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ORIGINAL ARTICLE

Clinical Features and Surgical Management of Intracranial Meningiomas in the Elderly

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ABSTRACT

Objective: Given the threat related with surgical intervention of intracranial meningiomas in the older populace because of maturing physiology and numerous co morbidities, an endeavor was made to distinguish mediators impacting results and to characterize a category of individuals who ought not be surgically treated because of deprived prognosis.

Study Setting: Mardan Medical Complex, KPK , PAKISTAN

Material and Methods: The investigation of 58 individuals over the age of 70 years was conducted to determine short- and long-term results. Additionally, we derived scores for our patients using the previously reported CRGS, SKALE, and GSS grading systems.

Result: The SKALE review technique indicated that only one important site was associated to neurological depression (P=0.02). Six people (10.3% of the total) quit due to their injuries. KPS 60 vs. KPS 70; P=0.0162); the American Society scale status (ASA 1 or 2 vs. ASA 3; P=0.0022); and the examination of meningiomas all had a link with death. Six occurrences of tumor recurrence were observed to be linked with the WHO grade (P = 0.00048) and the Simpson assessment of resection (P = 0.0437). In comparison to their Karnofsky score before surgery, the majority of patients either improved (50%) or did not change at all (24.9%). The 15.5% of patients who died as a result of the surgery or a recurrence are an exception to this rule.

Conclusion: Neurological impairment following surgery was only observed in patients with a significant tumour placement (skull base, eloquent area, large vessels indulgence by the tumor). Because of the greatly increased threat of fatality, surgery should be carefully considered in individuals with a low functional state (KPS 60) or a bad bodily state (ASA 3 status). During routine visits, the majority of patients' neurological health enhanced or remains constant in comparison to their condition before operation.

INTRODUCTION

Intracranial meningiomas have a consistent expansion in prevalence with age and are a pervasive infection in the more established populace in both genders. The recurrence is 3.5 occasions more noteworthy in those beyond 70 ones years old in more youthful ones[1]. With always expanding future and expanded utilization of analytic neuroimaging examinations, a significantly more prominent number of meningiomas found in this quiet populace might be normal in the coming years. Careful extraction, radiosurgery, and attentive hanging tight are generally alternatives for treatment. Medical procedure in more established patients may address a greater number of dangers than in more youthful patients, inferable from the physiology of maturing and the presence of different comorbidities. The necessity to find some kind of harmony between likely perils and advantages in the more seasoned age bunch entangles dynamic and methodology choice[2].

Medical procedure results are basic for therapy planning, especially the ID of patient subgroups that would profit with a medical procedure choice as far as in general endurance and personal satisfaction. Since choices about the ideal helpful methodology ought to be made with the most extreme consideration, I decide to portray our experience treating intracranial meningiomas in the senior populace beyond 70 years old[3].

MATERIAL AND METHODS

58 patients over the age of 70 who underwent surgery for intracranial meningioma between 2016 and 2019 were studied in depth in an effort to obtain insight into the surgical procedure's success rate. In order to determine the patient's present state of health, the American Society4 scale was used before to the surgery. Karnofsky Performance Status (KPS)8 was used to determine the functional status of the subject. In order to find the tumor, determine its maximum size, and calculate its overall size, MRI scans were performed prior to the procedure. Using the formula V=4/3x x 12A, B, and C, which reflect the tumor's greatest dimensions in each of the three planes, the volume of tumors was calculated. The Simpson categorization was used to determine how much tumor should be excised. Following the surgical procedure, CT and MRI images were performed to verify the Simpson resection score.. For the purposes of a series of MRI follow-up tests, a recurrence was defined as either an increase in tumor size following partial meningioma removal or the return of a previously excised tumor following complete removal of the meningioma. The first postoperative MRI scans were normally done one year after a medical operation, and further examinations were typically done once a year after that. To be safe, these tests were often carried out within a few hours of the treatment. In addition to the aforementioned therapies, MRI scans were performed anytime neurological problems appeared or became more serious. The patient underwent neurological evaluations during admission, immediately following surgery, just before to release, and at each subsequent visit to our medical facility7.

