

Original articles

Evaluation of functional capacity and functional disability in tracheotomized patients at a public hospital in Curitiba

Avaliação da capacidade e comprometimento funcional em pacientes traqueotomizados de um hospital público de Curitiba

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ABSTRACT

Purposes: to evaluate and describe the degrees of capacity and functional impairment in tracheostomized of a public hospital and their interrelations.

Methods: case-control study, quantitative, descriptive and cross, done in a tertiary hospital, linked to the National Health System Capacity and functional impairment were assessed using the Barthel Index and the Karnofsky Performance Scale in tracheostomized and not tracheotomized into four wards. The study group was matched with a control group taking into account age, sex and illness that led to hospitalization.

Results: the sample consisted of 52 patients, 30 males and 22 females. The mean age of the study group was 55.4 years and in the control group 55.1 years. Statistical analysis of the Barthel Index in the study group classified 84.62% of patients as totally dependent for the realization of the ten domains of the instrument, contrary to the control group only 15.38% of patients had this degree of physical dependence and 53.85% showed complete independence the same activities. The lifting of the Karnofsky scale showed that 57.69% of the study group had a 40% score, unlike the control group 42.31% got 90% score.

Conclusion: there was involvement of capacity and functional impairment in tracheostomized, fact that new look of the multidisciplinary team front demand to disability and shows that regardless of the tracheotomy facilitate weaning from mechanical ventilation and consequently the hospitalization period, important impacts on quality of life.

Keywords: Deglutition Disorders; Tracheostomy; Dependency; Physiotherapy

RESUMO

Objetivos: avaliar e descrever os graus de capacidade e comprometimento funcionais em pacientes traqueotomizados de um hospital público e suas inter-relações.

Métodos: estudo caso-controle, quantitativo, descritivo e transversal, realizado em um hospital terciário, vinculado ao Sistema Único de Saúde. A capacidade e comprometimento funcional foram avaliados por meio do Índice de Barthel e da Escala de Desempenho de Karnofsky, em pacientes traqueotomizados e não traqueotomizados em quatro unidades de internação. O grupo de estudo foi pareado com o grupo controle levando-se em conta a idade, o sexo e a doença que ocasionou a internação.

Resultados: a amostra foi composta por 52 pacientes, 30 do sexo masculino e 22 do sexo feminino. A média de idade entre o grupo de estudo foi de 55,4 anos e no grupo controle de 55,1 anos. A análise estatística do Índice de Barthel no grupo de estudo classificou 84,62% dos pacientes como totalmente dependentes para a realização dos dez domínios do instrumento, ao contrário do grupo controle no qual somente 15,38% dos pacientes apresentaram este grau de dependência física e 53,85% mostravam total independência às mesmas atividades. O levantamento da escala Karnofsky evidenciou que 57,69% do grupo estudo apresentava escore de 40%, diferentemente do grupo controle no qual 42,31% obteve escore de 90%.

Conclusão: houve implicação da capacidade e comprometimento funcional nos pacientes traqueotomizados, fato que demanda novo olhar da equipe multidisciplinar frente às incapacidades e demonstra que independente da traqueotomia facilitar o desmame da ventilação mecânica e consequentemente o período de internação, causa importante impacto na qualidade de vida.

Descritores: Disfagia; Traqueostomia; Dependência; Fisioterapia

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INTRODUCTION

The process of demographic transition has effected changes in the population disease pattern. Formerly acute diseases have been replaced by long-term, chronic processes and costly ones for the health system. Instead of infectious-contagious diseases, chronic, degenerative diseases and their complications have predominated, whose evolution features decrease in functional capacity¹⁻³.

Critically ill patients constitute a population at risk for the development of aspiration pneumonia due to innumerable risk factors that may lead to the decrease of awareness state, mechanical ventilation, neurological disease, decrease in coughing reflex, prolonged intubation, tracheostomy, parenteral feeding, head and neck surgeries and gastroesophageal reflux⁴.

