



Surgical treatment of intracranial meningiomas in patients over 65 years old: A retrospective study of 70 cases

Altmış beş yaş üzeri hastalarda intrakranial meningiomların cerrahi tedavisi: 70 olguluk retrospektif bir çalışma

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Abstract

Aim: Intracranial meningiomas are the most common types of brain tumor in patients over 65 years of age. Surgical resection in this group of patients may be at risk of severe complications, due to limited physiological capacities and the presence of comorbidities. This retrospective study aimed to summarise outcome data of patients older than 65 years who underwent surgery for intracranial meningioma at our clinic between Jan 2007 and Dec 2012.

Materials and Methods: Medical records of 70 cases diagnosed with intracranial meningioma were retrospectively reviewed. Demographic and clinical data (age, sex, symptoms), tumor localization, histopathologic properties, American Society of Anesthesiology (ASA) class, complications of the early postoperative period were analyzed.

Results: Male/female ratio was 0.37 and mean age was 71.3. The most common experienced symptoms were headache (78.5%), motor deficit (18.5%) and seizure (17.1%). Tumors were mostly settled to convexities (34.3%) and parasagittal regions (17.1%). Histopathological diagnoses were classified as follows; Meningothelial (40.0%), transitional (18.6%), fibroblastic (11.4%) and psammomatous (11.4%). Postoperative complications were manifested in 10 of 70 patients (14.2%) Complication rate was prominently higher in patients with class III and IV of ASA class.

Conclusions: Surgery for intracranial meningiomas in selected elderly patients is beneficial. Old age alone should not be used as a selection criterion for treatment.

Keywords: Brain Surgery; Complications; Elderly; Intracranial Meningioma.

Öz

Amaç: İntrakranial meningiomlar 65 yaş üstündeki hastalarda beyin tümörlerinin en yaygın türleridir. Bu hasta grubunda sınırlı fizyolojik kapasite ve yandaş hastalıkların varlığı nedeniyle cerrahi rezeksiyon ciddi komplikasyon riski içerebilir. Bu retrospektif çalışmada kliniğimizde Ocak 2007 ve Aralık 2012 tarihleri arasında intrakranial meningiom nedeniyle ameliyat edilen 65 yaş üstü hastalardan elde edilen verilerin özetlenmesi amaçlanmıştır.

Gereç ve Yöntemler: İntrakranial meningiom tanısı 70 olgunun tıbbi kayıtları retrospektif olarak gözden geçirildi. Demografik ve klinik veriler (yaş, cinsiyet, semptomlar), tümör lokalizasyonu, histopatolojik özellikler, Amerikan Anesteziyoloji Derneği (ASA) skorları, ameliyat sonrası erken dönem komplikasyonlar analiz edildi.

Bulgular: Erkek/Kadın oranı 0.37 ve ortalama yaş 71.3 idi. En sık görülen semptomlar, baş ağrısı (%78.5), motor defisit (%18.5) ve nöbet (%17.1) idi. Tümörler sıklıkla konveksite (%34.3) ve parasagittal bölgede (%17.1) ile yerleşim göstermekteydi. Histopatolojik tanımlar sırasıyla Meningotelyal (%40.0), transizyonel (%18.6), fibroblastik (%11.4) ve psammomatöz (%11.4) şeklindeydi. Postoperatif komplikasyonlar 70 hastanın 10'unda (%14.2) görüldü. Komplikasyon oranı ASA skoru III ve IV olan hastalarda belirgin olarak yüksekti.

Sonuç: Seçilmiş yaşlı hastalarda intrakranial meningiomlar için cerrahi tedavi faydalıdır. İleri yaş tek başına tedavinin bir seçim kriteri olarak kullanılmamalıdır.

Anahtar Kelimeler: Beyin Cerrahi; İntrakranial Meningiom; Komplikasyonlar; Yaşlı.

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INTRODUCTION

Parallel to the improvements in imaging methods and their extensive use, brain tumours have now become more frequently diagnosed pathologies. Meningioma, one of the most frequently seen types of brain tumours originates from the cap cells located outside the

arachnoid membrane, which is usually associated with the dura, and has an extra-axial localization (1).