Also, three proposed evaluating frameworks for surgicalsigns in older patients with intracranial meningiomas were resolved for every persistent, to be specific CRGS, SKALE, and GSS. Clinical-Radiological Grading System (CRGS) uses six models to evaluate a patient's health. Among the factors that go into these models are the tumor's size and area, the health of the nerves, the KPS score, the presence of peritumoral edema, and any additional issues. Those meningiomas that are adjacent to essential structures, such as major blood arteries, the brainstem, or regions that are responsible for decision-making, are considered harmful. Moderate to severe edema shifts midline structures, while mild edema is shown to be either peritumoral or absent.[8].

Statistical Analysis: Statistica programming, adaptation 12.0, was utilized to assess the collected information (Statsoft Inc., Tulsa, OK, USA). Fundamental clear measurements, the nonparametric Mann–Whitney U–test and the Kruskal–Wallis test, just as possibility tables with the Pearson chi-squared and Fisher's definite tests, were utilized in the investigations. Statistical importance was characterized as a P-value of 0.05[9].

RESULT

Ages ranged from 70 to 85 years, with a mean age of 75.1 years in our study's population. Women comprised the great majority of those attending (55.2 percent). Prior to medical procedure 10, the average length of time that patients were bothered by side effects was around 9.2 months (range: five days to four years). Motor impedances (34.5 percent of cases), seizures (31% of cases), migraines (24.1 percent of instances), aphasia (22.4 percent of cases), and cerebellar side effects were the most common symptoms observed in the study (8.6 percent). Fourteen patients had tumors that were related to the dura, 22 patients had tumors that were connected to the convexity, and 12 had tumors that were connected to the parasagittal area or the falx cerebri (20.7 percent). Our spouse's tumor measured ranging from 19 to 89 millimeters in diameter, with an average of 45.6 millimeters in diameter. At an average of 38.7 centimeters, the tumor's volume ranged from 2.5 to 164 centimeters. 15.5 percent of patients had severe peritumoral edema, while 58.6 percent had mild peritumoral edema, and 25.9 percent had no peritumoral edema. Table 1 shows that the majority of the 53 patients (middle 2, territories 0–9) had more than one health condition. More than seventy percent of patients had ASA grades 1, 2, or 3, while less than one in ten had ASA grades 4 or 5. When it comes to the KPS scale, 12 patients (or 20.6 percent) fell into the "dependent" category (KPS 60), whereas the rest of the population (46 patients) fell into the "free" (KPS 70). Between nine and seventeen points, the median CRGS score was 13 points. Patient scores ranged from 10 to 12, with the majority of patients (58.6%) scoring 12 or above. Only 1.7% of patients scored 10, with the majority (33.7%) scoring 10–12. Overall, the SKALE score ranged from 6 to 14, with the lowest score of 8 and the highest of 79.3 percent; the average score was 12. 8.6% of patients scored below 8, 12.1% scored the same as 8, and 79.3% scored higher than 8. More than 86% of the patients who took the GSS had a score of 16 or higher.

Comorbidities	Number of Patients n (%)
Hypertension	46 (79.3)
Thyroid disease	17 (29.3)
Ischemic heart disease	15 (25.9)
Diabetes	13 (22.4)
Arrhythmia	8 (13.8)
Chronic obstructive pulmonary disease	6 (10.3)
Chronic heart failure	3 (5.2)
Chronic renal failure	3 (5.2)
Artificial heart valves	2 (3.45)
Liver disease	1 (1.7)

Preoperative KPS Status	Number of Patients n (%)
40	1 (1.7)
50	5 (8.6)
60	6 (10.3)
70	4 (6.9)
80	11 (19)
90	27 (46.6)
100	4 (6.9)

Surgical Procedures: In each of the strategies, there was a specific goal in mind. 81% of the time, Simpson grade I or II was conducted, whereas Simpson grade III and IV was performed in 5.2% and 14.8% of medical procedures, respectively. Meningiomas of WHO grade I were found in 56.9% of the patients, while meningiomas of WHO grade II were found in 37.9% of the patients and meningiomas of WHO grade III were found in 5.2 percent of the patients. According to CRGS and GSS grading systems (P=0.003 and P=0.027, respectively), Simpson's judgment of resection was most influenced by the location of the dural connection (P=0.0027), the general status of meningiomas according to CRGS and GSS grading systems (P=0.003 and P=0.027, respectively), and the overall CRGS score. The presence and severity of peritumoral edema (P = 0.69) as well as tumor volume (P = 0.47) and the most obvious measurement of the meningioma (P = 0.71) had no effect on the outcome.[13, 18, 20]. The figures 1–3 represent illustrative models.