In hospital settings, tracheostomy is a routine surgical procedure where a tube is temporarily or indefinitely inserted in the trachea as an external communication means, making it the patent airway⁵.

Tracheostomized patients may present functional changes due to neuromuscular blockers and corticosteroids, with hospitalization length and mechanical ventilation pointed as the main culprits in these changes, contributing for daily-life activities impairment such as grooming and feeding⁶.

Functional capacity refers to people's autonomy to carry on daily living tasks, enabling them to live alone in a domestic context⁷. Daily living scales show individuals' dependence degree to carry on such activities and, indirectly, health status and aid needs^{8,9}.

High functional impairment prevents from returning to work as well as self-care capacity is impaired. Functional disability means individuals' capacity to keep their daily activities independently and evidences the need for special care¹⁰⁻¹².

In face of the exposed above, this article objectifies: to assess and describe capacity degree and functional disability in tracheostomized patients at a public hospital and their interrelationships.

METHODS

Sample

Quantitative, descriptive, cross-cutting, case-control study held at a University Hospital from the Unified Health System, tertiary care, in Curitiba, Paraná State/ Brazil between July, 2013 and July, 2014. It was approved by the Ethical Committee from Hospital

de Clinicas, Universidade Federal do Paraná under number 16640613.9.0000.0096.

Sample took up 52 patients, 26 tracheostomized ones (Study Group), and 26 non-tracheostomized patients (Control Group).

Inclusion criteria for the Study Group were as follows: patients over 18 years old, tracheostomized, admitted to Medical Clinic, Infectology, Neurosurgery and Neurology hospital wards who agreed to participate in the research, and for the exclusion ones: patients with less than 18 years old, in mechanical ventilation, with rare diseases preventing pairing; with cerebral palsy, quadriplegia and tracheostomy held in former hospitalization.

As for the Control Group, inclusion criteria were as follows: patients over 18 years old, non-tracheostomized, admitted to the wards where patients from the study group were also assessed, and agreed to participate in the research, and the exclusion ones were: patients under 18 years of age, intubated or tracheostomized and in mechanical ventilation.

Procedure

Active search was carried out in Medical Clinic, Infectology, Neurosurgery and Neurology wards for tracheostomized patients. After accepting to participate in the research and signing the informed consent form, data collection was held, being applied the Barthel Index³ to assess functional capacity and the Karnofsky Performance Scale¹⁰ to assess the extent of functional disability.

For each tracheostomized patient, another non-tracheostomized patient was searched in the same ward where the tracheostomized patient was evaluated, matching age, gender and disease responsible for his/her hospitalization.

To assess patients' performance, the Barthel Index was used, taking up ten domains: feeding, bathing, dressing, grooming, bowel eliminations, bladder eliminations, toilet use, chair-bed transfer, ambulation and stairs.

By applying the Karnofsky Performance Scale, patients were classified according to the degree of their disabilities or functional impairments. Its application enables to measure functional disability regardless the pathology, and points eligible patients for palliative care¹⁰⁻¹².

Statistical Analysis

For statistical analysis, descriptive statistical methods were used (absolute and relative frequency tables, mean and standard deviation), and inference methods (Chi-square test and Spearman Correlation, significance level = .05). Statistica 7.0 and Sphinx softwares were used.

RESULTS

Survey of epidemiological profile evidenced that 30 patients were male and 22 were female, mean age in

the study group was 55.4 years (SD – 15.6), and 55.1 years (SD – 14.1) in the control group. The distribution of sampling profile in the study group and control group showed 50-59 years as the prevailing age range (42.31% of the patients), followed by 70 years or over (19.23% of the patients) (Table 1).

Schooling analysis showed incomplete middle school for 50% in both groups (n=26). As for marital status, married patients prevailed in the study group (n=17), and single ones predominated in the control group (n=21) (Table 1).

