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Original Article

Constipation in patients admitted to the Neurological Rehabilitation Program*

Constipação intestinal em pacientes admitidos em Programa de Reabilitação Neurológica

Constipación intestinal en pacientes admitidos en un Programa de Rehabilitación Neurológica

Tânia Mara Nascimento de Miranda Engler[1], Luciano Farage[2], Paulo Andrade de Mello[3]

ABSTRACT

Objectives: To determine the prevalence of constipation in patients admitted for rehabilitation and to verify the results of two intervention models for bowel retraining during hospitalization. **Methods:** A longitudinal, analytical study, with 98 patients admitted to rehabilitation ward between December 2009 and May 2010. **Results:** The prevalence of constipation was 57.1%, there was no correlation with gender, education, age, transportation assistance, language disorder, physical activity, diet and presence of constipation; the improvement in functional capacity was a predictor of progress in intestinal frequency; interventions introduced demonstrated an important role in improving bowel habits. **Conclusions:** Conduct studies may provide treatment options for constipation, improving the quality of life for these individuals.

Keywords: Constipation; Stroke; Rehabilitation Centers

RESUMO

Objetivos: Conhecer a prevalência da constipação intestinal em pacientes admitidos para reabilitação e verificar os resultados de dois modelos de condutas instituídas para reeducação intestinal durante a internação. **Métodos:** Estudo longitudinal, analítico, com 98 pacientes internados em enfermaria de reabilitação entre dezembro de 2009 e maio de 2010. **Resultados:** A prevalência de constipação foi de 57,1%, não houve correlação entre as variáveis sexo, escolaridade, idade, auxílio locomoção, alteração de linguagem, atividade física, dieta e presença de constipação intestinal; a melhora na capacidade funcional foi um preditor de progresso na frequência intestinal; as condutas introduzidas apresentaram um importante papel na melhora do hábito intestinal. **Conclusões:** Estudos de condutas poderão fornecer subsídios no tratamento da constipação intestinal, aperfeiçoando a qualidade de vida dessas pessoas.

Descritores: Constipação intestinal; Acidente vascular cerebral; Centros de reabilitação

RESUMEN

Objetivos: Conocer la prevalencia de la constipación intestinal en pacientes admitidos para rehabilitación y verificar los resultados de dos modelos de conductas instituídas para la reeducación intestinal durante el internamiento. **Métodos:** Estudio longitudinal, analítico, realizado con 98 pacientes internados en una unidad de rehabilitación entre diciembre del 2009 y mayo del 2010. **Resultados:** La prevalencia de constipación fue del 57,1%, no hubo correlación entre las variables sexo, escolaridad, edad, auxilio locomoción, alteración del lenguaje, actividad física, dieta y presencia de constipación intestinal; la mejora en la capacidad funcional fue un predictor de progreso en la frecuencia intestinal; las conductas introducidas presentaron un importante papel en el mejoramiento del hábito intestinal. **Conclusiones:** Estudios de conductas pueden ofrecer subsidios en el tratamiento de la constipación intestinal, perfeccionando la calidad de vida de esas personas.

Descriptores: Estreñimiento; Accidente Cerebrovascular; Centros de Rehabilitación

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** The study took place in the Neurological Rehabilitation program at the SARAH network of Rehabilitation Hospitals, Unit SARAH – Brasilia (DF), Brazil.*

[1] Master. Nurse at the Neurological Rehabilitation Program of the SARAH network of Rehabilitation Hospitals, Brasilia (DF), Brazil.

[2] Doctor. Radiologist. Professor at the Radiology. Faculdade de medicina, Universidade de Brasília – UnB – Brasília (DF), Brazil

[3] Attached teacher. Neurosurgeon. Associated Researcher and former professor of Neurosurgery. Faculdade de medicina, Universidade de Brasília – UnB – Brasília (DF), Brazil.

Corresponding Author: **Tânia Mara Nascimento de Miranda Engler**
CCSW quadra 03 lote 02, Edifício Marta Hajjar - Brasília - DF - Brazil
Cep: 70680-350 E-mail: tania0877@hotmail.com

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INTRODUCTION

Intestinal constipation (IC) is a common problem in western populations impacting quality of life and adding associated treatment costs[1]. Typically patients describe one or more of the following symptoms: irregular movements or incomplete evacuation of lumpy or hard stools; straining at stool; excessive time to evacuate, and failure to eliminate stool[2-3].

