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# Intracranial meningiomas: Two-years experience of Mustafa Kemal University

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**ABSTRACT**

Meningiomas are the most common type of brain tumors. We have analyzed clinical, radiological and pathological characteristics of meningiomas that were diagnosed and operated in our centre. Twenty three meningioma cases operated in our hospital between 2010-2012 were reviewed retrospectively. Sixteen (69.1%) of cases were female and 7 (30.9%) of cases were male. The age range was 22-75. The most common symptoms of patients were headache, seizure, nausea and vomitting. Localizations of tumors were falx, cortex, sphenoid wing, posterior fossa-tentorium, olphactor, and sulcus. The surgical sizes were graded according to Simpson classification and 16 (69.1%) of cases were Grade 2 and 7 (30.9%) of cases were Grade I. At the histopathological examination; meningotheliomatous type was the most common type followed by fibrous, angiomatous, transitional, psammomatous and atypical types. Meningiomas are usually benign tumors with good prognosis which are often encountered in daily pathology and neurosurgery practice.

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## 1. Introduction

Meningiomas are one of the most common type of brain tumors constituting about 25% of all adult primary intracranial tumors (Claus et al., 2005). These tumors originates from arachnoid cap cells and frequently occurs in 5$^{th}$-6$^{th}$ decade and over with slight female predominance (Greenberg, 2001). The etiology of meningiomas remains unclear, but ionizing radiation, brain injury, smoking, chronic viral infection, chromosomal abnormalities were proposed to be predisposing factors (Phillips et al., 2005). Meningiomas are generally benign and slow-growing tumors with less agressive behaviour (Ragel and Jensen, 2005). In this study the clinical, pathological characteristics and localizations of meningioma cases in our center at 2010-2012 have been analyzed.

## 2. Materials and methods

We retrospectively reviewed records of the 23 patients operated and diagnosed as intracranial meningiomas in our center between 2010-2012. Patients files, pathology reports, radiological scans and surgical notes were reviewed and post-operative status of patients were recorded. Symptoms, clinical findings of patients and localizations of lesions were determined.

## 3. Results

Sixteen (69.1%) of cases were female and 7 (30.9%) of cases were male. The age range was 22-75. The avarage age was determined as 55.8±15.07. The patients referred to neurosurgery outpatient clinic due to headache (n:13, 56.5%), seizure (n:2, 8.7%), nausea and vomitting (n:2, 8.7%), behavioral and cognitive changes (n:2, 8.7%), hemiplegy (n:2, 8.7%), visual changes (n:1, 4.35%), hearing loss (n:1, 4.35%) (Table 1). Radiologic localizations of tumors were falx (n:7, 30.4%), corteks (n:6, 26.1%), sphenoid wing (n:5, 21.7%), posterior fossa-tentorium (n:3, 13.1%), and olphactory sulcus (n:2, 8.7%) (Table 2). The surgical sizes were graded according to Simpsons classification and 16 (69.1%) of cases were Grade II and 7(30.9%) of cases were Grade I. Fourteen patients had no problem during post-operative course (Fig. 1(a-b), 2(a-b)), while 4 patients died; 2 with cardiac arrest, 2 had hydrocephalus and pneumonia. One patient diagnosed as pneumonia, had antibiotherapy and recovered with no residual symptom. One patient had Cerebrospinal fluid (CSF) collection after the surgery, lomber drainage and dural impairment were applied. One patient had hemiparesia and was taken into rehabilitation programme and got progress. One patient had radiotherapy due to the residuel tumor and

