

Original Article**Surgical Outcome Following Meningioma Operation: Our Experience from a Tertiary Care Hospital**MI Khalil¹, MA Farazi², MF Haque³, A Salam⁴, MSR Sheikh⁵

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Abstract

Background: Meningiomas are the commonest predominantly non malignant brain tumour in adult. Various epidemiological and risk factors are associated with and influencing surgical outcome in the treatment of meningiomas.

Objective: The aim of the study is assess surgical outcome by using Glasgow Outcome Scale (GOS) for the cranial meningiomas.

Materials and Methods: This prospective study conducted in Neurosurgery Department of Shaheed Shiek Abu Naser Specialized Hospital and others private Medical Colleges in Khulna from Jan 2018 –July2019. Total 21 patients with meningioma underwent surgery are included in the study .The parameters analyzed included age, gender, location of tumor on imaging, histopathological type, and grade of tumor according to the 2007 WHO classification. The surgical outcome was assessed by the Glasgow Outcome Scale (GOS) at the end of the 1st week of convalescence and after 6 weeks following surgery. Favorable and unfavorable outcomes were defined as GOS 4- 5 and GOS 1–3, respectively.

Results: Meningiomas are more common in the age group of 40-49 with a female preponderance(61.90%).Headache was the most common symptom and convexity meningiomas were the most common accounting for about 42.85%. Simpson grade I achieved 10 (47.61%). Simpson II 5(23.80%), Simpson III 2(9.52%), Simpson IV 3(14.28%) and Simpson V 1(0.5%) respectively. Regarding Histopathological examination most of the tumours were WHO grade 1(85.71%). Surgical outcome assess by Glasgow Outcome Scale and majority of patients of this study GOS were between 4-5 which was good(90.47%).

Conclusion: The outcome for patients with meningioma is good and is improving. However there remains a significant mortality related to disease process.

Keyword: Meningioma, Simpson grade, Histopathological type, Surgical outcome.

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Introduction:

Meningiomas are one of the most common extra-axial neoplasms of intracranial nature constituting 15-20% of all intracranial neoplasms^{1,2}. They are twice as common in the female as in the male population, but

a reverse male-to-female preponderance of 3:1 has been reported in the malignant form. The incidence increases with age with peak incidence between the ages of 40 and 60 years. A slight drop after the 8th decade has been noted³. Recent advance in

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neuroimaging have increased the incidence of asymptomatic meningiomas⁴. Arising from arachnoid capcells, meningiomas are present in varied locations. Histopathologically, meningiomas currently are separated into three grades, i.e., benign (ordinary) meningioma, atypical meningioma, and anaplastic (malignant) meningioma, that intend to reflect the clinical behavior of the tumor⁵

Treatment options for meningiomas have varied historically from mere observation to surgery to radiation therapy to combined modalities of treatment. The degree of complete surgical removal essentially depends on the location of the tumor and the presence of near by vital neurovascular structures and eloquent brain matter. The completeness of resection as graded by Simpson grading which primarily correlates the degree of extirpation of the meningioma and associated dura with the probability of recurrence.

Materials and Methods:

This prospective study conducted in Neurosurgery Department of Shaheed Shiek Abu Naser Specialized Hospital and others private Medical Colleges in Khulna from Jan 2018 –July2019. Total 21 patients with meningioma underwent surgery are included in study. The parameters analyzed included age, gender, location of tumor on imaging, histopathological type, and grade of tumor according to the 2007 WHO classification. The patients who underwent surgery were studied with regard to the degree of extirpation that was done based on the Simpson grading of meningioma resection. The post-operative course was monitored. The outcome was assessed by the Glasgow Outcome Scale (GOS) at the end of the 1st week of convalescence and after 6 weeks following surgery. Favorable and unfavorable outcomes were defined as GOS 4- 5 and GOS 1–3, respectively. In addition, postoperative surgical (Neurologic and Nonneurologic) and medical complications within the first postoperative month were recorded. The information collected regarding all the selected cases in a master chart, and data analysis was done.

Results:

The study encompasses the analysis of the evaluation done of about 21 patients who underwent surgery for meningiomas during the period January 2018-July 2019. The outcome parameters were analyzed.

Table-I

Distribution of cases according age (n=21)

Age	Number	Number (%)
<29	2	10%
30-39	6	29%
40-49	8	38%
50-59	4	19%
>60	1	5%

Table II Shows age distribution of the study patients. The grouping of patient with respect to the age-wise breakup is age range of <30-10%, 30-39-29%, 40-49-38%, the highest, 50-59-19%, >60-5%.

Table-II

Distribution of cases according sex(n=21)

Sex	Number	Number (%)
Male	8	38.09%
Female	13	61.90%

Table II Shows sex distribution of the study patients. The sex-based incidence showed a female preponderance of about 62% in females and 38% in males.

Table-III

Distribution of cases according symptoms(n=21)

Symtoms	Number	Percentage
Headache&vomiting	10	47.61%
Headache only	1	4.76%
Seizure	2	9.52%
Hemiparesis/deficit	3	14.20%
Behavioral disturbances	1	4.76%
Diminution of vision	2	9.52%
Papilledema	2	9.52%

Table III With regard to the symptomatology of presentation, the findings were as follows: Headache and vomiting (47.61%), Headache alone(4.76%) , Seizures(9.52%) Hemiparesis/Deficits(14.20%) Behavioral disturbances (4.76%) , Diminution of vision (29.52%) , Papilledema (9.52%).

