

Clinical and laboratory profile of hospitalized patients affected by pressure injury

Perfil clínico-laboratorial de pacientes hospitalizados acometidos por lesão por pressão

Perfil clinico-laboratorio de pacientes hospitalizados afectados por lesion por presion

Marcela Gama Santana Moreira^{1}, Silvia de Magalhães Simões², Caíque Jordan Nunes Ribeiro³*

ORCID IDs

Moreira MGS  <https://orcid.org/0000-0002-4951-2504>

Simões SM  <https://orcid.org/0000-0003-2751-7993>

Ribeiro CJN  <https://orcid.org/0000-0001-9767-3938>

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ABSTRACT

Objective: To characterize the clinical and laboratory profile of hospitalized patients affected by pressure injury (PI). **Method:** Retrospective and descriptive study, which included data from electronic medical records of 95 patients affected by PI during hospitalization. **Results:** There was a predominance of females (52.6%), mean age 74.8 ± 14 years, mean hospital stay was 76.9 ± 88.8 days. Most were admitted to the intensive care unit, with an average of 17.86 ± 36.58 days. Regarding the clinical condition, 60% were using a mechanical ventilator when they developed PI, 37.9% needed hemodialysis, 30.4% were diagnosed with some degree of protein-energy malnutrition and 54.7% progressed to death. The most frequent comorbidities were hypertension (63.16%), diabetes (43.16%) and neuropathy (33.68%). As for the laboratory profile, hypoalbuminemia (97.3%), hyperglycemia (87.8%), anemia (84.4%) and hyperuremia (78.9%) were present in more than two thirds of the sample. **Conclusion:** This study allowed to know the profile of patients affected by PI during hospitalization, which can serve as a basis for developing scientifically based effective preventive actions.

DESCRIPTORS: Adult; Stomatherapy; Hospitalization; Pressure injury; Skin.

1. Universidade Federal de Sergipe – Programa de Pós-graduação em Ciências da Saúde – Aracaju (SE), Brazil.

2. Universidade Federal de Sergipe – Centro de Ciências Biológicas e da Saúde – Departamento de Medicina – Aracaju (SE), Brazil.

3. Instituto Federal de Educação, Ciência e Tecnologia de Sergipe – Coordenadoria de Saúde Escolar – São Cristóvão (SE), Brazil.

*Correspondence author: marcelinha_gama@hotmail.com

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RESUMO

Objetivo: Caracterizar o perfil clínico-laboratorial de pacientes hospitalizados acometidos por lesão por pressão (LP). **Método:** Estudo retrospectivo e descritivo, que incluiu dados de prontuários eletrônicos de 95 pacientes acometidos por LP durante a hospitalização. **Resultados:** Houve predominância do sexo feminino (52,6%), média de idade 74,8 ± 14 anos, tempo médio de internação foi de 76,9 ± 88,8 dias. A maioria esteve internada na unidade de terapia intensiva, com uma média de 17,86 ± 36,58 dias. Com relação à condição clínica, 60% estavam em uso de ventilador mecânico quando desenvolveram a LP, 37,9% tinham a necessidade de hemodiálise, 30,4% foram diagnosticados com algum grau de desnutrição energético-proteica e 54,7% evoluíram para o óbito. As comorbidades mais frequentes foram hipertensão (63,16%), diabetes (43,16%) e neuropatia (33,68%). Quanto ao perfil laboratorial, hipoalbuminemia (97,3%), hiperglicemia (87,8%), anemia (84,4%) e hiperuremia (78,9%) estiveram presentes em mais de dois terços da amostra. **Conclusão:** Este estudo permitiu conhecer o perfil de pacientes acometidos por LP durante internação hospitalar, o que pode servir de base para desenvolver ações preventivas eficazes embasadas cientificamente.

DESCRITORES: Adulto; Estomaterapia; Hospitalização; Lesão por pressão; Pele.

