How to cite this article: Paiva DR, Guerreiro CF, Anjos JLM. Correlation between functional performance and length of stay of neurosurgical patients in the intensive care unit. J Phys Res. 2018;8(2):167-174. doi: 10.17267/2238-2704rpf.v8i2.1866

Original article

Journals BAHIANA
SCHOOL OF MEDICINE AND PUBLIC HEALTH

Correlation between functional performance and length of stay of neurosurgical patients in the intensive care unit

Correlação entre desempenho funcional e o tempo de permanência de pacientes neurocirúrgicos na unidade de terapia intensiva

Débora Ribeiro Paiva[1], Caroline Ferreira Guerreiro[2], Jorge Luís Motta dos Anjos[3]

[1]General Hospital Roberto Santos. Salvador, Bahia, Brazil. ORCID: 0000-0001-6842-1184. deborapaiva2011@gmail.com
[2]General Hospital Roberto Santos. Salvador, Bahia, Brazil. ORCID: 0000-0003-1653-3461. carol.guerreiro@yahoo.com.br
[3]General Hospital Roberto Santos. Salvador, Bahia, Brazil. ORCID: 0000-0003-2897-9858. jorgelmanjos@hotmail.com

RESUMO | INTRODUÇÃO: Os pacientes neurocirúrgicos são predispostos a disfunções neurológicas inerentes à doença de base, às alterações sensório-motoras, cognitivas e tem sua mobilidade reduzida na fase aguda pós-operatória. **OBJETIVO:** Investigar a correlação entre desempenho funcional e o tempo de permanência de pacientes neurocirúrgicos na unidade de terapia intensiva (UTI) e descrever a frequência de retirada do leito nesse período. **MÉTODOS:** Trata-se de um estudo observacional, de corte transversal, realizado em uma UTI cirúrgica de um hospital de alta complexidade da rede pública estadual em Salvador, Bahia. Foram incluídos indivíduos adultos submetidos a algum tipo de neurocirurgia, sendo excluídos aqueles transferidos para outra unidade ou hospital antes da alta. Retirou-se dos prontuários dados sociodemográficos, clínicos e sobre a retirada do leito. A medida de independência funcional (MIF) foi avaliada no momento da alta e a correlação com o tempo de internação na UTI foi verificada através do coeficiente de Spearman. **RESULTADOS:** Foram incluídos no estudo 26 pacientes, sendo 57,7% (15) do sexo feminino, com idade média de 37,2±12,9 anos. Foi observado que 56% (14) dos pacientes foram mobilizados em menos de 24 horas de internação da UTI e aqueles que não foram mobilizados durante o internamento tiveram como justificativa a restrição médica. Não houve correlação entre o escore funcional da MIF na alta com o tempo de internação na UTI (r= 0,3 p=0,11). **CONCLUSÃO:** A prática de retirada do leito foi iniciada dentro das 24 horas de internação na UTI, evidenciando um perfil de pacientes com independência funcional modificada ou completa na alta, entretanto sem correlação com o tempo de internação na UTI.

PALAVRAS-CHAVE: Unidades de Terapia Intensiva. Neurocirurgia. Deambulação precoce. Modalidades de fisioterapia. Tempo de internação.

ABSTRACT | INTRODUCTION: Neurosurgical patients are predisposed to neurological dysfunctions inherent to baseline disease, sensory-motor and cognitive alterations, and their mobility is reduced in the acute postoperative phase. **OBJECTIVE:** To investigate the correlation between functional performance and length of stay of neurosurgical patients in the intensive care unit (ICU) and to describe the frequency of bed removal in this period. **METHODS:** This is a cross-sectional, observational study performed at a surgical ICU of a highly complex hospital of the state public network in Salvador, Bahia. Adult subjects submitted to some type of neurosurgery were included, excluding those transferred to another unit or hospital before discharge. Sociodemographic, clinical data and bedside removal were removed from the medical records. The functional independence measure (FIM) was assessed at the time of discharge and the correlation with ICU length of stay was verified using the Spearman coefficient. **RESULTS:** A total of 26 patients were included in the study, of which 57.7% (15) were females, with a mean age of 37.2 ± 12.9 years. It was observed that 56% (14) of the patients were mobilized in less than 24 hours of ICU admission and those who were not mobilized during hospitalization had medical justification. There was no correlation between the MIF functional score at discharge and the length of ICU stay (r = 0.3; p = 0.11). **CONCLUSION:** The practice of bed withdrawal was started within 24 hours of ICU stay, evidencing a profile of patients with modified or complete functional independence at discharge, but without correlation with the length of ICU stay.

