






ORIGINAL ARTICLE

DIARRHEA: DERMATITIS ASSOCIATED WITH INCONTINENCE AND PRESSURE ULCER\*

DIARREIA: DERMATITE ASSOCIADA À INCONTINÊNCIA E LESÃO POR PRESSÃO

DIARREA: DERMATITIS ASOCIADA A INCONTINENCIA Y LESIÓN POR PRESIÓN

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ABSTRACT






**Objective:** to verify the association of diarrhea in the development of incontinence-associated dermatitis and pressure injuries in cancer patients admitted to an Intensive Care Unit. **Method:** this is a quantitative, descriptive, exploratory, retrospective study. We used data from 86 patients who were classified according to the risk of developing incontinence-associated dermatitis and other risk factors. The simple statistical analysis was presented, using absolute values and percentages. **Results:** all risk factors were reported to be present: mobilization, humidity, nutrition, tissue perfusion and colonization. Of the 86 patients in the study, 36 (42%) presented skin lesions, of which 33% presented exclusively incontinence-related dermatitis; 25%, exclusively pressure injury and 42% presented both. Most patients without diarrhea during hospitalization showed no skin lesion (83%), and in those with diarrhea, the incidence of lesions was inversely proportional to the others, and only 18% of the patients did not present any of the lesions. two lesions and 40% presented both. **Conclusion:** diarrhea was evidenced as an important risk factor for incontinence-associated dermatitis and pressure injury. **Descriptors:** Diaper Rash; Dermatitis; Pressure Ulcer; Diarrhea; fecal Incontinence; Wounds and Injuries.

RESUMO

**Objetivo:** verificar a associação da diarreia no desenvolvimento de dermatite associada à incontinência e lesões por pressão em pacientes oncológicos internados em Unidade de Terapia Intensiva. **Método:** trata-se de um estudo quantitativo, descritivo, exploratório, retrospectivo. Utilizaram-se dados de 86 pacientes que foram classificados quanto ao risco de desenvolvimento de dermatite associada à incontinência e referentes a outros fatores de risco. Apresentou-se a análise estatística simples, com emprego de valores absolutos e percentuais. **Resultados:** relata-se que todos os fatores de risco estavam presentes: mobilização, umidade, nutrição, perfusão tecidual e colonização. Revela-se que, dos 86 pacientes do estudo, 36(42%) apresentaram lesões de pele, sendo que, destes, 33% apresentaram exclusivamente dermatite associada à incontinência; 25%, exclusivamente lesão por pressão e 42% apresentaram ambas. Mostra-se que a maioria dos pacientes sem diarreia durante a internação não apresentou lesão de pele (83%) e, nos que apresentaram diarreia, a incidência de lesões foi inversamente proporcional aos demais, e, apenas 18% dos pacientes não apresentaram nenhuma das duas lesões e 40% apresentaram ambas. **Conclusão:** evidenciou-se a diarreia como um importante fator de risco para dermatite associada à incontinência e lesão por pressão. **Descritores:** Dermatite das Fraldas; Dermatite; Lesões por Pressão; Diarreia; Incontinência Fecal; Ferimentos e Lesões.

RESUMEN

**Objetivo:** verificar la asociación de diarrea en el desarrollo de dermatitis asociada a incontinencia y lesiones por presión en pacientes con cáncer ingresados en una Unidad de Cuidados Intensivos. **Método:** este es un estudio cuantitativo, descriptivo, exploratorio, retrospectivo. Utilizamos datos de 86 pacientes que se clasificaron según el riesgo de desarrollar dermatitis asociada a incontinencia y otros factores de riesgo. Se presentó el análisis estadístico simple, utilizando valores absolutos y porcentajes. **Resultados:** se informó que todos los factores de riesgo estaban presentes: movilización, humedad, nutrición, perfusión tisular y colonización. De los 86 pacientes en el estudio, 36 (42%) presentaron lesiones cutáneas, de las cuales 33% presentaron dermatitis exclusivamente asociada a incontinencia; 25%, lesiones por presión exclusivamente y 42% presentaron ambas. La mayoría de los pacientes sin diarrea durante la hospitalización no mostraron lesiones cutáneas (83%), y en aquellos con diarrea, la incidencia de lesiones fue inversamente proporcional a las otras, y solo el 18% de los pacientes no presentaron ninguna de las lesiones y 40% presentaron ambas. **Conclusión:** la diarrea se evidenció como un factor de riesgo importante para la dermatitis asociada a incontinencia y la lesión por presión. **Descriptor:** Dermatitis del Pañal; Dermatitis; Úlcera por Presión; Diarrea; Incontinencia Fecal; Heridas y Lesiones.

