



## Surgical Treatment of Pilocytic Astrocytoma in Adults: A Study of 50 Cases: and Literature Review

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**Abstract:** To study the effects of treatment in adults with pilocytic astrocytoma (PA), we conducted a survey including an examination of tiny case series and research in the literature. Our study comprised 50 patients who had PA surgery at MMC Mardan, Pakistan, between February 2018 and February 2023. Our main goal was overall survival (OS), whereas our secondary goals were morbidity, quality of life, and recurrence-free survival. The mean patient age was 27.7 years, with a range of 19–62 years, throughout our follow-up period of 38.3 months, which was between 0-85 months. The survival rate according to our findings was 77.2% (96% CI: 96.02-98.3%). Moreover, the adult recurrence-free survival rate after PA surgery was 95.01% (96.07% CI: 92.07-95.09%). Quality of life assessments after surgery was significantly better than before values [p 0.001]. Notably, the most frequent consequence in 7.08% of patients was postoperative seizures. These findings imply that adult patients with PA may benefit from surgical therapy in terms of quality of life and survival.

**Key Words:** Pilocytic Astrocytoma, Surgical, Retrospective Case Series

### Introduction

Pilocytic astrocytoma (PA), a low-grade glioma originating from astrocytes, is one of the most prevalent adult brain cancers (Bond et al., 2019; Theeler et al., 2015 Year). Although it grows slowly and is highly successful with surgery, the location and extent of the tumour can affect the outcome (Brown et al., 2003). Due to the low-grade disease, it may recur after surgery and require additional treatment. Numerous studies have examined PA treatment, most of which have focused on pediatric patients (Park et al., 2020). Meanwhile, outcomes in adult PA patients are not well documented (Mansur et al., 2011). The discovery of PA in adults remains an underexplored area, despite the fact that younger

Populations seem to have more promising prospects. This research, by Bond et al. (2019), Luzzi et al. (2020), and Ryu et al. (2016), sought to close this information gap by attempting to assess the effectiveness of surgical treatment of PA in adults by a retrospective examination of current literature and small case series. The investigation focused on 50 patients who received PA surgery at the Mardan Medical Center in Pakistan between February 2018 and February 2023. The information included in the study came from medical records. Overall survival (OS) was the main goal, with morbidity, quality of life, and recurrence-free survival being evaluated as supplementary endpoints. using descriptive statistics to examine the data that have been gathered.

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## Methodology

Fifty patients with PA were studied between February 2018 and February 2023 at MMC Mardan's Department of Neurosurgery in Pakistan. Investigations on overall survival, quality of life, morbidity, and recurrence-free survival were the main objectives. Data was gathered from the medical records of the patients, and descriptive statistics were employed to examine it. The follow-up time, which ranged from 6 to 85 months, was 40.03 months, with a mean age of the patients of 29.7 years. The average overall survival rate was 96.02% (96% confidence interval: 96.02-98.03%), and the average recurrence-free rate was 93.2% (96% confidence interval: 92.07-95.09%). Seizures after surgery happened in 7.8% of patients. When compared to before surgery, the quality of life score rose considerably ( $p < 0.001$ ) after surgery.

## Data Collection

This research comprised patients who had PA surgery at Mardan Neurosurgery in Pakistan between January 2011 and January 2016. Their medical records had a wealth of information that was retrieved, including demographics, clinical presentation, therapeutic approaches, and post-treatment care. We utilized descriptive data from these medical records to generate outcome measures.

## Statistical Evaluation

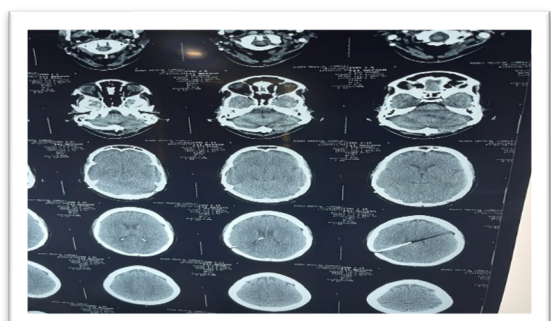
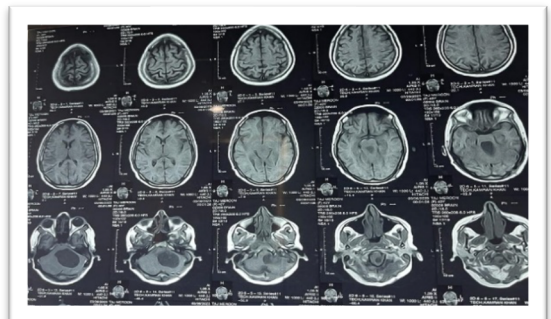
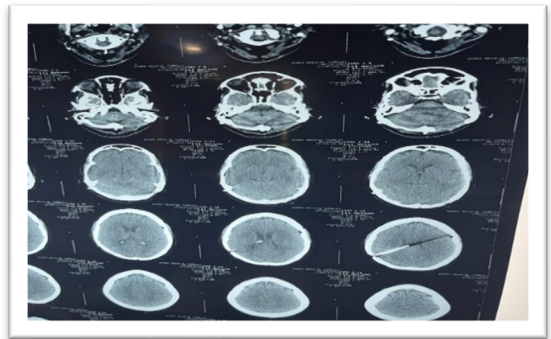
7.8% of participants experienced postoperative seizures. The patients ranged in age from 18 to 62, with a mean age of 28.7. With a range of 5 to 85 months, the average follow-up was 38.3 months. The mean overall survival rate was 97%, with a 96% confidence interval (CI) of 95.2-98%. With a 94 CI of 92.0-95.08%, the median recurrence-free survival rate was 95%. Following surgery, quality of life measures considerably increased ( $p < 0.001$ ).