Morbidity: One patient's underlying neurological condition worsened, whereas another patient's preexisting neurological condition didn't change at all after the surgery. The procedure also caused additional neurological problems in five patients, resulting in a total of 12 cases of neurological degeneration (20.7 percent). In any case, 14 of the 40 patients who had neurological difficulties before to surgery showed improvement. Those who had been afflicted before to surgery showed signs of improvement in 35 percent of cases. It has emerged that six of these patients have regained their pre-injury neurologic condition (15 percent). Internal

issues resulted in 12 patients (20.7%), including six instances of pneumonic issues and two instances of cardiovascular issues[12]. In 18 patients, generally morbidity was characterized as postoperative neurological deteriorating or potentially huge internal entanglement (31%).

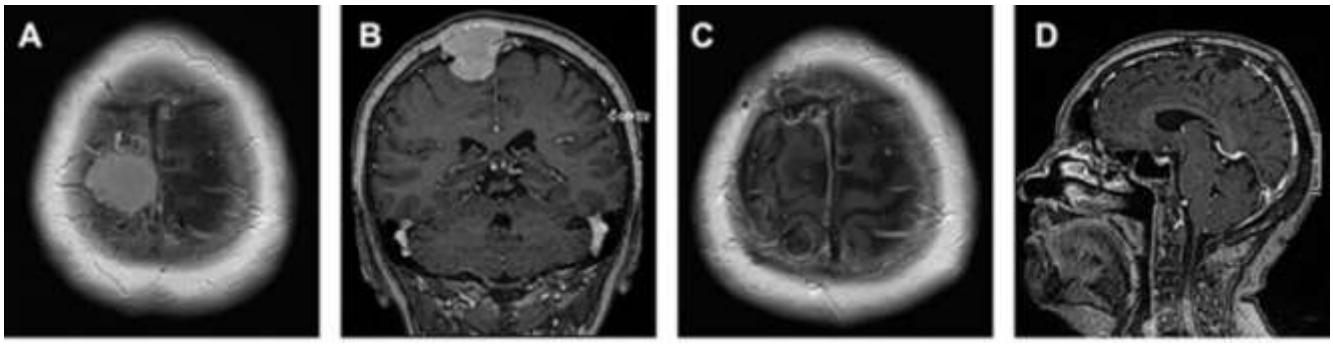


Fig 1

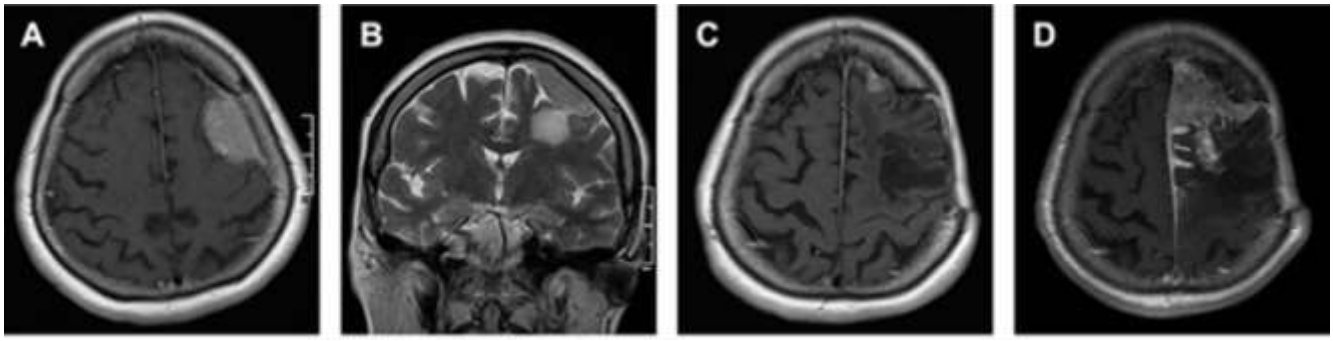


Fig 2

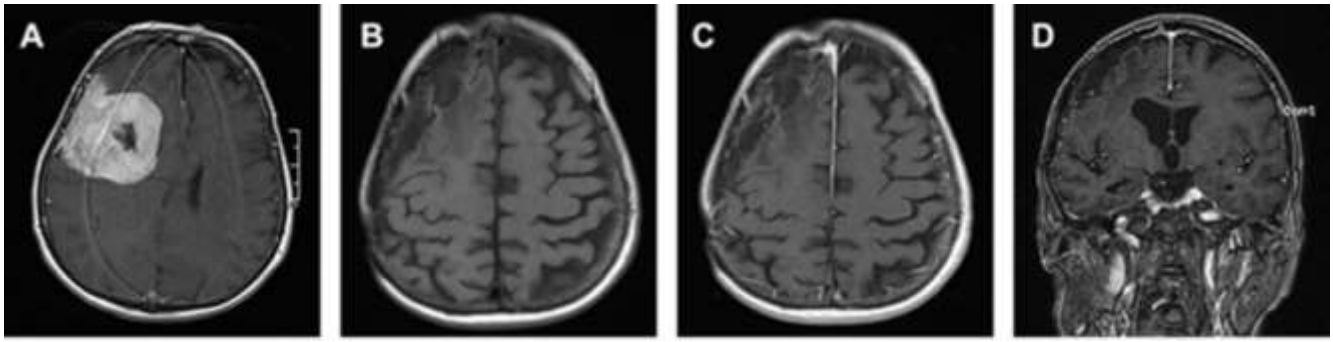


Fig 3

Mortality: In the postoperative term, six people (10.3 percent) died. Men (23.1%) had a more prominent passing rate than ladies (0%) (P=0.015). Three patients passed on as an immediate consequence of medical procedure, while the excess three passed away because of extra postoperative issues. Individual cases brought about the following: Massive venous stroke because of postoperative venous apoplexy, ischemic stroke of the brainstem because of hindrance of tumor-encased veins during a medical procedure, meningitis, sepsis, pneumonia, and myocardial dead tissue[13].

