INVESTIGATION OF THE PREVALENCE OF DELIRIUM, PAIN, MOBILIZATION INDICES, FRAILTY, AND MUSCLE WEAKNESS IN PATIENTS ADMITTED TO WARDS

ANTONIO HENRIQUE MARCZUK ESPEZI[1] ; ENZO BELUCI ACHILLES BONDARCZUK[1]; JULIANA CARDOSO SANTOS[1]; MIKAELY SOUSA SANTOS[1]; JAQUELINE APARECIDA ALMEIDA SPADARI[1]; GIULLIANO GARDENGHI[1,2]

1.Instituto de Ensino e Pesquisa, Hospital e Maternidade São Cristóvão - São Paulo- SP- Brazil
2.Hospital ENCORE/GO, Faculdade CEAFI/GO - Goiânia – Goiás - Brazil

ABSTRACT

Introduction: Patients admitted to wards are subject to complicated situations such as the emergence of delirium, the presence of pain and the development of muscle weakness or frailty. Low mobilization rates are also associated with adverse events, increasing morbidity and mortality in this population. Aims: 1) Investigate the prevalence of delirium, pain, frailty and muscle weakness in patients admitted to wards. 2) Characterize the mobilization pattern adopted with patients. **Methods:** Cohort study that followed patients admitted to the clinical and surgical wards of Hospital e Maternidade São Cristóvão (HMSC) who were monitored during their hospitalization, in 03 assessments (beginning, intermediate and end of hospitalization). Delirium was assessed using the 3D-CAM questionnaire. Pain was investigated using a pain body map and the pain visual analogue scale (VAS). Frailty was studied using the CFS scale (Clinical Frailty Scale). Weakness was investigated using the MRC scale (Medical Research Council) and the handgrip dynamometer (Saehan®). Finally, the mobilization indices adopted with the patients were measured using the JHMS (Johns Hopkins Mobility Scale). Data were presented as mean and standard deviation and absolute and relative frequency. The student's t test and the chi-square test were used, when necessary, assuming values of p≤0.05 as significant. **Results:** 62 patients were studied (age: 79.8±0.4 years; BMI: 26.4±6.3 kg/m2; 37.5% male). The total hospitalization days were 12.3±8.8 days, with 23.4% of the sample passing through the intensive care unit (ICU), remaining there for 5.9±5.8 days, before being admitted to the infirmary. The main cause of hospital admission was related to the respiratory system (32.9%), followed by the cardiovascular system (21.1%). The delirium observed in the sample was 27.0%, with the hypoactive type being the most prevalent (70.6% of cases). When considering the number of medications used at home versus the number of medications during hospitalization, there was a significant increase in their quantity (home: 4.8±2.8 vs. Hospitalization: 10.8±4.2 medications, p: 0.00), which may be associated with the emergence of delirium. Pain was present in 22.9% of assessments, with an average intensity of 1.1±5.9 points on the VAS. The area most frequently referred to as painful by patients was the lower limbs (47.1%), followed by the abdomen (15.7%). Measured by the CFS, the presence of some degree of fragility/vulnerability in the sample was 54.7%. In the assessment of strength by MRC, 14.5% of patients presented

1

weakness. Using handgrip dynamometry, 25.1% had weakness and 40.1% had severe weakness. To verify mobilization rates based on JHMS, it was shown that 61.5% of the sample remained in bed throughout their hospitalization and only 7.4% of patients walked, at some point, more than 76 meters during their hospitalization. Mortality in the sample was 7.8%. **Conclusions:** 1) Important portions of the studied population presented complications and adverse events during their hospitalization. Representative rates of delirium, pain, frailty/vulnerability and weakness were observed. 2) A large portion of the patients evaluated remained in bed during their hospitalization, which could further worsen the emergence of the findings presented here. Implementing assessment tools, systematizing the processes involved and implementing measures that can minimize such situations is fundamental to improving the hospital care

INTRODUCTION

Delirium is understood as an acute alteration of mental status, characterized by a wide range of neuropsychiatric signs and symptoms, with a fluctuating course, and explained by disruptions in cerebral homeostasis.[1],[2],[3]

This condition is common among hospitalized elderly patients. One-third of general medical patients aged 70 or older experience delirium, with the condition being present in half of these patients upon admission. In contrast, the prevalence among patients admitted to intensive care units (ICUs) who have undergone mechanical ventilation can exceed 75%.[1]

In the study by Park and Kim (2019)[3], in-hospital mortality, as well as mortality at 3, 6, and 12 months, was significantly higher in patients with delirium. These patients also had higher rates of adverse events, hospital expenses, and hospital readmissions.

