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Research Article

FUNCTIONAL GAIT ASSESSMENT IN RIGHT VERSUS LEFT HEMISPHERE LESION PATIENTS OF STROKE IN LAHORE, PAKISTAN

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Abstract:

Background: Stroke is a prevalent condition that causes major morbidities and disabilities in individuals. Stroke results in disturbing the patient's functional status of life to a great extent. Different treatment strategies for stroke patients with respect to site of hemispheric lesion are least considered by researchers and clinicians. The disabilities related to left and right hemispheric lesion are also less under discussion. Regaining walking ability in stroke patients is somehow linked with site of hemispheric lesion and this ability is a big goal of all rehabilitation institutes. **Objectives:** To compare the functional gait among left and right hemisphere lesion patients of stroke. **Methodology:** This cross sectional comparative study included 126 patients among them 63 were with right and 63 were with the left sided hemispheric lesion. This study was conducted from December 2016 to May 2017. Convenience sampling was done and subjects were selected from different hospitals and rehabilitation centers of Lahore, Pakistan on the basis of inclusion & exclusion criteria after taking informed consent. Functional gait assessment scale is a unique measure with its clinical usefulness, ascertain demonstrable qualities for assessing functional gait performance and disturbance related to balance in stroke patients. FGA is suggested for its psychometric properties because it efficiently detect decrease in functional gait during walking by performing different walking tasks. It is an observational test with excellent validity, consistency and reliability with least ceiling effects. The descriptive statistical data was analyzed using SPSS v20. Means and Standard deviations was calculated and Independent sample t-test was used for comparison of functional gait between left and right hemispheric lesion patients. P-value $\leq .05$ was taken statistically significant. **Results:** Mean difference of functional gait assessment scores in Group A was 12.56 ± 2.595 and in Group B was 15.59 ± 4.172 with p-value of $< 0.001^*$. P-value shows that the difference is significant because lower p-value represented for conformation to reject the Null hypothesis. According to the independent sample t-test there is a significant difference of FGA scores present between the two groups. Results gave the p-value less than the 0.05 which express that our findings are significant. **Conclusion:** Our study concludes that a significant difference is present between the two groups. The finding from this study gave us understanding that ambulatory functions differ with respect to site of hemisphere lesion. The site of hemisphere lesion impact on patient's functional gait has statistically significant. The patients had their stroke on left side hemisphere more prone to balance and gait impairment as compared to right hemisphere lesion patients expressed from the study population. So, these differences in deficits caused by left & right CVAs must be taken into account in various physical therapy approaches.

Key Words: Hemispheric lesion, Stroke, Disabilities, Functional gait assessment scale (FGA), Walking abilities, Stroke rehabilitation, Gait.

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INTRODUCTION:

Regaining walking ability in stroke patients is of more valuable and may be a big goal of all rehabilitation institutes. So, that some reportable data may vary but those patients which survive after stroke can regain some extent of perfection in their ambulation ability are near 50% to 80%. Many studies suggested that most of the motor recovery is started at duration of 1st three months post stroke and the recovery levels progressed from six months to one year post stroke.(1)

The right hemisphere found to be dominant for spatial orientation and the left side of brain dominant with motor functions. So the left-side lesions cause more disturbance of voluntary movements but right-side lesions cause loss of spatial attention and posture management. We may compare people with left and right side lesion regarding to start their first impairments and recovery after 3 months post stroke.(2)

Gait may be a higher quality determinant for independent life. Therefore, it is not shocking that among the stroke survivors regaining walking function found to be top priority importance as compared to other impairments.(3)

Those patients which haven't done some adequate therapy represent with higher level of postural changes. As compared to right hemispheric lesion patients the left one expressed with more instable in their postural balance while sitting and standing positions.(4)

Recovery of independent walk in post stroke may be a major goal. Although there is few scant proof that ambulant functions are hemisphere-dependent, this hypothesis can't be excluded. (5)

