Pressure ulcers: the casuistry of an Internal Medicine Service

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Abstract

Pressure ulcers (PU) are a medical condition of significant clinical importance and prognostic value among the elderly population. In order to characterize patients with pressure ulcers in the Medicine Service I of the University of Coimbra Hospitals, a retrospective and descriptive analysis was carried out of the clinical records of all patients admitted to this unit during a six month period (1st January to 30th June 2006), evaluating several individual criteria including age, sex, home conditions, main diagnosis, hospitalization time, mobility, chronic co-morbidities, mortality and number, and location and severity of the pressure ulcers.

The results showed that the number of patients reported as having PU on discharge represents a small fraction of the real PU patient count. Most patients with PU were over 65 years old, and a significant association was found between PU and chronic neuropathies, with sensorimotor or cognitive deficits ($p<0.001$), particularly cerebral vascular accident, and also with institutionalization in retirement homes ($p<0.001$). The majority of patients presented PU in the sacrococcygeal region. Half of the new PUs appearing during hospitalization were recorded in patients who already presented PU on admission to hospital. The presence of PU determined a statistically increase not only in hospitalization time ($p<0.001$), but also in the mortality rate ($p<0.001$) among the patients affected with PU.

Key words: pressure ulcers, elderly, neuropathy, mortality, hospitalization time.

INTRODUCTION

Pressure ulcers (PU) are a pathology with high prevalence among the elderly population,[1,2,3,4] representing a serious problem for public health care and consuming human and economic resources,[1,5-9] preventative efforts are generally being more effective than curative procedures.[10] However, it is a pathology that is often undervalued by health professionals.[11]

Although its underlying etiopathogenic mechanisms have not yet been fully defined, there are various agents described as potentializers to this condition, which is clearly multifactorial. Of all the factors, prolonged pressure applied to the soft tissue located over bone protuberances (typically in areas where the body weight is distributed on the supporting surface) has been highlighted as the predominant agent, in association with various other agents, including skin aggression by friction and shearing resulting from mobilization of the bed-ridden patient, immobility and sensorial dysfunction, prolonged surgeries, prolonged hospitalization or residence in retirement homes, urinary incontinence, malnutrition, other related co-morbidities, and the effects of various drugs.[1,2,6] All these factors, which are often present in older individuals, associated with skin alterations that are part of natural ageing, make the elderly population a group that is highly susceptible to the development of pressure ulcers.[1]

Various studies have been carried out at international level, aiming to improve the characterization of this clinical condition, in all its forms, although the results have not always been consistent, particularly regarding the epidemiology. Estimates for the prevalence of PU in hospital units for the treatment of acute pathology (therefore excluding long-term health care units) are extremely variable, but, in general, values from 5% to 25% are indicated.[2,3,4,5,12-16] Its importance as a potentializing factor for mortality is recognized[5], and it is also an important prognostic indicator in the overall assessment of a patient,[11] regardless of the diagnosis, particularly at the time of hospital admission, generally determining more

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Received for publication on 11th December 2008
Approved for publication on 30th June 2009

prolonged hospitalization times.[7,17]

To characterize the severity of PU, the classification system of the National Pressure Ulcer Advisory Panel (NPUAP) was used, which evaluates the extension of the ulcer in terms to tissue damage, based on the involvement of the different cutaneous and subcutaneous structural levels.[2]

OBJECTIVES

- To evaluate the prevalence of pressure ulcers in an Internal Medicine Service;
- To characterize the population with pressure ulcers in this Service;
- To evaluate the relation between the presence of pressure ulcers and age, sex, diagnosed co-morbidities, and institutionalization of patients.
- To evaluate the impact of pressure ulcers on mortality and hospitalization time.

MATERIAL AND METHODS

A retrospective study was carried out on the population consisting of all patients admitted to the Medicine Service I of the HUC, regardless of diagnosis on admission, in a limited six-month period, from 1st January to 30th June 2006.