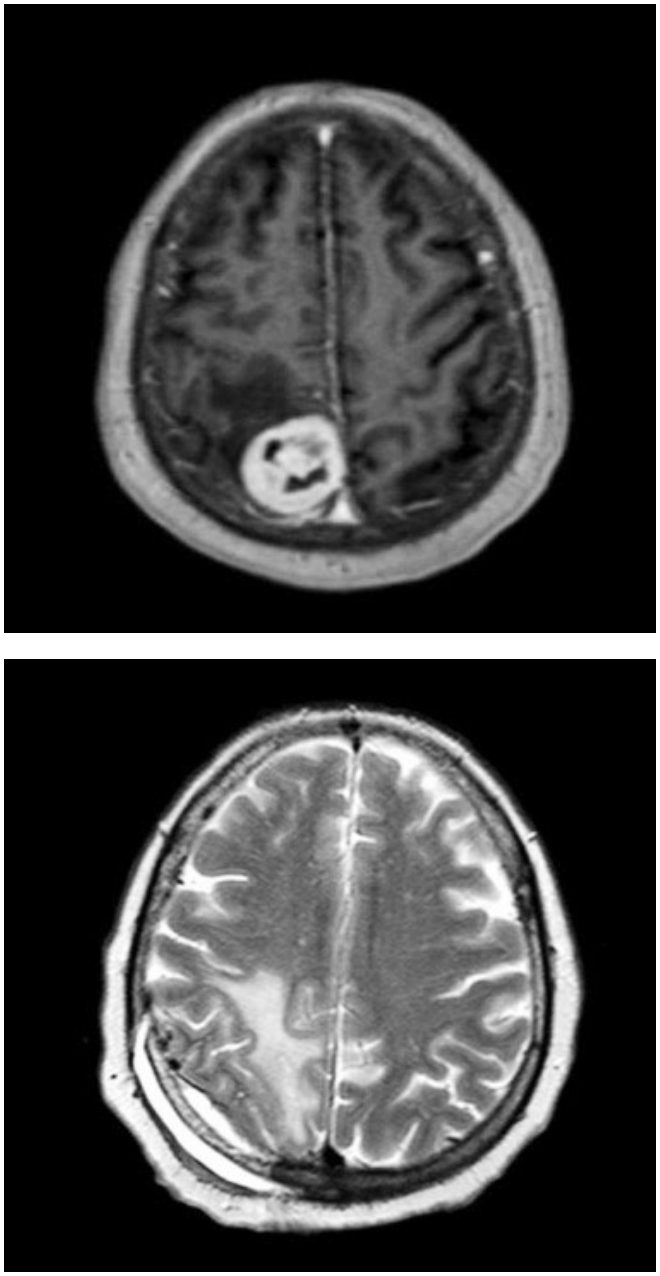

**Fig. 1(a-b).** MRI of the patient with parasagittal falx meningioma preoperatively (a) and at 1-month follow-up (b)

had no symptoms afterwards. Meningotheliomatous type (n:10, 43.4%) is the most common type followed by fibrous (n:5, 21.7%) (Fig. 3), angiomatous (n:4, 17.4%) (Fig. 4), transitional (n:2, 8.7%), psammomatous (n:1, 4.3%), and atypical (n:1, 4.3%) types.

**Table 1. Distribution of patients' symptoms**

| Symptoms | Number(n) | % |
|---|---|---|
| Headache | 13 | 56.5 |
| Seizure | 2 | 8.7 |
| Nausea and vomitting | 2 | 8.7 |
| Behavioral and cognitive changes | 2 | 8.7 |
| Hemiplegy | 2 | 8.7 |
| Visual changes | 1 | 4.35 |
| Hearing loss | 1 | 4.35 |

## 4. Discussion

Intracranial meningiomas are primarily benign tumors with 5 year-survival rates of 72% in females and 66% in males (McCarthy et al., 1998; Claus et al., 2005). The optimum age range of meningioma in adults is 40-60 and there is a female predominance (Greenberg, 2001). Our cases' age range was wide differing from 22 to 75, but mean age was 55.8±50 years and a slight female predominance of 69% was obtained similar with the literature (Greenberg, 2001; Yılmaz, et al., 2012). Moon et al. (2012), evaluated prognostic factors of WHO Grade II meningiomas and found out that the patients had a median age of 48.4 years and similar to our study group there has been slight female predominance with 29/26: Female/male in their series. In a study conducted by Mahmood et al. (1993), typical and malign meningiomas were observed in males more often than females. Meningioma etiology still