Table-IV
Distribution of cases according to anatomical locations(n=21)

Location of the lesion	Number	Percentage
Convexity	9	42.85%
Parasagittal	4	19.04%
Falcine	1	4.7%
Suprasellar	2	9.52%
Olfactory groove	2	9.52%
Sphenoid wing	2	9.52%
Interosseous	1	4.7%

Table IV shows anatomical location of the tumour and maximum tumours were convexity meningioma (42.85%).

1Table-V
Distribution of cases according to simpson grading(n=21)

Simpson grading	Number	Number(%)
I	10	47.61%
II	5	23.80%
III	2	9.52%
IV	3	14.28%
V	1	4.76%

The grade of resection according to Simpson grading was also stratified and the results were shown in Table V and simpson grade1 (47.61%) and grade II (23.80%) respectively.

Table-VI
Distribution of cases according to GOS (n=21)

GOS	Number	Number(%)
Good outcome (4-5)	19	90.47%
Poor outcome(1-3)	2	9.52%

All patients were subject to surgical treatment, and the results of the surgery were measured by the parameters of the Glasgow outcome scoring at the end of the period of 6 weeks postoperatively. Table6 shows Glasgow outcome scoring <3(9.52%) and > 3(90.47%). The scoring of the patients was done with GOS d"3 taken as poor outcome and GOS more than 3 taken as representative of good outcome .

Table-VII
Analysis of outcome according to post up complications(n=21)

Total surgeries	Complications	No complications
21	3(14.28%)	18(85.72%)

The outcome was also assessed on the basis of the post-operative neurological and medical complications that were also analyzed (Table VII).

Table-VIII
Distribution of cases according to WHO grading (n=21)

WHO Grade	Number	Number (%)
i	18	85.71%
ii	2	9.52%
iii	1	4.76%

Table VIII shows Histopathological examination report of study group which were WHO Grade1 (85.71%), WHO Grade2(9.52%), WHO Grade3(4.76%).

Discussion:

The study encompasses the results of the analysis of 21 patients who underwent surgical treatment for meningiomas in Neurosurgery Department of Shaheed Shiek Abu Naser Specialized Hospital and others private Medical Colleges in Khulna from Jan 2018 –July2019.

The epidemiological analysis revealed that the incidence of meningiomas in terms of occurrence was more common in the age group of 40-49 with 38% of patients presenting in this age group closely followed by the age group of 30-39 with 29% with an incremental incidence with increasing age.

The overall ratio of sexual preponderance of meningiomas heavily tilts toward the female sex and near about two times more than the male. Age and female-to-male ratio in our study were comparable to meningioma patients characteristics in the literature^{6,18,19}

With regard to the primary symptomatology of presentation, the study indicates that the most common symptom is headache and vomiting both of which are non-specific in the sense that no localization could be attributed to the headache as was evidenced in 10 of 21 patients about 47.61% of the total sampled.

The site of lesion as exemplified in this study was found to be convexity 42.85%, parasagittal 19.04%, falcine 4.7% suprasellar 9.52%, olfactory 9.52% and interossious 4.7%. Most of our meningiomas were located over cerebral convexities followed by parasagittal meningiomas. We observed one case of primary intraosseous meningiomas which are consistent with world literature⁷.

Meningiomas with skull-base location and bone invasion were less often completely resected. This is unsurprising as these locations can be technically more challenging due to their restricted surgical access and vicinity to vascular and/or neurological structures^{6, 8, 9}. This difference was particularly stark between convexity and cavernous or petroclival meningiomas, where a Simpson grade I or even grade II resection was rarely possible.

The complete surgical resection while preserving the patient's neurological status is the goal, a Simpson I resection is neither always attainable nor does it guarantee increased Progression free survival^{6, 10}. This holds especially true in view of other available adjuvant therapeutic options such as radiotherapy¹¹⁻¹³, second surgery¹⁴⁻¹⁶, or a watchful *wait-and-scan* follow-up.

Recently, there has been a trend towards more conservative treatment for meningiomas, mainly because it has been shown that the Simpson grade is not universally applicable to all meningiomas^{10, 11, 17}. Hence, a staged treatment with debulking followed by adjuvant treatment might be preferable in order to minimize postoperative morbidity and mortality, especially in skull-base meningiomas.

The analysis of grade of resection reveals that simpson grade I achieved (47.61%) Simpson II (23.80%), Simpson III (9.52%), Simpson IV (14.28%) and Simpson V (0.5%) Similar to other series²⁰, a Simpson grade I resection was achieved in 39.4% , Simpson II (34.3%), Simpson III (5.4%) , Simpson IV (20.6%) and Simpson V (0.5%) of the cases.

The surgical outcome parameters assess by the Glasgow outcome scoring which was 90.47% of GOS 4-5 and 9.52% of GOS 1-3 (Table 4) in our study. Similar study was found where the Glasgow outcome scoring with 80% of GOS 4-5 and 20% of GOS 1-3²¹. The scoring of the patients was done with GOS ≥ 3 taken as poor outcome and GOS more than 3 taken as representative of good outcome .

The outcome was also assessed on the basis of the post-operative neurological and medical complications that were also analyzed. Total postup-comlications were 3 (14.28%) in our study.

In this study 85.71% of cases were WHO Grade I lesions, 9.52% Grade II, and 4.76% Grade III lesions which are consistent with world literature^{5, 22}.

Limitation of the study was very small sample size. So the study findings are not generalizable in large scale. Follow up duration was short, a longer follow up might bring a better result.

Conclusion:

Meningiomas are benign tumors which are more common in females. Clinical symptoms at presentation, skull-base location and bone invasion were significant predictors of a poor extent of resection for meningiomas. Good surgical outcome depends on the histological grade and Simpson grade of excision . The identification of these factors may aid clinicians managing patients with meningiomas.

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