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## INTRODUCTION

Among the care offered to critically ill patients, the prevention of adverse events, specifically the prevention of skin lesions, stands out as one of the concerns of nursing that require continuous planning and evaluation. It is known that, among the most likely adverse events in the daily practice of intensive care professionals, the occurrence of Pressure Ulcers (PU) and Incontinence-Associated Dermatitis (IAD) draws attention for the following reasons: high prevalence in ICUs; painful events that cause discomfort and suffering to the patient; increased morbidity and mortality; length of stay and costs, as well as workload for the care team.

Concern about the prevention of IAD and PU is in line with the guidelines of the Ministry of Health, which, through the National Program for Patient Safety, and from it, the publication of the Pressure Ulcer Prevention Protocol highlights the importance of preventing adverse events to the patient and aims to prevent the occurrence of pressure lesions and other skin lesions, including moisture dermatitis.<sup>1</sup>

It is understood that incontinence is characterized as involuntary loss of feces or urine and that most patients admitted to intensive care have altered level of consciousness due to various causes, using diapers to collect their eliminations, promoting thus, environment conducive to the development of moisture lesions, therefore, it is considered of great importance to understand the risks to which these patients are exposed.

It is understood that reducing the exposure of the skin to moisture means minimizing one of the main risk factors for pressure injuries, contributing to the fall in the incidence of this injury in the service. In a technical paper prepared by the National Group for the Study and Counseling on Pressure Ulcers and Chronic Wounds / GNEAUPP, a close relationship between incontinence and the development of pressure ulcers, currently called "Pressure Ulcers" (PU), citing studies that show that 56.7% of people with "Fecal Incontinence" (FI) develop PU. Also reported is the risk of fecal incontinence increasing the risk of developing PU by 22%.<sup>2</sup>

It is noted that in a consensus of experts documented by Beeckman, they concluded that there is a higher risk of developing IAD in patients with fecal than urinary incontinence and, among them, those with liquid stool elimination, as it is associated with higher concentration of digestive enzymes and colonization of pathogenic bacteria, mainly *Clostridium difficile*, which is a major cause of diarrhea in a hospital setting, and in addition to *Clostridium*, colonization by enterobacteria (*Klebsiella*, *Acinetobacter*, *Pseudomonas* and *Enterococcus*) increases the risk

of fecal contamination of wounds located in the perineal area.<sup>3</sup>

IAD is interpreted as the end result of a cascade of events initially triggered by lesions at the horn extract level induced by exposure to multiple factors such as: hyperhydration; friction; temperature; chemical irritants; urine and feces. After compromising the skin barrier, several additional factors of the same type potentiate these changes, leading to a vicious cycle vulnerable to infections by opportunistic microbial agents, such as *Candida albicans*, which is a frequent aggravating factor. Therefore, in the development of dermatitis of the primary irritant diaper area, several factors have to be considered: diaper; feces; urine; friction; hydration; temperature; chemical irritants; sensitizing substances and microorganisms.<sup>4</sup>

In addition to incontinence, risk factors for IAD include poor skin conditions, impaired mobility, lowered level of consciousness, dependence on hygiene, pain, fever, the use of antibiotics and corticosteroids, malnutrition and the critical health picture.<sup>3</sup>

Confused and commonly classified as PU, the IAD is exclusively etiology related to humidity, behaving as a "top-down" lesion, while pressure lesions originate in deeper tissues, usually associated with extrinsic factors, such as moisture, which makes the skin more vulnerable to pressure.

