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RESEARCH

Cost of dressings for prevention of sacral pressure ulcers

Custos de coberturas para a prevenção de úlcera por pressão sacral

Costo de apósitos para la prevención de la úlcera por presión sacra

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ABSTRACT

Objective: to identify costs of dressings to prevent sacral pressure ulcers in an adult intensive care unit in Paraná, Brazil. **Methods:** secondary analysis study with 25 patients admitted between October 2013 and March 2014, using transparent polyurethane film (n = 15) or hydrocolloid dressing (n = 10) on the sacral region. The cost of each intervention was based on the unit amount used in each type of dressing, and its purchase price (transparent film = R$15.80, hydrocolloid dressing = R$68.00). **Results:** the mean cost/patient was R$23.17 for use of transparent film and R$190.40 for use of hydrocolloid dressing. The main reason for changing the dressing was detachment. **Conclusion:** the transparent film was the most economically advantageous alternative to prevent sacral pressure ulcers in critical care patients. However, additional studies should be carried out including assessment of the effectiveness of both dressings.

Descriptors: Bandages; Costs and Cost Analysis; Nursing; Pressure Ulcer; Intensive Care Units.

RESUMO

Objetivo: identificar os custos com coberturas na prevenção de úlcera por pressão sacral em uma Unidade de Terapia Intensiva para Adultos do Paraná, Brasil. **Métodos:** pesquisa de análise secundária com 25 pacientes internados entre outubro/2013 e março/2014, que utilizaram filme transparente de poliuretano (n = 15) ou placa hidrocoloide (n = 10) na região do sacro. O custo de cada intervenção se baseou na quantidade unitária utilizada, em cada tipo de cobertura e seu preço de aquisição (filme transparente = R$15,80, hidrocoloide = R$68,00). **Resultados:** O custo médio/paciente foi de R$23,17 para uso do filme transparente e de R$190,40 para uso de hidrocoloide. O principal motivo para a troca de cobertura foi o descolamento. **Conclusão:** O filme transparente consistiu na alternativa economicamente mais vantajosa para a prevenção de úlcera por pressão sacral em pacientes críticos; mas são necessários estudos adicionais que incluam a avaliação da efetividade de ambas as coberturas.

Descritores: Bandagens; Custos e Análise de Custo; Enfermagem; Úlcera por Pressão; Unidades de Terapia Intensiva.

RESUMEN

Objetivo: identificar los costos de apósitos para la prevención de úlcera por presión sacra en una Unidad de Terapia Intensiva de Adultos en Paraná, Brasil. **Métodos**: investigación de análisis secundario con 25 pacientes internados entre octubre de 2013 y marzo de 2014, que utilizaron film transparente de poliuretano (n = 15) o placa hidrocoloide (n = 10) en la región sacra. El costo de cada intervención se basó en la cantidad unitaria utilizada, en cada tipo de cobertura y su costo de adquisición (film transparente = R$15,80, hidrocoloide = R$68,00). **Resultados**: el costo promedio/paciente fue de R$23,17 usando film transparente y R$190,40 usando hidrocoloide. El principal motivo de cambio fue la mala adhesión. **Conclusión**: el film tranparente constituyó la alternativa económica más ventajosa para la prevención de la úlcera por presión sacra en pacientes críticos, pero se necesita de estudios adicionales que incluyan la evaluación de la efectividad de ambos apósitos.

Descriptores: Vendajes; Costos y Análisis de Costo; Enfermería; Úlcera por Presión; Unidades de Terapia Intensiva.

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INTRODUCTION

In order to promote patient safety, prevention of pressure ulcers (PU) is a concern for managers and other healthcare professionals. Furthermore, healthcare institutions need to optimize care costs for organizational survival, in addition to providing quality care.