Table 1. Profile distribution of samples from study and control groups (n=52)

VARIABLE	STUDY GROUP		CONTROL GROUP	
	Frequency	%	Frequency	%
AGES				
Less than 30 years	2	7.69	2	7.69
30 to 39 years	3	11.54	2	7.69
40 to 49 years	2	7.69	2	7.69
50 to 59 years	11	42.31	11	42.31
60 to 69 years	3	11.54	5	19.23
70 years or over	5	19.23	4	15.38
GENDER				
Male	15	57.69	15	57.69
Female	11	42.31	11	42.31
MARITAL STATUS				
Never married	4	15.38	21	80.77
Married	17	65.38	3	11.54
Divorced	2	7.69	2	7.69
Widow(er)	3	11.54	-	0.00
SCHOOLING				
Illiterate	3	11.54	2	7.69
Incomplete middle school	13	50.00	13	50.00
Complete middle school	2	7.68	1	3.85
Incomplete high school	-	0.00	4	15.38
Complete high school	4	15.38	2	7.69
Incomplete superior studies	1	3.85	1	3.85
Complete superior studies	3	11.54	3	11.54

From the assessed patients, 32 were admitted to the Medical Clinic, 12 to Neurology, 2 to Neurosurgery and 6 to Infectology. Diseases leading to hospitalization were: non-transmissible chronic diseases, acute diseases, infectious diseases and transmissible chronic diseases.

In the Medical Clinic, eight patients were diagnosed with pneumonia, six with ischemic stroke, four with acute kidney failure, four with chronic obstructive lung

disease, two with breast cancer, two with hepatic cirrhosis, two with gastric ulcer, two with leukemia and two with pericardial disease.

In the Infectology ward, four patients had acquired immunodeficiency syndrome, and two others, besides this syndrome, featured tuberculosis. In the Neurosurgery ward, two patients presented brain aneurysm.

In the Neurology ward, six patients were diagnosed with ischemic stroke, two with polyneuropathy, two with hemorrhagic stroke, and two with acute myasthenia.

It should be pointed out that the above mentioned diseases were the ones which caused the hospitalization. For example, in the medical clinic, the patient suffered from pneumonia when admitted, as well as the other with ischemic stroke, and subsequently for the other diseases, except for the patients diagnosed in the medical clinic with chronic obstructive lung disease and hepatic cirrhosis, as well as the one in neurology featuring acute myasthenia.

Statistical analysis applying the Barthel Index evidenced significant change in functional capacity in the study group in relation to the control group. Patients in the study group showed dependence to feed, needed help to perform their personal hygiene, had bladder and bowel incontinence, were dependent when they needed to transfer from bed to chair, incapable of ambulation, dependence for toilet use, dressing and bathing, and unable to climb stairs (Table 2).

The limitations evidenced in this group, according to the instrument cutoff point, enabled to rate 22 patients (84.62%) as totally dependent; two (7.69%) as severely dependent; one (3.85%) as moderately dependent, and only one patient (3.85%) showed independence to perform activities.

Unlike data found in the study group, 14 patients (53.85%) in the control group showed independence to carry on all activities; six (23.08%) showed moderate independence; four (15.38%) showed total dependence; one (3.85%) evidenced severe dependence, and another (3.85%) evidenced mild dependence (Table 3)

Besides the disabilities in the functional capacity evidenced by tracheostomized patients, the extent of functional disability was also verified by applying the Karnofsky Performance Scale.

It can be observed in table 4 that from the 26 tracheostomized patients assessed in the Study Group, 15 (57.69%) had a disability score of 40%, signaling disability and need for care and special assistance; five (19.23%) scored 30%, signaling disability and need

for hospitalization; two (7.69%) scored 20%, signaling for the adoption of some measures or supportive treatment; two others (7.69%) scored 50%, requiring considerable assistance and medical care; one (3.85%) scored 60%, being able to perform most activities with occasional aid, and only one patient (3.85%) scored 90%, being able to carry on normal activities and work.