RESUMEN

Objetivo: caracterizar el perfil clínico y de laboratorio de pacientes hospitalizados afectados por lesiones por presión (LP). **Método:** estudio retrospectivo y descriptivo, que incluyó datos de historias clínicas electrónicas de 95 pacientes afectados por LP durante la hospitalización. **Resultados:** hubo predominio del sexo femenino (52,6%), edad media 74,8±14 años, estancia hospitalaria media 76,9±88,8 días. La mayoría ingresó en la unidad de cuidados intensivos, con una media de 17,86±36,58 días. En cuanto a la situación clínica, el 60% utilizaba ventilador mecánico cuando desarrollaron LP, el 37,9% necesitó hemodiálisis, el 30,4% fue diagnosticado con algún grado de desnutrición proteico-energética y el 54,7% progresó a muerte. Las comorbilidades más frecuentes fueron hipertensión (63,16%), diabetes (43,16%) y neuropatía (33,68%). En cuanto al perfil de laboratorio, la hipoalbuminemia (97,3%), hiperglucemia (87,8%), anemia (84,4%) e hiperuremia (78,9%) estuvieron presentes en más de dos tercios de la muestra. **Conclusión:** este estudio permitió conocer el perfil de los pacientes afectados por LP durante la hospitalización, lo que puede servir de base para desarrollar acciones preventivas efectivas con base científica.

DESCRIPTORES: Adulto; Hospitalización; Úlcera por presión; Piel.

INTRODUCTION

Pressure injury (PI) is defined as a region of the skin with tissue suffering due to intense and / or prolonged pressure on soft tissues, usually in areas of bony prominence, with the possibility of being associated with shear, or it may also be related to medical devices or other type of artifact¹. Tissue damage results from external pressure in the tissue, caused by the contact surface being higher than the capillary perfusion pressure for longer than is necessary to recover the generated ischemia².

The degree of tissue impairment is considered for the staging of PIs, which can be classified into: stage 1 (intact skin with unbleached hyperemia); stage 2 (partial loss of skin, with exposure of the dermis, or blister with serous content); stage 3 (total loss of the skin, with exposure of the subcutaneous tissue, besides being able to present granulation, slough and necrosis); stage 4 (total loss of skin, with exposure of other structures); deep tissue (intact skin or not, with dark red, brown or purple color that does not whiten, or blister with bloody content); and

not classifiable (loss of skin in its full thickness covered by slough or eschar)¹.

Stage 3, 4 and non-classifiable PIs, when acquired after admission to health institutions, are considered “never events”, that is, unequivocal, serious and generally preventable adverse events³. These pressure-induced injuries are a highly prevalent worldwide problem, representing the most serious condition of impaired skin integrity as they result in numerous negative outcomes, such as clinical complications, physical and psychosocial impacts that directly impact on the quality of life of individuals⁴⁻⁶. A health care quality indicator is configured⁷ and its emergence can lead to the judicialization of institutions and health professionals⁸.

These complications increase hospitalization time, hospital readmission rates, morbidity and mortality rates, the need for intensive care, the workload for the nursing team, with a consequent increase in the cost to the health system⁹⁻¹⁰.

It is important to highlight the importance of assessing the risk of developing PI for prevention and

early intervention. To perform risk management, it is essential that professionals know the susceptible population, in order to intervene with actions aimed at minimizing the risk factors inherent or not to the patient. In addition, there are tools that assist in the systematic assessment of risk for PI, such as the Braden scale, translated into several languages, the most used worldwide¹¹. On the other hand, clinical judgment is essential, as this scale assesses only sensory perception, humidity, mobility, activity, nutrition, friction and shear¹¹, that is, other risk factors that are not measured on this scale may be directly associated with the appearance of PI.

In this context, in view of the professional practice aimed at managing PI in a hospital environment, the motivation for carrying out this study emerged. The importance of knowledge about the clinical-epidemiological profile of patients who develop PI in a hospital environment is emphasized, since the characteristics found can be similar in different scenarios. Thus, conducting studies in this area can contribute to improving the nursing team's decision making regarding preventive strategies for PI. In such a way, the success in preventing these injuries optimizes the results of the indicators that reflect the quality of the nursing services provided, as well as it favors the quality of life of the individuals.

OBJECTIVE

To characterize the clinical and laboratory profile of hospitalized patients affected by PI.

METHOD

Retrospective descriptive study based on secondary data, collected through documentary research. This type of research was carried out from retrospective documents, not fraudulent, without analytical treatment¹².

