Original Article

Pulmonary complications among patients with stroke

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Objective: To assess the frequency of pulmonary complications in post-stroke patients receiving cardiopulmonary physical therapy treatment for pulmonary complications.

Methodology: It was a cross-sectional study and sampling technique was Purposive convenient sampling and study duration was 4 months. It included 193 stroke patients. The study was conducted in Social Security Hospital, Jinnah Hospital, Shaikh Zaid Hospital, Services Hospital, Ganga Ram Hospital and General Hospital, all in Lahore. A questionnaire was used to collect the data using Diaphragmatic Excursion Test (DET) and Modified Medical Research Council (MMRC) Dyspnea Scale.

Results: Out of 193 stroke patients, 100(51.81%) were female and 93(48.19%) male. The age ranged from 18 to 100. MMRC dyspnea Scale having (0- 4 grades), the maximum frequency was 152(81.3%) of grade 4. In DET, Positive test frequency was 80(41.45%). Frequency of patients feeling better through cardiopulmonary physical therapy treatment was 58 (95.08%) and total participants were 61.

Conclusion: There was a low frequency of pulmonary complication among patient with stroke and high frequency of functional limitations. However, cardiopulmonary Physical Therapy treatment e.g. (Percussion, Vibration, Postural Drainage and breathing exercises) showed best effects on the treatment of pulmonary complications after a stroke. (Rawal Med J 202;45:307-309).

Keywords: Stroke, pulmonary, cardiopulmonary, CVA, cerebrovascular accident.

INTRODUCTION

"Stroke (Cerebrovascular accident; CVA) is the sudden loss of neurological function caused by an interruption of the blood flow to the brain.[1] Stroke causes weakness or loss of function of respiratory muscles, which leads to loss of lungs function, may be cough, a complication of the chest wall, decrease the lung capacity and lung volume and decrease expiration and inspiration. Consequently, in the acute and sub-acute stage of stroke, cardiopulmonary rehabilitation has an important role in lungs function in patients.[2] In acute stroke, swallowing difficulties are common and is responsible for fatal respiratory events of aspiration pneumonia.[3] The weakness of respiratory muscles, more danger of chest infections in that population.[4]

Stroke is a cause of disability and death. Major risk factors include age, High blood pressure, high cholesterol level, obesity, physical inactivity, smoking, and diabetes.[5] In acute stroke, there is impairment of the function of respiratory muscles and cough.[6] Fatigue is common after stroke and patient feeling with stress.[7] Fatigue and depression are correlated.[8,9] Chest complications after stroke are the main cause of death.[10] After stroke problems of musculoskeletal are common.[11] In severe stroke there is pharyngeal weakness.[12] Stroke is accompanied by psychological, physical and social stress.[13] The rationale of this study was to assess the frequency of pulmonary complications in different stages of stroke and to evaluate the frequency of post-stroke patients receiving cardiopulmonary physical therapy treatment for pulmonary complications.

METHODOLOGY

It was a cross-sectional observational study and data collected by Purposive convenient sampling technique and study duration was 4 months. The sample size was 193 patients. The sample size was calculated by the following WHO formula keeping the margin of error equal to 10% and level of significance equal to 5%.

$$n = \frac{Z^2_{1-\frac{\alpha}{2}} P(1-P)}{d^2}$$

Z 1-α/2 is the desired level of significance = 95% P_o is the expected proportion of Subjects =43.1% and d^2 is the expected margin of error = 07%

The study was conducted in Social Security Hospital, Jinnah Hospital, Shaikh Zaid Hospital, Services Hospital, Ganga Ram Hospital and General Hospital, all in Lahore. Participants selected were those who were already diagnosed with stroke. Acute phase (Initial stage, last approximately 2 weeks after the lesion begins.), Subacute phase (which usually lasts up to six months after the beginning) and Chronic phase patients (begins months to years after the stroke and) can continue until the end of the life of the person.[14] Age range was 18-100 years. Exclusion criteria was monoplegia and pre stroke pulmonary complications.