The gastrointestinal tract can be affected in many ways following a cerebral vascular accident (CVA). The most common manifestations are dysphagia and alterations in bowel function[4]. A CVA can result in paresis, changes in cognition and speech, leading to an inability to evacuate in a socially acceptable place and time. These difficulties may lead to fecal incontinence or constipation[5].

The prevalence of IC in patients with brain injury as a result of CVA varies from 22.9 to 60%, depending on the definition used and the type of study[4,6-7]. The Neurological Rehabilitation Program of SARAH Hospital Brasilia, part of the SARAH network of Rehabilitation Hospitals, provides comprehensive patient care free of charge to the Brazilian public. Many patients report irregular bowel movements and defecation of lumpy or hard stools. One of the admission expectations of the patient and his family is that the bowel function will improve.

In patients with brain injury secondary to CVA, little published literature exists about bowel habit alterations, and modalities that may promote intestinal reeducation. Better understanding of IC may enhance an intestinal reeducation program, leading to an improved quality of life in these patients.

OBJECTIVE

To determine the prevalence of intestinal constipation in patients who are admitted for rehabilitation and analyze the results of treatment methods utilized for intestinal re-education during hospitalization.

METHODS

A longitudinal analytical study was done between December 2009 to May 2010 of patients admitted to the neurological rehabilitation ward for diagnostic investigation and rehabilitation. Selected for analysis were adults suffering from ischemic or hemorrhagic vascular brain damage, independent of time since injury and extent of cognitive and language impairment. Of 120 patients admitted during the study period 98 met the inclusion criteria. All participants or the caregiver signed the term of informed consent. The project was reviewed and approved by the hospital research ethics committee (letter of approval number 518). Interviews were performed directly with the patients, assisted when necessary by caregivers.

Data were collected by a semi-structured interview. Socio-demographic status, routines of regular physical activity, clinical status, use of locomotion aids, eating habits, and use of laxatives /suppositories were recorded. Cognitive impairment was evaluated by mini mental examination, Brazilian version[8].

To define IC we used the Rome criteria, as well as documenting the use of laxatives, suppositories and enemas[4,6-7,9-10]. The Rome criteria was chosen because of the acceptance as an international standard in research. A specific instrument for the evaluation of IC in the brain injury population was not found.

The patients identified with IC on admission were accompanied for a period of approximately four weeks and received orientation about bowel re-education. No bowel re-education program specific to this evaluation was created. The methods evaluated in this study are those most usually used in our rehabilitation program. The patients were not randomized in the study.

The orientation to promote bowel re-education include increased fluid intake, use of a high fiber diet, respect of the gastro-colic reflex, abdominal massage and daily stimulation of evacuation after breakfast or according to the patients bowel habits prior to CVA. When indicated, pharmacological interventions were added. Individual patient orientation varied as outlined in the methods below:

- Treatment 1: The patients, who did or did not use suppositories, and non oral laxatives, received a high fiber diet and the orientation to promote bowel re-education. This method does not predict the use of oral laxatives.
- Treatment 2: All patients who on admission used oral laxatives regularly were placed on osmotic laxatives, a high fiber diet and the orientation to promote bowel re-education.

Patients who were not identified at admission with IC had bowel habits observed by the nursing team in the first days of hospitalization. Those who required an oral laxative and/or suppositories and/or enema were included in Treatment 2.

An osmotic laxative was preferred due to safety from collateral effects, allowing good tolerance during prolonged use. Strong recommendations against stimulating laxatives have been made for bowel re-education programs[11]. The majority of the patients admitted for rehabilitation are using stimulating laxatives possibly because they are cheaper, and more commonly known.

As proposed by the rehabilitation program and confirmed in clinical experience, osmotic laxative use assists in the initial process of bowel re-education of patients who have a history of chronic use of stimulating laxatives and who do not respond immediately to dietetic or behavioral measures. In many cases the association of a high fiber diet and other measures of bowel re-education permit the discontinuance of osmotic laxatives by the end of the hospitalization period. In the cases that the removal of the osmotic laxative is not possible, the

patient or his caregiver is taught how to complete this process at home.

The patient's bowel habits are registered on admission to the hospital and discharge. The information is registered as: daily, every two days, and three or more days. The necessity of laxative use is also documented on discharge.