While the incidence of meningiomas might vary depending on the region of study, time period, population, ethnic origin, and the mean age of the investigated population, according to data of Central Brain Tumour Registry of United States (CBTRUS), a population-based cancer registry system in the United States, meningiomas were responsible from 36.9% (35.9% non-malignant, 0.5% malignant) of all cases diagnosed with primary brain and central nervous system tumours between 2008-2012, positioning them at the top of the list.

The mean age of the patients with meningioma at the time of diagnosis was estimated to be 64 years. The incidence of meningioma increases with age, with a dramatic peak, particularly in people aged above 65. CBTRUS study reported the age distribution among the newly diagnosed patients with primary brain tumour and SSS tumours (Figure 1) and the age-dependent incidence rates of meningiomas (Figure 2) (2).

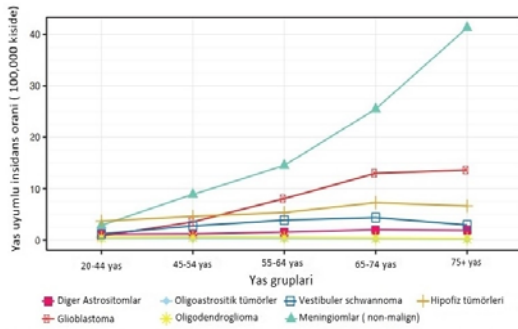


Figure 1. Distribution of newly diagnosed patients with primary brain and central nervous system tumors based on age groups (Ostrom et al.: CBTRUS 2008-2012 Statistics report)

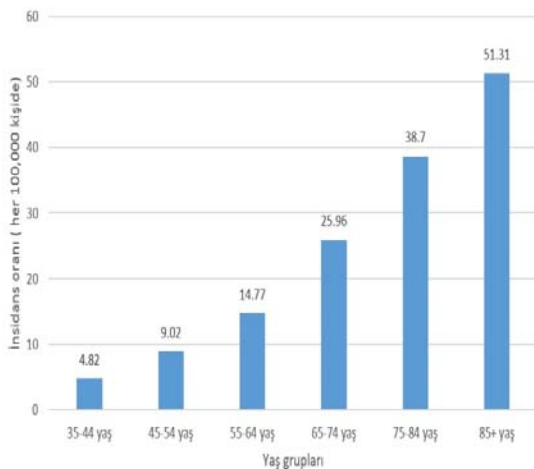


Figure 2. Mean age-specific yearly incidence rates of meningiomas (Ostrom et al.: CBTRUS 2008-2012 statistics report)

Although intracranial meningiomas are usually benign lesions, they can still potentially cause high rates of morbidity and mortality, particularly in the geriatric age group when the patients are inadequately selected in the absence of preoperative assessments. Both due to the contribution of technological improvements in medical practices and the extensive use of and accumulated experience regarding microsurgery and endoscopic techniques, several previous studies in the literature reported high success rates along with a low rate of complications, for surgical resection of intracranial meningiomas in geriatric patients (3-13).

The present study aims to review the demographical and clinical characteristics, histopathological findings, complication rates and surgical outcomes for geriatric patients diagnosed with intracranial meningioma, who were operated at our clinic.

MATERIALS and METHODS

All patients, who were operated for an intracranial mass and diagnosed with meningioma at our clinics between 2007 and 2012, were retrospectively screened for this study. Among the patients, 70 patients aged 65 and above, whose complete medical records were available and they were included in this study. The medical data of the patients were accessed through the hospital's data processing system. Medical files of the patients, results of radiologic investigations, anaesthesia and surgery notes, pathology reports and clinical follow-up records were systematically reviewed. Patients' complaints and findings at admission, preoperative American Society of Anaesthetists (ASA) scores, mass localization, histopathological classification of pathologic tissue samples based on the classification system modified by World Health Organization (WHO) in 2007, postoperative complications and the distribution of all the parameters according to age and gender were analysed.

RESULTS

A total number of 70 patients, aged 65 years and above, were operated due to meningioma. Of 70, 51 (72.8%) were female and 19 (17.2%) were male, whereas the male/female ratio was 0.37. The mean age of the study group was 71.3±6.8 years (Min: 65, Max: 103). Table 1 shows the distribution characteristics of patients between the age groups. Headache was the most frequent complaint at admission (78.5%), followed by the motor deficit and seizure complaints. (Table 2) All the patients had undergone a computerized cranial tomography (CT) and a contrast cranial magnetic resonance imaging (MRI). The most common sites of tumour localization were the convexity (34.3%) and parasagittal (17.1%) regions. (Table 3)

The histopathological investigations showed that 88.6% of the cases (62 cases) had WHO Grade I disease. The most common sub-type was the meningothelial meningioma (40.0%), followed by transitional type

(18.6%). WHO Grade II patients, including four patients with atypical meningioma and two patients with clear cell sub-type, accounted for 8.6% (6 patients) of the study sample. There was no patient with chordoid sub-type. WHO Grade III disease was noted in 2.8% (2 patients) of the patients and included anaplastic and rhabdoid meningiomas.