Function and mobility improve throughout the second month of rehabilitation ($P = \text{zero}.001$), however stance unsteadiness and imbalance don't. The aspect of brain lesion appears to have an effect on recovery of

independent stance with a bonus to patients with right hemiparesis. However, there's no distinction between balance management of people with left versus right hemiparesis in patients who reach independent stance by the top of the first month following their stroke. (6) As the result of stroke, evidence showed that variations must be present within the left and right hemispheres is especially attention-grabbing. The right hemisphere was a lot of significant in spatial orientation but the left one significant with more control.(4)

The location or side of lesion and age of the patient was not affected on the recovery rate. the purposeful recovery established by the physical and occupational therapy .(7)

The population of stroke patients may be a heterogeneous group. Severity but additionally location and kind of stroke confirm the symptoms and outcome, even in gait analysis(3)

The study has been done by different countries and areas but in Lahore Pakistan no such type of study done before our study so a regional gap is present. We are conducting this study because to show how much variation present in functional gait during different walking tasks among left and right hemisphere lesion patients during recovery stages.

OBJECTIVE:

Objective of the study was: To compare the functional gait among left and right hemisphere lesion patients of stroke.

OPERATIONAL DEFINITION:

Functional Gait Assessment Scale: is a unique clinical observational tool used to measure functional gait performance and disturbance related to balance.(8) FGA is suggested for its psychometric properties. During rehabilitation walking function is assessed by FGA in stroke patients. The total score of FGA is from 0 to 30. Test retest reliability is 0.95 and

least ceiling effects (0.0% to 5.7%).(9)

The FGA scores for the intra-rater and inter-rater reliability are excellent, with ICCs of 0.97 and 0.94 respectively. Excellent convergent validity calculated with criteria (six months after stroke, average age 69.9 (9.5) years): Excellent correlations of FGA with FAC and Gait speed ($\rho = 0.83$, $p < 0.001$) and ($\rho = 0.82$, $p < 0.001$) respectively. (10)

FGA is not very sensitive for faller but value less than 15 or 30% represent prediction of faller risk. The values ≥ 15 represents sufficient balance & gait performance but the values ≥ 22 shows better postural stability & functional gait. The sensitivity and specificity is 0.72 and 0.78 respectively.(11)

The ten items of FGA in which each item expressed with 4 point ordinal scale 0, 1, 2, & 3 score is used. Higher scores on FGA shows perfect gait and balance ability. The ICC for the whole FGA is 0.99 & the Kappa values for each items from 0.91 to 0.99 in range. (12)

METHODOLOGY:

This was comparative cross-sectional study comprised of 126 patients among them 63 with right and 63 with

the left sided hemispheric lesion. This study was conducted from December to May 2017. Convenience sampling was done and subjects were selected from different hospitals and rehabilitation centers of Lahore, Pakistan on the basis of inclusion & exclusion criteria after taking informed consent. Study carried out on those patients which have aged between 45 to 65 years, single either side hemisphere lesion, sitting and standing upright at least for 1 minute. Functional gait assessment scale is a unique measure with its clinical usefulness, ascertain demonstrable qualities for assessing functional gait performance and disturbance related to balance in stroke patients. FGA is suggested for its psychometric properties because it efficiently detect decrease in functional gait during walking by performing different walking tasks. It is a observational test with excellent validity, consistency and reliability with least ceiling effects. A therapist remained by the patient's side during the test procedure for safety in case the patient lost his or her balance. The descriptive statistical data was analyzed using SPSS v20. Means and Standard deviations were calculated, and Independent sample t-test was used for comparison of functional gait between left and right hemispheric lesion patients. P -value $\leq .05$ was considered statistically significant.