The clinical diagnosis of CVA is confirmed by the brain imaging with Computerized Tomography (CT) or Magnetic Resonance Imaging(MRI) examinations performed on admission. The same radiologist interprets all the exams avoiding discrepancies in the description of the findings.

Each patient was evaluated by functional independence measure (FIM), determining the level of independence of the patients for self care, sphincter control, mobility, communication and social integration, on a seven level scale, recording scores varying from one to seven[12]. The FIM data from the motor score were completed on admission and discharge. This data can vary from a minimum score of 13 points (highest dependence rate) to a maximum score of 91 points (lowest dependence rate).

The semi-structured interview and other instruments of evaluation were used during the first thirty days of data collection. These instruments were applied at admission or up to a maximum of 72 hours from admission, by the researcher and two other specifically trained nurses.

A Chi-square test was used for statistical analysis of the data collected referring to the social-demographic, clinical, eating habits and the physical activity. The percentage of patients admitted with IC and that percentage identified after hospitalization was verified with the McNemar test. A logistic regression model with generalized estimating equations (GEE)[13] was used to verify the behavior of laxative use during the evaluation period. To evaluate the bowel habits of the constipated patients who participated in the bowel re-education program, the proportionate odds with GEE model were used. A regression model with proportional odds GEE[14] estimating equations was employed to determine the effect of the FIM (independent variable) score on bowel habit (dependent variable). The level of significance (p) was defined at 0.05.

RESULTS

Table 1 shows that half (49 individuals) of the sample were women, with an average age of 58.13 years and standard deviation of 12.64. Upon admission 48 (48.98%) patients were identified with IC. After admission detection of IC that number increased to 56 (57.14%).

Table 1 - Social demographic variables, dietary habits and physical activity of patients with and without intestinal constipation, Brasilia, DF, December 2009 to May 2010(n=98)

Variables	Intestinal Constipation				P - value
	without		with		
	n	%	n	%	
Gender					
Female	20	40.82	29	59.18	0.6831
Male	22	44.90	27	55.10	
Marital status					
Not married	10	27.77	26	72.23	0.1466
Married	32	51.61	30	48.39	
Skin color					
White	26	47.27	29	52.73	
Black/brown	16	38.10	26	61.90	0.4546
Yellow	-	-	1	100.00	
Walking aid					
Without assistance	6	50.00	6	50.00	
Walker/crutches/others	18	50.00	18	50.00	0.3753
wheelchair	18	36.00	32	64.00	
Liquid consumption					
< 1 l	17	44.74	21	55.26	
1 à 2 l	21	40.38	31	59.62	0.8389
> 2 l	4	50.00	4	50.00	
Intake fruits/vegetables/legumes					
Never	2	33.33	4	66.67	
Rarely	9	36.00	16	64.00	0.6003
Always	31	46.27	36	53.73	
Other rich fiber foods					
No	24	48.98	25	51.02	0.2207
Yes	18	36.73	31	63.27	
Physical activity					
Never	30	37.97	49	62.03	0.0464
Rarely/regularly	12	63.16	7	36.84	

The comorbidities observed in the sample were: 07 (63.64%) cases of Chagas disease, 10(43.48%) cases of diabetes, 10 (100.00%) cases of hypothyroidism, 42 (60.00%) cases with ypertension, 33 (58.93%) those who had dyslipidemia and 05 (83.33%) who had heart disease.

Table 2, Shows the difference in use of laxatives over the three periods evaluated. The frequency of laxative use during hospitalization is 2.11 times higher than at admission (p = 0.0035). At discharge the use was 64.4% lower than during hospitalization (p <0.0001), and 24.86% lower than at admission (p = 0.3936).

While assessing the FIM score and bowel habits of constipated patients, we found that for every one-unit increase in FIM score the patient's chance of improving the frequency of bowel habit increases 11.45% (p = 0.0090). At discharge, patients were 2.05 times more

Table 2 – Laxative use at admission, during hospitalization and at discharge of neurological rehabilitation patients, Brasilia, DF, December 2009 to May 2010 (n=56)

Comparision	Odds ratio	Odds ratio IC (95 %)		Chi-square	P value
Hospitalization vs admission	2.1109	1.2777	3.4876	8.51	0.0035
Discharge vs hospitalization	0.3560	0.2269	0.5586	20.19	<.0001
Discharge vs admission	0.7514	0.3897	1.4489	0.73	0.3936

likely to have frequent bowel habits than at admission (p = 0.0207).

