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Neurosurgical Treatment of Brain Tumors: An Analysis of Current Strategies

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Abstract: *We have extensively studied the strategies available to many patients admitted to the Neurosurgery Department of the Khyber Teaching Hospital, Peshawar to combat malignant brain diseases. Our survey focused on interviewing leading neurosurgeons, learning about their procedures, and carefully reviewing numerous previous case studies. During our study, a total of sixty cases were observed. We found that craniotomy was the most prevalent method for removing brain tumours, followed by endoscopic surgery and that some patients were sent to specialized clinics for stereotactic and radio surgical procedures. The findings revealed a correlation between tumour type and tumour site, with glioblastoma multiforme and metastatic brain tumours having the greatest rates of morbidity and mortality after surgery. According to the results, craniotomy is the go-to neurosurgical operation for removing brain tumours, and the kind of brain tumour is a crucial determinant in determining the risk of postoperative complications and mortality. The results of this study may have far-reaching consequences for the development of neurosurgical knowledge and technique.*

Key Words: Neurosurgery, Brain Tumours, Contemporary Techniques, Craniotomy, Endoscopic Surgery, Stereotaxic Surgery, Radiosurgery, Postoperative Morbidity, Mortality

Introduction

Brain tumours need extensive neurosurgical care (Robertson, 2006). Despite the fact that treatment options for malignant brain tumours have expanded recently, they may be harmful (Uche et al., 2013). In order to preserve brain tissue and remove as much of the tumour as possible, neurosurgery is performed (Djirackor et al., 2020). Treatment is influenced by the size, nature, location, and age of the tumour. A craniotomy is used to remove brain malignancies (Campanella et al., 2020). To reach the tumour, transect the skull. Tumours may be removed using a variety of equipment and techniques depending on their size and location (Belykh et al., 2020). Thin tubes, tiny cameras, and specialized tools are used in minimally invasive endoscopic surgery (Badie, Brooks, & Souweidane, 2004). To locate and remove malignancies, stereotactic surgery employs pictures (EBINA, ANDOH, TAKAHASHI & IWABUCHI, 1990). High-energy radiation is used in radiosurgery to kill cancerous cells without surgery (Sheehan et al., 2005). By kind of brain tumour, postoperative morbidity and death differ (Smith et al., 2015). The most common types of brain cancers are metastatic and glioblastoma multiforme (Grossman and Batara, 2004). The result is also influenced by age, health, and tumour stage (Ma, Kim, Rim, Kim, & Cho, 2010). The Khyber Teaching Hospital's neurosurgery department assessed Sixty patients with brain malignancies utilizing cutting-edge neurosurgical methods. Medical professional interviews and case study research provide the data. Brain tumours are often removed via craniotomies, endoscopic,

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stereotaxic, and radiosurgery techniques. Postoperative morbidity and mortality are influenced by the tumour subtype. The greatest rates of surgical mortality and morbidity are seen in glioblastoma multiforme and metastatic malignancies (Muzumdar, 2012). The findings demonstrated that, depending on the kind of tumour, craniotomy is the best neurosurgical technique for eliminating brain cancers.

Methods

The Khyber Teaching Hospital's Neurosurgery Department will be doing research on the management of brain tumours from February 2020 to February 2021. Physicians were questioned as part of the process, which also includes reading previously published case reports. Sixty patients were examined using a descriptive study approach to look at current neurosurgical therapy options.

Data Collection

Data were collected for this study through interviews with attending physicians and a review of case reports. Data collection took six months.

Data Analysis

Using the descriptive statistics program SPSS 28.0, frequency and percentage were two of the methodologies employed for data analysis.

Results

The research has shown that, after surgical removal of various brain tumours utilizing craniotomy, stereotaxic surgery, radiosurgery, and endoscopic surgery, morbidity and mortality differed. The greatest rates of morbidity and death were found to be associated with metastatic brain malignancies and glioblastoma multiforme.

Figure 1

Demographically Outcomes of the Study

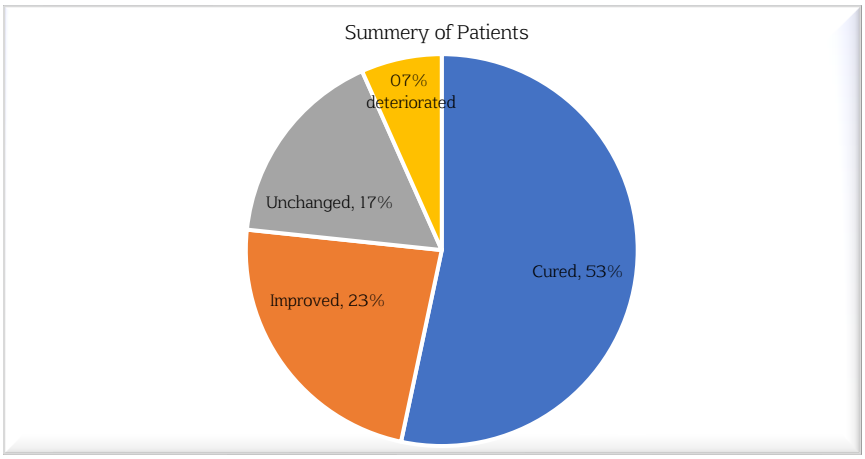

Table 1

Patients Undergoing any Type of Neurosurgery

Finding Treatment	N
1. Cranio-tomy	35
2. Endoscopic-Surgery	13
3. Stereotactic-surgery	06
4. Radio-surgery	07

