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Editorial

Risk factors of meningioma

Meningioma is a common pathology in the central nervous system (CNS). It arises from the arachnoid cap cells of the arachnoid villi in the meninges, which envelop the brain and spinal cord. Therefore, a meningioma can occur anywhere from the vertex to the spine. It is often named according to its anatomical location. For example, a meningioma abutting the sphenoid bone between the frontal and temporal lobes is called a sphenoid ridge meningioma. A meningioma can be malignant, but it is usually benign and causes few symptoms until it reaches a large size. Because of the slow rate of tumor growth, a meningioma that is found incidentally may require no treatment other than periodic follow up. For symptomatic meningioma, an intradural extra-axial neoplasm can be managed with surgical resection when it produces a significant mass effect or can be managed with radiosurgery if its maximal diameter is <3 cm. With the advances in modern image technology (e.g., magnetic resonance images), contemporary neurosurgical practice usually obtains good results in the treatment of a meningioma.

The risk factors of meningioma remain elusive. Epidemiology studies have demonstrated a higher prevalence rate of meningioma in women.[1] Type 2 neurofibromatosis (NF) is frequently associated with multiple meningiomas, whereas type 1 NF is not associated with an increased risk of meningioma.[2] The most common genetic mutations involved in meningiomas are inactivation of the NF 2 gene on chromosome 22q. There are several other genes that may be involved in the development of meningioma such as the *AKT1, MN1,* and *PTEN* genes.[3,4] Environmental causes, ionizing radiation, and exogenous hormones have also been correlated with intracranial meningioma in several previous studies.[5–8] Despite these reports, the actual etiology and risk factors of meningioma in the CNS remain uncertain.

In this issue of the *Journal of the Chinese Medical Association*, there is an interesting article entitled "Risk of meningioma in patients with head injury: A nationwide population-based study", by Dr. Kuan and colleagues.[9] The authors should be commended for utilizing a large data analysis to investigate the association between head injury and meningioma.[9] They compared 75,292 patients with head injury to a matched cohort without head injury (as the control). During the follow-up of approximately 430,000 person-years, they found 17 meningioma cases in the head injury cohort and 14 meningioma cases in the control cohort. Therefore, the authors concluded that head injury is an unlikely cause of meningioma.

However, there are several caveats to the study. The follow-up period in this cohort was relatively short and variable (e.g., an average of 5 years and ranging from 31 days to 10 years). Considering the fact that a meningioma is a slow-growing tumor, a longer follow-up is required to establish a correlation between it and various etiologies. The incidence rates of meningioma were as low as 3.23 per 100,000 person-years reported in the current study. With such low incidence rates, a case-controlled study design would be more appropriate to elucidate the causal effect of head injury. Furthermore, the heterogeneity of the head injury cohort is a significant concern. It is reasonable to infer that concussion, contusional brain hemorrhage, and diffuse axonal injury cause a great variety of effects in oncogenesis. These confounding factors would limit the power of this study. Further investigation is encouraged to explore the causes of meningioma and other oncology in the CNS.

Conflicts of interest

The author declares that there are no conflicts of interest to declare related to the subject matter or materials discussed in this article.

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