In addition, although pathophysiologically and histologically different, IAD and PU are closely related to injury risk factors. In a recent systematic review with meta-analysis, incontinence and IAD were mentioned as the most important risk factors for PU.<sup>5</sup>

Other factors that associate the presence of IAD with the development of PU are also highlighted: increased local temperature associated with inflammation; increased coefficient of friction due to local moisture and skin wrinkling in a humid environment, which leads to increased shear load and is related to vasoconstriction.<sup>6</sup>

Therefore, the association between exposure to moisture, especially that caused by the occurrence of diarrhea, as an important risk factor for the development of IAD and pressure injuries, should be clearly identified in order to classify high-risk patients propose measures that minimize their effect on the incidence of these adverse events.

## OBJECTIVE

- To verify the association of diarrhea in the development of incontinence-associated dermatitis and pressure injuries in cancer patients admitted to the intensive care unit.

METHOD

It is a quantitative, descriptive, exploratory, retrospective study. Primary data were collected from the medical records of patients admitted to the Adult ICU of a cancer hospital between February and August 2016.

Patients were classified according to the risk of developing IAD according to the pattern of intestinal elimination in the period. The patients were classified as having low risk, although incontinent, without diarrheal episodes during hospitalization or at high risk, presented diarrheal diseases (three or more liquid eliminations / day) during this period.

Data was also collected from medical records regarding other risk factors, such as length of stay, use of vasoactive amines, antibiotics, diet, weight, serum albumin and colonization by multiresistant germs. Data was also collected on the occurrence and severity of IAD and pressure injuries.

The study was conducted in the ten-bed intensive care unit (ICU) of a federal public institution specialized in cancer care, teaching and research.

The sample consisted of 86 patients according to the inclusion criteria: patients over 18 years; patients who were hospitalized in the ICU for more than 48h; patients with urinary and / or fecal incontinence; patients without perineal skin lesions at ICU admission.

The confidentiality of the collected data and the non-disclosure of identities were guaranteed at any time, according to NHC Resolution No. 466/12. Data collection began after the authorization of both Research Ethics Committees, the Federal University of Rio de Janeiro State (UNIRIO) and the National Cancer Institute José Alencar Gomes da Silva (INCA) - CAAE: 56558216.0.3001,5274.

Results were presented in table and figures after simple statistical analysis, using absolute values and percentages.

RESULTS

Most of the population was male, with body weight between 61 and 80kg and average age of 59 years. It was noticed that there was a large variation in the length of stay, from two to 101 days, with an average of 18 days of hospitalization per patient and, as a result, 41% died and 59% were discharged from the ICU. Most of the sample (77%) consisted of patients weighing between 60 and 80 kg, and the minority (10%) were below 60 kg followed by 13% of patients weighing over 80 kg.

Table 1 shows the distribution of patients by risk factors for skin lesions.

Table 1. Description of risk factors for skin lesions present in hospitalized patients. Rio de Janeiro (RJ), Brazil, 2016.

Risk factors	Variables	n	%
Mobilization	Aticve	15	17
	Passive	71	83
Incontinence	Urinary	86	100
	Fecal	86	100
	Urinary and Fecal	86	100
	Diarrhea	33	38
Serum albumin	3.5 to 5.5	0	0
	Below 3.5	86	100
Vasoactive drugs	Yes	63	73
	No	23	27
Antibiotics	Yes	83	97
	No	3	3
Colonization by Enterobacteria	Yes	38	44
	No	48	56

It is noteworthy that the hospitalized patients had a clinical or late postoperative cancer profile, coming from the clinics offered at the hospital unit. Most of the patients were sedated, dependent on ventilatory, nutritional support and vasopressor medications and antibiotics, and all patients were restricted to bed and were wearing diapers.

It is emphasized that all study subjects were urinary and fecal incontinents, and urinary incontinence by itself did not determine a risk

factor for IAD, since no patient was diaper urinating: 87% used delayed bladder catheter (CVD); 6%, cystostomy and 7% were anuric.