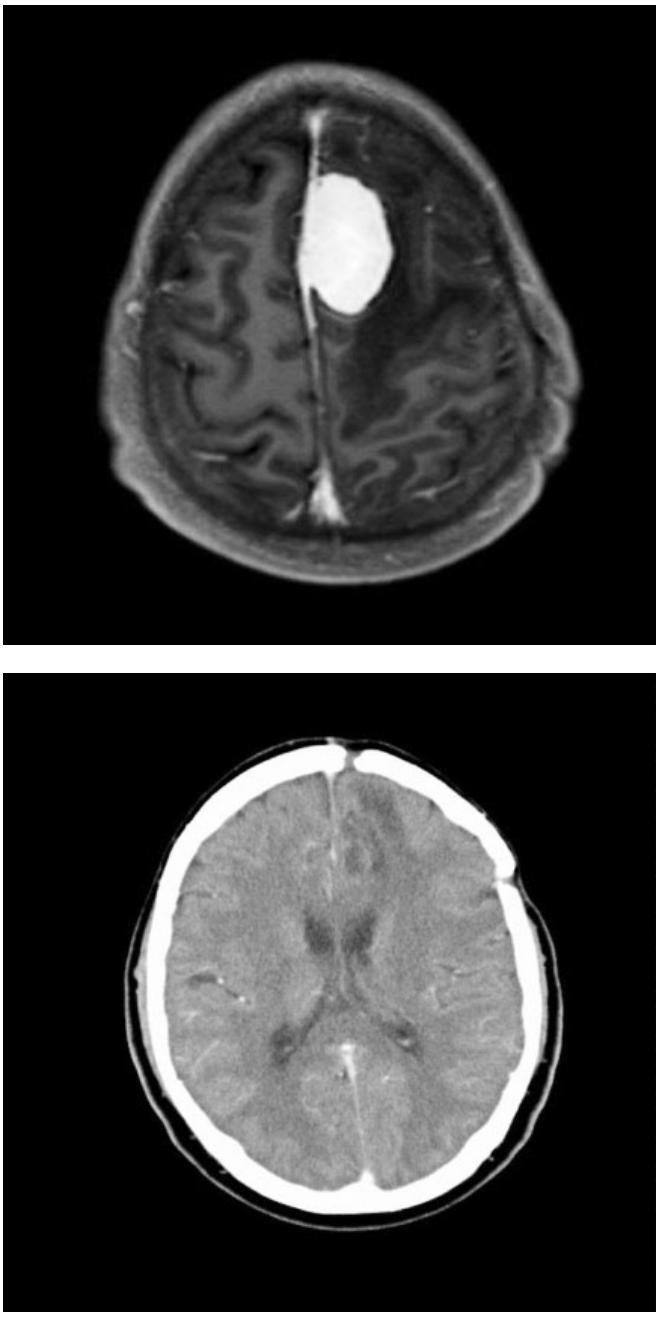

**Fig. 2(a-b).** (a): MRI brain (gado) axial (plain) section shows anterior parasagittal falx meningioma (b): Post-operative CT shows totally removed

**Table 2. Distribution of tumor localizations**

| Localization | Number(n) | % |
|---|---|---|
| Falx | 7 | 30.4 |
| Corteks | 6 | 26.1 |
| Sphenoid wing | 5 | 21.7 |
| Posterior fossa-tentorium | 3 | 13.1 |
| Olphactory sulcus | 2 | 8.7 |

remains elusive but female predominance suggests a role for hormonally mediated risk factors (Claus et al., 2012). Trauma, ionizing radiation, brain injury, smoking, chronic viral infection, chromosomal abnormalities are proposed to be other predisposing factors (Phillips et al., 2005; Nakasu et al., 2009). We could not demonstrate spesific etiological agents in our cases which could be related to the minority of our study group. Symptoms of meningiomas vary due to the localization of tumoral mass and compression of brain which can affect cranial nerves and blood vessels. Patients referred to neurosurgeon mostly with headache, seizures, nausea and vomitting, visual changes and sometimes visible changes produced by the tumor extending into the bones of head and face (Alexiou et al., 2010). Similar to the literature headache has been the most common symptom followed by seizure and other symptoms in our cases. Ninety percent of meningiomas located supratentorially. Parasagittal region, convexity and falx were described to be the favourite regions of these tumors (Chan et al., 1984; Tuna et al., 1999). Radiologic localizations of tumors were mostly falx and cortex, sphenoid wing, posterior fossa-tentorium and olphactor sulcus were less frequent in our series. Different from our study Yılmaz et al. (2012), stated sphenoid wings as the most common localization of meningiomas in their series.

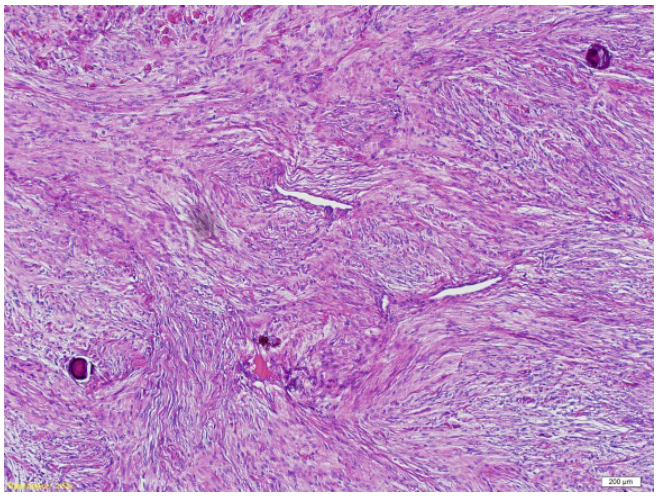

**Fig. 3.** Fibroblastic meningioma; fascicles of fiber-like cells with abundant interstitial collagen and a few psammoma bodies (Hematoxylene&Eosin X100).

