

Research Article

Effectiveness of Swallowing Therapy in Patient with Cervical Spinal Cord Injury-Induced Dysphagia

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Citation: Mukta HA, Asha NJ, Kamrujjaman M, Islam MZ, Binte SM, et al. (2020) Effectiveness of Swallowing Therapy in Patient with Cervical Spinal Cord Injury-Induced Dysphagia. Curr Trends Otolaryngol Rhinol 4: 132. DOI: 10.29011/2689-7385.000032

Received Date: June 24, 2020; **Accepted Date:** July 03, 2020; **Published Date:** July 10, 2020

Abstract

Swallowing difficulty is common in patient with cervical spinal cord injury. It generates health-related complications with a great deal of morbidity and mortality. The objective of the study is to explore the effectiveness of swallowing therapy among patients with cervical spinal cord injury-induced dysphasia. A ten cervical spinal cord injury-induced dysphagia subjects were included to conduct the study. Data were collected from the spinal cord injury unit in Centre for The Rehabilitation of the Paralysed (CRP) in accordance with the Speech and Language Unit. Pre experimental study design was used to determine the outcome of swallowing therapy. Speech and Language Therapist provided 10-12 session for swallowing therapy. P-value (<0.05) used as the level of significance. Most of the cervical spinal cord injury-induced dysphagia was complete cord injury and maximum reported at the C4-C5 level. Oral and Oropharyngeal phase of dysphagia reported in this study. Most of the subjects complained about a moderate level of dysphagia. The mean post-test was decreased on comparison of swallowing difficulty questionnaire. However, there was a significant (p-value=< 0.000) outcome after swallowing therapy. It is concluded that swallowing therapy is an effective treatment procedure for the cervical injury-induced dysphagia.

Keywords: Cervical spinal cord injury; Dysphagia; Effective treatment; Swallowing difficulty

Abbreviations: SCI: Spinal Cord Injury; SD: Swallowing Difficulty; QoL: Quality of Life; SLT: Speech and Language Therapist; ST: Swallowing Therapy; CSCI: Cervical Spinal Cord Injury; CRP: Centre for the Rehabilitation of the Paralysed

Introduction

Cervical Spinal Cord Injury (CSCI) is the reasons of

complete or incomplete tetraplegia and deficiency of sensory and autonomic function [1,2]. Patient with Cervical Spinal Cord Injury (CSCI) has respiratory insufficiency due to muscle weakness [1]. Swallowing Difficulty (SD) is a common and distressing consequence of CSCI which diminishes the Quality of Life (QoL). Patient with SD has trouble having inadequate calorie intake and suffering nutritional deficiency [3,4]. Dysphagia means SD which is a structural disorders or disturbances of the neurological control of swallowing. Dysphagia sometimes causes pneumonia [1]. The role of Speech and Language Therapists (SLTs) is to provide

treatment, support and care for children and adults who have difficulties with swallowing. SLTs are the concern professionals who works with neurological conditions related to SD [5]. Early detection of SD can help health professional to implement effective treatment as well as improve rehabilitation by taking advantage of intensive care [6]. Under interdisciplinary treatment, the prognosis of swallowing difficulty is well established [1]. SD is not always addressed properly because of lack of awareness by the patient or the healthcare professional. The swallowing problem is assessed by the professionals pointing medical history, physical examination, clinical observation, cranial nerve examination, oral cavity, test swallow, and feeding evaluation [7]. As the incidence of SCI is high and no study has been conducted earlier on swallowing treatment effectiveness of patient with cervical spinal cord injury in Bangladesh. So, the core task of the study is to identify the outcome of Swallowing Therapy (ST) among patients with SD after CSCI. The aim of the study is to explore the effectiveness of swallowing therapy in patient with the cervical spinal cord injury-induced dysphagia.

