

Physiotherapy for traumatic brachial plexus injury: A Case Report.

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Received: October 2019

Accepted: October 2019

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ABSTRACT

The brachial plexus injury is a rare condition that is commonly categorized as traumatic or obstetric injuries. The brachial plexus injuries commonly occurred due to motor vehicle accidents. This plexus is created problem with a lack of sensory and motor dysfunction, neurologic degeneration, atrophy of related muscle groups. The physiotherapist is aware effectively to create a plan of care for the betterment of patient's condition. The case study was used to highlight the effectiveness of physiotherapy for traumatic brachial plexus injury. 3.6 years old girl was diagnosed as left brachial plexus injury. The child is receiving physiotherapy treatment from November 2018 to till now, 3 times in a week. The treatment focused on improving active movement, muscle power, sensation, weight bearing and unimanual and bimanual function. This child's clinical status is improving day by day including: ROM, muscle strength, improved symmetrical weight bearing, unimanual and bimanual function. The outcome measures were goniometer, Oxford muscle grading scale and Narakas Sensory Grading System for sensory assessment. The shoulder active movement especially flexion, abduction and external rotation, elbow flexion was increases. The muscle power of shoulder flexor, abductor, external rotator and elbow flexor were also improved but the sensation of elbow area is only improved. The sensation of shoulder area was not changed. This case studies highlighted that physiotherapy is effective to improve ROM, muscle power, weightbearing as well as function (one hand and both hand) for traumatic brachial plexus injury.

Keywords: Brachial plexus injury, physiotherapy.

INTRODUCTION

The brachial plexus injury is one of peripheral injury that affecting the upper extremities.^[1] Globally, it is unknown known exactly how many brachial plexus injuries occur each year but the number of injuries is increasing day by day may be due to growing high-speed motor vehicle collisions.^[2] It is estimated that traumatic brachial plexus injury accounts for 44% to 70% in motorcycle accidents, sporting activities or workplace accidents. In 22% motorcycle injuries 4.2% having brachial plexus damage.^[3]

The upper brachial plexus lesion (C5, C6) causes paralysis of the shoulder muscles and biceps. If elbow flexion and wrist extension is reduced or winging of the scapula is detected, C6 involvement should be considered. When the wrist and forearm muscles are affected, C7 is affected and the forearm flexor and the

intrinsic muscles of the hand involved indicated C8, T1.^[4]

The brachial plexus injury affects in chronic impairments in children thus need long-term management.^[3]

The aim of physiotherapy is to maintain ROM, to strengthen affected muscles, to improve sensation, to manage pain and to prevent secondary complications.^[6]

This present study focused the early physiotherapy for traumatic brachial plexus injury.

Study Design:

The case study was used to highlight the effectiveness of physiotherapy for traumatic brachial plexus injury.

CASE REPORT

The child was 3.6 years old, girl and came from rural area in Gazipur District, Bangladesh. She has only one brother aged 13 years. Her parents both are completed primary education and economic status is poor and lived in an extended family. On the month of April 2018, the child got a trauma (motor vehicle collision) and has taken some medication for her problem. On the month of November 2018 local doctor has referred to Centre for the Rehabilitation of

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Begum; Physiotherapy for traumatic brachial plexus injury

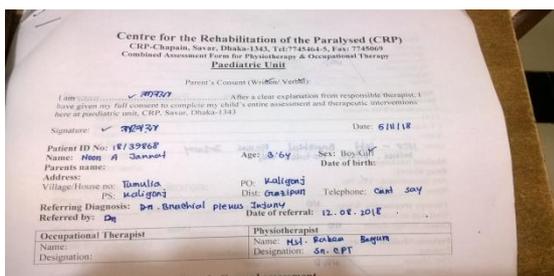
the Paralyzed (CRP), Savar, Dhaka for physiotherapy management. This child has come to Paediatric Department, CRP, Savar, Dhaka. The physiotherapist used assessment to find out her problem. At first the therapist has done the subjective assessment. Before starting assessment, the therapist has taken the written and verbal consent from child's mother. The mother complaint of the child is not able to move her left hand due to trauma. In Investigation, the impression of the nerve conduction velocity test was Left brachial plexus injury (deltoid, biceps and rotator cuff).

Impression of NCV report:

Date of injury: 7.04.18
 Date of 1st study: 23.06.18
 Date of 2nd study: 13.10.18
 Injury to the left brachial plexus (axonal), affecting mostly upper trunk reinnervation going on.
 Comparing to the previous study, today there is good improvement. (13.10.18)

Inform consent:

A written and verbal consent has given from child's mother before starting the formal assessment.



