually manifest progressively, worsening over time. Depending on the affected region, motor and sensitivity changes, decreased visual and auditory acuity, language changes, personality changes, memory changes, and disorientation may be manifested. The vast majority of these patients will require an intense support network to continue treatment and home care. It is important to emphasize that even tumors considered benign and indolent can put pressure on brain structures, causing irreversible and fatal neurological damage[1].

For primary CNS tumors, surgery is the treatment of choice. Tumor resection should be maximal, avoiding impairment of neurological functions due to the extent of the resection. Treatment may also involve radiotherapy and chemotherapy, either exclusively or as an adjuvant to the surgical procedure[3].

According to INCA[1], the treatment for this type of tumor is quite complex and must involve the entire multidisciplinary team, including speech therapists, nurses, nutritionists, and physiotherapists. For patients with CNS tumors, time is crucial to maintaining quality of life; late diagnosis and treatment can lead the patient to develop irreversible motor or cognitive complications.

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Therefore, characterizing patients undergoing microsurgery for intracranial tumors and correlating these data with mortality may contribute to the planning of health actions aimed at this population and the general population, since from the moment that factors that may be related to death are established, actions can be developed to help reduce this outcome.

The present study aims to: analyze hospitalizations registered for microsurgery for intracranial tumors in the state of Rio de Janeiro in 2019 and 2020; and correlate the outcome of death with the factors of age group, ICU admission, type of injury and nature of hospitalization.

METHODS

This is a quantitative, cross-sectional, retrospective, analytical study focusing on secondary data from the Hospital Information System (SIH) of the SUS. All microsurgeries for intracranial tumors were included, according to hospitalization in the period 2019 and 2020, corresponding to the complete years, totaling 342 microsurgeries for intracranial tumors, 163 in 2019 and 179 in 2020 in the state of Rio de Janeiro.

To compose the sample, patients who underwent microsurgery for intracranial tumors in the SUS Network and services affiliated with SUS in the state of Rio de Janeiro in 2019 and 2020 were selected, regardless of age group; adult and pediatric patients were included in the study[4].

The state of Rio de Janeiro has an estimated population of 17,463,349 inhabitants in 2021, and is made up of 92 municipalities spread over an area of 43,696 thousand km². It is divided into nine health regions, each with its own specificities regarding the regionalization process: Baía de Ilha Grande, Baixada Litorânea, Centro Sul, Médio Paraíba, Metropolitana I, Metropolitana II, Noroeste, Norte and Serrana[4].

Territorial information is extremely important in understanding the processes of division of labor, product and income and their constant changes. According to the researcher from the Department of Epidemiology and Quantitative Methods at ENSP Iuri da Costa Leite, the close relationship between demography and health possibly emerged in 1662 with John Graunt. For Leite, epidemiology, demography and biostatistics are fundamental disciplines for public health, the elaboration of indicators, development of methods and mainly the collection of information is extremely necessary [5].

In an interview with the president of the Association of Population Studies (Abep) Jair Lício Ferreira dos Santos diz, “the connection between health and demography is complex. While demography is essentially a scientific discipline, health can be interpreted as a sector of activities that include services, production and research. Health is also a broad concept and there have been many attempts to define it.”[5]

However, data from the Hospital Information System of the Unified Health

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System (SIH/SUS) were used, which is made available by the Ministry of Health through the Department of Information Technology of the Unified Health System (DATASUS). It consists of a database where information is collected from Hospital Admission Authorizations (AIH), demographic and clinical data, thus allowing the description of hospital morbidity and mortality within the scope of services contracted by the SUS. This system allows the determination of the profile of all hospitalizations within the scope of the SUS, and their corresponding costs, as well as the profile of patients undergoing such hospitalizations.

The following variables were used for the study: age, race/color, length of ICU stay, sex, death (yes or no), and the International Statistical Classification of Diseases and Related Health Problems (ICD). This information is in the public domain and was collected from SIH-SUS (SUS hospital morbidity – by place of hospitalization, Rio de Janeiro, accessed through the R statistical program in June/2022) for the period 2019 and 2021.

As the first stage of the study, the distribution of microsurgeries for intracranial tumors in the state of Rio de Janeiro in 2019 and 2020 was analyzed. Through the frequency distribution, the qualitative variables were analyzed, and for the quantitative variables, measures such as mean, standard deviation, maximum and minimum values were calculated. The chi-square test was used to verify the association between the variables, considering a significance level of 5%. The analyses were performed using the R software. After describing the data, a discussion was held based on the literature on the subject.

Since this is a study that used data made available electronically in DATASUS by the Ministry of Health, and this information is in the public domain, there was no need to submit the project to the Research Ethics Committee.