Materials and Methods

Study Design and Participants

A pre-experimental study design was conducted in SCI unit of CRP, Dhaka. Ten subjects as diagnosed with cervical spinal injury-induced dysphagia were selected in this study. The subjects were categorized by oral, pharyngeal or oropharyngeal types. The same subject design is a variant of the experimental design, which involved testing of the same group and also provided the intervention program in this study. The subjects received 0-2 sessions for pre-examination and 10-12 session was selected for post examination.

Data Collection Procedure

At first, qualified SLTs confirmed the diagnosis of swallowing difficulty then collected the data by taking an appointment from the patients. The administration time for a particular case is between 15-20 minutes at pretest as well as post-test in a semi-structure questionnaire. According to the protocol of SLT department, SLTs provided a 10-12 session swallowing therapy for the subjects and assessed the outcome of the therapy for the same subjects. After that, compared the scores on before and after therapy to measure the effectiveness of swallowing treatment.

Data Analysis

The investigators used statistical calculation using the inferential statistics parametric related t-test to find out cervical patient's swallowing treatment outcome following before and after

treatment. The inferential statistics tried to find out the differences between the sets of scores [8]. The investigator calculated the total score using inferential statistics parametric related t-test. P-value (<0.05) was accepted by the researcher to show the significance of the study.

Ethical Issues

The study was approved by the Institutional Review Committee (IRC) of the Bangladesh Health Professions Institute. Permission was also taken from Clinical Speech and Language Therapy Department and SCI unit of Centre for the Rehabilitation of the Paralyzed (CRP), Savar. Written consent was taken from the participants including signature to ensure voluntary participation in the study and explained to them about the purpose of the study. Information from this study was anonymously coded to ensure confidentiality and was not personally identified any publication containing the result of the study.

Results

Table 1 reveals that the mean age of the participants was 30 years (± 11.6) where maximum belongs to age range 16-31 (70.0%). Male and Female participants ration was equal. Among the participants, majority were students (40.0%).

Age group (years)	n (%)
16-31	7 (70.0)
32-47	2 (20.0)
48-63	1 (10.0)
Mean\pmSD= 30\pm11.16	
Sex	
Male	50 (50.0)
Female	50 (50.0)
Occupation	
Student	4 (40.0)
Housewives	1 (10.0)
Construction worker	2 (20.0)
Driver	1 (10.0)
Teacher	2 (20.0)

Table 1: Socio demographic characteristics.

Table 2 reveals that maximum participants were diagnosed by complete cord injury (70.0%) and a half (50.0%) of the participants suffered by C5 level of injury. Considering the swallowing difficulty, half of them (50.0%) was reported by oral phase and half of them (50.0%) was diagnosed by oropharyngeal phase. Most of the participants complained to moderate level (70%) of injury.

Types of injury	n (%)
Complete	7 (70.0)
Incomplete	3 (30.0)
Level of injury	
C4	3 (40.0)
C5	5 (50.0)
C6	1 (10.0)
C7	1 (10.0)
SLT Diagnosis Phase	
Oral	5 (50.0)
Oropharyngeal	5 (50.0)
Severity of injury	
Mild	2 (20.0)
Moderate	7 (70.0)
Severe	1 (10.0)

Table 2: Spinal Cord injury and SLT diagnosis related information.

The study represents the swallowing difficulty by the 15 item swallowing disturbance questionnaire (SDQ) response score before and after swallowing therapy. It was notably decreased the mean of score of post-test compare to pre-test in the 15 item scale as shown in Figure 1.

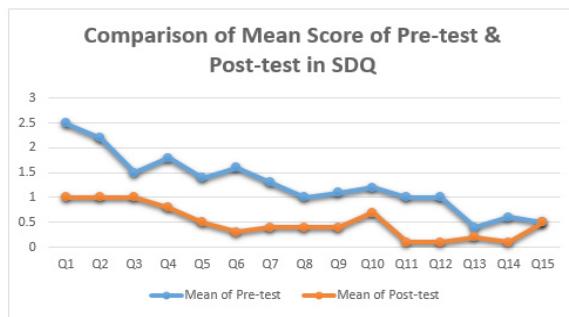


Figure 1: Comparison of Mean score of Pre-test and Post-test in SDQ.