Meningiomas are 25% isodense and 75% slightly hiperintense on non-contrast Computed Tomography (CT). Calcification and edema may be present in up-to10-25% cases with different forms. Homogenous dense enhancement is generally observed with contrast media administration. On magnetic resonance imaging typical meningiomas are usually isointense (60-65%), or hypointense (30-35%) relative to

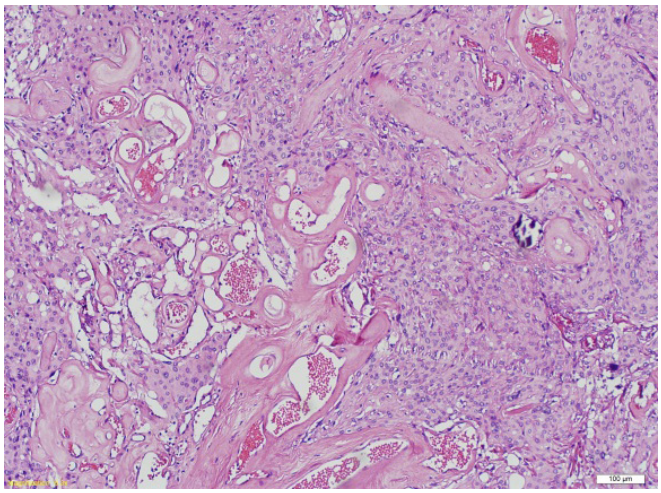

**Fig. 4.** Angiomatous meningioma; composed of numerous vascular structures with thick, hyalinised walls and meningothelial cell proliferation (Hematoxylene&Eosin X100).

brain (Ginsberg, 1996). After administration of contrast, an enhancing ‘‘dural tail’’ which reflects neoplastic dural infiltration or reactive vascularity, or both, draining into the adjacent dura is specific sign for meningiomas. CT is more widely available for rapid screening in urgent settings, and can be used when patients have magnetic resonance imaging (MRI) exclusions (such as pacemakers). Conventional angiography is most often performed for preoperative endovascular embolization and is intended to reduce intraoperative complications (Saloner et al., 2010).

Meningiomas comprise one of the most encountered intracranial tumors with different histopathological variants. Almost all (96%) of meningiomas are typical meningiomas; meningotheliomatous type being the commonest (Rohinger et al., 1989; Torres et al., 1996). Similar with the literature meningotheliomatous type has been the most common type in our study too, followed by fibrous, angiomatous, transitional, psammomatous and atypical types. Twenty two (95.6%) of our cases were Grade I while 1 (4.3%) case was Grade II. Karabaglı et al. (2004) also stated Grade I meningiomas were more frequent than Grade II meningiomas in their series. Surgical excision is the available treatment in the current literature on meningiomas. There are five grades for surgical excision according to Simpsons classification system (Simpson, 1957). This surgical grading system has become a consensus for the excision of meningiomas. Sixteen (69.1%) of our cases were Grade II and 7 (30.9%) of cases were Grade I. Radical surgical excisions planned by the Simpson grading system reduces the recurrence rates. One of our patients had radiotherapy due to the residual tumor and had no symptoms afterwards. Stereotactic and external beam radiotherapy offers another option in irresectable meningiomas. Peptide receptor radionuclide therapy and hormonal therapies have been used as alternative approaches in advanced cases (Flickinger et al., 2003; Wolfsberger et al., 2004). There are some studies suggesting non-toxic somatostatin analogues might treat recurrent meningiomas (Chamberlain et al., 2007).

In conclusion; our data of last two years demonstrating meningiomas in our clinic are similar with the literature findings. Our goal is to perform more effective diagnostic and therapeutic approaches concommittant with scientific novelties in our hospital evoking new researchs.