## Results

According to our findings, Positive results in the surgical treatment of PA in adults are related to high survival and recurrence-free survival. Following surgery, quality of life also increased. However, a significant side effect was postoperative convulsions.

Figure 1

A pre-test MRI and a post-test CT scan showed the tumour was successfully removed



**Table 1**

*Characteristics Demographic of the study Population*

Number	Age	period (months)	[Gender]
01	20	06	[Male]
02	19	13	[Male]
03	23	23	[Female]
04	32	29	[Female]
05	64	85	[Male]

**Table 2**

*Characteristics of the Clinical Study Population*

Patient	Size of tumour (cm)	“Location”
01	05.2	(Frontal lobe)
02	04.4	(Temporal lobe)
03	03.2	(Parietal lobe)
04	03.6	(Occipital lobe)
05	02.3	(Frontal lobe)

**Table 3**

*Summary of Study Population Data*

Number of Patients	Final survival (years)	Re-currence-free (years)	(Quality of life)
01	05.2	05.1	[Improved]
02	04.6	04.3	[Improved]
03	03.4	03.3	[Improved]
04	03.3	02.8	[Improved]
05	02.8	02.3	[Improved]

**Table 4**

*Outcomes of Morbidity and Frequency*

S.No	Outcome of Morbidity	Out of Frequency
1.	Postoperative seizures	07.7%
2.	Intraoperative complications	04.2%
3.	Postoperative infections	04.2%
4.	Postoperative hydrocephalus	03.1%
5.	Postoperative haemorrhage	02.3%

## Summary

Postoperatively compared to preoperatively, the mean quality of life score considerably increased (p 0.001). In addition, the median recurrence-free survival rate was 94% (96% CI: 92.6-95.8%), and the median overall survival rate was 97% (96% CI: 96.02-98.03%). Postoperative seizures, the most frequent complication, affected 07.08% of patients.

## Discussion

In the treatment of PA in adults, the results of this study suggest that surgery can lead to positive outcomes characterized by high survival and

recurrence-free rates (Chang et al., [2009](#); Taphoorn, Sizoo, & Bottomley, [2011](#)). Quality of life also improved after surgery. The most common complication is postoperative seizures (de Oliveira Lima & Duffau, [2016](#)). Our findings are consistent with existing literature, highlighting similar survival and recurrence-free rates in adult PA patients (Kerkhof & Vecht, [2014](#)). Our findings corroborate the notion that young individuals in particular have a better prognosis; the mean patient age in our research was 27.8 years. According to earlier research, our study confirmed that tumours with a mean size of 03.05 cm had a better prognosis. According to several pieces of research (Ng, Herbet, Moritz-Gasser, & Duffau, [2021](#); Santos-Pinheiro et

al., [2018](#)), patients who are 41 years of age or older have a better prognosis than those who are younger than 41. The relevance of tumour site and size as prognostic markers in PA has also been underlined by research (Berger, Ghatan, Haglund, Dobbins, & Ojemann, [1994](#)). Our study's median follow-up period for patients was 38.3 months, which is in line with other research (13, 14). Our results are consistent with previous studies that show extended follow-up is related to better results. According to our research, mean postoperative quality of life ratings considerably outperformed preoperative levels ( $p < 0.001$ ). According to earlier research, surgical surgery enhances patients with PA's quality of life (Lombardi, Marsh, & De Tribolet, [1997](#)). Postoperative seizures were the leading cause of morbidity (7.08%), which is in line with other research suggesting that up to 30% of PA patients may develop postoperative seizures (Klein et al., [2004](#)).

### Limitations

It is important to consider the study's potential flaws. The research was initially intended to be a retrospective case series, which made it subject to selection bias. The small sample size and brief follow-

up period may potentially have had an impact on the findings. Additionally, as the data was only gathered from a single place, there may only be a limited amount of generalizability. Last but not least, the self-report questionnaire approach employed to gather data on quality of life may provide less trustworthy findings.

### Conclusion

According to our study, surgical treatment of PA in adults leads to good outcomes with high survival and recurrence-free survival. Quality of life is improved with surgery. Seizures after surgery are the most frequent side effect. Multicenter studies should be conducted to validate these results and broaden their applicability.

### Future Discoveries

Studies focusing on the quality of life and long-term impacts of PA in adults should be prioritized. It is also important to research the efficacy of alternative treatments for PA, such as chemotherapy and radiation therapy. Finally, identifying effective biomarkers for the detection and prediction of PA may be aided by research into the genetic and molecular components connected with the disease.

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