Figure 2 illustrates the total score of ten patients with SCI according to the response in Bangla version swallowing disturbance questionnaire (SDQ). Here, visual presentation of the initial score of swallowing difficulty of patient with SCI and score after taking speech and language therapy had showed. To measure the outcome of swallowing therapy for 10 participants showed a

decrease scores at post-test along with pre-test score relatively.

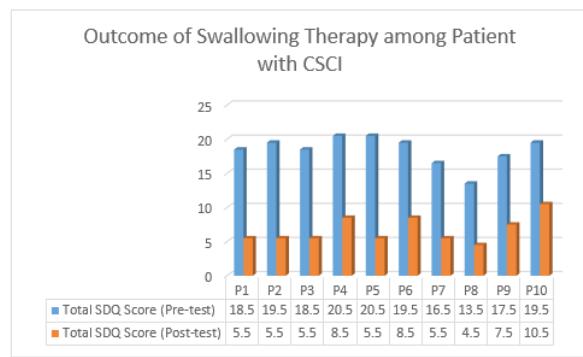


Figure 2: Outcome of Swallowing Therapy among Patient with CSCI.

In response to Swallowing Disturbance Questionnaire (SDQ) before and after swallowing therapy, the participants show significant changes after taking intervention. With the comparison of mean \pm SD (Total Pre SDQ 18.40 ± 2.132 and Total Post SDQ 6.70 ± 1.932) before and after swallowing therapy showed that there was 95% confidence interval where the upper value was 13.17 and lower value were 10.22 and the p-value was <0.000 . The p-value indicated a statistically significant result as shown in Table 3.

	Mean \pm SD	95% CI	t-value	p-value
Total Pre SDQ score	18.40 ± 2.132	13.17-10.22	17.98	<0.000
Total Post SDQ score				

Table 3: Statistical analysis of significance.

The p value is significant (<0.000), indicating that swallowing therapy is effective for the patient with dysphagia.

Discussion

The study examined the swallowing difficulty among the patient with cervical spinal cord injury over a three months' period to detect the effectiveness of ST. In response to SDQ before and after swallowing therapy, the participants show significant changes after taking intervention. A study by Yura, et al. (2014) [9] found 21 cases of improvement among 45 dysphagia subjects. This study indicated that most of the patient with dysphagia diagnosed as complete cervical cord injury and C5 was the most prevalent site of injury. Chaw, et al. (2012) [10] reported that C4 SCI is the risk factors for swallowing difficulty. Razzak (2013) [11] stated that about 70% of patient with swallowing problem found in complete SCI. The Current study found oral and oropharyngeal phase of swallowing difficulty among the participants. On the other

hand, Shem, et al. (2012) [12] stated that most of the patient with swallowing difficulty was the pharyngeal phase of swallowing. This study revealed, the majority of the participants reported to dysphagia in a moderate level of severity. On the other hand, Wolf & Meiners (2003) [1] found 41.3% severe and 39.2% mild swallowing difficulty following CSCI. Hayashi, et al. (2017) [13] indicated 70% were suffered from severe dysphagia after acute CSCI. In response to Swallowing Disturbance Questionnaire (SDQ) of before and after swallowing therapy, the participants show significant changes after taking intervention. Wheeler-Hegland, et al. (2009) [14] performed a systematic review of 17 studies for evidence-based practice on oropharyngeal dysphagia behavioral treatment and 31 concluded with efficiency in positive swallowing outcome. Permsirvanich, et al., (2009) [15] found the outcome of swallowing therapy showed no statistically significant result between the experimental and control group. Oropharyngeal swallowing ability was significantly improved where the p-value was <0.005), which was statistically significant [16]. SLT is an innovative profession in Bangladesh. To make the treatment program as evidence-based, this study was conducted with the aim to explore the swallowing treatment effectiveness among cervical spinal cord injury-induced dysphasia. The study was pre-experimental design, for this reason the result could not be generalized, so need to perform a true experimental study within this area. So a much larger study scale along with longer duration is needed in the future.

