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Meningioma and it's relation with Diabetes

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KEYWORDS

Meningioma,
Diabetes,
Prevalence

A B S T R A C T

Meningiomas are the most common benign intracranial tumor. Diabetes mellitus, or simply diabetes, is a group of metabolic diseases in which a person has high blood sugar, either because the pancreas does not produce enough insulin, or because cells do not respond to the insulin that is produced. The aim of this study was evaluation of diabetes mellitus prevalence in patients with meningioma and age/sex distribution. In a cross-section and descriptive-analytical study that performed in neurosurgery department of Tabriz University of medical sciences on patients with meningioma, incidence rate of diabetes in patients with meningioma evaluated. 14 of patients were male and 30 of them were female. Mean age of male patients was 48.14 ± 14.59 and in female patients was 51.43 ± 10.89 ($P=0.408$). Ten (22.7%) of studied patients were diabetic. Mean age of diabetic patients was 57.40 ± 9.04 and in non-diabetic patients was 48.32 ± 12.23 ($P=0.036$). All diabetic patients were female and frequency of diabetes in female patients with meningioma was significantly higher ($P=0.018$). 8 of patients had HTN. Results of our study show that the meningioma was more frequent in female patients and incidence of that was increasing with age and also the prevalence of diabetes was significantly higher in patients with meningioma than normal population.

Introduction

Meningiomas are the most common benign intracranial tumor. They originate from arachnoid cap cells, which are cells within the thin, spider web-like membrane

that covers the brain and spinal cord. The arachnoid is one of three protective layers, collectively known as the meninges, surrounding the brain and the spinal cord.

The meninges also include the dura mater and pia mater (Cushing, 1922; Buetow, 1991). Although the majority of meningiomas are benign, these tumors can grow slowly until they are very large if left undiscovered, and, in some locations, can be severely disabling and life-threatening. Most patients develop a single meningioma; however, some patients may develop several tumors growing simultaneously in other parts of the brain or spinal cord.

Some meningiomas are found along the dural lining in the venous sinuses of the brain and skull base, locations where arachnoid cap cells are most abundant. The following subtypes are based on the location of the tumor (Cushing, 1922; Buetow, 1991).

Diabetes mellitus, or simply diabetes, is a group of metabolic diseases in which a person has high blood sugar, either because the pancreas does not produce enough insulin, or because cells do not respond to the insulin that is produced (Williams textbook of endocrinology, 2000). This high blood sugar produces the classical symptoms of polyuria (frequent urination), polydipsia (increased thirst) and polyphagia (increased hunger) (Williams textbook of endocrinology, 2000). Although meningioma and LGG are characterized as slow growing tumors with long preclinical phases (Behin, 2003). In contrast, results for diabetes and stroke are more consistent with the putative dichotomy between slow-growing and fast-growing tumors (Brenner, 2002). The aim of this study was evaluation of diabetes mellitus prevalence in patients with meningioma and age/sex distribution.

Methods

In a cross-section and descriptive-analytical study that performed in neurosurgery

department of Tabriz University of medical sciences on patients with meningioma, incidence rate of diabetes in patients with meningioma evaluated.

In this study, 44 patients with meningioma that diagnosed and were under treatment in neurosurgery ward of Emam Reza hospital selected and evaluated PMH of these patients and Rates of diabetes in the patients was studied.

The initial portion of the statistical analysis included descriptive statistics. We used t-tests, chi-square analysis, and Fisher exact tests to examine the association between the risk of meningioma and independent covariates and $P < 0.05$ was considered significant.

Result and Discussion

14 of patients were male and 30 of them were female. Mean age of male patients was 48.14 ± 14.59 and in female patients was 51.43 ± 10.89 and significant difference was not found in mean of age between two gender ($P=0.408$) (Chart 1).

Ten of studied patients were diabetic (Chart 2). Mean age of diabetic patients was 57.40 ± 9.04 and in non-diabetic patients was 48.32 ± 12.23 year and mean of age in diabetic patients was significantly higher ($P=0.036$) (Chart 3).

Frequency percent of diabetic patients based on gender was shown in chart 4, it was observed that all diabetic patients were female and frequency of diabetes in female patients with meningioma was significantly higher ($P=0.018$). 8 of patients had HTN (Chart 5).

Meningioma accounted for 33.8% of all primary brain and CNS tumors reported in the US between 2004 and 2006 and thus

represent the most frequently diagnosed primary brain tumor in adults(Central Brain Tumor Registry of the United States, 2010).

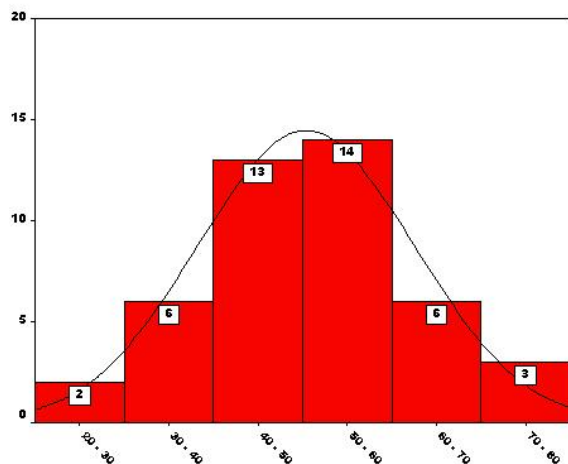


Chart.1 Age distribution of patients with Meningioma

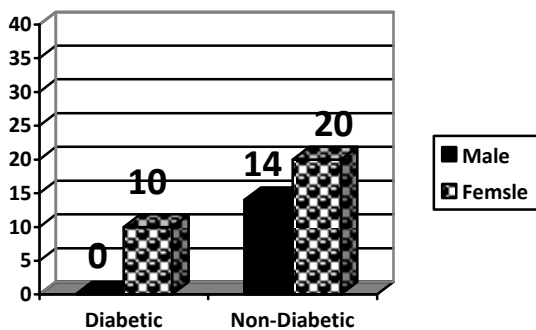


Chart.2 Frequency of diabetic and non-diabetic patients based on sex.