The bowel habits of patients who participated in the program of bowel re-education, had three variations (daily, every two days and three days or more), evaluated at admission and discharge for both treatments: Treatment 1 (patients who received a high fiber diet and received orientation about bowel re-education) and Treatment 2 (patients that in addition to a high fiber diet and orientation, received an osmotic laxative, either orally or rectally).

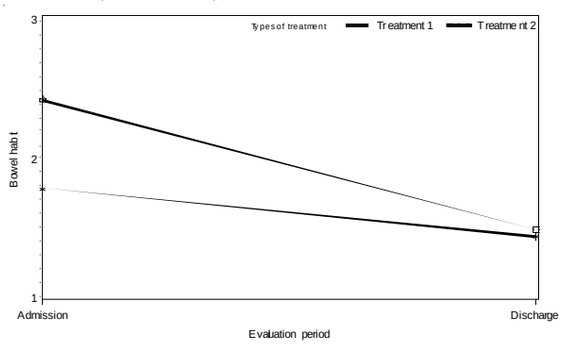

Figure 1 – Behavior of the average score of bowel habits according to the treatment 1 e 2 during the admission and discharge of constipated patients, admitted to neurological rehabilitation, Brasilia, DF, December 2009 to May 2010 (n=56)

Figure 1 demonstrates that the interaction between the type of treatment and the result is significant (p = 0.0191), indicating that the behavior of two groups upon admission and discharge differ in scores for bowel habits. In relation with this data, Table 3 demonstrates that upon admission, the average scores of bowel habit showed significant differences between the two groups. Those patients who received treatment 1 were 4.95 times more likely to have more frequent bowel movements than those who received treatment 2 (p = 0.0040). In those who received treatment 1, the average scores of bowel habit had a significant reduction when compared to the end of treatment. Patients at discharge were 2.42 times more likely to have more frequent bowel habits than when they started treatment (p = 0.0116).

The admission result analysis shows that patients who were submitted to treatment 2 are 4.18 times more likely to have more frequent bowel habits than those with treatment 1 (p = 0.0131).

DISCUSSION

Latin America studies relate that chronic constipation has an estimated frequency of 5% to 21%[15] in the general population.

In the CVA population, studies exist where the prevalence of chronic IC varied from 22,9% to 60%. The definitions and the moments of investigation vary; in some cases the prevalence was investigated in more acute patients or in those who the CVA was more recent[6-7,16] and in other cases with chronic patients[4]. In this study the prevalence found was similar to other studies[7,9].

The difference observed in the prevalence of constipation at the moment of admission and after hospitalization can be justified by the false perception of the family or the patient himself in relation to the symptoms. Some patients have bowel movements with overflow diarrhea and both the patient and the caregiver believe to be presenting frequent bowel movements. In this case the patient and/or caregiver often make use of constipating foods and medications believing this to be a case of diarrhea. After physical examination (rectal) or imaging (radiography or conventional CT) evaluation, a large amount of stool is identified in the colon / rectum. Thus, after the first day of admission, the team can identify constipation, which was not perceived by the patient / caregiver. It is also important to note that some patients/caregiver have initial attention focused on physiotherapy, not understanding the need comprehensive rehabilitation. Thus at the moment of admission they are not cognizant of the symptoms of constipation.

Evaluating the profile of constipated patients, there is a larger number of women present. A significant statistical correlation between gender and constipation was not drawn, but this same findings was observed in former studies[4,6,9], highlighting that in the general population constipation is more commonly found in woman[11]. Amongst constipated patients there is a larger number of wheelchair users. This could be related to limited mobility, and thus they do not practice physical activity. However a significant statistical correlation was not drawn between these varying elements corroborating the finding of past research[4]. A greater tendency of constipation amongst patients with limited capacities[16] was found in other studies. A study which took place with recent CVA patients, showed that those who walked independently were less constipated[9], a fact which was also observed in our study. There are reports that walking less then 0,5 km per day raises the risk of constipation

Table 3- Comparative avaliation between assessment periods e treatment 1 e 2, of patients that participate in the bowel re-education program in neurological rehabilitation, Brasilia, DF, December 2009 to May 2010 (n=56)

Comparision	Odds ratio	Odds ratio IC (95%)		Chi-square	P value
Admission - treatment 1 vs treatment 2	4.9448	1.6661	14.6758	8.29	0.0040
Discharge - treatment 1 vs treatment 2	1.1835	0.4105	3.4124	0.10	0.7552
Grup treatment 2 - discharge vs admission	10.0967	4.1270	24.7020	25.66	<.0001
Grup treatment 1 - discharge vs admission	2.4166	1.2180	4.7946	6.37	0.0116
Difference between discharge and admission comparing treatment 2 vs treatment 1	4.1781	1.3509	12.9224	6.16	0.0131

in the elderly[5].