The research was carried out in a general private hospital in the city of Aracaju in the state of Sergipe, Brazil. It is a highly complex hospital, composed of emergency facilities, hemodynamics, surgical center, adult and pediatric intensive care unit (ICU) and inpatient units, which serves several medical specialties.

The institution has a skin committee composed of eight nurses trained in the prevention and treatment of skin lesions and / or specialized in nursing in dermatology or stomatherapy, in order to perform the management of PIs. Patients assisted by this team are captured by screening or at the request of other health professionals (doctors, nurses and nursing technicians). This commission is triggered in situations in which patients have the possibility of developing skin lesions, or in incontinent patients wearing diapers, who have an ostomy, or even when the application of the Braden scale, in the evaluation of patients, results in a score ≤ 14 .

The nursing team performs daily activities determined in the institutional protocols for injury prevention and treatment, such as, for example: skin inspection, application of the Braden scale, dressing, installation of preventive coverings and care for patients with ostomy. The skin commission manages these activities through the evaluation of the patient and the medical record and the preparation of the daily prescription of preventive coverings and dressings, in addition to notifying new cases of PI within the institution, as recommended by the National Pressure Injury Advisory Panel (NPIAP)¹.

The sample was given for convenience, consisting of cases of patients over 18 years of age who developed PI in the hospital environment from June 2017 to June 2018, totaling 95 participants. Patients who developed only injuries by a medical device were excluded, since, in the analysis of the cases made by the managers, it was observed that the majority were due to failure to comply with the PI prevention protocol. The clinical and laboratory data of these patients were extracted from electronic medical records, available on the institution's system, to which one of the authors has access, between the months of September 2018 to March 2019.

The data were organized and tabulated in Microsoft Office Excel 2013[®] spreadsheets and exported to the R Core Team 2019 program. Categorical variables were expressed as absolute and percentage frequencies, and quantitative variables as means and standard deviations. Pearson's chi-square tests were used, with and without Monte-Carlo simulations to verify the association between categorical variables and Mann-Whitney for independent samples to verify the difference in medians between groups.

This study was approved by the Institutional Research and Ethics Committee (Comitê de Ética e Pesquisa

institucional - CAAE nº 89872918.4.0000.5546) and respected the ethical recommendations of Resolution 466/2012 of the National Health Council and the Declaration of Helsinki.

RESULTS

The sample consisted of 95 patients, 50 of whom were women (52.6%), with a mean age of 74.8 ± 14 years, whose average hospital stay was 76.9 ± 88.8 days. Of these, 76 (80%) were in the ICU, with an average of

17.86 ± 36.58 days of hospitalization. Fifteen (15.8%) were under palliative care. The death outcome was verified in 52 patients (54.7%). Regarding the clinical condition, 57 patients (60%) were using a mechanical ventilator when they developed PI, 36 (37.9%) needed hemodialysis and 28 (30.4%) were diagnosed with some degree of energy-protein malnutrition (EPM).

Only one (1.05%) patient affected by PI had no underlying disease, 20 (21.07%) had only one, 30 (31.57%) patients two and 44 (46.31%) with three or more. The main comorbidities found in medical records are shown in Table 1.

Table 1. Comorbidities of patients affected by pressure injuries. Aracaju (SE), Brazil - September 2018 to March 2019.

Comorbidities	n (%)
Arterial hypertension	60 (63.16)
<i>Diabetes mellitus</i>	41 (43.16)
Neuropathy	32 (33.68)
Cardiovasculopathy	26 (27.36)
Oncological disease	26 (27.36)
Nephropathy	20 (21.05)
Pneumopathy	14 (14.73)
Hepatopathy	11 (11.57)

The drug therapies used by patients with PI are shown in Table 2. Antibiotic drugs were the most

prescribed, while chemotherapy drugs were the least frequently used.

Table 2. Medications in use by patients with pressure injuries. Aracaju (SE), Brazil - September 2018 to March 2019.

Variable	Values n (%)
Vasoactive Drugs	54 (56.8)
Sedatives	47 (49.5)
Corticosteroids	65 (68.4)
Chemotherapy	6 (6.3)
Antibiotics	82 (86.3)

As for laboratory tests, almost 70% of the patients had altered results, with the exception of the platelet count and creatinine level, in which less than 35% of the

individuals had alterations. Table 3 shows the average of the exam values and the results categorized according to the reference values of the research location.