It is revealed that the risk factor that stands out for the occurrence of IAD is faecal incontinence, especially the one aggravated by the occurrence of diarrheal episodes (38% of the total patients) and, of the patients with fecal incontinence, 16% were ostomized.

In terms of nutrition, 66% of the patients were receiving enteral diet, 18% orally or not, 16%

received Total Parenteral Nutrition (TPN), and although enteral diets may being full in its offer, most ICU patients did not receive the total scheduled for 24 hours due to interruptions in hygiene and procedures, temporary discontinuation due to high gastric residue or hemodynamic instability. In addition, patients on an oral diet are not guaranteed full nutrient supply either. Thus, 84% of the patients were considered to have probably inadequate nutrition.

As in the nutritional assessment, serum albumin level also stood out as a risk factor. Serum albumin level is the reference between 3.5 and 5.5mg / dl and no patient presented these levels during ICU stay. The mean serum concentration was 2.6 mg / dl, which shows hypoproteinemia in

100% of the patients studied. These values suggest susceptibility to the occurrence and aggravation of wounds.

Data on prevalence and incidence of IAD and pressure injuries were collected during the study period, and IAD had a mean prevalence of 29% and pressure ulcers (PU) an average of 24%, and the incidence of IAD averaged 20% and PU average 18%.

Figure 2 shows a schematic highlighting of the incidence of patients who developed only IAD, only PU, or developed combined lesions of IAS and PU.

IAD	IAD + PU	PU
33%	42%	25%

Figure 2. Incidence of combined incontinence-associated dermatitis injury and pressure injury. Rio de Janeiro (RJ), Brazil, 2016.

Of the 86 patients in the study, 36 (42%) presented skin lesions. Of these, 12 (33%) presented exclusively IAD, nine (25%), exclusively PU and 15 (42%) presented two ulcers.

The incidence of skin lesions by low and high risk patients is illustrated in Figures 3 and 4, respectively.

Without IAD and PU n= 44 (83%)		
With IAD and PU n= 2 (4%)	No diarrhea n= 53	No IAD and with PU n= 5 (9%)
	With IAD and without PU n=2 (4%)	

Figure 3. Incidence of injuries in low-risk patients. Janeirol River (RJ), Brazil, 2016.

It is observed in the figure above that most patients who did not have diarrhea on admission did not develop skin lesion. However, although the patient did not have diarrhea, moisture was

present by the use of diapers, time to change them and sweating, contributing, even at low rates, to the development of lesions in 17% of the sample.

Without IAD and PU n= 6 (18%)		
With IAD and PU n=13 (40%)	With diarrhea n= 33	No IAD and with PU n= 4 (12%)
	With IAD and without PU n=10 (30%)	

Figure 4. Incidence of lesions in high-risk patients. Rio de Janeiro (RJ), Brazil, 2016.

It can be seen that in patients who had diarrhea during hospitalization, the incidence of skin lesions was inversely proportional to the others, since in this group only 18% of the patients did not have IAD or PU and 40% had both lesions.

The relationship between injury occurrence and exposure to diarrheal bowel elimination is shown in Figure 4, in which the scheme organizes the data of the 42 patients who presented at least one of the three events.

Among the study participants, 42 patients had at least one of these events: diarrhea, IAD or PU; among them, 14% had diarrhea only; 5%, IAD only and 12%, PU only. It is noteworthy that 31% presented the three associated events: diarrhea, progressing to IAD and later to PU, and another 38%, at least, the association of two events.

DISCUSSION

Most of the study sample presented all risk factors for the development of skin lesions related to mobilization, moisture, nutrition, tissue perfusion and exposure to infectious agents.

