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Research Article

Primary Spinal Tumors Epidemiology in Fars, Iran: A Multi-Center Retrospective Study

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Abstract

Background: Primary spinal tumors are rare, and epidemiologic studies on this topic are limited. These tumors may originate from the spinal cord, cauda equina, or spinal meninges. Various factors, including age and sex, influence the epidemiology of primary spinal tumors.

Objectives: This study provides a descriptive report on the epidemiology of primary spinal tumors in Fars province, southern Iran.

Methods: We retrospectively collected data from patients with primary spinal tumors who underwent surgery at major neurosurgery centers in Fars province from 2001 to 2019. Descriptive statistics were used to analyze data concerning sex, age, tumor histology, and behavior.

Results: The study included 166 patients with primary spinal tumors. The mean age of the patients was 41.9 years (SD, 17.1 years), with 55.4% being female. Among the patients, 66.9% had spinal cord tumors, 25.9% had tumors of the spinal meninges, and 7.2% had tumors in the cauda equina. Most tumors were intradural extramedullary (45.2%), followed by intramedullary tumors (42.2%) and extradural tumors (12.7%). Of the total, 76 tumors (45.8%) were classified as malignant, while 90 tumors (54.2%) were non-malignant. The most frequent histological types were ependymoma (24.1%), nerve sheath tumors (22.3%), and meningioma (20.5%). An increase in the relative incidence of astrocytic and ependymal tumors was observed compared to previous studies conducted in the same region.

Conclusions: This study presents a comprehensive epidemiologic report on primary spinal tumors in Fars province, Iran. Further nationwide studies, including all diagnosed spinal tumors, are recommended.

Keywords: Primary Spinal Tumors, Spinal Cord, Cauda Equina, Neoplasm, Epidemiology

1. Background

Spinal tumors are critically important due to their potential to cause significant disability by affecting the spinal cord and nerve roots (1). Primary spinal tumors include those arising from the spinal cord, cauda equina, and spinal meninges (2). These tumors are relatively rare, comprising approximately 3% of all central nervous system (CNS) tumors (3, 4). The rarity of the disease hinders research on the topic and undermines the effective management of patients with primary spinal tumors. The incidence of primary spinal tumors in Iran is approximately 0.48 per 100,000 individuals (5), which is lower than the rates observed in the United States (0.97 per 100,000) and Korea (3.26 per 100,000) (2, 6). This variation can be attributed to several factors, including genetic predispositions, environmental factors, and differences in healthcare access and diagnostic capabilities. Notably, countries with lower income levels tend to report lower incidence rates of spinal tumors (7). This highlights the necessity for region-based epidemiological studies on spinal

nerves and ependymomas (2, 15, 16). When comparing the results to data from the same region between 1962 and 1986 (9), we observed an increase in the relative incidence of ependymal and astrocytic tumors (Figure 1). This finding, along with the higher prevalence of astrocytic tumors noted in comparison to other regions (2, 15, 16), suggests a potential rise in the prevalence of these tumors in the Fars region over time. However, it is important to note that this data does not definitively indicate an increase in the incidence rate of these tumors, as this study only evaluates the relative incidence among surgically treated patients and does not assess population-based incidence rates. Given the significance of this issue, further studies are warranted to confirm this trend and explore its underlying etiology.

Regarding sex-based differences, the percentage of women with primary spinal tumors was higher compared to men. While malignant tumors were almost equally distributed between sexes, the proportion of female patients was higher in non-malignant tumors. These observations align with other reports from the United States and Korea (2, 6). Meningioma was the most common histological type of primary tumor observed among women, and ependymal tumors were the most frequent tumor among men, consistent with previous observations (2). The frequency of primary spine tumors was lowest in patients under 20 years old and highest in patients aged 40 to 60 years. Similarly, the majority of primary spine tumors were observed in middle-aged patients in Korea and the United States (2, 6). Astrocytic tumors were the most frequent histologic type in young patients, while meningioma was the dominant tumor in patients over 60 years.

Our study has several limitations. First, the database only included spinal tumors confirmed through pathological samples; therefore, it was not possible to reliably calculate the incidence rate of all spinal tumors. Future studies that include all diagnosed spinal tumors will help address these biases and provide a clearer understanding of spinal tumor epidemiology. Second, we did not evaluate metastatic tumors or tumors of the vertebrae, as the data, primarily collected from tertiary referral centers, may not fully represent these cases. More comprehensive studies are needed to establish population-based incidence rates of all spine tumors in Iran. Lastly, our study population was limited to Fars province; therefore, additional research on spinal tumor epidemiology at the national level is recommended.

5.1. Conclusions

This study presents the epidemiology of primary spinal tumors in Fars province, offering a detailed analysis of age and sex differences as well as the distribution of histological types of spinal tumors. We observed a higher prevalence of ependymal and astrocytic tumors compared to other regions and earlier studies conducted in this area. Further research is necessary to confirm these findings and explore their underlying etiology.

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Footnotes

Authors' Contribution: A. S. and M. F. conceptualized and supervised the study. I. A. provided the data and designed the study. M. G., A. N., and S. A. were involved in the extraction and preparation of the data. A. N. analyzed the data and wrote the original draft. All authors reviewed and confirmed the final draft of the article.

Conflict of Interests Statement: The authors declare that there are no conflicts of interest to disclose regarding this article.

Data Availability: The dataset presented in the study is available on request from the corresponding author during submission or after publication. The data are not publicly available due to concerns regarding patient privacy.

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