There are three classifications of delirium. Hyperactive delirium is characterized by restlessness, agitation, and emotional lability. Hypoactive delirium is defined by the presence of apathy and reduced responsiveness. In the mixed type, there is an alternation between hypoactive and hyperactive characteristics.[4] Delirium has several risk factors, including preexisting cognitive impairment, advanced age, use of psychoactive drugs, mechanical ventilation, untreated pain, and a variety of medical conditions such as heart failure, prolonged immobilization, abnormal blood pressure, anemia, sleep deprivation, and sepsis.[5]

Considering the above, the objective of this study was to investigate the prevalence of delirium, pain, frailty, and muscle weakness in patients admitted to the wards and to characterize the mobilization patterns adopted.

METHODOLOGY

This is an analytical cohort study. The research began after approval by the Research Ethics Committee of Hospital e Maternidade São Cristóvão (HMSC) in São Paulo/SP.

Patients aged 60 years or older, of both sexes, admitted to Hospital e Maternidade São Cristóvão and hospitalized in the wards between July and September 2024 were evaluated. Patients with a history of alcoholism and those with previous neurological diagnoses were excluded from the study.

A screening of the patients at the research site was conducted through the electronic medical records system. Then, eligible patients were invited to participate in the study, and their companions were asked to read and sign the informed consent form (ICF or TCLE

in Brazilian Portuguese).

The main patient data were collected from their medical records, such as diagnosis, hospital length of stay, and medications in use during hospitalization. Additionally, a bedside interview was conducted, gathering vital signs, home medications, comorbidities, lifestyle habits, present invasive devices, and the presence of physical restraints.

During the evaluations, the 3-Minute Diagnostic Interview for Confusion Assessment Method (3D-CAM) scale was used to diagnose delirium in patients. The Medical Research Council (MRC) scale was applied to assess the presence of weakness, and grip strength was measured using the Saehan® hand dynamometer. Additionally, patients were questioned about the presence of pain, which was graded using the visual analog scale and a pain map. To characterize in-hospital mobility, the Johns-Hopkins Maximum Mobility Scale (JHMS) was used daily for the patients included in the study. Functionality and frailty were assessed using the Clinical Frailty Scale (CFS).

A minimum of three assessments were conducted for each patient: initial, intermediate, and final. The initial assessment was performed within 48 hours of the patient's admission to the ward, followed by the intermediate assessment after 4 days. Finally, the final assessment was conducted on the day of the patient's discharge.

The data were presented as means with standard deviation, as well as absolute and relative frequencies. The Student's t-test and Chi-square test were used when necessary, with p values ≤ 0.05 considered statistically significant.

RESULTS

The sample consisted of 62 patients, with an average age of 79.8±0.4 years, as presented in Table 1. The total length of hospital stay was 12.3±8.8 days, with 23.4% of the sample having been admitted to the Intensive Care Unit (ICU), where they remained for 5.9±5.8 days before being transferred to the ward.

The main causes of hospital admission were related to the respiratory system (32.9%), followed by the cardiovascular system (21.1%) and orthopedic system (19.7%).

Delirium was observed in 27.0% of the sample, with the hypoactive type being the most prevalent, accounting for 70.6% of the cases (n=12). The hyperactive and mixed types had prevalences of 17.6% (n=3) and 11.8% (n=2), respectively.

Table 01. Baseline characteristics of the sample

Variable	N (%)	Total
Sex (M/F)	22 (35.5)/ 40 (64.5)	62 (100.0%)
Age (years)*	79.8±9.4	
Weight (Kg)*	69.5±16.7	
Height (meters)*	1.62±0.08	
BMI (Kg/m²)*	26.4±6.3	

Legend: N: number; %: percentage; M: male; F: female; Kg: kilograms; *: mean ± standard deviation.