KEYWORDS: Intensive Care Units. Neurosurgery. Early ambulation. Physiotherapy modalities. Length of hospital stay.

Submitted 03/12/2018, Accepted 05/16/2018, Published 05/23/2019
J Phys Res, Salvador, 2018 May;8(2):167-174
Doi: 10.17267/2238-2704rpf.v8i2.1866 | ISSN: 2238-2704

Introduction

The Brazilian neuroepidemiological reality is little known, however, stroke is globally considered the main cause of functional disability and has increased its incidence in the last ten years.[1,2] Traumatic brain injury (TBI) is another a major cause of disability and affects 65.7 per 100,000 inhabitants in Brazil, and it is estimated that more than one million people have irreversible neurological sequelae as a consequence[3]. In addition to vascular and traumatic injuries, central nervous system disorders, peripheral and autonomic diseases, congenital diseases, together with brain tumors, constitute the scenario of neurological diseases that can be treated surgically.[4]

The neurocritical patient requiring surgical intervention requires intensive postoperative care and is subject to the inherent morbidities of the procedure, functional decline secondary to prolonged immobility and length of stay in the intensive care unit (ICU). The average length of stay of the patient with clinical and surgical profile in intensive care units is from one to six days[7]. According to the Hospital Information System of the National Health System (SIH / SUS), in the year 2016 this time of stay was 5.6 days.[8]

Despite the increasing technical and scientific development, mortality rates and increased survival have been reported, many individuals have acquired neuromuscular and respiratory disorders in the ICU[9,10]. Neurosurgical patients are predisposed to neurological dysfunctions inherent to the underlying disease, sensory- and impaired mobility in the acute postoperative phase[11,12]. Prolonged immobility in the bed is a predictor of increased ICU stay and is associated with unfavorable outcomes such as hospital mortality. In addition to these acquired changes, the need for invasive ventilatory support, the use of sedatives and neuromuscular blockers have a negative impact on quality of life and functional independence.[13]

With the need to reduce the impact of dysfunctions caused by hospitalization, strategies for prevention and functional recovery have been advocated[14]. Early mobilization is defined as a series of progressive therapeutic activities instituted within 24 hours of ICU admission after stabilization of the changes physiological aspects[15,16]. It is part of a set of evidence-based practices for approaching the patient in the ICUs, which is recognized as feasible, safe and beneficial[5,17]. In this context, behaviors such as early withdrawal of the bed through standing with lower limbs, orthostasis and ambulation, are part of this set of established activities as a therapeutic strategy for functional rehabilitation[16,18].

Recent studies have demonstrated that clinical patients are mobilized early in relation to surgical patients10 and that the delay in the onset of physical activities during ICU stay has been associated with worse functional performance after hospital discharge. On the other hand, bed withdrawal at an early stage reiterates the importance of mobilization for functional recovery and reduction of ICU stay. Access to information regarding bedside practices encourages the development of treatment strategies and implementation of early mobilization protocols for this patient profile. The objective of this study was to investigate the correlation between functional performance and length of ICU stay and to verify the frequency of bed withdrawal in patients submitted to neurosurgery.

Methods

Study design

This is an observational, cross-sectional study performed at the Surgical ICU of a highly complex hospital of the state public network in Salvador, Bahia. The integration and configuration of this production are linked to a Cohort study for the evaluation of the functionality in hospitalized

patients, which was approved by the Ethics and Research Committee under the opinion 1,752,512 and CAAE 59587416.0.0000.5028. All participants signed the informed consent form (TCLE).