There was no patient with papillary type. (Table-4) All the patients were preoperatively evaluated by anesthesia clinics based on ASA scoring. Based on the age groups, most of the patients were included in the ASA II-III groups. (Table 5). In total, 10 (14.2%) out of 70 patients developed postoperative complications. However, none of the ASA I patients developed a complication. The rates of complications in ASA II, III and IV groups were 5.2%, 27.2% and 33.3%, respectively. The rate of postoperative complications was markedly higher in the ASA III and IV patient groups as compared to the ASA I and II patient groups. Table 6 presents the postoperative complications based on the ASA scores.

Table 1. Distribution of patients based on age groups and gender

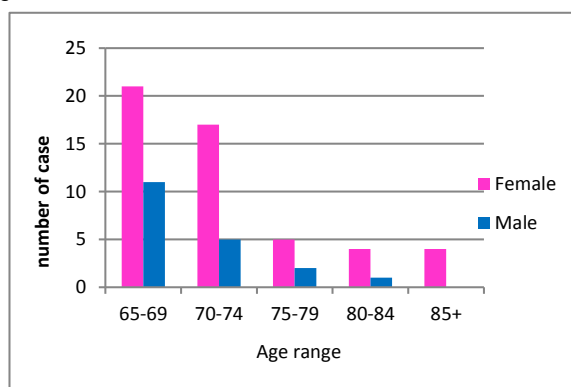


Table 2. Distribution of the patients' complaints and examination findings at admission

Complaint-Examination Finding	Number of patients (%)
Headache	55 (78.5%)
Motor deficit	13 (18.5%)
Seizures	12 (17.1%)
Sensory loss	8 (11.4%)
Asymptomatic	6 (8.5%)
Visual defects	6 (8.5%)
Cerebellar findings	5 (7.1%)
Behavioral changes	5 (7.1%)
Cranial nerve paralysis	3 (4.2%)

Table 3. Lesion localization of patients

Localization	Number of patients (%)
Convexity	24 (34.3%)
Parasagittal	12 (17.1%)
Sphenoid wing	6 (8.6%)
Falx cerebri	6 (8.6%)
Tuberculum sella	5 (7.1%)
Olfactory groove	4 (5.7%)
Pontocerebellar angle	4 (5.7%)
Tentorium	3 (4.3%)
Multiple	3 (4.3%)
Foramen magnum	2 (2.8%)
Lateral ventricle	1 (1.4%)

Table 4. Histopathological classification of the patients

WHO Grade	Sub-type	Number of patients (n,%)
3	Meningothelial	28 (40.0%)
	Transitional (mixed)	13 (18.6%)
	Fibrous (fibroblastic)	8 (11.4%)
	Psammomatous	8 (11.4%)
	Angiomatous	3 (4.3%)
	Microcystic	1 (1.4%)
	Secretory	1 (1.4%)
	Lymphoplasmacyte-rich	0
	Metaplastic	0
	II	Atypical
Clear cell		2 (2.8%)
Chordoid		0
III	Anaplastic	1 (1.4%)
	Rhabdoid	1 (1.4%)
	Papillary	0

Table 5. Distribution of preoperative ASA scores based on age groups

Age (years)	ASA I n(%)	ASA II n(%)	ASA III n(%)	ASA IV n(%)
65-69	3 (8.5%)	21 (54.3%)	8 (31.4%)	0 (0%)
70-74	1 (5.7%)	14 (35.7%)	6 (23.8%)	1 (2.8%)
75-79	0 (0%)	2 (5.2%)	3 (11.4%)	2 (5.7%)
80-84	0 (0%)	1 (2.6%)	3 (11.4%)	1 (2.8%)
85 +	0 (0%)	0 (0%)	2 (7.6%)	2 (5.7%)
Total	4 (5.7%)	38 (54.3%)	22 (31.4%)	6 (8.5%)