The CRGS, SKALE, and GSS scores had no impact on neurological morbidity, a variable impact on morbidity, and a considerable impact on mortality (Table 4).

Follow Up: 522 of 52 survivors were checked for a middle of 48.25 months (mean: 75.6 months; range: 5.5–110 months). Two patients remained unfollowed. Six cases (12%) of repeat were seen after, and 97 months, separately. Four people had WHO grade II meningiomas and two had WHO grade III meningiomas[15]. In those four patients with WHO grade II meningiomas, postoperative irradiation was conducted in two patients with incomplete extraction (Simpson IV) and no illumination was planned for two patients with absolute tumor expulsion (Simpson I). Postoperative radiation was scheduled for the two patients with WHO grade III malignancies, anyway one of them rejected further therapy. Table 5 sums up the course of illness in patients who have had tumor repeats. Three patients (6%) expired because of tumor repeats, and ten additional patients (20%) passed away during follow-up for irrelevant reasons[14].

Grading Scale	Neurological Morbidity	Overall Morbidity	Mortality
CRGS score	*P*=0.108	*P*=0.0171[a]	*P*=0.017[a]
SKALE score	*P*=0.56	*P*=0.067	*P*<0.005[a]
GSS score	*P*=0.35	*P*=0.152	*P*=0.0494[a]

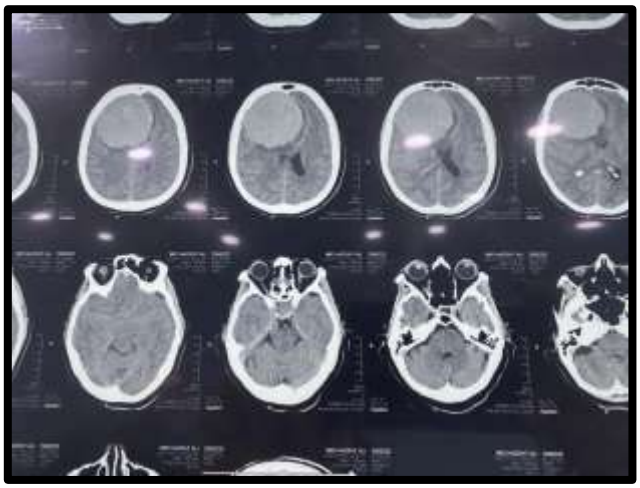
Note: [a]Significant relationships.