Population and Sample

We included individuals of both sexes, over 18 years of age, submitted to neurosurgeries, admitted to the surgical ICU from October 2016 to December 2017, excluding those who were transferred to another unit or hospital before discharge from the ICU.

Data collect

For the data collection, a structured form was elaborated by the authors, where sociodemographic variables such as age and sex were extracted from the medical records, clinical variables such as the surgical profile, length of stay in invasive mechanical ventilation (IMV), length of ICU stay and the severity score according to the Simplified Acute Physiology Score 3 (SAPS 3)[19]. The SAPS[3] is a tool composed of twenty variables of physiological evaluation and the previous state, measurable in the admission of the patient in the ICU and aims to establish a predictive index of mortality. The score varies from 16 to 217 points, the higher the score, the greater the severity and the greater the probability of death.

To evaluate the frequency of bed withdrawal, the time elapsed between admission and the practices of sedestation, orthostasis and ambulation were extracted. For this purpose, the approach within 24 hours of ICU admission, between 24 and 48 hours or greater than 48 hours was considered. For patients who were not removed from the bed during the period of ICU admission, it was pointed out for reasons of hemodynamic instability, pain, IMV use, lowering of consciousness level, motor deficit or medical restriction.

The Functional Independence Measure (FIM), developed in 1986 by Granger et al[20], was translated and validated in Brazil in 2000 by Riberto et al[21]. This instrument is divided into two domains: motor and cognitive, composed of eighteen items to evaluate activities related to self-care, sphincter control, mobility, locomotion, communication and social cognition, referred by patients. Each of these activities receives a score ranging from 1 (complete dependency) to 7 (complete independence), with a total score ranging from 18 to 126. In this way, the lower the score, the greater the degree of dependency to perform the activities.

Statistical analysis

The collected data were allocated and analyzed by the Statistical Package for the Social Science (SPSS ©), for Windows, version 22.0 (IBM Corp. Released 2013. Armonk NY, USA). After evaluation of the normal distribution pattern by the Kolmogorov-Smirnov test, univariate descriptive analyzes were performed. In the bivariate analysis, the correlation between the FIM score at discharge and the length of stay in the ICU was measured using the Spearman coefficient. The level of significance was set at $p < 0.05$. For this study, coefficients with values ranging from 0.00 to 0.25 showed little or no correlation; between 0.25 and 0.50 a weak degree of correlation; between 0.50 and 0.75 suggest a moderate to good correlation; values above 0.75 are indicative of good to excellent correlation.[22]

Results

In a population of 73 patients hospitalized in the surgical ICU from October 2016 to December 2017, 47 were not included in the analysis because they did not meet the neurosurgical profile of the study, with the sample being composed of 26 patients submitted to neurosurgery, all in an elective manner. Regarding the time they underwent IMV, 73.1% required ventilatory support between 24 and 48 hours (Table 1).

Table 1. Sociodemographic and clinical characteristics of patients submitted to neurosurgery in an intensive care unit, Salvador, Bahia. (N = 26)

Variables	Mean ± SD	Median (IQ)	n	%
Age (years)	37,2 ± 12,9			
Sex				
Female			15	57,7
Type of surgery				
Elective			26	100
VMI time (hours)				
>24			4	15,4
24-48			19	73,1
>48			3	11,5
SAPS 3		30,0 (19)		
Length of ICU stay (days)		4,0 (3,75)		

Legend: SD = Standard deviation; SAPS 3 = Simplified Acute Physiology Score 3; VMI = invasive mechanical ventilation.