Regarding the assessment of 26 non-tracheostomized patients from the Control Group, it was observed that 11 patients (42.31%) scored 90%, being able to carry on their activities as well as work; four patients (15.36%) scored 80%, presenting signs or symptoms of the disease only with the effort, being able to carry on their activities and work; four (15.36%) scored 50%, requiring frequent assistance and medical care; three (11.54%) scored 40%, evidencing high disability degree, with impairment and need of special care and assistance; two (7.69%) scored 60%, requiring occasional assistance, in spite of being able to carry on most activities, and two (7.69%) scored 70%, incapable of active work, but they can take care of themselves (Table 4)

Statistical descriptive analysis of length of hospital stay from admittance to the moment of evaluation by means of the Barthel Index and Karnofsky Performance Scale, evidenced that patients in the study group were assessed 26.2 days from admittance in average, being a minimum of two days, and a maximum of 57 days from admittance, standard deviation of 13.6 days. The same analysis for the control group showed averaged days from admittance to evaluation of 7.8 days, being a minimum of one day, and a maximum of 47 days, standard deviation of 9.9 days.

Among the tracheostomized patients, 14 were using the metallic tube, and 12 of them were still using the plastic tube.

Interrelationship between functional capacity and disability was verified by means of Spearman Correlation, evidencing the younger the age, the higher functional independence will be, and scores by applying the Karnofsky Scale showed lower functional disability (Table 5).

Table 2. Frequency distribution of the Barthel Index results for study and control groups (n=52)

FUNCTIONAL CAPACITY		STUDY GROUP		CONTROL GROUP		P
		n	%	n	%	
Feeding						
0	Dependent	21	80.77	4	15.38	0.0000*
5	Needs help	2	7.69	2	7.69	
10	Independent	3	11.54	20	76.92	
Grooming						
0	Needs help	24	92.31	5	19.23	0.0000*
5	Independent	2	7.69	21	80.77	
Bladder elimination						
0	Incontinent	22	84.62	4	15.38	0.0000*
5	Occasional accident	2	7.69	2	7.69	
10	Continent	2	7.69	20	76.92	
Bowel elimination						
0	Incontinent	22	84.62	5	19.23	0.0000*
5	Occasional accident	2	7.69	-	0.00	
10	Continent	2	7.69	21	80.77	
Bed-chair transfer						
0	Dependent	22	84.62	3	11.54	0.0000*
5	Major help required	1	3.85	4	15.38	
10	Minor help required	2	7.69	3	11.54	
15	Independent	1	3.85	16	61.54	
Ambulation						
0	Unable	22	84.62	4	15.38	0.0000*
5	Wheelchair independent	-	-	-	-	
10	Walks helped by others	3	11.54	11	42.31	
15	Independent	1	3.85	11	42.31	
Toilet Use						
0	Dependent	23	88.46	3	11.54	0.0000*
5	Some help required	2	7.69	5	19.23	
10	Independent	1	3.85	18	69.23	
Dressing						
0	Dependent	20	76.92	3	11.54	0.0000*
5	Help required for the most actions	5	19.23	6	23.08	
10	Independent	1	3.85	17	65.38	
Bathing						
0	Dependent	24	92.31	8	30.77	0.0000*
5	Independent	2	7.69	18	69.23	
Stairs						
0	Unable	23	88.46	4	15.38	0.0000*
5	Help required	2	7.69	7	26.92	
10	Independent	1	3.85	15	57.69	

Chi-SquareTest, significance level = 0.05

Table 3. Frequency distribution of the Barthel Index Results according to final scores and dependence level for study and control groups (n=52)