Objective assessment

The physiotherapist observed the muscle tone, range of motion, muscle strength and sensation. The assessment area is given below:

Assessment area	Upper limb	
	Left	Right
AROM (shoulder flexion, abduction, elbow flexion)	Loss	Full
Muscle strength	1	5
Sensation	Loss	Intact

After completing the assessment, the therapist confirmed the diagnosis as brachial plexus injury (traumatic) of left side.

Outcome measures:

1. Goniometer was used to measure the active range of movement of shoulder and elbow joint.
2. Oxford Grading Scale was applied to measure the muscle strength of shoulder and elbow muscles.
3. Narakas Sensory Grading System was used to assess to sensory status of left upper extremity (shoulder and elbow).

Problem list

- Reduce Active ROM
- Reduce sensation from shoulder

- Reduce muscle strength
- Reduce unimanual and bimanual function
- Poor weight bearing

Plan of care

The short term (2 months) goal was

- To provide care giver education about diagnosis, prognosis and physiotherapy management as well as proper position, handling of this child.
- To maintain normal range of movement
- To improve muscle strengths of affected muscles up to 3 in Oxford Grading Scale.
- To improve weight bearing in cross sitting, side sitting
- Advice about home program

Long-term goal (8 months) is

- To prevent secondary complications
- To improve sensation
- To increase active movement
- To improve bimanual and unimanual function
- To improve weight bearing in backward and 4-point kneeling
- Advice about home program

Intervention

The treatment plan was Care giver education, to provide Active assistate movement, Active ROM exercise, Strength training, Weight bearing practice, Tactile stimulation, Practice unimanual function, Practice bimanual function. The patient is receiving physiotherapy sessions 2 to 3 times per week from Nov-18 to till now. Each session lasts 45 minutes. The physiotherapist also provided home exercise program



Figure 1: Shoulder Flexion



Figure 2: Shoulder Abduction

Outcome of findings

Now, improved child’s active movement, especially shoulder flexion and abduction from initial status. [Table and Figure 1 & 2].

The distribution of progression of ROM, sensation and muscle strength for this child is given below:

Assessment area	Nov’18 to Dec’18	Jan’19 to Feb’19	March’19 to April’19
ROM			
Shoulder flexion	0°	40°	170°
Shoulder abduction	0°	45°	130°
Shoulder adduction	Full	Full	Full
Shoulder internal rotation	60°	80°	90°
Shoulder external rotation	0°	0°	20°
Elbow flexion	5°	60°	130°
Elbow supination	0°	20°	60°
Elbow pronation	90°	90°	90°
Wrist flexion	Full	Full	Full
Wrist extension	Full	Full	Full
Muscle power			
Shoulder flexors	0/5	2/5	3/5
Shoulder abductors	0/5	2/5	3/5
Shoulder internal rotators	5/5	5/5	5/5
Shoulder external rotators	0/5	2/5	2/5
Elbow flexor	2/5	3/5	3/5
Supinator	0/5	1/5	2/5
Pronator	5/5	5/5	5/5
Wrist flexor	5/5	5/5	5/5
Wrist extensor	5/5	5/5	5/5
Sensation			
Shoulder	So	So	So
Elbow	So	S1	S2
Wrist	S3	S3	S3

DISCUSSION

The purpose of this study was to focus the importance of early physiotherapy for traumatic brachial plexus injury. The result of this study emphasized that early physiotherapy is effective to improve range of movement, muscle strength, sensation, weight bearing in side, front, backward, cross sitting, 4-point kneeling position, unimanual and bimanual function for this child with brachial plexus injury and also add these findings as an evidence that is currently lacking.

Most of the studies focuses the surgical management of brachial plexus injury but did not address the physiotherapy management for traumatic brachial plexus injury for children. Early physiotherapy after post-surgery improved child’s clinical condition such as- range of motion, muscle strength, cruising independent and crawling with open hand for brachial plexus injury.^[6]

CONCLUSION

The early physiotherapy is effective to improve physical status of children with traumatic brachial plexus injury.

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How to cite this article: Begum MR. Physiotherapy for traumatic brachial plexus injury: A Case Report. *Ann. Int. Med. Den. Res*. 2019; 5(6):MC06-MC08.

Source of Support: Nil, **Conflict of Interest:** None declared