ARTIGO ORIGINAL

Correlação do perfil de deambulação e velocidade da marcha em um grupo de pacientes hemiplégicos atendidos em um centro de reabilitação

Correlation between the ambulation profile and gait velocity in a group of hemiplegic patients treated at a rehabilitation center

Ana Cristina Franzoi[1], Nelson Shigueru Kagohara[2]

RESUMO

Introdução: a marcha de pacientes com hemiplegia é caracterizada por diminuição da velocidade e assimetria, trazendo limitações às atividades e restrições da participação social deste indivíduo. O objetivo deste estudo foi descrever o perfil funcional da deambulação deste grupo de pacientes, correlacionando-o à velocidade da marcha. Métodos: Foram avaliados 87 pacientes utilizando a Classificação Funcional da Marcha Modificada (CFMM), velocidade da marcha em 10 metros sendo identificada a necessidade de auxílio de terceiros e o uso de transporte público. Análise estatística: descritiva, comparação entre grupos e testes de correlações (p ≤ 0,05). Resultados: 49 homens, idade média 54 anos, tempo médio de lesão 33 meses. Três pacientes realizavam marcha terapêutica, 10 marcha domiciliar, 29 comunitária restrita, 43 comunitária e 2 marcha normal. Em relação a assistência à marcha: 38 pacientes necessitavam de auxílio de terceiros ou supervisão, 45 utilizavam transporte público, 59 não utilizavam apoio. A velocidade de marcha foi diferente entre os grupos divididos pelos tipos funcionais de marcha, necessidade de auxílio de terceiros e uso de transporte público, se correlacionando com idade, CFMM, assistência de terceiros e uso de transporte público. Conclusão: 85% da amostra realizavam marcha comunitária, mas somente 55% o faziam de maneira independente. Houve correlação entre a velocidade e as categorias funcionais de marcha estudadas, sendo estabelecidos limiares de velocidades de marcha para os diferentes grupos.

PALAVRAS-CHAVE

hemiplegia, marcha, atividades cotidianas, centro de reabilitação

ABSTRACT

Introduction: The gait of hemiplegic patients is characterized by decreased velocity and asymmetry, which brings limitations to the activities of daily living and restrictions in the individual's social integration. The aim of this study was to describe the functional ambulation profile in this group of patients and correlate it with gait velocity. Methods: 87 patients were evaluated using the Modified Functional Gait Classification (MFGC), gait velocity at 10 meters, with the identification of the need for help and use of public transportation. Statistical analysis: descriptive analysis; comparison between groups and correlation tests (p ≤ 0.05). Results: 49 male individuals, with a mean age of 54 yrs, mean injury time of 33 months. Three patients performed therapeutic gait, 10 at-home gait, 29 restricted community gait, 43 community gait and 2 presented normal gait. Regarding gait assistance: 38 patients needed help or supervision from others, 45 used public transportation, 59 did not need gait support. Gait velocity was different among the groups divided by the gait functional type, need for others' help and use of public transportation, correlated with age, MFGC, help from others and use of public transportation. Conclusion: 85% of the sample performed community gait, but only 55% did it independently. There was a correlation between gait velocity and the functional types of gait evaluated, with gait velocity thresholds being established for the different groups.

KEYWORDS

hemiplegia, gait, activities of daily living, rehabilitation centers

1Fisiatra da Associação Brasileira Beneficente de Reabilitação (ABBR), Prof Adjunta de Medicina Física e Reabilitação da Universidade Federal do Rio de Janeiro
2Médico Fisiatra responsável pela Unidades de Lesões Crânio-Encefálicas da ABBR

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INTRODUCTION

The gait of hemiplegic patients, when compared to that of healthy adults, is characterized by a decrease in velocity and spatial as well as temporal asymmetry[1]. Both gait velocity and symmetry are related to motor recovery after the injury[2]. The outcome of this sequel brings activity limitations and restrictions in the individual's social integration. The patient's capacity of performing community gait is a functional independence milestone, being considered essential or very important by the great majority of patients[3]. Gait velocity, as an independent measurement, can differentiate at-home gait from community gait, providing information on the patient's discovery and the efficacy of treatment[4-6].

OBJECTIVE

The objective of this study was to describe the functional ambulation profile of a group of hemiplegic patients, correlating it to gait velocity.

METHODS

The study was carried out at the Outpatient Clinic of the Unit of Cranioencephalic Injuries of The Beneficent Brazilian Association of Rehabilitation (ABBR). All patients with hemiplegia sequelae, capable of ambulating 15 meters, were included consecutively. Study design: transversal, descriptive study.

A clinical protocol was filled out at the moment of the consultation with the physiatrist, which included:

1. Age, sex, diagnosis, date of the injury.

2. Modified Functional Gait Classification (MFGC)[7], as described in Chart 1.

Being identified whether:

a) the patient needed physical assistance or assistance from others or supervision;

b) the patient needed support (support or walker) or orthoses (ankle support)

c) the patient was capable of using public transportation.

3- 10-meter Gait Velocity Test. The test was demonstrated by the examiner and then the patient was instructed to walk at a comfortable velocity. The time was measured for one attempt.

The data was analyzed by descriptive statistics, comparison between the groups (ANOVA, Student's t test) and Correlation Tests (Pearson for parametric data and Spearman for the non-parametric ones), with the significance level set at $p \leq 0.05$.

RESULTS

A total of 87 patients, with a mean injury time of 33 months, were evaluated. The characterization of the sample is depicted in Table 1. The Modified Functional Gait Classification (MFGC) and its correlation with gait velocity are shown in Table 2.