Extent of Removal (Simpson Grade)	Neurological Morbidity n (%)	Overall Morbidity n (%)	Mortality n (%)
I + II n=47	9 (19.15)	13 (27.7)	3 (6.4)
III n=3	0	1 (33.3)	1 (33.3)
IV n=8	3 (37.5)	4 (50)	2 (25)

Case	WHO Grade	Simpson Grade	Postop Rth	Time to Recurrence	Additional Treatment	Last Patient Status (Length of Follow-up)
78-year-old man	II	IV	Yes	41 months	Reoperation, GKS, radiation	Deceased (76 months)
74-year-old man	II	IV	Yes	97 months	Not, watchful observation	Alive (118 months)
74-year-old woman	II	I	No	88 months	Not watchful observation	Alive (106 months)
72-year-old woman	II	I	No	18 months	2 + Cyberknife	Alive (50 months)
76-year-old man	III	I	Yes	23 months	Chemotherapy	Deceased (26 months)
85-year-old man	III	III	Refused	3 months	No	Deceased (5.5 months)

DISCUSSION

Expanded future expectancy and use of symptomatic neuroimaging examinations currently have brought about an increment in the quantity of recognized meningioma cases, especially among the old. Neurosurgeons are every day gone up against with the choice whether to operate on meningiomas in patients in this age bunch. Due to the physiology of maturing and different comorbidities, medical procedure in the old populace might be accomplished with a risk of hazardous postoperative outcomes[15]. Nonetheless, it is significant that intraoperative and postoperative consideration of intracranial injuries have improved considerably in late many years, and careful treatment of intracranial meningiomas has become a feasible restorative alternative for the older. Momentary death rates have been accounted in the range of 0% and 13.5 percent, while all out intricacy rates have been accounted in the range of 3% and 30%. Referencing that an immediate examination of bleakness between considers are tricky in light of the fact that inconveniences are once in a while characterized exhaustively. Our gathering had a 10.3 percent death rate, a 20.7 percent neurological dismalness rate, and a 31% absolute morbidity rate, which included neurological crumbling just as dangerous inward issues[16].



Older patients' meningiomas can be removed in the same way that meningiomas can be removed from young patients' brains21–23. In the vast majority of instances (72–89 percent), the tumor is completely removed. They are quite close to the resection rate we achieved. Medical procedures are more effective when they remove as much of the tumor as possible. Convexity meningiomas are the most commonly removed, followed by parasagittal and falcine meningiomas and skull base meningiomas in the minority of cases, according to our research. A skull base meningioma can lead to vascular and cranial nerve involvement, tumor attachment to the brain stem, considerable sinus contribution and formation of blind patches after surgery17 if it is not treated. There's nothing worse than one of these situations happening.

Elderly patients' preoperative risk factors have been studied extensively by medical professionals. Patients' age, gender, tumor size and location, presence and severity of edema,11,14 as well as general health indices like ASA and KPS scores, all have considerable predictive significance. A few of researchers, however, have questioned the accuracy of these features in predicting future outcomes.[18].

Surgical expulsion risks should be weighed against the accessibility of elective treatment procedures, for example, stereotactic radiosurgery. Regularly, deciding the proper administration technique for an individual patient is testing. Stereotactic radiosurgery (SRS) might be utilized to treat oligosymptomatic, especially minuscule meningiomas, to achieve a drawn out tumor control rate similar to medical procedure. Meningiomas have a one-year repeat pace of 5.4 percent to 11.5 percent, and a five-year repeat pace of 8% to 24.1 percent. Recurrence happened in 13% of patients in our example, with a one-year repeat pace of 2% and a five-year repeat pace of 8%. The examination recognized meningiomas' histopathological WHO grade and the degree of their resection as the essential danger factors for tumor repetition[19, 20].

CONCLUSION

Old people are turning into an expanding focal point of neurosurgical practice. An exhaustive assessment of patients with intracranial meningioma should consider their clinical and neurological status preceding a medical procedure, just as their intellectual condition and level of dependence. Fortunately, the before surgery KPS score is the essential indicator of clinical results and technique costs. The patient's age can't be utilized as motivation to keep away from the surgical intervention. Preoperative arranging has a huge effect in postoperative results and personal satisfaction. Joining surgical and adjuvant radiosurgical medicines empowers decreases in surgical time, postoperative issues, and emergency clinic stay[21].

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