**REFERENCES**

Alexiou, G.A., Gogou, P., Markoula, S., Kyritsis, A.P., 2010. Management of meningiomas. Clin. Neurol. Neurosurg. 112, 117-182.
Chamberlain, M.C., Glantz, M.J., Fadul, C.E., 2007. Recurrent meningioma: Salvage therapy with sandostatin. Neurology. 69, 969-973.
Chan, R.C., Thompson, C.B., 1984. Morbidity mortality and quality of life following surgery for intracranial meningiomas: A retrospective study in 257 cases. J. Neurosurg. 60, 52-60.
Claus, E.B., Bondy, M.L., Schildkraut, J.M., Wiemels, J.L., Wrensch, M., Black, P.M., 2005. Epidemiology of intracranial meningioma. Neurosurg. 57, 1088-1095.
Claus, E.B., Calvocoressi, L., Bondy ,M.L., Wrensch, M., Wiemels, J.L., Schildkraut, J.M., 2012. Exogenous hormone use, reproductive factors, and risk of intracranial meningioma in females. J. Neurosurg. 118, 649-656.
Flickinger, J.C., Kondziolka, D., Maitz, A.H., Lunsford, L.D., 2003. Gamma knife radiosurgery of imaging-diagnosed intracranial meningioma. Int. J. Radiat. Oncol. Biol. Phys. 56, 801-806.
Ginsberg, L.E., 1996. Radiology of menigiomas. J. Neurooncol. 29, 229-238.
Greenberg, M.S., 2001. Tumor. In: Hand book of Neurosurgery. 5th ed. New-York: Thieme press, 407-410.
Karabaglı, P., Gucluer, B., Erdincler, G., Aksoy, N., Barlas, A., 2004. The histopathologic features of 172 meningioma cases. Türkiye Ekopatoloji Dergisi 10, 13-19.
Mahmood, A., Caccamo, D.V., Tomecek, F.J., Malik, G.M., 1993. Atypical and malignant meningiomas: A clinicopathological review. Neurosurgery. 33, 955-963.
McCarthy, B.J., Davis , F.G., Freels, S., Surawicz, T.S., Damek, D.M., Grutsch, J., 1998. Factors associated with survival in patients with meningioma. J. Neurosurg. 88, 831-839.
Moon, H.S., Jung, S., Jang, W.Y., Jung, T.Y., Moon, K.S., Kim, I.Y., 2012. Intracranial meningiomas WHO Grade II: Prognostic implications of clinicopathologic features. J. Korean Neurosurg. Soc. 52, 14-20.
Nakasu, S., Fukami, T., Jito, T., Nozaki, K., 2009. Recurrence and regrowth of benign meningiomas. Brain Tumor Pathol. 26, 69-72.
Phillips L.E, Longstreth Jr W.T., Koepsell, T., Custer, B.S., Kukull, W.A., van Belle G., 2005. Active and passive cigarette smoking and risk of intracranial meningioma. Neuroepidemiology. 24, 117-122.
Ragel, B.T., Jensen, R.L., 2005. Molecular genetics of meningiomas. Neurosurg. Focus. 19, E9.
Rohinger, M., Sutherland, G.R., Louw D., 1989. Incidence and clinicopathologic features of meningioma. J. Neurosurg. 71, 665-672.
Saloner, D., Uzelac, A., Hetts, S., Martin, A., Dillon, W., 2010. Modern meningioma imaging techniques. J. Neurooncology. 99, 333-340.
Simpson, D., 1957. The recurrence of intracranial meningiomas aftersurgical treatment. J. Neurol. Neurosurg. Psychiatr. 20, 22-39.
Torres, L.F., Madalazzo, L.E., Werner, B., 1996. Meningiomas, epidemiological and anatomopathological study of 340 cases. Arq. Neuropsiquiatr. 54, 549-556.
Tuna, M., Göçer, A.I., Gezercan, Y., Vural, A., Ildan, F., Haciyakupoglu, S., Karadayi, A., 1999. Huge meningiomas: A Review of 93 Cases. Skull Base Surg. 9, 227-238.
Yılmaz, I., Gunaldı, O., Eseoglu, M., 2012. Intracranial meningiomas: Investigation of 85 cases with literature search. Türk Nöroşirurji Dergisi 22, 80-83.
Wolfsberger, S., Doostkam, S., Boecher-Schwarz, H.G., Roessler, K., VanTrotsenburg, M., Hainfellner, J.A., 2004. Progesterone-receptor index in meningiomas: Correlation with clinico-pathological parameters and review of the literature. Neurosurg. Rev. 27, 238-245.