RESULTS

During the years 2019 and 2020, which were considered in this study, 342 microsurgeries for intracranial tumors were registered within the scope of SUS in the state of Rio de Janeiro. Of the total surgeries, 211 (61.7%) were female and 131 (38.3%) were male. Of the total number of patients undergoing surgery in the period, 35 died (10.23%), of which 26 (74.3%) were female and 9 (25.3%) were male. Regarding age, 24 (7%) patients were pediatric, under 18 years old, 23 (6.7%) were between 18 and 35 years old, 95 (27.8%) were between 36 and 53 years old, 152 (44.4%) between 54 and 71 years old and 48 (14.1) between 72 and 88 years old. Regarding race/color, most microsurgeries for both sexes were concentrated among whites and browns, with 117 (78.5%) women and 76 (86.3%) men (31% of patients did not have their race/color recorded in the SIH). 44.5% of the neoplasms were benign, 54.8% were malignant and 0.7% of the lesions were metastatic malignant, as shown in Table I.

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Table I - Distribution of the frequency of microsurgeries for intracranial tumors according to sex, year, type of surgery, age group, ICU stay and type of tumor, correlating with the mortality of the population studied in 2019-2020 in Rio de Janeiro.

	DEATHS	
Variables	**YES**	**NO**
Gender		
Male	9	122
Female	26	185
Year		
2019	18	145
2020	17	162
Surgery Level		
Elective	09	158
Urgency	26	149
Age Range		
0 to 17 yo	0	24
18 to 35yo	3	20
36 to 53 yo	7	88
54 to 71 yo	13	139
72 to 88 yo	12	36
ICU stay		
Yes	24	171
No	11	136
Tumor Type		
Benign	11	140
Malignant	24	164

Source: SIH – SUS – Ministry of Health
(*) 106 data not registered in SIH
(**) 03 cases were not related to Intracranial Tumor

In Table I, which refers to the mortality of the studied population, it was shown that 74.3% of the total number of deaths were among women and 25.7% among men.

The hospitalizations of patients who underwent microsurgery for intracranial tumors in 2019 and 2020 were selected for the study in order to perform a comparative analysis of the procedures before and after the COVID-19 pandemic, to assess the number of procedures in the year preceding the pandemic and in the first year of the pandemic, and the number of deaths in the periods mentioned. Table 1 shows that there was no reduction in procedures in 2020, the first year of the pandemic. On the contrary, procedures increased by more than 10%, going from a total of 145 surgeries in 2019 to 162 in

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2020. When we compare the number of deaths, we observe a reduction in deaths in 2020 when compared to 2019, where in 2019 we had 18 death outcomes against 17 in 2020.

In this study, hospitalizations of patients who underwent microsurgery for intracranial tumors in 2019 and 2020 were selected, as shown in Table I, with elective (51.5%) and emergency (48.5%) surgeries obtaining practically similar percentages. However, when comparing mortality, 74.3% of deaths were of patients undergoing emergency surgery and 25.7% elective surgeries.

When we correlate the outcome of death with the age group, we observe that 71.4% of the total number of deaths occurred in the population over 54 years old and that there were no deaths among the pediatric group (0 to 17 years old), which proves the relationship between age and death.

Regarding the hospitalization of patients undergoing microsurgery for intracranial tumors in the Intensive Care Unit (ICU), it is observed that 42.9% of the total number of patients approached did not go through the ICU and 57.1% needed to be admitted to the ICU. 68.6% of the total deaths occurred among the group of patients who were admitted to the ICU, although the highest number of deaths was among patients admitted to the ICU, admission to the ICU does not increase the chance of death among this population.

The correlation between the death outcome and the type of tumor presented by the patient was also presented. The definition of benign and malignant was defined based on the ICD presented in the patient's primary diagnosis. 46.1% of patients who did not progress to death underwent microsurgery for benign intracranial tumors or tumors of benign origin and 53.9% for treatment of malignant neoplasms. 31.4% of the death outcomes were related to benign disease and 68.6% to malignant neoplasms.

When analyzing ICU admissions and the nature of the admission, it was possible to see that the nature of the admission was not related to the need for ICU admission. When analyzing the correlation between age group and nature of the admission, we observed that 65.7% of all emergency interactions were in individuals over 54 years of age.

Regarding the correlation between the year of competence and the nature of the hospitalization, it was evident that in 2019, the pre-pandemic year, the majority of surgeries (58.9%) were performed on an urgent basis, followed by 41.1% of elective procedures. When compared to 2020, during the pandemic, this profile was reversed, with 55.9% of elective hospitalizations followed by 44.1% of emergency hospitalizations. Regarding the complexity of the procedure, 100% were characterized as highly complex procedures, as shown in Table II.

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Table II - Distribution of frequencies of variables according to the nature of hospitalization in 2019 and 2020 in Rio de Janeiro.