Demographic data were collected. Diaphragmatic Excursion Test (DET) and Modified Medical Research Council Dyspnea scale were used (0-4 points). DET measurement gap less than 3cm than test considers positive. Patients who were paralysis completely or partially and completely depend on others for movement, turn rotations and motion was consider 4 grade of dyspnea scale. All Data were analyzed through SPSS Version 25.

RESULTS

Out of 193 stroke patients, 100(51.81%) were female and 93(48.19%) male. The age ranged from 18 to 100. DET Positive test frequency was 80(41.45%), Negative test was 113(58.55%) (Table 1). (Normal or Negative diaphragmatic excursion should be 3-5cm if it is less than 3-5cm then the test is positive). Frequency of cough was never in patients 85(44.04%), sometimes cough was 89(46.11%), and often cough was 19(9.84%). Frequency of shortness of breath was never in patients 104(53.89%), sometime in 49(25.39%), and often in 40(20.73%).

Frequency of breathing problems during the speech was never in patients 138(71.50%), sometime in 27(13.99%), and often in 28(14.51%). Frequency of orthopnea was never in patients 117(60.62%), sometime in 40(20.73%), and often in 36(18.55%). Frequency of chest tightness was never in patients 140(72.54%), sometime in 21(10.88%), and often in 32 (16.58%). Frequency of wheezing was never in patients 130(67.36%), sometime in 30(15.54%), and often in 33 (17.10%). Frequency of fatigue was never in patients 63(32.64%), sometime in 62(32.12%), and often in 68(35.23%). Frequency of palpitation was never in patients 91(47.15%), sometime in 69(35.75%), and often in 33(17.10%).

Table 1. Frequency distribution of Diaphragmatic Excursion Test.

	Frequency	Percent
Positive	80	41.5%
Negative	113	58.5%
Total	193	100%

Table 2. Have been feeling better through cardiopulmonary physical therapy treatment?

	Frequency	Percent
Yes	58	30.1%
No	3	1.6%
Total	61	31.6%
Not Participants	132	68.4%
Total	193	100%

Frequency of stroke patients they treated pulmonary complications through cardiopulmonary physical therapy 61(31.6%) and they were not treated through cardiopulmonary physical therapy 132(68.4%). Patients feeling better after through cardiopulmonary physical therapy treatment was 58 (95.08%) (Table 2).

DISCUSSION

In post-stroke patients, functional limitations affect patient sitting, standing, walking and other movements. In pulmonary complications, dyspnea and pneumonia are a major cause of death. We found cough frequency to be 66.2%, due to respiratory muscle weakness. Frequency of Diaphragmatic Excursion test was positive 45%, similar to reported by Khedr et al.[15]

A study on prevalence of post-stroke acute & sub-acute pulmonary damage in 44, 19 were diagnosed with pulmonary impairments and there were 18 participants who did not seek cardiopulmonary physiotherapy.[2] The prevalence of pulmonary disability in stroke patients was 43.1% and the

incidence of respiratory failure patients who did not undergo cardiopulmonary exercise instruction was 40.90%. Participants were tested on the scale of dyspnea and diaphragmatic excursion test, out of which 19 participants had positive results and were diagnosed with pulmonary disability. As per our Diaphragmatic Excursion Test (DET) report, 80 (41.45%) were positive.[2]

Currently, 45% to 50% of all patients after stroke in Germany under do physical therapy rehabilitation. Reperfusion can be achieved to controlled acute complications.[16] Recovery is unlikely in about 5% stroke patients due to its severity.[17] The study limitation include short duration and data were collected only one time.

CONCLUSION

This study concluded that there was a low frequency of pulmonary complication among patient with stroke and high frequency of functional limitations. However, cardiopulmonary Physical Therapy treatment e.g. Percussion, Vibration, Postural Drainage and breathing exercises had shown best effects on the treatment of pulmonary complications after a stroke.

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