Among the most striking findings are hypoalbuminemia (97.3%), hyperglycemia (87.8%), anemia (84.4%) and hyperuremia (78.9%) were present in more than half of the sample.

Table 3. Laboratory profile of patients affected by pressure injury. Aracaju (SE), Brazil - September 2018 to March 2019.

Exam (reference value)	Mean ± SD	Change	n (%)
Hemoglobin (12 - 16 g/dL)	9.9 ± 2.1	↓	76 (84.4)
		↑	2 (2.2)
Leukocytes (4.000 - 11.000/mm ³)	15,560 ± 9,685.1	↓	4 (4.4)
		↑	58 (64.4)
Platelets (130.000 - 400.000/mm ³)	230,511.1 ± 123,625.1	↓	22 (24.4)
		↑	9 (10)
Urea (< 50 mg/dL)	89.5 ± 50.8	↑	71 (78.9)
Creatinine (< 1.25 mg/dL)	1.4 ± 1.3	↑	29 (32.2)
Albumin (3.5 - 5.0 g/dL)	2.6 ± 0.4	↓	71 (97.3)
Glycemia (60 - 100 mg/dL)	175.2 ± 90.3	↑	43 (87.8)

SD = standard deviation.

The average of the Braden scale score was 10.5 ± 2.5 , classified as high risk, and the average time interval for the development of LPs was 25.8 ± 43.09 days. The “stage 3” PI required a longer hospital stay to develop, 55.6 ± 80.8 days (Table 4). The “deep tissue” PI was the most reported

category (42.5%), followed by “stage 2” (28%). No “stage 4” injuries were reported.

The body surface most affected by PI was the gluteal region (39.4%), followed by the sacrococcygeal region (19.3%) and the calcaneus (9.3%) (Fig. 1).

Table 4. Medicações em uso pelos pacientes com lesão por pressão. Aracaju (SE), Brasil - setembro de 2018 a março de 2019.

Classification	%	Injury time (days)		p-value
		Present	Absent	
		Mean ± SD		
Not classifiable	1.5	10	26.2 ± 43.5	0.640 ^w
Stage 1	15.8	31.4 ± 76.4	24.5 ± 31.3	0.126 ^w
Stage 2	28	24.9 ± 35.4	26.5 ± 47.9	0.912 ^w
Stage 3	12.3	55.6 ± 80.8	19.8 ± 27.6	0.003 ^w
Deep Tissue	42.5	18.7 ± 19.3	30.8 ± 53.4	0.650 ^w

SD = standard deviation; ^w Mann-Whitney test.