FINAL SCORE	DEPENDENCE LEVEL	STUDY GROUP		CONTROL GROUP	
		Frequency	%	Frequency	%
0 to 20	Total	22	84.62	4	15.38
21 to 60	Severe	2	7.69	1	3.85
61 to 90	Moderate	1	3.85	6	23.08
91 to 99	Mild	-	0.00	1	3.85
100	Independent	1	3.85	14	53.85

Table 4. Frequency Distribution of the Karnofsky Performance Scale results for study and control groups (n=52)

KARNOFSKY PERFORMANCE SCALE		STUDY GROUP		CONTROL GROUP	
		Freq.	%	Freq.	%
Able to carry on normal activity and work. No special care needed	100% No complaints, no evidence of the disease	-	0.00	-	0.00
	90% Able to lead normal life, minor signs or symptoms of the disease	1	3.85	11	42.31
	80% Some signs and symptoms of the disease with the effort	-	0.00	4	15.36
Unable to work. Able to live at home, care required for most personal needs. Variable amount of assistance needed.	70% Able to care for self. Unable to perform daily living activities or active work	-	0.00	2	7.69
	60% Occasional help needed, but still able to carry on most activities	1	3.85	2	7.69
	50% Requires considerable assistance and frequent medical care	2	7.69	4	15.36
Unable to care for self. Care required at an institution or hospital. Disease may be progressing rapidly.	40% Disabled. Special care and assistance required.	15	57.69	3	11.54
	30% Severely disabled, hospitalization indicated, although death not imminent	5	19.23	-	0.00
	20% Very debilitated, requires hospitalization, measures or supportive treatment	2	7.69	-	0.00
	10% Moribund, fatal processes progressing rapidly	-	0.00	-	0.00
	0% Death	-	0.00	-	0.00

Table 5. Spearman correlation between functional capacity, impairment and age (n = 52)

CORRELATION BETWEEN	SPEARMAN CORRELATION(R)	P
Functional capacity and age	-0.3583	0.0091*
Disability and Age	-0.2881	0.0384*

*significance level = 0.05

DISCUSSION

This research objectified to assess and describe the degrees of functional capacity and disability and their interrelationships in tracheostomized patients. The choice for a case-control design enabled the comparative analysis between the study group and the control group, relating functional capacity and disability.

Low educational level was prevalent in both studied groups (TABLE 1). In a longitudinal study on the prevalence of risk factors and prevention from non-transmissible chronic diseases in adults, the author showed that risk factors were associated to aging, male sex and lower educational level¹³.

Thus, data from the last Brazilian census¹⁴ on the educational level of Brazilian population point that

among people with 25 years of age or over, old enough to graduate from a superior course, 49.3% were illiterate or did not even conclude middle school, while 11.3% had complete superior education, evidencing low schooling.

As for the prevalence of married subjects in the study group, another study pointed out the predominance of married women between 40 and 60 years old as caregivers of patients with chronic disease and functional disability, scoring 50% in the Karnofsky Performance Scale¹⁵. Data also ratified in the study which assessed oncology caregivers' profile, claiming that women historically assumed the role of children's, parents' or family caregivers¹⁶. Functional changes

among both groups evidenced the different disability degrees related to hospitalization and tracheostomy.

Besides the importance of non-transmissible chronic disease control to prevent functional disability in elders, it is important to point out that they feature reduced muscle power capacity for rapid power output, aggravating the impact of muscular weakness on their mobility, which may also be exacerbated by other conditions, such as cerebrovascular accident, Parkinson's Disease, Alzheimer's disease, arthritis, diabetic neuropathy, muscular dystrophy, among others^{17,18}. Aging is a factor which triggers reduced muscle power, directly affecting the capacity to carry on daily living activities and hindering elders' functional capacity, being a significant health indicator^{10,19}.