Regarding length of stay, only 33% of patients remained in the ICU for up to seven days, which shows a long-term profile, with an average of 18 days and, according to the National Health Agency/NHA in 2013, the target for the average ICU stay would be 4.5 to 5.3 days.<sup>1</sup> The average length of stay also points to the greater risk of developing dermatitis associated with incontinence, thus impacting the costs for the prevention and treatment of this condition. Studies refer to an average of 13 days for the



installation of IAD in nursing home patients, but in another study by the same author, in 2011, in intensive care patients, the average was four days, ranging from one to six days of hospitalization for the onset of signs of dermatitis.<sup>7</sup>

ICU patients, specifically those under mechanical ventilation, develop energy output early in the hospital stay. Therefore, the reduced caloric intake, even with enteral nutrition, due to logistic or physiological demands is justified and, from a logistic point of view, interruptions in the diet supply are caused by the need for multiple exams during patient hospitalization, which requires temporary or permanent suspension. Physiologically, opioids may be prolonged by sedation for ventilation, gastric emptying and intestinal transit time, while catecholamines used in circulatory support may also decrease blood flow to the system.<sup>8</sup>

Reduced caloric intake, dehydration and reduction of serum albumin may warn the tolerance of skin and underlying tissue to pressure and frictional forces, which increases the risk of skin excision and reduces wound healing, and the combination of muscle loss and mobility increases the risk of pressure injuries by 74%.<sup>2</sup>

In low weight patients, body weight and subcutaneous fat recovery is required to provide relief from the pressure exerted by the underlying tissues on the bony prominences; In relation to overweight patients, the goal is weight control, because overweight increases the pressure on the tissues and, along with reduced mobility, the risk of pressure injuries.<sup>2</sup>

The inadequate body weight also indirectly contributes to the increased cost of skin care, because, in addition to the increased risk of developing wounds, overweight patients also greatly affect nursing workload, requiring more professionals to perform the many activities that require mobilization during care: bed bath; diaper change; enema; dressing change; change of position; positioning for procedures; referral for exams, among others.

Of the 86 patients in the study, 36 (42%) presented skin lesions. Of these, 12 (33%) presented exclusively IAD, nine (25%), exclusively PU and 15 (42%) presented two ulcers.

This data is in agreement with the literature, which states the close relationship between both events in which incontinence and IAD are the most important risk factors for PU.<sup>5</sup>

The mechanism of moisture injury development can be explained by the fact that moisture alters the resistance of the epidermis to external forces and contains debris; In the case of urine, as ammonia products resulting from the breakdown of urea change the pH of the skin, there is a predisposition for increased permeability; In

relation to faecal incontinence, besides promoting humidity, it exposes the patient to mechanical friction when cleaning the region, causing the appearance of cracks and lesions that will act as a gateway to microorganisms that cause infection. It is known that diarrhea is very caustic to the skin and can cause its rupture in a short time as evidenced in the research.<sup>9</sup>

The results indicate the occurrence of diarrhea as an important risk factor for the development of skin lesions, demonstrating the importance of recognizing the prevention of IAD by impacting the incidence of pressure injuries. The idea of causality between events is reinforced by the fact that 31% of patients with diarrhea, IAD or PU had the three occurrences in association.

Significant reductions in the incidence of IAD have been shown in studies by identifying high-risk patients, training the nursing staff to assess and follow up on indicators.<sup>10</sup>

Therefore, the need for reassessing routines with the incontinent and diarrhea patient emerges with regard to early identification of high-risk warning, review of hygiene and skin protection products, and evaluation of the purchase of deviation devices of fecal material. Further research should be carried out to verify the effectiveness of these preventive actions to reduce the incidence of incontinence-associated dermatitis and pressure injuries in daily intensive care.

## CONCLUSION

Through this study, it was possible to trace the profile of patients admitted to this oncology ICU, highlighting the intensity of the risk factors to which this population is subjected and highlighting in particular the occurrence of diarrhea as an important risk factor for the disease. development of IAD and pressure injuries. The close relationship between the prevalence and incidence of IAD and pressure injuries could be reinforced by the study, justifying the importance of early identification of patients at risk for these events.

Therefore, it is hoped that this study will awaken care professionals to address risk factors of adverse events in promoting patient safety.

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