Maintenance of skin integrity of bedridden patients is based on risk assessment for developing PU, optimization of nutrition and hydration, moisture management and minimization of pressure[1-2]. In this context, there is a need to evaluate the recommendation for protective dressings[2] and use of protective polyurethane foam on areas of bony prominence[1]. This can undermine the care provided to hospitalized patients who are bedridden, especially when admitted to intensive care units (ICU).

Intensive care units incur the highest costs to a hospital, partly because there is growing incorporation of innovations in biomedical technology (medicines, materials and equipment) that enable the realization of intensive care, and set it apart from other hospital units. One cost analysis study undertaken in New York, in the United States, found that total costs and length of stay were higher among critical care patients who suffered adverse events in the hospital, including PU. Conversely, in this same study, there was less use of resources by those who did not present any complication related to care[3].

In Brazil, although it is generally assumed that the data on occurrence of adverse events are underestimated[4], there is recognition that damages to patients arising from health care significantly impact hospital costs.

Because they are the leaders of the nursing team, nurses need to develop and enhance management skills in the provision and supervision of care, with a view towards the acquisition, maintenance and/or improvement of physical, technological, human and information resources, for the greater safety of patients, their families and everyone involved in the care process[5], including in the ICU to prevent PU.

When considering ICU costs and those arising from adverse events, it is necessary and urgent to adopt more efficient measures to prevent diseases arising from health care in this type of health care sector, since by design, it is strongly related to high institutional burden. Thus, it is necessary to act to reduce costs by establishing preventive measures related to PU, as opposed to therapeutic measures.

Pressure ulcers are defined as a localized area of tissue injury caused by pressure, shearing or friction[2,6-7]. They usually affect parts of the body that are more susceptible to uneven distribution of weight or excess pressure, both of which are common in the sacral region[6,8-9].

One alternative that initially may represent high costs to implement strategies for prevention of sacral pressure ulcers is the use of protective covers such as transparent film and hydrocolloid dressings, which act by limiting excessive moisture of the skin and improving tissue tolerance to pressure[10]. At the same time, the reduction of shearing forces on the sacral region occurs during the passive mobilization of the patient[10].

Based on the above, studies that investigate the costs of technologies used to prevent PU can support better decision making by managers and healthcare workers. Thus, the objective of the present study was to identify the costs of dressings in the prevention of sacral pressure ulcers in an adult intensive care unit (AICU) in the southern Brazilian state of Paraná.

METHOD

This is a secondary analysis study of data from the research project entitled "Technologies for care in an intensive care unit: analysis of costs of health care safety and quality," undertaken in an AICU at a private teaching hospital in the state of Paraná, from October 2013 to March 2014.

Study participants were patients who met the following inclusion criteria: minimum age of 18 years, without PU at the time of admission to the AICU, and presenting motor and/or neurological limitation for active mobilization in bed, at the time of admission to the unit. Patients who refused to participate in the study and who had been hospitalized for less than 24 hours in the AICU were excluded from participating.

Of the 86 patients evaluated for eligibility, 25 were allocated in intervention groups for follow-up and analysis, by simple randomization (alternate allocation by order of admission to the AICU). Thus, the transparent film intervention group (FIG) consisted of 15 patients, and the hydrocolloid intervention group (HIG) consisted of 10 patients. Follow up was finalized upon the patient's exit from the AICU due to discharge (n = 8), death (n = 7), transfer (n = 1) or withdrawal from the study (n = 1), change of spontaneous decubitus (n = 1), development of PU (n = 6) or injury from tape (n = 1) on the sacral region.

The dressings were placed in a standardized manner by nursing staff upon admission of the patient into the AICU, or within a maximum period of 24 hours, provided that there were no signs of tissue damage. Prior to placement of the dressings, the skin was cleaned with gauze soaked in alcohol chlorhexidine solution, dried with gauze, and the dressing was attached as described below.