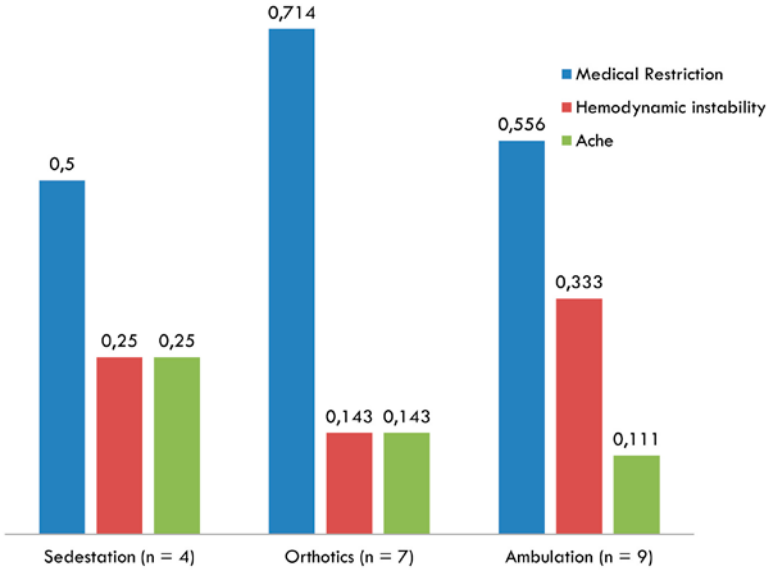
When evaluating the bedside practices after admission to the ICU, it was verified that the sitting was performed in less than 24 hours in 56% of the sample, while 34.8% were placed in orthostasis and 30.4% of the patients wandered in this area. same period of time (table 2).

Table 2. Frequency of bed removal of patients submitted to neurosurgery in an intensive care unit, Salvador, Bahia. (N = 26)

Time between admission and bed withdrawal (hours)	n	%
Time for sitting		
<24	14	56,0
24- 48	5	20,0
>48	2	8,0
Did not perform	4	16,0
Time for orthostasis		
<24	8	34,8
24- 48	7	30,4
>48	1	4,3
Did not perform	7	30,4
Tempo para deambulação		
<24	7	30,4
24- 48	5	21,7
>48	2	8,7
Did not perform	9	39,1

The most frequent reasons for not performing the bed mobilization practices were medical restriction, hemodynamic instability and pain reporting, (Figure 1).

Figure 1. Percentage distribution of the reasons attributed for non-removal from the bed of patients submitted to neurosurgery in an intensive care unit, Salvador, Bahia (N = 26) .



The FIM at the time of discharge was equivalent 98,31 (DP ± 27,08), which corresponds to the modified or complete functional independence, where the individual needed some or no aid to carry out the activities. There was no correlation between functional performance at discharge and length of stay in the intensive care unit (r= -0,294 p = 0,162).

Discussion

The sample studied showed a frequency of bed withdrawal of 56% in the first 24 hours of admission to the ICU, showing a profile of patients with modified or complete functional independence on discharge from the unit, however there was no correlation between functional performance at discharge and time in the unit.

The studies by Klein and Cols[5] and Schaller and Cols[26] diverge from our findings, showing that bed withdrawal, as it increased patient mobility, reduced the length of stay in the neurological ICU. Similar results were found in the studies by Soares and Cols[25] when comparing ICU stay at bedside, where it was seen that 56% of the patients who left the bed had a stay of 5 days (95% CI, 6 -14 days), in relation to the 44% that were not taken from the bed, totaling 10 days (IC95%, 8-13 days) of ICU admission.

Surgical patients have a higher age and shorter hospital stay and shorter hospital stay than clinical patients.[23] The studies by Matos and Cols[10] and Kasotakis and Cols[14] indicate an average age of 60 years for patients with a surgical profile, diverging from our sample that shows an average age of 37.2 ± 12.9 years of patients submitted to neurosurgery, which may explain the better functional performance in our sample and justify the absence of correlation with the residence time in the unit seen that the postoperative functional impact is lower in younger individuals.

In our study, we presented an expressive percentage of patients who used IMV between 24 and 48 hours of ICU admission. Corroborating our findings, Oliveira and Cols[24] reported a higher percentage of patients (52.4%) who remained in IMV for more than 24 hours and added that this factor was related to the length of stay in the ICU.

Similar results were also reported by Matos and Cols[10] in which surgical patients remained shorter in IMV and hospitalized in ICU compared to clinical patients. The short period of use of ventilatory support by the patients studied can be explained by the need inherent to the surgical procedure, however temporary, since all were programmed in an elective manner, with control of risk factors that could increase morbidity and mortality in the post-operative.