The main causes of hospital admission were related to the respiratory system (32.9%), followed by the cardiovascular system (21.1%) and orthopedic system (19.7%).

Delirium was observed in 27.0% of the sample, with the hypoactive type being the most prevalent, accounting for 70.6% of the cases (n=12). The hyperactive and mixed types had prevalences of 17.6% (n=3) and 11.8% (n=2), respectively.

No total 3 pacientes estavam com contenção mecânica no momento da avaliação, sendo que todos estes apresentaram delirium.

The number of medications used at home versus the number of medications during hospitalization showed a significant increase in the quantity (home: 4.8±2.8 vs. hospitalization: 10.8±4.2 medications, p: 0.00).

Regarding the presence of comorbidities, patients had an average of 2.3±1.4 coexisting conditions. Hypertension was the most prevalent, affecting 29.6% of the patients.

Pain was present in 22.9% of the assessments, with an average intensity of 1.1±5.9 points on the Visual Analog Scale (VAS). The most commonly reported painful area by patients was the lower limbs (47.1%), followed by the abdomen (15.7%) and upper limbs (13.7%).

In the strength assessment using the MRC scale, 14.5% of patients exhibited weakness. Through grip dynamometry, 25.1% showed weakness, and 40.1% exhibited severe weakness.

To assess the mobilization indices based on the JHMS, it was found that 61.5% of the sample remained in bed during the assessments, and in only 7.4% of the assessments did patients walk more than 76 meters. Table 02 presents comparative values between patients with and without delirium, considering their mobility, showing that patients who remained in bed (JHMS 1 and 2) had a higher prevalence of delirium.

Table 02. Baseline characteristics of the sample

Variable	JH 1 and 2 - in bed N (%)	JH 3 and 8 – out of bed N (%)	Total
Delirium	161 (68.8%)	73 (31.2%)	234 (100.0%)
Without *delirium*	309 (58.3%)*	221 (41.7%)*	530 (100.0%)
Total number of bedside assessments	460	294	754

Legend: N: number; %: percentage; *p:0.03 comparing bed stay between the Delirium and non-Delirium groups using the Chi-Square test.

Measured by the CFS, the presence of some degree of frailty/vulnerability in the sample was 54.7%.

The mortality rate in the sample during the research was 7.8%.

DISCUSSION

In our research, the most prevalent type of delirium was the hypoactive type (17%), characterized by less responsive behavior and difficult detection. In Todd's systematic review[6], it was shown that less interactive patients at hospital admission had a higher mortality rate; this reduction in interaction is strongly correlated with the presence of hypoactive delirium. In light of this, the implementation of tools that assist in the early detection of hypoactive delirium, combined with treatment protocols, may lead to better outcomes for these patients. In our sub-analysis, we demonstrated that patients who experienced delirium got out of bed less during assessments. This finding aligns with data from Zoremba and Coburn[7], who also showed that staying in bed is associated with more complications, such as delirium.

Delirium, in addition to being associated with increased morbidity and mortality, costs, complications, and delays in physical and cognitive recovery, also contributes to longer hospital stays. This, combined with immobility and the inflammatory process of the condition, exacerbates the reduction of muscle strength and mass, leading to the development of sarcopenia and, consequently, frailty.[8,9] Both conditions are linked to an increased risk of adverse health outcomes and functional loss, worsening the patient's quality of life.[10] In our sample, a large portion of the patients already had reduced muscle strength during the first assessment, as well as high levels of frailty. These factors are potentially worsened by the low mobilization rates observed during the study. Early mobilization, when done correctly, mitigates muscle strength loss and has the potential to reduce hospital stay duration, leading to favorable outcomes for this population.[11] It can also reduce the rate of delirium and significantly increase the likelihood of returning to independent living.[8]