Patients allocated into the FIG used transparent film with a standardized size of 15 cm x 20 cm (Tegaderm™, non-sterile transparent film, roll of 15 cm x 10 m, 3M do Brasil Ltda., Brazil), attached to the skin, with the centralized base of 20 cm just above the intergluteal fold. In the HIG, a hydrocolloid sacral dressing was used (Comfeel Plus® Sacral Dressing, 18 cm x 20 cm, Coloplast S/A, Denmark), positioned so that the longer rectilinear length was centered just above the intergluteal fold and toward the dorsal region, attached to the patient's skin. Both groups benefited from other measures to prevent PU, according to the work dynamic of the AICU, change of decubitus and use of static air mattress, under clinical judgment of the nurse in charge of the work shift, as well as daily care for skin hydration and moisture management.

For data collection, daily visits to the unit were carried out, with direct observation of the patient and notes entered into their chart. To this end, an instrument called "Information about the prevention of sacral region PU" was used, developed and pilot tested for this study. The instrument consisted of two parts. Part I pertained to client data, with 27 items relating to demographic and clinical variables, whereas Part 2 contained

information on prevention of PU, with 12 items relating to evaluation of the effectiveness of protective dressing, as well as possible confounding variables (angle of the headboard, mattress type, frequency of repositioning, use of disposable diaper and aspects pertaining to fecal and urinary incontinence).

The data were compiled and processed in a Microsoft Office Excel® spreadsheet, and descriptive statistical analysis was performed using the software Statistical Package for the Social Sciences, version 20. For the purposes of calculation, the cost of each intervention was based on quantity used for each type of dressing and its purchase price, in which the unit value of the transparent film and the hydrocolloid was R$15.80 and R$68.00, respectively.

All ethical and legal requirements were complied with, and approval to conduct this study was registered under CAAE approval no. 13426113.4.0000.5220 of the Ethics Committee of Faculdade Ingá, located in the city of Maringá, state of Paraná, Brazil.

RESULTS

Among the patients allocated in the FIG, 10 (66.7%) were women and 5 (33.3%) were men, whereas in the HIG, 5 (50%) were men and 5 (50%) were women. Other characteristics are presented in Table 1.

The data relating to costs of each type of intervention are summarized in Table 2.

In 25 cases, there was a need to change the dressing, 7 (28%) being in the FIG and 18 (72%) in the HIG. All dressings changed in the FIG were due to their detachment. In the HIG, the same cause was indicated in 15 (83.33%) instances. There were 2 (11.11%) changes without justification and 1 (5.56%) due to entry of feces under the dressing.

Table 1 – Characteristics of the study participants, according to intervention group, Maringá, Paraná, Brazil, 2014

Intervention / Variable	Film group		Hydrocolloid group	
	Variation	Mean (SD)	Variation	Mean (SD)
Age (years)	60-90	77.87 (8.05)	37-84	63.70 (15.59)
Length of stay in the unit (days)	1-51	9.13 (14.91)	2-118	28.60 (39.01)
Follow up (days)	1-51	7.60 (13.06)	1-39	10.90 (14.29)

Note: SD = Standard deviation.

Table 2 – Data on usage and costs of dressings for prevention of sacral pressure ulcers, by type of intervention, Maringá, Paraná, Brazil, 2014

Group	Dressings used	Variation	Mean (SD)	Total cost (R$)	Mean cost (R$/patient)
Film (n = 15)	22	1-5	1.47 (1.13)	347.60	23.17
Hydrocolloid (n = 10)	28	1-9	2.80 (3.05)	1,904.00	190.40

Note: SD = Standard deviation.

DISCUSSION

Pressure ulcers are a serious complication with multiple morbidities and immobility, related to intrinsic and extrinsic factors, and not always preventable or curable[2,6-7,11]. Nevertheless, to prevent this illness, different types of dressings have been used, such as hydrocolloid dressing and transparent polyurethane film.