Chart 1
Modified Functional Gait Classification

0	Does not perform gait
1	Non-functional gait
2	At-home gait
3	Ambulates around the house or neighborhood
4	Independent community gait
5	Normal gait

Table 1
Characterization of the sample (n=87)

	n	n	n	n
Sex	F=38 (43.7%)	M=49 (56.3%)	-	-
Hemiplegia	R=53(60.9%)	L=34(39.1%)	-	-
Causes	Total = 87	CVA= 73(83.9%)	HT=9 (10.3%)	Others*=5 (5.7%)
Mean age	Total=53.9 yrs	CVA=57.7 yrs	HT=29.9 yrs	Others=42.67 yrs
Health Service Public = 59 (67.8%)	Private =28 (32.2%)	-	-	

HT=head trauma; R=right; L=left CVA = cerebral vascular accident; * (tumor=2, vasculitis=1, abscess=1, HIV=1);

Table 2
Modified Functional Gait Classification (MFGC)

MFGC	n	Age (yrs)	Gait velocity (m/min)
Therapeutic	3 (3,4%)	59,0	7,83
At-home	10 (11,5%)	66,8	11,45
Restricted Community	29 (33,3%)	56,2	29,85
Community	43 (49,4%)	48,4	39,47
Normal	2 (2,3%)	48,0	103,44

There was a significant difference among the therapeutic gait, at-home gait, community gaits and normal gait groups regarding the gait velocity (ANOVA one way, p = 0.001) with a differentiation between the therapeutic gait and at-home gait groups (Tukey's Test). When the gait groups were divided as Group 1: therapeutic and at-home gaits and Group 2: community and normal gaits a significant difference was found between the groups regarding the velocity (Student's t Test; p = 0.00). The results are described in Table 3.

The data regarding gait assistance, use of public transportation and use of orthoses are described in Table 4.

There was a significant difference between the patients that needed assistance from others, those who needed supervision or those who presented free gait regarding the gait velocity and age (ANOVA one way, p = 0.001) with the differentiation of the group of patients that needed assistance from others (Tukey's Test).

There was a significant difference between the patients that used public transportation and those who did not, regarding gait velocity as well as age (Student's t Test, p = 0.02).

There was a significant difference between the patients that used support during ambulation and those who did not, regarding gait velocity (Student's t Test, p = 0.01), with no significant difference regarding age.

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There was no significant difference between the patients that used sural-podalic orthoses during ambulation and those who did not, regarding either velocity or age.

The variable time of injury did not correlate with gait velocity or MFGC. The significant correlations are depicted in Table 5.

Table 3
Modified Functional Gait Classification (MFGC) Groups

Group	n	Velocity (m/min)	Confidence interval
1: therapeutic and at-home	13 (14.9%)	10.34	8.04 – 14.52
2: community and normal	74 (85.1%)	35.50	32.00 – 39.73

Table 4
Gait assistance, use of de public transportation and orthoses

	n	Age	Velocity (m/min)
Help from others	12 (13.8%)	65.7	12.76
Supervision	26 (29.9%)	51.8	24.79
Alone	49 (56.3%)	51.4	36.36
Public Transportation Use	Yes = 45 (51.7%)	49.2	35.71
	No = 42 (48.3%)	58.2	20.20
Use of support	No support =59 (67.8%)	51.2	31.74
	With support =28 (32.2%)	58.2	18.92
Use of orthoses	Yes = 10 (11.5%)	49.9	16.85
	No = 77 (88.5%)	53.9	28.03

Table 5
Correlation between gait velocity, age, MFGC, gait assistance and use of public transportation

	Velocity	Age	MFGC	Assistance	Transportation
Velocity	1	0,225*	0,723**	0,504**	0,336**
Age	0,225*	1	0,320**	0,229*	0,255*
MFGC	0,723**	0,320**	1	0,710**	0,630**
Assistance	0,504**	0,229*	0,710**	1	0,532**
Transportation	0,336**	0,255*	0,630**	0,532**	1

* p<0,05, ** p<0,01

DISCUSSION

A total of 85% of our sample was capable of community gait (considering the restricted community gait, community gait without distance restrictions and normal gait); however, when the independence from others was considered (supervision or assistance) for the performance of this activity, this percentage decreases to 55.2%. Only 48 patients were able to perform independent community gait. In the restricted community gait group (n=29), the independent individuals were 27.6% and in the community gait without distance restrictions (n=43) they were 88.4%. One must take into account the fact that our sample consisted of outpatients, which might have selected patients with a better ambulation capacity. Forty-five patients (51.7%) reported using public transportation, of which 12 needed help from others, with a total number of 33 patients that were independent users of public transportation (37.9%).

The time of injury probably did not show a correlation with the gait velocity and MFGC due to the fact that the present study evaluated patients at the stable phase of hemiplegia and only 7 patients had less than six months of injury.

The aspect of gait velocity was important when separating the therapeutic gait + at-home gait groups from the community gait groups, as well as regarding the need for others' help and use of support. The lower limit of the confidence interval found in the community gait category was 32 m/minute, which does not differ from the one reported in literature [3,4], as well as the lower velocity limit reported for safely crossing a street[5].

Gait velocity has been related to the functional gait classifications, being sensitive in detecting clinical changes[8]. The use of objective parameters such as gait velocity can be useful in the identification of these patients' potential, allowing us to define clear and tangible aims for the rehabilitation program, such as, for instance, a patient can attain the community gait as the outcome of the rehabilitation program.

Another determinant factor was age, when considering the need for others' help and use of public transportation and age can be a factor that will add to the hemiplegic patient's functional limitations.

CONCLUSION

The majority of our sample performed community gait (85%); however, when one considered independent community gait (with no need for others' help or supervision), this percentage decreased to 55%. Regarding the use of public transportation, 38% used it independently. There was a statistically significant correlation between gait velocity and the functional gait categories studied, with gait velocity thresholds being established for the different groups.

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