Pain and its intensity are considered a modifiable risk factor for the development of delirium.[12] The pain reported by patients using the Visual Analog Scale (VAS) was present in 22.9% of the evaluations, with significant variability in intensity, as evidenced by the high standard deviation (±5.9 points on the VAS). The presence of pain is associated with the use of analgesic medications, including opioids and benzodiazepines, which also promote the development of delirium. A large portion of the studied sample experienced polypharmacy, as the average use of medications during hospitalization doubled compared to the use at home (home: 4.8±2.8 vs. hospitalization: 10.8±4.2 medications). This contributes to the occurrence of delirium, particularly when combined with the use of psychotropic medications.[12,13]

CONCLUSION

Important segments of the studied population experienced complications and adverse events during their hospitalization. Representatively high rates of delirium, pain, fragility/vulnerability, and weakness were observed. A large portion of the evaluated patients remained in bed throughout their hospitalization, which may exacerbate the emergence of the findings presented here. Implementing assessment tools, systematizing the processes involved, and implementing measures to minimize such conditions are essential for improving the hospital care provided at HMSC.

REFERENCES

1. Marcantonio ER. Delirium in hospitalized older adults. N Engl J Med. 2017 Oct 12;377(15):1456-66.

2. Oh ST, Park JY. Postoperative delirium. Korean J Anesthesiol. 2018 Aug 24;72(1):4-12.

3. Park EA, Kim MY. Postoperative delirium is associated with negative outcomes and long-term mortality in elderly Koreans: a retrospective observational study. Medicina (Kaunas). 2019 Sep 20;55(10):618.

4. Liptzin B, Levkoff SE. An empirical study of delirium subtypes. Br J Psychiatry. 1992;161(6):843-5.

5. Marra A, Ely EW, Pandharipande PP, Patel MB. The ABCDEF bundle in critical care. Crit Care Clin. 2017 Apr;33(2):225-243.

6. Todd A, Blackley S, Burton JK, Stott DJ, Ely EW, Tieges Z, MacLullich AMJ, Shenkin SD. Reduced level of arousal and increased mortality in adult acute medical admissions: a systematic review and meta-analysis. BMC Geriatr. 2017 Dec 8;17(1):283.

7. Zoremba N, Coburn M. Acute confusional states in hospital. Dtsch Arztebl Int. 2019;116(7):101-6.

8. Maldonado JR. Acute brain failure: pathophysiology, diagnosis, management, and sequelae of delirium. Crit Care Clin. 2017 Jul;33(3):461-519.

9. Jun L, Robinson M, Geetha T, Broderick TL, Babu JR. Prevalence and mechanisms of skeletal muscle atrophy in metabolic conditions. Int J Mol Sci. 2023 Feb 3;24(3):2973.

10. Gielen E, Dupont J, Dejaeger M, Laurent MR. Sarcopenia, osteoporosis and frailty. Metabolism. 2023 Aug;145:155638.

11. Surkan MJ, Gibson W. Interventions to mobilize elderly patients and reduce length of hospital stay. Can J Cardiol. 2018 Jul;34(7):881-8.

12. White N, Bazo-Alvarez JC, Koopmans M, West E, Sampson EL. Understanding the association between pain and delirium in older hospital inpatients: systematic review and meta-analysis. Age Ageing. 2024 Apr;53(4):afae073.

13. Inouye SK, Westendorp RG, Saczynski JS. Delirium in elderly people. Lancet. 2014;383(9920):911-22.

ANTONIO HENRIQUE MARCZUK ESPEZI
http://lattes.cnpq.br/4887843490025608 - https://orcid.org/0009-0003-3526-8453

ENZO BELUCI ACHILLES BONDARCZUK
http://lattes.cnpq.br/5689582391827177 - https://orcid.org/0009-0008-8019-6504

JULIANA CARDOSO SANTOS
http://lattes.cnpq.br/9711743673915869 - https://orcid.org/0009-0003-5553-4923

MIKAELY SOUSA SANTOS
http://lattes.cnpq.br/2789454247479787 - https://orcid.org/0009-0008-4101-5993

 JAQUELINE APARECIDA ALMEIDA SPADARI
http://lattes.cnpq.br/7330745324933487 - https://orcid.org/0000-0002-7773-4171

GIULLIANO GARDENGHI
http://lattes.cnpq.br/1292197954351954 - https://orcid.org/0000-0002-8763-561X