Table 2

Postoperative Morbidity and Mortality by Brain Tumour Type

Brain-Tumor	Mor-bidity	Mor-tality
1.Glioblas-toma Multi-forme	49.6%	29%
2. Metastatic	44.4%	26%
3. Meningioma	24.6%	09%
4. Astrocytoma	21.4%	05%

Table 3

% of Patients Treated with any Type of Surgery

Treatment	%
1. Craniotomy	59%
2. Endoscopic Surgery	21%
3. Stereotactic Surgery	09%
4. Radiosurgery	11%

Table 4

Number of Reported Postoperative Complications

Complication	N
1. Infection	03
2. Cerebral Edema	06
3. Brain Hemorrhage	04
4. Seiz-ures	02

Table 5

Patients with Long-term Complications

Complication	N
(Epilepsy)	01
(Cognitive-Impairment)	05
(Visual-Impairment)	03
(Hearing-Impairment)	01

Table 6

Finding of the Summery

Summary	N
(Cured)	32
(Improved)	14
(Unchanged)	10
(Deteriorated)	04

Discussion

Based on the results of this study, craniotomy appears to be the neurosurgical method of choice for brain tumour removal, with details showing that postoperative risk and death vary by tumour type. The most common recovery impairments include intracerebral haemorrhage, cerebral oedema, infection, and seizures. In addition, the analysis revealed that a significant number of patients were struggling with long-standing problems such as cognitive impairment, epilepsy, hearing loss and vision problems. The results of this study have been documented in previous studies (Kalkanis, Quiones-Hinojosa, Buzney, Ribaudo, & Black, 2000; Lehane et al., 1983; Neska-Matuszewska, Bladewska, Ssiadek, & Zimny, 2018). Patient outcomes varied; of the 60 subjects: 32 recovered, 14 got better, 10 stayed the same, and 4 became worse. These findings are in accordance with the study's summary

of the most recent research on neurosurgical methods for treating brain cancers (Oya et al., 2020; Turek, Pasterski, Bankiewicz, Dzierzcki, & Zbek, 2020). According to earlier research (Sherman et al., 2011; Zhong, Sun, Lin, Sun, & Bian, 2013), the most frequent surgical approach for removing brain tumours is a craniotomy, and postoperative morbidity and mortality are significantly influenced by the tumour's particular form. The most prevalent problems after surgery mirrored earlier results (Walker, Hamilton, Walter, & Watts, 2013). Seizures, infections, cerebral oedema, and cerebral bleeding are a few of them.

Conclusion

A variety of surgeries are used to remove brain tumours, the most frequent being a craniotomy, then endoscopic surgery,

Radiosurgery, and stereotaxic surgery. Glioblastoma multiforme and metastatic tumours have the greatest rates of postoperative morbidity and death, and tumour type has a significant effect on these outcomes. According to the research, craniotomies are the most popular procedure for removing brain tumours, and tumour type may have an impact on postoperative results.

Finding

To improve treatment outcomes, emphasis must be placed on developing innovative surgical methods and optimizing current methods. Identifying biomarkers that predict postoperative complications in patients with brain tumours is an urgent research topic to explore. It is important to explore different neurosurgery for specific cancers to address this question.

Limitations

Brain tumour patients are an important population to study as potential indicators of surgical complications. Furthermore, it is important to thoroughly evaluate the effectiveness of different neurosurgical approaches in different types of cancer. To further increase the success rate of treatment, new surgical methods should be developed and existing procedures should be optimized.

Summary of Study

The most common neurosurgery procedure to remove a
brain tumour is a so-called craniotomy. Postoperative mortality and morbidity were also observed to vary by tumour type. The study identified some common postoperative complications. These include cerebral oedema, seizures, infections, and brain haemorrhages. The study also found that a significant proportion of patients struggled with long-term effects, such as sensory disturbances (such as blindness or hearing loss), mental decline, and seizures. Thirty-two of the Sixty patients were declared cured, while the rest had mixed results: 14 improved, 10 remained unchanged, and four experienced worsening symptoms. The findings of this study have important implications for neurosurgical practice and research.

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