Considering the clinical severity and the prognosis of patients in our results, the relatively low SAPS 3 score pointed to a sample with a reduced percentage in the probability of death. In the study by Jesus et al[18], the same tool was used to evaluate the severity of the patients, with a median of 38.5 (29.0-58.3) points.

Previous studies[5,14,15,25,26] used the Acute Physiology and Chronic Health Evaluation II (APACHE II) to estimate severity and predicted mortality, however, in line with our study, only those individuals who underwent surgery were included and the APACHE II score reflected a low to moderate level of severity.

The low score in the SAPS 3 achieved in our study suggests the control of the possible risk factors for the surgical procedure, portraying a sample of lower severity. Knowing that this influences the functional prognosis, it is possible that there was no correlation between the functional performance and the length of stay in the ICU due to the low percentage of severity.

In the study by Jesus and Cols[18] a median of 2.0 (1.0-4.0) days of ICU admission was found. There was also similarity regarding the length of ICU stay reported in other studies.[5,14,15,25,26] In the study by Hickmann and Cols[15], the removal of the bed was feasible in the first 24 hours of ICU admission to 81% of the patients, corroborating our results where we found that most of the patients were removed from the bed in less than 24 hours of ICU admission. A longitudinal study by Soares and Cols[25] found that 56% of the patients were removed from the bed after discontinuation of the IMV, of which 54.9% performed in the period between 24 and 48 hours.

Another study on bedside removal at the ICU[10] described that 61.4% of the surgical patients performed the sit-in after three days. The literature has shown that early bedside removal has been instituted with the purpose of maximizing the functional capacity of individuals, promoting independence and thus reducing the time of IMV use as well as the length of ICU stay.[5,11,15.26]

Despite the importance of early mobilization, in our findings, a significant percentage did not perform sedation, orthostasis and ambulation. The main factors that limited bed withdrawal were medical restraint, followed by hemodynamic instability and pain reporting. Similarly, Soares et al[25] reported bed restriction in 33% of patients due to medical advice.

Different reasons were found in the studies of Hickmann and Cols[15], where the surgical procedure itself, hemodynamic instability and patient refusal restricted the removal of the bed. It is known that functional decline leads to reduced mobility and has often been associated with worse outcomes in hospitalized patients.[11,25,26] Our findings suggest that both physiological and neurological instability in the acute postoperative phase can motivate the bed restriction.

In our sample, early intervention in the patients submitted to neurosurgery showed the functional performance on discharge from the ICU through the FIM score, where the values were compatible with a modified or complete functional independence. The study by Bartolo and Cols[11] showed that the patients affected by brain tumor and stroke presented improved functional results with mobilization given early after neurosurgery. In this same study, a subgroup of meningioma patients achieved functional progression in daily life activities and mobility after the intervention.

Similarly, the study by Klein and Cols[5] showed an increase in mobility during the ICU stay, where 42.7% of the individuals who were removed from the bed, wandered with assistance or independently in the first days of hospitalization. Although our results do not show a correlation between functional performance at discharge and length of stay in the ICU, we consider that the removal of the bed in an early postoperative way, allows the functional recovery of neurocritical patients.

This study was developed through the collection of data in medical records and was vulnerable to the information available in the registries. In addition, the study was developed in a single ICU involving a small sample of patients undergoing neurosurgery for a relatively short period of time, which limited our results.

Although the results can not be generalized and extrapolated to other ICUs, we recognize the importance of identifying the frequency of early mobilization practices performed at the institution, enabled by the Ministry of Health as a state reference unit in the high complexity care in neurosurgery, making this data relevant to this unit and to the physiotherapeutic practices in the institution.

Therefore, we suggest future studies involving a greater number of individuals with elective and urgent neurosurgical profile, so that they can clarify the relationship between the bedside removal practices during their stay in the ICU, and the functional status at the discharge of the unit.