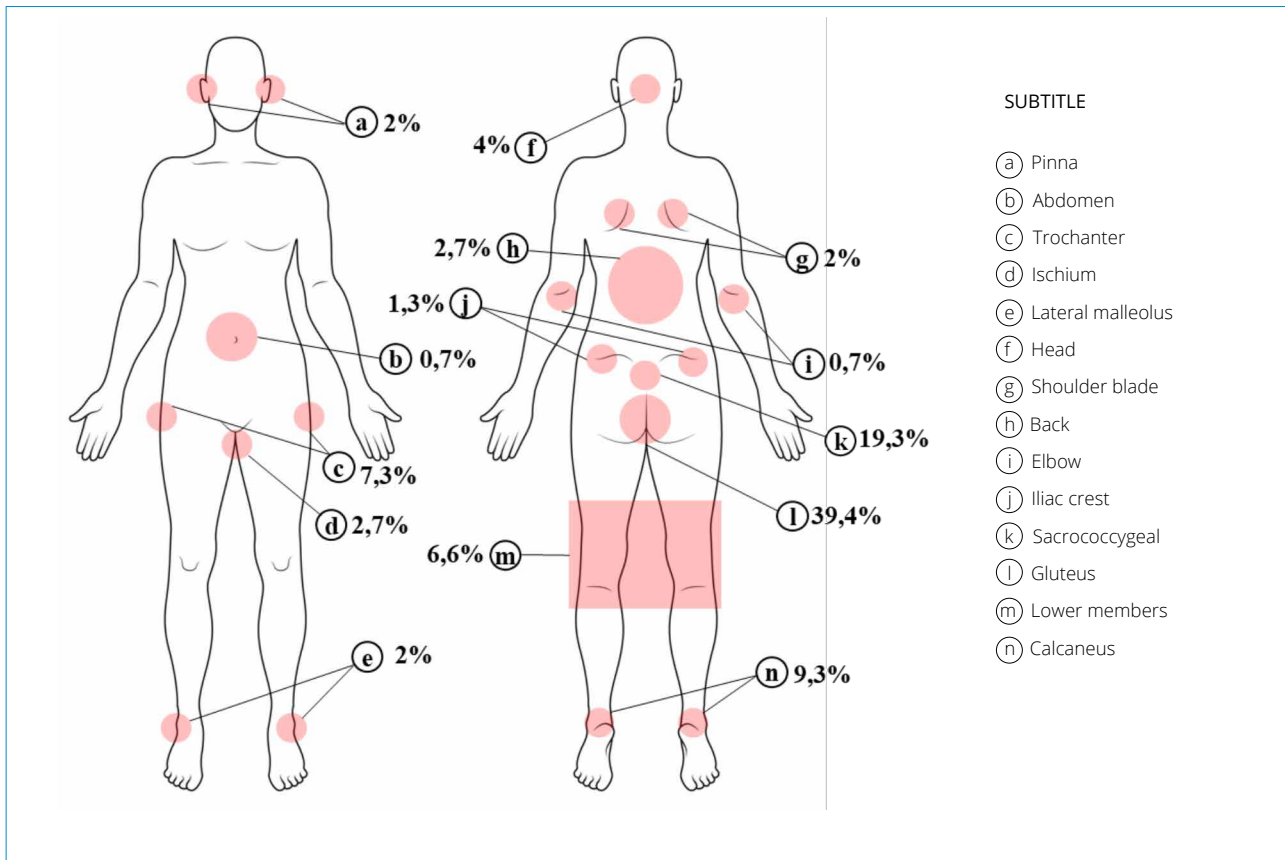


Figure 1. Regions affected by the pressure injury. Aracaju (SE), Brazil - September 2018 to March 2019.

DISCUSSION

The results of this study consist in the characterization of the clinical and laboratory profile of patients who developed LP during hospitalization. As for age, the individuals' advanced age (> 70 years) was observed. It is known that aging causes structural and functional changes in the skin. Some changes in the skin of the elderly that can compromise tissue tolerance to pressure are: reduced skin thickness, junction between dermis and epidermis damaged, limited cell division, decreased subcutaneous fat, slowed vascular response and altered innervation and sensitivity¹³.

In addition, the elderly population represents an age group with impaired functional status, reduced activity and mobility, as well as longer hospital stays¹⁴. The impaired functional status was evidenced in the sample, since the majority had at least one diagnosis of underlying disease. Results of a study pointed to a high association between systemic diseases and the existence of PI¹⁵.

Death was the outcome of hospitalization in more than half of the patients with PI. Researchers evaluated

the survival rate in hospitalized patients and found that the average survival time for the group of individuals with PI was considerably shorter than the group without PI (94 vs. 414 days)¹⁵. Although these injuries are not a cause of death during hospitalization, they do increase the risk of infectious processes and hospital malnutrition⁹.

The average score on the Braden scale revealed "high risk" for developing PI. This finding corroborates the profile of the patients analyzed, since it was verified a considerable number of patients with PI using sedative medications, mechanical ventilation and in need of hemodialysis. It should be noted that patients using sedation, analgesia or relaxers generally do not perceive tissue pressure or are unable to react properly⁹.

It is noteworthy that most of the participants in this study developed PI in the ICU. The indication for ICU can be for control of vital signs and, mainly, for clinical interventions in hemodynamically unstable patients and/or with failure of a single or multiple organs. A study carried out in public hospitals in Australia showed that patients allocated to the ICU are 3.8 times more likely to

develop PI when compared to patients hospitalized in other units¹⁶. That said, patients admitted to the ICU should be considered at high risk for the onset of PI.