There is much published in the literature and wide discussion about the role a high fiber diet plays in prevention and treatment of constipation. Much information is found about how the diet raises the frequency of defecation, although the results are not unanimous. In this study, in the admission history of the patient/caregiver, we observed a high fiber diet amongst the constipated patients. No statistical correlation exists between these two variables. This data may not be trustworthy as to the quantity and type of fiber consumption, due to the fact that the information was not quantified. Following the assessment made during the bowel re-education program, it was observed that the high fiber diet can play a role in bowel re-education, although further research is needed to clarify its role, taking into account other factors.

There is little information in literature about the correct treatment for constipation in CVA patients. In one stratified study we found a treatment for constipation and fecal incontinence based on one nursing encounter with the patient which included a physical evaluation and patient orientation. This was reinforced by also giving him a orientation manual about bowel re-education, adequate liquid consumption and a high fiber diet. This manual was also forwarded to the doctor who was attending the patient. The control group received routine care. In six months there was a evolution of dysfunctional bowel movements. In twelve months there was a change in lifestyle, dietary habits, liquid consumption and the prescription of laxatives by the healthcare professionals[7].

Our study evaluated the use of laxatives related to bowel re-education and high fiber diet upon admission, during hospitalization, and at the moment of discharge. It is interesting to observe that laxative use was greater during hospitalization than upon admission. This may be due to the fact that some patients were identified with constipation only after admission and included in the program. At discharge there was a decrease in these numbers. There are other factors that may be related to this reduction, as all the patients who were using laxatives were also following the high fiber diet and other bowel re-education methods. Laxative use improved the frequency in the number of evacuations; however the importance of the other measures must be highlighted. The patients who received laxatives, presented fewer evacuations prior to the laxative use than the patients who were only treated with the high fiber diet and other bowel re-education methods. Therefore these patients had a more serious diagnosis of constipation. To clarify the role that a high fiber diet and other re-education methods play, further randomized research would be necessary.

These treatments were also evaluated based on the changes in the bowel habits score. There is significant interaction (p=0,0191) between the type of treatment and the final score. There is a difference between the average score on admission and at discharge. The patients at discharge present higher chances of having more frequent bowel movements than when they began being treated.

The functional capacity and the frequency of bowel movements had direct correlation between the raise in the FIM score and the improvement of bowel movements. In a study using the Barthel scale to evaluate functional capacities the prevalence of IC was increased in patients with a low score on the Barthel scale, or in other words , the most dependant. For every point less, the risk of IC increased 2,6%, so the Barthel scale was a clear predictor of IC[16]. In another study of 152 patients suffering from recent hemiplegia, the IC patients also presented lower Barthel scores[9]. In this study an improvement in the functional capacity, measured by the FIM scale was a predictor of more frequent bowel movements.

This study presents some limitations, it is not randomised, and also the information provided by the caregiver, could compromise the quality of the data. The selection of participants was due to convenience and the data collected from a study with a larger and unselected population may differ.

It is stressed that the interventions analyzed took place in an ideal situation, inside the hospital environment, with a multi-professional team and that the results may not be reproduced in a different situation than the one analyzed here.

In future studies further investigation of a treatment based on bowel re-education methods, along with a high fiber diet performed in a randomized manner, could be beneficial in understanding the results of this intervention for this population. The functional aspects of verifying the FIM scale that improve after a rehabilitation program are predictors of a higher frequency in bowel movements merit further investigation.

CONCLUSIONS

A high prevalence of IC (57,1%) was observed in patients with vascular brain injury upon admission into the rehabilitation program.

There are individuals who have been sub-diagnosed because of an erroneous perception, either by themselves or by members of their family, and they should be identified promptly so that they can be included in the bowel re-education program.

The implementation of a functional and bowel re-education program are necessary in rehabilitation of CVA patients and have a positive impact in the frequency of patients intestinal habit.

Additional studies in this area are necessary, with the object to evaluate treatment methods that diminish the IC and consequentially have a positive impact on the life quality of these people.

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