Conclusion

We conclude that there is no correlation between functional capacity at discharge and length of stay in the ICU, which can be explained by the fact that the early mobilization and bed withdrawal practices were initiated within the first 24 hours of admission, which with which the functional performance at discharge was little modified or complete.

Author contributions:

Paiva DR designed the study, interpreted the results, wrote the final draft and approved the final version of the paper. Guerreiro CF and JL Anjos interpreted the results and approved the final version of the paper.

Competing interests

No financial, legal or political competing interests with third parties (government, commercial, private foundation, etc.) were disclosed for any aspect of the submitted work (including but not limited to grants, data monitoring board, study design, manuscript preparation, statistical analysis, etc.).

References

1. Xu T, Yu X, Ou S, Liu X, Yuan J, Chen Y. Efficacy and Safety of Very Early Mobilization in Patients with Acute Stroke: A Systematic Review and Meta-analysis. Scientific Reports. 2017;7:6550. doi: 10.1038/s41598-017-06871-z

2. Bensenor IM, Goulart AC, Szwarcwald CL, Vieira MLFP, Malta DC, Lotufo PA. Prevalence of stroke and associated disability in Brazil: National Health Survey – 2013. Arq Neuropsiquiatr. 2015;73(9):746-750. doi: 10.1590/0004-282X20150115

3. Magalhães ALG, Souza LC, Faleiro RM, Teixeira AL, Miranda AS. Epidemiologia do traumatismo cranioencefálico no Brasil. Rev Bras Neurol. 2017;53(2):15-22.

4. Domingues JRS, Manno E. Brazilian neurointensive care: a brief history. Arq Bras Neurocir. 2011;30(4):166-8. doi: 10.1055/s-0038-1625633

5. Klein K, Mulkey M, Bena JF, Albert NM. Clinical and psychological effects of early mobilization in patients treated in a neurologic ICU: A comparative study. Crit Care Med. 2015;43(4):865-873. doi: 10.1097/CCM.0000000000000787

6. Fujii T, Moriel G, Kramer DR, Attenello F, Zada G. Prognostic factors of early outcome and discharge status in patients undergoing surgical intervention following traumatic intracranial hemorrhage. J Clin Neurosci. 2016;31:152-156. doi: 10.1016/j.jocn.2016.03.007

7. Orlando JMC, Milani CJ. 2° Anuário Brasileiro de UTIs – 2° Censo Brasileiro de UTIs. São Paulo: Associação de Medicina Intensiva Brasileira (AMIB); Edição 2002-2003.

8. Ministério da Saúde. Sistemas de Informações hospitalares do SUS (SIH/SUS). Internações hospitalares do SUS [Internet]. [acesso em 2016 mai. 20]. Disponível em: http://tabnet.datasus.gov.br/cgi/deftohtm.exe?sih/cnv/sxuf.def

9. Harrold ME, Salisbury LG, Weeb AS, Allison GT. Early mobilisation in intensive care units in Australia and Scotland: a prospective, observational cohort study examining mobilisation practises and barriers. Crit Care. 2015;19:336. doi: 10.1186/s13054-015-1033-3

10. Matos CA, Meneses JB, Bucoski SCM, Mora CTR, Fréz AR, Daniel CR. Existe diferença na mobilização precoce entre pacientes clínicos e cirúrgicos ventilados mecanicamente em UTI? Fisioter Pesqui. 2016;23(2):124-8. doi: 10.1590/1809-2950/13965623022016

11. Bartolo M, Zucchella C, Pace A, Lanzetta G, Vecchione C, Bartolo M et al. Early rehabilitation after surgery improves functional outcome in inpatients with brain tumours. Neurooncol. 2012;107(3):537-544. doi: 10.1007/s11060-011-0772-5

12. Kumble S, Zink EK, Burch M, Deluzio S, Stevens RD, Bahouth MN. Physiological Effects of Early Incremental Mobilization of a Patient with Acute Intracerebral and Intraventricular Hemorrhage Requiring Dual External Ventricular Drainage. Neurocrit Care. 2017;27(1):115-119. doi: 10.1007/s12028-017-0376-9

