

Research Article

Out Comes of Surgical Treatment of Brachial Plexus Injuries in a Tertiary Care Hospital of Pakistan and its Impact on Psychosocial Status

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Abstract

Background: Brachial plexus injuries (BPI) are severe injuries that cause significant physical disability and functional Impairment.

Objective: This study aimed to investigate motor recovery, functional ability, and psychological well-being after surgical treatment for BPI in a developing Country.

Methodology: A retrospective study was conducted at Mayo Hospital Lahore, including 12 patients who underwent surgical intervention for BPI. Motor function was assessed using the British Medical Research Council grading system, functional ability was evaluated using the QuickDASH score, and psychological well-being was assessed using the Patient Health Questionnaire-8.

Results: The study found varying degrees of motor recovery, with an average MRC grade of 4.2. Functional assessment revealed moderate disability in all patients, with an average QuickDASH score of 40.15±8.09. Psychological assessment showed no signs of depression in all patients, with an average PHQ-8 score of 4±0.5.

Conclusion: The study highlights the importance of incorporating psychological assessments into initial evaluations to ensure comprehensive care and support for these patients. Further research is needed to fully understand the complexities of BPI and their impact on patient's lives.

Received | 28-06-2024 1st Revision | 09-08-2024 2nd Revision | 05-09-2024 Accepted | 17-11-2024

Keywords | Brachial Plexus, Psychological Impact, BPI, QuickDASH, Functional outcome

Introduction

Brachial plexus injuries (BPI) are severe injuries that cause significant physical disability and functional impairment. Diagnosis is crucial to determine the surgical plan, and involves a detailed history, clinical examination, electro diagnostic studies, and imaging tests. Surgical options include nerve repair, neurolysis, nerve grafting, nerve transfer, tendon transfer, muscle transfer, and joint stabilization, and are chosen based on factors such as injury duration, type, and involved nerve roots.

Studies have shown varying outcomes after surgical treatment for BPI. Some have reported good motor

outcomes but poor patient satisfaction, while others have documented good functional outcomes in most patients. (1-3) However, patients often remain significantly disabled after surgery, highlighting the need for improved treatment strategies.

This study aims to investigate motor recovery, functional recovery, and psychosocial status after surgery for BPI to understand overall outcomes in our Centre. By examining these aspects, we can identify areas for improvement and optimize treatment strategies to enhance patient outcomes and satisfaction.

Methodology

This retrospective study was conducted at the Plastic Surgery Department, Mayo Hospital Lahore after IRB approval. A retrospective review of medical records from the last five years was performed to collect data on patients diagnosed with brachial plexus injury.

The data collection included patient demographics, surgical procedures, pre- and post-operative assessments, complications, and follow-ups. Recovery was assessed in three areas: motor function (British Medical Research Council grading system, 0-5 with a score of 3 was considered satisfactory) (4), functional ability (Quick DASH score) (5), and psychological well-being (Patient Health Questionnaire-8). Patients who had undergone surgical treatment for brachial plexus injuries more than 1 year prior were invited to return for a follow-up assessment and 2 observers filled out a questionnaire.

Results

A review of hospital records revealed 22 patients who sought treatment for brachial plexus injuries. Of these, 10 patients were treated conservatively, while 12 patients underwent surgical intervention. All the patients presented to the Outpatient department between 6-9 months post-injury, and all were referred from peripheral centers. Among the surgically treated patients, 5 underwent double nerve transfer for shoulder stabilization, 4 had the modified Oberlin procedure (fig-1), 2 underwent tendon transfer and the remaining 1 had triple nerve transfer (double nerve transfer for shoulder stabilization and Oberlin procedure for elbow flexion simultaneously) (table-1). All surgical patients underwent thorough clinical and electro-diagnostic evaluation before intervention. The mean follow-up period was 1.9 ± 0.86 years, and the mean age was 28 years. Notably, only one female patient opted for surgical intervention and all patients belonged to the lower middle class socioeconomic group. The majority of injuries resulted from traffic accidents. Despite counseling, none of the patients opted for free functional muscle transfer due to concerns about the lengthy procedure, extended hospital stay, and prolonged follow-up requirements.



Figure 1: Modified Oberlin procedure done for R Brachial Plexus Injury.

Table 1: (Data of different procedures)

DOUBLE NERVE TRANSFER	No. of patients
SAN to SSN FCR fascicles to AN	4
SAN to SS FCU fascicles to AN	1
MODIFIED OBERLIN PROCEDURE :	4
TRIPLE NERVE TRANSFER:	
SAN TO SS FCU fascicles to AN Oberlin nerve transfer	1
Tendon Transfer (Opponensplasty + Jones's Transfer)	2
Total no. patients	12

(SAN; Spinal Accessory nerve. SSN; suprascapular nerve. AN; Axillary Nerve. FCU; Flexor carpi ulnaris. FCR: Flexor carpi radialis.)