It should be noted that the outside face of the hydrocolloid dressing is composed of semi-permeable polyurethane polymer, and the inside face contains carboxymethylcellulose, gelatin and pectin[12]. It is a self-adhesive dressing developed primarily for the treatment of PU, because it promotes angiogenesis, increases the amount of dermal fibroblasts, stimulates the production of granulation tissue and increases synthesized collagen[13]. Transparent film consists of polyurethane polymer, with one of the faces made of acrylic adhesive[12]. To prevent sacral PU, there is no need for the dressing to be sterile.

The purchase price of the transparent film was 4.3 times lower (R$15.80, per fraction of 15 cm x 20 cm) than the sacral hydrocolloid dressing (R$68.00 per unit). This difference is justified basically by the composition and applicability of each dressing.

The use of dressings entailed an increase in care costs. Despite this, the costs presented by both interventions seemed to be reasonable when compared to those spent for the treatment of PU (Table 2).

One study conducted in the United Kingdom[14] identified that the cost of treating a PU ranged from £1,214.00 to £14,108.00, with increased financial burden according to severity. This result confirms another study conducted in the United States that, when evaluating 19 patients with category IV PU, found that the mean cost of in-hospital treatment of PU and its complications was $129,248.00[15]. In addition to the economic costs related to treatment of PU, there are intangible advantages to prevent this disease, rather than allow it to develop to then treat it[11].

Considering that there is a need to rationalize financial resources, and that both types of dressings are equivalent in the prevention of PU, in principle, it is more advantageous financially to use transparent film, which showed a mean saving of R$167.23 per patient (Table 2).

However, it must be pointed out that patients in the HIG had a higher mean length of stay and follow up when compared to those in the FIG (Table 1). This may have influenced the greater need to change dressings in the HIG and, consequently, as can be seen in Table 2, have raised the mean consumption 1.9 times greater than that observed in the FIG, raising the mean cost with the use of hydrocolloid dressings, which initially were more expensive than the transparent film.

In both groups, the main reason for changing the dressing was detachment (FIG = 100%, HIG = 83.33%). Thus, it is important to examine skin moisture before recommending or using dressings to prevent sacral PU.

Situations that increase skin moisture, such as perspiration, extracellular fluid extravasation resulting from important edema, exuding wounds and proximal surgical drains, as well as the presence of urinary and/or fecal incontinence, may favor

the detachment of dressings. Consequently, there is a greater need for change, which thus increases the cost of its use.

Even when the dressing used for prevention of sacral PU is partially detached, it must be changed since the formation of folds and/or recesses can contribute to development of PU rather than prevent it.

The formation of folds and/or enclosures as well as probes and drains left between the body and the supporting surface exerts excessive pressure on the localized areas with which they are in direct contact. Thus, when performing change of passive decubitus of patients and their repositioning in bed, it is necessary to be aware of the aspects mentioned above, with a view towards minimizing pressure that predisposes a patient to PU[2]. In this context, good adhesion and factors that influence it are important aspects to be considered by nurses at the time of recommendation and selection of the type of dressing for prevention of sacral PU.

CONCLUSION

The purchase price of the hydrocolloid dressing (R$68.00) was 4.3 times higher than the transparent film (R$15.80), with a mean consumption of dressings greater in the HIG (2.8 units/patient) in relation to the FIG (1.47 units/patient).

The use of transparent film (R$23.17/patient) was the most economically advantageous alternative in comparison to the hydrocolloid dressing (R$190.40) for the prevention of sacral PU among patients in the AICU.

Although there is no statistically significant difference, the mean length of hospital stay and follow-up was greater in the HIG. Thus, there was greater need to change dressings, which may have raised its mean cost even higher.

The main reason for the change of dressings was detachment (FIG = 100%, HIG = 83.33%). This indicates that it is necessary to evaluate the factors that influence skin moisture before recommending which dressing to use to prevent PU.

Even considering that the results of this study contribute to the analysis of cost in prevention of PU, and that this analysis can also be used in theoretical comparisons related to costs of treatment of PU, the effectiveness of the intervention was not discussed in this article. Therefore, the authors suggest that further studies be undertaken to evaluate the cost-effectiveness of these products.

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