	Level of Admission			
	Elective		Urgency	
	N	%	N	%
ICU				
Yes	107	64,1	88	50,3
No	60	35,9	87	49,7
Age range				
0 to 17	21	12,6	3	1,7
18 to 35	15	9,0	8	4,6
36 to 53	46	27,5	49	28,0
54 to 71	65	38,9	87	49,7
72 to 88	20	12,0	28	16,0
Complexity				
High Complexity	167	100	175	100
Year				
2019	67	41,1	96	58,9
2020	100	55,9	79	44,1

Source: SIH – SUS – Ministry of Health

(*) p-values derived from the Chi-square test

DISCUSSION

The results of the research showed that the age group with the highest frequency of hospitalizations for microsurgery of intracranial tumors was 54 to 71 years old, with a significantly higher number of women undergoing the procedure, 61.4% versus 38.6% of men. Regarding mortality in this population, 48.6% more deaths were observed among women, with 74.3% of the total deaths being related to the female sex and 25.7% to the male sex. Regarding the age of deaths, it was evident that 71.4% occurred in individuals over 54 years old, this finding strongly corroborates the results obtained by Gasparini (2010), who showed that there was a significant increase in mortality from CNS tumors in people over 50 years old in the city of Rio de Janeiro.

Although CNS tumors are considered a rare disease, due to the increase in their incidence, mortality and high lethality, they have gained more epidemiological importance. These tumors are among those that lead to the most

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deaths, and are the second most important cause of death related to neurological diseases. The vast majority of patients suffer from highly limiting sequelae, with all socioeconomic dynamics altered and requiring great assistance to perform their daily activities. Therefore, knowing the sociodemographic profile and factors related to death of the population studied is extremely important[3].

The study showed that only 7% of all microsurgeries for intracranial tumors in the state of Rio de Janeiro, in 2019 and 2020, were performed on children under 18 years of age, and that there were no deaths in this age group in the period described. Despite the results obtained through this research, it is known that CNS tumors are a major challenge for pediatric oncology, being the second most common diagnostic group in childhood, contributing to approximately 19% to 27% of neoplasms in the most developed countries[6].

When we present the data regarding the nature of hospitalization and the outcome of death within the population studied, we can see that there is no major difference between elective hospitalization (51.5%) and emergency hospitalization (48.5%). However, when we talk about the outcome of death, we can see that 74.3% of the total number of deaths occurred among patients who underwent emergency hospitalization, that is, who had to undergo microsurgery for intracranial tumors that were not scheduled electively. According to the Ministry of Health[7], the probability of death in surgical patients depends on multiple factors, including: the patient's preoperative conditions (age, sex, comorbidities, among others), the type of procedure and nature of admission (urgent, emergency, scheduled or elective surgery), and the hospital's performance.

The research showed that 100% of microsurgeries for intracranial tumors in the population studied were highly complex procedures and that 55.7% of patients required intensive care unit (ICU) care during their hospitalization. Of the total deaths, 68.6% occurred among the population that required ICU care. It is desirable to achieve increasingly lower surgical mortality rates. However, for these rates to provide reliable information, the data must be provided within their context and with additional information. We know that teams that receive more serious patients, with comorbidities, older patients, especially in urgent and emergency situations, and that perform more complex procedures, have a higher mortality rate[7].

Regarding the type of tumor, 53.9% of the total tumors treated in the population described were histopathologically malignant, this group accounted for 68.6% of the total deaths among the population studied, this result corroborates what was evidenced by Gaparini (2010), the results of the research carried out by the author showed that malignant tumors are the most frequent and responsible for an average of 80% of the deaths that occurred in the period in which she studied.

According to Farias[8], as a result of the fight against the COVID-19 pandemic, it is estimated that in Brazil 1 million surgeries,

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whether elective or emergency, were accumulated in 2020, resulting in delays throughout the process. However, regarding microsurgery for intracranial tumors, the data show that in 2019, 163 surgeries were performed in the state of Rio de Janeiro, compared to 169 in 2020, which presents us with an unexpected result that diverges from the previously mentioned research.

In view of the data analyzed, the main characteristics of patients undergoing microsurgery for intracranial tumors showed a significant relationship with mortality, thus highlighting the possibility of developing health actions aimed at reducing the death outcome, based on the disclosure of the characteristics listed in this study as risk factors for this outcome, which can then be used as a guide for defining preventive measures such as providing priority beds in the ICU, multidisciplinary monitoring from admission to extra-hospital post-surgical recovery, and ongoing counseling and guidance to family members and/or support networks, highlighting information about possible complications.

CONCLUSIONS

The study highlighted the importance of the health information system in the State of Rio de Janeiro for developing strategies that can facilitate the early diagnosis of CNS tumors and the scheduling of scheduled and/or elective and rapid microsurgeries for intracranial tumors, which would probably help reduce complications and deaths. Knowing the profile of patients undergoing such procedures also helps to establish an extra-hospital support network, taking into account the high level of dependency of most patients.

Although the findings of this research will greatly contribute to the care of patients undergoing microsurgery for intracranial tumors, the limitations of the SIH are highlighted, such as coding errors, inadequate completion of hospital admissions, under-registration, lack of information such as race, associated diseases, among others, which could greatly enrich the results of the research and the search for improvements in care.

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Declaration of conflict of interests

Nothing to declare.

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