Motor Assessment: Six patients underwent surgery for shoulder abduction, with varying outcomes: three achieved grade 3 recovery, two achieved grade 5, and one achieved grade 4 according to MRC grade (fig-2). Meanwhile, five patients underwent the modified Oberlin procedure for elbow flexion, with two achieving grade 4 recovery and three achieving grade 5. Additionally, two patients underwent tendon transfer for thumb abduction, wrist flexion, and fingers extension, both achieving grade 4 recovery (table-2).

Table 2: (MRC GRADING)

MOTOR FUNCTION	Mean MRC GRADE
Shoulder Abduction	3.8
Elbow Flexion	4.6
Thumb opposition	4
Wrist extension	4
Finger extension	4

**Figure 2.** MRC Grade-4 shoulder abduction.**Functional Assessment:**

The results from the evaluation of QuickDASH-9 score indicated all patients with moderate disability and 1 patient with severe disability. The average QuickDASH-9 score for all patients was 40.15 ± 8.09 , which falls within the moderate disability range (scores range from 0 to 100, with higher scores indicating greater disability).

Psychological Assessment:

The Patient Health Questionnaire-8 (PHQ-8) results show that all patients are functioning well, with no signs of depression. The average score of 4 ± 0.5 is significantly below the threshold for major depression (10 or greater) and severe depression (20 or greater).

Discussion

Brachial plexus injuries can result in lifelong functional impairment and psychological trauma for patients. However, with the various surgical options available today, this disability can be significantly reduced. In our Centre, most patients who underwent surgery had a diagnosis of either pan plexus injury or upper brachial plexus injury.

After 1.5 years, the motor assessment results revealed varying degrees of recovery in shoulder abduction, elbow flexion, and hand function, with an average MRC grade of 4.2. This outcome is consistent with previous studies on brachial plexus injuries, particularly in our population (2, 6). Notably, most patients in this study were laborers and had irregular follow-ups and physiotherapy, which may have impacted their recovery.

The functional assessment using the QuickDASH-9 score indicates moderate disability in all patients, with an average score of 40.15 ± 8.09 . This suggests that patients still experience significant difficulties with daily activities and functional tasks, despite showing improvements in motor function. Lukas Rasulić investigate the functional outcomes along with motor recovery after surgery for brachial plexus injury. His data showed high DASH score (58.7%) along with depression and anxiety.³ Another study performed in Tehran showed similar results in 50 patients.¹ This shows that despite good motor recovery patient suffered difficulty in doing daily routine activities.

The psychological assessment results in our study are notable, as they indicate no signs of depression in all patients. This contrasts with studies in developed countries populations, which have reported higher rates of depression and anxiety in patients with brachial plexus injuries.^{7,8} This difference may be attributed to cultural and societal factors, as well as differences in healthcare systems and support networks.

A qualitative study on life satisfaction conducted in the USA after surgery for traumatic brachial plexus injury supports our findings.⁹ The study, which included 15 patients, labeled brachial plexus injury as a "disability paradox," where patients experience a high quality of life despite their physical limitations.¹⁰ Notably, patients who returned to work early reported higher satisfaction, which is consistent with our study's findings. This highlights the importance of

early rehabilitation and return to work in promoting overall well-being and life satisfaction in patients with brachial plexus injuries.

Our study has several limitations. Firstly, we did not conduct pre-operative functional and psychological assessments, which would have provided a more comprehensive understanding of the patient's improvement. Additionally, these assessments should have been included in the follow-up evaluations to monitor patient's progress at various stages. Furthermore, we only explored the variable of occupation and could not assess other factors that may influence the relationship between psychological stress and patient characteristics. Lastly, we had limited cases which may not be representative of the larger population. To address these limitations, future studies should aim to include larger sample sizes, involve multiple centers from both developed and developing countries, and explore a range of variables to gain a deeper understanding of how to effectively address patient satisfaction in surgically treated brachial plexus injuries.

Conclusion

In conclusion, our study demonstrates that patients with brachial plexus injuries in a developing country like Pakistan can achieve moderate functional improvement and surprisingly high quality of life after surgery. This highlights the resilience and adaptability of patients in resource-constrained settings. However, further research is needed to fully understand the complexities of brachial plexus injuries and their impact on patient's lives. Moreover, we emphasize the importance of incorporating psychological assessments into initial evaluations to ensure comprehensive care and support for these patients. By addressing these gaps, we can work towards improving outcomes and enhancing the well-being of individuals with brachial plexus injuries worldwide.

Conflict of Interest: *None*

Source of Funding: *None*

Author's Contribution

Shumaila Dogar: Conception and design of the study, Data collection, Data analysis and

interpretation, Final approval of the version to be published and accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Sadia Hussain: Substantial contribution to acquisition of data, Data analysis and interpretation and final approval of the version to be published.

Kanwal Zameer: Concept and design, substantial contribution to acquisition of data, critical review and final approval of the study.

Ifrah Ali: Acquisition of data, Data analysis and interpretation and final approval of the version to be Published.

Komal Saeed: Critical review, Data analysis and interpretation and Final approval of the Version.

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