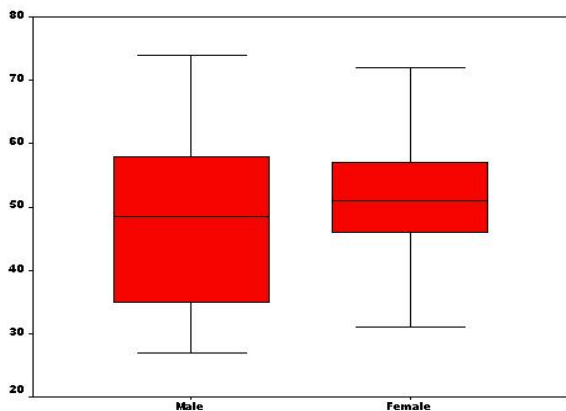


Chart.3 Age distribution of patients based on sex

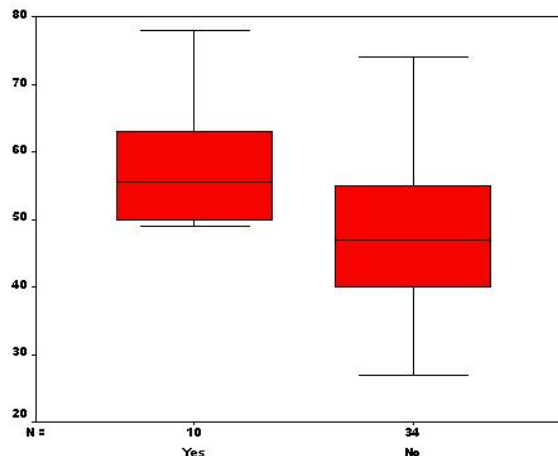


Chart.4 Age distribution of patients based on Diabetes

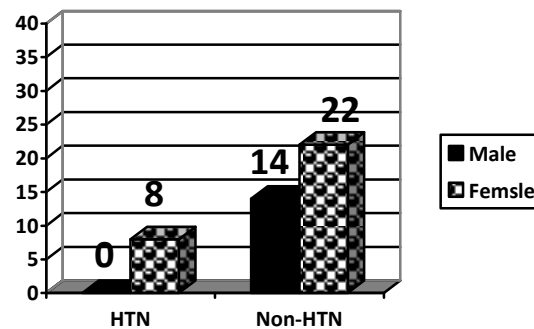


Chart.5 Frequency of HTN and non-HTN patients based on sex.

Worldwide there are varying reports on the prevalence of meningiomas among intracranial neoplasms. Different reports state intracranial meningiomas, gliomas or metastatic tumours as the most common tumour among intracranial neoplasms (Ibebuikwe, 2013).

The study of Ibebuikwe and et al, showed that meningioma is the most common tumour among intracranial neoplasms (Ibebuikwe, 2013).

Meningiomas are among the most common primary intracranial tumors. Although the

vast majority of these tumors are considered histologically benign, the incidence of complications can be high(Barnholtz-Sloan and Kruchko, 2007).

Meningiomas are the most common primary brain tumor, the incidence of which rises with age(Cohen-Inbar, 2011). Surawicz demonstrate that, Meningiomas were the only tumors with a significant excess in females (RR = 0.5) (Surawicz, 1999). Few risk factors for meningioma, aside from increasing age and female sex, have been identified(Johnson, 2011). Their incidence increases with age, and they affect women more commonly than men. The annual incidence per 100,000 people ranges from two to seven for women and from one to five for men (Longstreth, 1993).

In this study male to female ratio of patients with meningioma was 0.46, it was observed that frequency of meningioma was significantly higher in female patients.

Mean age of patients with meningioma was 50.38 ± 12.11 most of patients were in 50-60 years (chart 1). Long-term HRT use, particularly of combined oestrogen-progestagen therapy, may increase the risk of meningioma (Andersen, 2013). Molecular and clinical observations suggest a role of sex steroid hormones in the occurrence of meningioma (Blitshteyn, 2008).

The potential effects of endogenous or exogenous sex hormones on tumor induction or growth remain unexplored in epidemiologic studies(Longstreth, 1993). Obesity increases the risk for a number of solid malignant tumours. However, it is not clear whether body mass index (BMI) and height are associated with the risk of primary tumours of the central nervous system (CNS)(Wiedmann, 2013). These results Wiedmann and et al study, suggest

that BMI is positively associated with meningioma risk in women(Wiedmann, 2013).

The positive association with height suggests a role for early life influences on risk, whereas the associations with BMI and physical activity suggest a role for modifiable factors later in life (Johnson, 2011). A significant improvement of hyperinsulinemic diabetes was observed in a patient with Werner's syndrome after the removal of a large parasagittal-meningioma (Montecucco, 1984).

The possible relationship between meningioma and diabetes in Werner's syndrome is discussed (Montecucco, 1984). Prevalence of diabetes in our study was 22.7% that more than prevalence of diabetes in Society. These results show meningioma are not an infrequent occurrence in MEN 1, and loss of the function of the MEN1 gene product plays a role in their pathogenesis in these patients (Asgharian, 2004).

Several diseases and medical treatments are discussed as risk factors for the development of brain tumors (Schlehofer, 1992). Results of our study show that the meningioma was more frequent in female patients and incidence of that was increasing with age and also the prevalence of diabetes was significantly higher in patients with meningioma than normal population.

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