Regarding age variable, 42.31% of the assessed patients in both groups ranged between 50 and 59 years old. It is deemed to point out that muscle power usually peaks around the thirties, remaining steady until the fifties, then starts to decline. Between fifty and seventy years, decline is around 15% every ten years, and after the seventies, reduction is around 30% every ten years²⁰. As for the findings on changes of functional capacity, from a therapeutic point of view, analyzing the domains in an individualized way so that therapeutic intervention can be directed and constantly reassessed, is as important as considering the total score of the Barthel Index to classify the degree of functional dependence^{6,21,22}.

Functional changes found in patients after a long period of hospitalization, mainly in ICUs, are stressed by long periods of bed immobility. Early mobility held by a physiotherapist ultimately improves functional capacity and reduces associated bed-rest risks^{18,23}.

Prolonged bed rest, from 7 to 15 days provokes muscle changes, such as backbone and limb stiffness, muscle weakness and osteoporosis, leading to the Immobility Syndrome²⁴.

That syndrome is responsible for osteomuscular changes and functional disabilities, impairing daily-life activities, just like transfers and changes in bed position²⁵. Functional dependence presented by most tracheostomized patients (n=22) signals the importance of physiotherapists' role to care for these clients, not only in ICUs but also in the other hospital wards in order to reestablish maximum functional capacity, leading to less disability after discharge.

Recommendations of the physiotherapy department of Brazilian Intensive Medicine Association unfold the occurrence of ICU immobility-related complications,

being one of the factors for functional decline, increase of care costs, reduction in the quality of life and lifespan after discharge²⁶.

In spite of old age and disease not being synonyms, elderly individuals tend to feature more non-transmissible chronic diseases. That chronicity leads to impairing sequels associated to high functional disability and physical dependence. The course of the disease itself, in spite of all available resources, makes dying process inevitable. From then on, patients get palliative care focused on the relief of family suffering and anguish²⁷.

In this context, it is important to determine each professional's role in the multiprofessional team. The physiotherapist must design a treatment plan in view of patients' degree of dependence and functionality, offering support for a more active life, with less impact on their quality of life^{11,28}.

Concerning tracheostomy, from the 26 patients evaluated, 14 were using metallic tube, while 12 remained with a plastic tube, which evidences that tube weaning off is not an exclusive process from intensive care settings.

CONCLUSION

This study shows the importance of a new professional look on the part of the multidisciplinary team facing the disabilities verified in tracheostomized patients.

There was a significant change in the capacity and functional disability in the study group, which brought about limitation in the daily routine and negative impact on their quality of life.

Physiotherapeutical guidance to family members/caregivers during discharge of tracheostomized patients at the hospital this study was carried out, involves stoma care and tracheostomy tube parts caring; tracheal suction technique, identification of the need for inhalation with physiological saline depending on the viscosity of the suctioned tracheal secretion, and the observation of signs for breathing efforts; mandrel cleaning; fixing the tracheostomy set, and other caring actions such as bed position to prevent muscle contractions and decubitus changes to prevent pressure ulcers.

The other professionals from the multidisciplinary team, such as nurses and nutritionists also perform guidance to family members regarding proper care in their area, entailing bathing techniques and hygiene, preparation and feeding through nasoenteral tube

or gastrostomy, among others, evidencing the care complexity which will be demanded from caregivers of this type of clients from then on, usually lay people in the health area. Physiotherapists are responsible for dysphagia management, the recommendation of the proper feeding device and rehabilitation to prevent the incidence of aspiration pneumonia.

Due to the literature scarcity related to capacity change and functional disability in tracheostomized patients, this research contributes to encourage further studies on the addressed theme as well as patients' follow-up after discharge, not only regarding functional capacity and disability, but also in relation to the tracheostomy. Some limitations occurred along the research study, for example, two strikes broke out during data collection in the above mentioned hospital, which caused bed reduction, and short staffing, resulting in pairing difficulty between study and control groups. At the end of the data collection, 31 tracheostomized patients had been assessed; however, due to shortage of patients in the control group for matching, only 26 patients from each group were included, with five patients from the study group not being included in the present study.

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