Table 6. Distribution of postoperative complications based on preoperative ASA scores

Postoperative Complications	ASA I n(%)	ASA II n(%)	ASA III n(%)	ASA IV n(%)
Hematoma	0	1 (2.6%)	2 (9.0%)	0
Meningitis-CSF fistula	0	1 (2.6%)	1 (4.5%)	0
Wound-site	0	0	2 (9.0%)	0
Status epilepticus	0	0	1 (4.5%)	0
Total	0	2 (5.2%)	6 (27.2%)	2 (33.3%)

DISCUSSION

Because meningiomas are generally slowly-growing tumours, they might not cause any symptoms until they are large enough. Indeed, some meningiomas are incidentally detected during radiological investigations conducted for non-related symptoms. The frequency of incidental detection of intracranial meningiomas is higher in the geriatric age group as compared to younger patients (14).

Total resection is the primary surgical treatment option for meningiomas, as they are generally benign tumours. Surgical treatment is recommended for all symptomatic cases, even for very old patients (age \geq 80 years).

While some previous studies reported that surgical excision of intracranial meningiomas was associated with a serious increase in mortality and morbidity among the elderly (15-18), successful surgical outcomes can be achieved today with a low rate of complications, owing to the extensive use of microsurgery and minimally invasive surgeries and the accumulated surgical experiences. (3-13).

Niirio et al. conducted a study on 40 patients to evaluate the natural course of asymptomatic meningioma in the elderly. In their study, no tumour growth was detected in almost two-thirds of the cases after a mean follow-up of 42 months, where the disease followed an asymptomatic course in the patients. Tumour growth was noted in one-third of the patients, after a mean follow-up of 32 months. Approximately one-third of the patients with tumour growth became symptomatic.

The authors underlined the need for careful clinical and radiological monitoring in the asymptomatic patients due to the possibility of tumour growth and symptomatic transformation (14).

In our study, six patients were operated despite being asymptomatic. Radiological investigations of two patients showed progressive growth in tumour size. Apart from large tumour size, the remaining four patients

were under the potential risks for epilepsy and sagittal sinus invasion, and proximity of meningiomas to motor cortex regions.

In a study conducted by Boviatsis et al., 348 patients operated for supratentorial meningioma were classified into two groups as patients being over and below 65 years of age, and the rates of complications were compared between these groups.

The rate of complication in younger and older patient groups was 11.7% and 20.4%, respectively. When the complications were compared between these groups, infections and cardiopulmonary problems were almost 2-folds more common and the rates of DVT and hematoma events were almost three times higher in older patients as compared to others (5). In the present patient series, the overall rate of complications was found to be 14.2%. Moreover, the rate of postoperative complications was markedly higher in the ASA III and IV patients than the ASA I and II patients.

As the ASA III and IV patients have more comorbidities and limited functional reserve as compared to the ASA I and II patients, the incidence of postoperative complications and the duration of hospital stay might be expected to be higher in these patients. In a study conducted by Sacko et al. on 74 patients aged 80 and above, postoperative early-term morbidity rates were found to be 2.5 times higher than in the ASA III and IV groups as compared to the ASA II group (4).

In another study, Roser et al. compared the complications in 43 patients, who were at least 70 years old and operated for skull base meningioma, with the complications seen in 89 patients aged below 70. The rate of postoperative infections was found to be significantly higher in the older patient group (6). In the present study, the infections were noted in patients with ASA scores II and III.

Various scoring systems have been suggested in the literature to identify surgical indications and predict the prognosis in geriatric patients with intracranial meningiomas. Clinical-Radiological Grading System (CRGS), suggested by Caroli et al. and Geriatric Scoring System (GSS) and Cohen-Inbar et al., are scoring systems based on lesion size, localization, neurological picture, presence of peritumoral edema, Karnofsky performance score (KPS) and comorbidities, which helps in the selection of patients eligible for surgery (10,12,13).

CONCLUSION

In conclusion, old age is not a contraindication for surgery in patients with intracranial meningioma, and surgical treatment could be safely performed on the elderly. However, the frequency of postoperative complications and the duration of hospital stay increases with higher ASA scores. The rate of complications could be reduced by an eligible patient selection and good preoperative planning and preparation.

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