Additionally, vasoactive drugs used in the ICU context are intended to maintain blood pressure, optimizing oxygen-rich blood flow to vital organs and, consequently, reducing perfusion to cutaneous and other tissues under pressure¹⁷.

As for laboratory tests, the presence of anemia and hypoalbuminemia is notable among patients with PI. Anemia has been documented in other studies as a possible contributor to the onset of PI¹⁸⁻¹⁹. In addition, it influences the resistance of tissues to pressure due to the possibility of reducing tissue oxygenation and, consequently, compromising the healing process¹⁸. Also, it can be a condition resulting from the combined influence of advanced systemic diseases, such as oncological disease, chronic kidney dysfunction and systemic infections¹⁵.

As for the hypoalbuminemia present in the majority (97.3%) of the patients with PI in this study, other studies have also shown similar results in different health scenarios^{15,20}. Albumin is a protein seen as a marker of nutrition, as well as oncotic pressure, which is reduced when albumin levels are low, causing edema and consequently compromising tissue tolerance²⁰. In addition, it is important to highlight that malnutrition causes reduction of muscle mass, immune dysfunction, consequently compromising the inflammatory response, reduction of the subcutaneous layer and loosening of the dermis and epidermis junction^{17,21}. These conditions accentuate bone prominences and / or provide a greater risk of skin rupture, being easily found in immobilized and elderly people⁵.

The most notified stage was “deep tissue”, followed by “stage 2”, diverging from other studies that point out “stage 2” as the most frequent^{9,21}. Both stages are defined as mild damage by the NPIAP, however, they can evolve to more advanced stages, reaching deeper tissues, in situations where appropriate treatment actions are not performed¹. Also noteworthy are the notifications of 17 “stage 3” and two “non-classifiable” injuries, corresponding to the never event³.

The most common stage found among patients who died was deep tissue. It is noteworthy that these lesions may worsen and reach deeper structures, becoming extensive and cavitory, when the patient’s clinical conditions are not favorable to the healing process²². The time to develop the “stage 3” PI was considerably longer, compared to the other notified stages. Time can be associated with the level

of tissue damage caused by the injury, in which “stage 3” reaches even the subcutaneous tissue¹.

Regarding topography, the most affected body region was the gluteal region, followed by the sacrococcygeal region, diverging from other studies that report the sacral region as the most affected^{9,23}. Despite this contrast, these body surfaces are close, in addition to being support regions when the individual assumes the supine position. In addition, these sites are often affected by dermatitis associated with fecal or urinary incontinence (DAI), which is considered a predisposing factor for PI²⁴.

Given the knowledge of the profile of individuals affected by PI in the hospital environment, it is possible to outline health promotion and prevention actions for the hospitalized population. The result of this research allowed to identify other variables, not included in the Braden scale, as involved in the emergence of PI. Thus, these results reinforce the importance of individual patient assessment, in addition to the application of the Braden scale. It is noteworthy that preventive measures to maintain skin integrity during hospitalization are extremely necessary to achieve good outcomes regarding the indicators that measure the quality of nursing care.

The study had the limitation of conducting the research in only one hospital. However, the results found in this research suggest the realization of longitudinal and prospective studies that can elucidate statistical models of PI risk prediction that take into account the possible contributing factors described in our findings.

CONCLUSION

The characterization of the clinical and laboratory profile of hospitalized patients affected by PI can favor the planning of effective and scientifically based preventive actions. In addition, it can contribute to improving nursing care and obtaining better results related to the indicators of the quality of hospital care.

In this way, knowledge of the clinical and laboratory profile of hospitalized individuals who develop PI favors the work of the health team, especially nursing. In cases of high flow of admitting and care for critical patients, such knowledge will assist nurses in prioritizing activities and systematizing nursing care, promoting patient safety and quality in the interventions performed

CONTRIBUIÇÃO DOS AUTORES

Conceptualization: Moreira MGS e Simões SM; Methodology: Moreira MGS; Simões SM e Ribeiro CJN; Investigation: Moreira MGS; Writing - First

version: Moreira MGS; Writing - Review & Editing: Moreira MGS; Simões SM e Ribeiro CJN; Financing Acquisition: Moreira MGS e Simões SM; Resources: Moreira MGS; Simões SM e Ribeiro CJN; Supervision: Simões SM.

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