Conclusion

C4-C5 level of the spinal cord injury was the common site of dysphagia where complete cord injury was the most prevalent site found in this study. Dysphasia reported to oral and oropharyngeal phases. Response to SDQ the mean score of post-test in every subject found less compare to pre-test. However, a significant improvement found after swallowing therapy. ST is reached the conclusion to be an effective treatment procedure for the cervical spinal cord injury-induced dysphasia

Acknowledgement

The authors acknowledge the support provided by the Spinal Cord Injury Unit and Speech and Language Therapy Unit at CRP, Dhaka.

References

1. Wolf C, Meiners TH (2003) Dysphagia in patients with acute cervical spinal cord injury. *Spinal Cord* 41: 347-353.
2. Hasan MR, Kamrujjaman M (2019) A Cross Sectional Study of Spinal Cord Injury-Induced Musculoskeletal Pain. *Journal of Current Medical Research and Opinion* 2: 367-371.
3. Abel R, Ruf S, Spahn B (2004) Cervical spinal cord injury and deglutition disorders. *Swallowing* 19: 5-94.
4. Wilkins T, Gillies RA, Thomas AM, Wagner PJ (2007) The Prevalence of Swallowing in Primary Care Patients: A Hames Net Research Network Study. *J Am Board Fam Med* 20:144-150.
5. Shaker R, Easterling C, Belafsky PC, Postma GN (Eds.) (2012) Manual of diagnostic and therapeutic techniques for disorders of deglutition. Springer Science & Business Media.
6. Cohen JT, Manor Y (2011) Swallowing disturbance questionnaire for detecting dysphagia. *The Laryngoscope* 121: 1383-1387.
7. Cary M, Groher M (2003). Introduction to adult swallowing Disorders. USA: Butterworth-Heinemann.
8. Andrew PSD, Edersen, Mark P, McEvoy DC (2011) Research methods and design in sport management. Library of congress. USA.
9. Yura S, Nakanami A, Takagi Y, Kagechika K (2014) No. 209 Effectiveness of Feeding and Swallowing Therapy in Patients with Dysphagia. *PM&R* 8: S134.
10. Chaw E, Shan K, Castillo K, Wong SL, Chang J (2012) Dysphagia & Associated Respiratory Considerations in Cervical Spinal Cord Injury. *Top Spinal Cord Inj Rehabil* 18: 291-299.
11. Razzak ATMA (2013) Early care following traumatic spinal cord injury (TSCI) in a rehabilitation centre in Bangladesh-an analysis. *Disability, CBR & Inclusive Development* 24: 64-78.
12. Shem KL, Castillo K, Wong SL, Chang J, Kao MC, et al. (2012) Diagnostic accuracy of bedside swallow evaluation versus videofluoroscopy to assess dysphagia in individuals with tetraplegia. *Phys Med Rehabil* 4: 283-289.
13. Hayashi T, Fujiwara Y, Sakai H, Maeda T, Ueta T, et al. (2017) Risk factors for severe dysphagia in acute cervical spinal cord injury. *Spinal Cord* 10: 940-943.
14. Wheeler-Hegland K, Ashford J, Frymar T, McCabe D, Mullen R, et al. (2009) Evidence-based systematic review: oropharyngeal dysphagia behavioral treatments. Part II-impact of dysphagia treatment on normal swallow function. *J Rehabil Res Dev* 46:185-194.
15. Permsirvanich W, Tipchatyotin S, Wongchai M, Leelamanit V (2009) Comparing the effects of rehabilitation swallowing therapy vs. neuromuscular electrical stimulation therapy among stroke patients with persistent pharyngeal dysphagia: a randomized controlled study. *J Med Assoc Thai* 92: 259.
16. Kim YK, Choi SS, Choi JH, Yoon JG (2015) Effectiveness of Rehabilitation Balloon Swallowing Treatment on Upper Esophageal Sphincter Relaxation and Pharyngeal Motility for Neurogenic Dysphagia. *Ann Rehabil Med* 39: 524-534.