		Group A (Left Hemisphere Lesion) n=63	Group B (Right Hemisphere Lesion) n=63	p-Value
Age (Years)		54.19±8.536	51.46±8.570	0.076
Weight (kg)		61.95±8.818	58.67±5.828	0.015
Gender	Male	45	41	0.444
	Female	18	22	
Use of device	Yes	23	15	0.120
	No	40	48	
Hand dominance	Left	7	11	0.309
	Right	56	52	

Socio-demographic characteristics of the study population and the distribution of their data are summarized in table-I.A total of 126 stroke patients were included in the study who were divided equally into two different groups i.e Group A and Group B (group A with left & group B with right hemispheric lesion patients).Out of 63 patients in Group A 45

males and 18 females whereas in Group B 41 were males and 22 were females. Mean age of patients in Group A was 54.19±8.536 and in Group B was 51.46±8.570 with p -value (0.076). And Mean weight of patients in Group A was 61.95±8.818 and Group B was 58.67±5.828 with p -value (0.015).

TABLE II. Independent Sample T-test Between Group Comparison Mean difference of scoring Functional Gait Assessment Scale			
	GROUP A LEFT HEMISPHERE LESION	GROUP B RIGHT HEMISPHERE LESION	P-Value
Mean Score FGA	12.56±2.595	15.59±4.172	<0.001*
* p-value significant ≤ 0.05			

Comparison of mean score of difference in functional gait between groups is summarized in table II. Mean difference of functional gait assessment scores in Group A was 12.56±2.595 and in Group B was 15.59±4.172 with p -value of <0.001*. P -value shows that the difference is significant because lower p -value represented for conformation to reject the Null hypothesis. According to the independent sample t-test there is a significant difference of FGA scores present between the two groups. Results gave the p -value less than the 0.05 which express that our finding are significant.

DISCUSSION:

This present report is perhaps the first study regarding the site of hemispheric lesion differentiation with functional gait assessment of stroke patients conducted in Lahore. In Pakistan where stroke is a prevalent condition and causing a major morbidities or disabilities among individuals which effect their functional status of life to a great extent.

The current results confirmed the hypothesis that there is a significant difference in functional gait of patients with right and left hemisphere lesion. So, the alternate hypothesis is proved. Differences between the functional consequences of stroke in the left and right hemispheres is particularly interesting.

Our study revealed that stroke patients with left side hemispheric lesion represent with greater functional impairments which means they show poor balance and gait during performing different walking tasks on FGA scale as compared to right sided patients. These findings suggests that individuals with left side injury we may need different treatment protocol and rehabilitation procedure or training for stroke patients should under consideration.

This differentiation may be the fact of dominance of left hemisphere for the motor function as compared to right hemisphere which dominant for spatial orientation. This was supported by results from many other studies.

A previous study showed that individuals with left sided injury show greater impairment of gait and daily activities as compared to same right sided injury but recovery rate of gait is less in left ones by **Mariana & Valle in 2008**.(2) Another study reported by **Stephen et al. in 1998** that functional outcomes depends upon the age, initial severity of stroke and lesion side which represented by patients.(17) The study illustrated and conducted by **Lopes Priscila et al. in 2015** that individuals with left hemiparesis (right sided lesion) represent with good center of pressure and gait determinants with improved balance and gait during rehabilitation training.(4)

These are the finding which relate with our results but some studies also against in this regard. Our study differ from other similar studies because of the use of observation tool and age group.

The existing significant finding difference in functional gait has clinical importance which help us to set or change patient's protocol with respect to lesion and improved quality of life with better recovery of stroke.

CONCLUSION:

Our study concludes that a significant difference is present between the two groups. The finding from this study gave us understanding that ambulatory functions differ with respect to site of hemisphere lesion. The site of hemisphere lesion impact on patient's functional gait has statistically significant. The patients had their stroke on left side hemisphere more prone to balance and gait impairment as compared to right hemisphere lesion patients expressed from the study population. So, these differences in deficits caused by left & right CVAs must be taken into account in various physical therapy approaches.

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