13. Abelha FJ, Castro MA, Landeiro NM, Neves AM, Santos CC. Mortalidade e o tempo de internação em uma unidade de terapia intensiva cirúrgica. Rev Bras Anestesiol. 2006;56(1):34-45. doi: 10.1590/S0034-70942006000100005

14. Kasotakis G, Schmidt U, Perry D, Grosse-Sundrup M, Benjamin J, Ryan C et al. The surgical intensive care unit optimal mobility score predicts mortality and length of stay. Crit Care Med. 2012;40(4):1122-8. doi: 10.1097/CCM.0b013e3182376e6d

15. Hickmann CE, Castanares-Zapatero D, Bialais E, Dugernier J, Tordeur A, Colmant L et al. Teamwork enables high level of early mobilization in critically ill patients. Ann Intensive Care. 2016;6(1):80. doi: 10.1186/s13613-016-0184-y

16. Jolley SE, Regan-Baggs J, Dickson RP, Hough CL. Medical intensive care unit clinician attitudes and perceived barriers towards early mobilization of critically ill patients: a crosssectional survey study. BMC Anesthesiol. 2014;14:84. doi: 10.1186/1471-2253-14-84

17. Bhat A, Chakravarthy K, Rao BK. Mobilization of patients in neurological Intensive Care Units of India: A survey. Indian J Crit Care Med. 2016;20(6):337-41. doi: 10.4103/09725229.183911

18. Jesus FS, Paim DM, Brito JO, Barros IA, Nogueira TB, Martinez BP et al. Declínio da mobilidade dos pacientes internados em unidade de terapia intensiva. Rev Bras Ter Intensiva. 2016;28(2):114-119. doi: 10.5935/0103-507X.20160025

19. Silva Junior JM, Malbouisson LMS, Nuevo HL, Barbosa LGT, Marubayashi LY, Teixeira IC et al. Aplicabilidade do escore fisiológico agudo simplificado (SAPS 3) em hospitais brasileiros. Rev Bras Anestesiol. 2010;60(1):20-31. doi: 10.1590/S0034-70942010000100003

20. Granger CV, Hamilton BB, Keith RA, Zielezny M, Sherwin FS. Advances in functional assessment for rehabilitation. Topics in geriatric rehabilitation. 1986;1(3):59-74.

21. Riberto M, Miyazak MH, Jucá SSH, Sakamoto H, Pinto PPN, Battistella LR. Validação da Versão Brasileira da Medida de Independência Funcional. Acta Fisiatr. 2004;11(2):72-76. doi: 10.5935/0104-7795.20040003

22. Portney LG, Watkins MP. Foundations of clinical research: Applications to practice. Connecticut, USA: Appleton & Lange; 1997.

23. Toufen Junior CF, Franca SA, Okamoto VN, Salge JM, Carvalho CR. Infection as na independent risk factor for mortality in the surgical intensive care unit. Clinics. 2013;68(8):1103-8. doi: 10.6061/clinics/2013(08)07

24. Oliveira ABF, Dias OM, Mello MM, Araújo S, Dragosavac D, Nucci A et al. Fatores associados à maior mortalidade e tempo de internação prolongado em uma unidade de terapia intensiva de adultos. Rev Bras Ter Intensiva. 2010;22(3):250-256. doi: 10.1590/S0103-507X2010000300006

25. Soares TR, Avena KM, Olivieri FM, Feijó LF, Mendes KMB, Souza Filho SA et al. Retirada do leito após descontinuação da ventilação mecânica: há repercussão na mortalidade e no tempo de permanência na unidade de terapia intensiva? Rev Bras Ter Intensiva. 2010;22(1):27-32. doi: 10.1590/S0103-507X2010000100006

26. Schaller SJ, Anstey M, Blobner M, Edrich T, Grabitz SD, Gradwohl-Matis I et al. Early, goal-directed mobilisation in the surgical intensive care unit: a randomised controlled trial. Lancet. 2016;388(10052):1377-1388. doi: 10.1016/S0140-6736(16)31637-3