A review was done of the respective clinical processes. This population was divided into two groups; those with PU and those without PU, based on the information from the daily medical and nursing records. The hospital discharge report and the list of diagnoses in the hospital statistics service were not used. All the patients, belonging to both sub-populations, were characterized in terms of age, sex, pathological history and chronic co-morbidities diagnosed during the current hospitalization or in previous ones (including neuropathy with functional impairment, diabetes mellitus, congestive cardiac insufficiency, arterial hypertension, malignant neoplasia or chronic venous insufficiency, according to the data shown in the individual clinical process), hospitalization time, and mortality. In a later phase, an evaluation was also carried out based on the same criteria, considering only subjects aged 65 or over in each of the sub-populations.

The sub-population of patients with PU was also evaluated considering several other variables:

- Main diagnosis and admission route to the Service;
- Identification of "pressure ulcers" as the diagnosis shown in the discharge report;
- Type of residence among outpatients;
- Position of the body during hospitalization;
- Nnumber of PUs on admission and on discharge from the Service, their location on the body, and their respective severity, according to the NPUAP classification.

The evaluation of statistical significance corresponding to the relations between presence of pressure ulcers and the variables sex, mortality rate, length of hospitalization, level of institutionalization and the different co-morbidities recorded was carried out using the Chi-square test on the different variables.

RESULTS

Characterization of the sample

498 clinical processes were reviewed. Of all the patients assessed, 21 (4.2%) were considered as having PU on discharge, taking into account all the data in the hospital discharge report, and consequently, on the official statistical lists of the Medicine Service I –HUC, for the period analyzed. However, a careful review of doctors' and nurses' records for each individual process revealed that the number of patients with PU was, in fact, 61 (12.2%).

As shown in *Figs.1 and 2,* almost all (n=59, 97%) 61 patients with PU were 65 years old or over. The remaining 3% consisted of specific cases of two young subjects (<35 years old) with previous cranioencephalic/vertebro-medullary trauma with severe neurologic sequelae. The average age of the PU patients group was 79.2 (±12.3) years. There was a slight prevalence of males (55.7%) over females (44.3%), but this difference was not statistically significant.

In relation to hospitalization time, 7% of the patients (n=4) stayed in hospital for 3 days or less; 28% (n=17) stayed for between 4 and 8 days; 34% (n=21) between 9 and 15 days; 21% (n=13) between 16 and 29 days; and 10% (n=6) for 30 days or more. Thus, more than half (65%) of the PU patients had a hospitalization time of 9 days or more, the average hospitalization time being 14.6 (±11.6) days.

The mortality rate among PU patients was 32.8% (n=20). After excluding the two subjects aged under 65, adjustment of the calculations by age group (59 patients) revealed an average age of 81.2 (±7.8) years and average hospitalization time of 14 ± 10.7 days, with a mortality rate of 33.9% (n=20).

The remaining 437 patients without PU comprised a subpopulation that was more dispersed among the

	Sample (n = 498)	
	Patients with PU n = 61	Patients without PU n = 437
Patients aged > 65 years	59 (97%)	253 (58%)
Patients aged < 65 years	2 (3%)	184 (42%)
Average age (in years)	79,2 (± 12,3)	65 (± 18,1)
Male sex (%)	55,7%	50,1%
Female sex (%)	44,3%	49,9%
Average hospitalization time (days)	14,6 (±11,6)	8,3 (±8,4)
Mortality rate (%)	32,8%	9,6%

Characterization of the sample.

FIG. 1

different age groups (*Fig. 1 and 2*). Despite this, there was a high prevalence of elderly subjects (58% were aged 65 years or above – *Fig. 1*), equally distributed between the sexes. The average age of patients without PU was 65 years (± 18.1).

Of these patients, 30% (n=131) had a hospitalization time of 3 days or less; 34% (n=151) between 4 and 8 days; 23% (n=102) between 9 and 15 days; 10% (n=42) between 16 and 29 days; and 3% (n=11) 30 days or more. The average hospitalization time was 8.3 (±8.4) days, and more than half of patients (64%) remained in hospital for a period of less than 9 days.

In the group of patients without PU, 42 deaths were recorded, corresponding to a mortality rate of 9.6%. Considering only the 253 patients aged 65 or over, the average age was 77.8 (±7.5) years, with an average hospitalization time of 9.7 (±9.6) and a mortality rate of 13.4% (n=34).

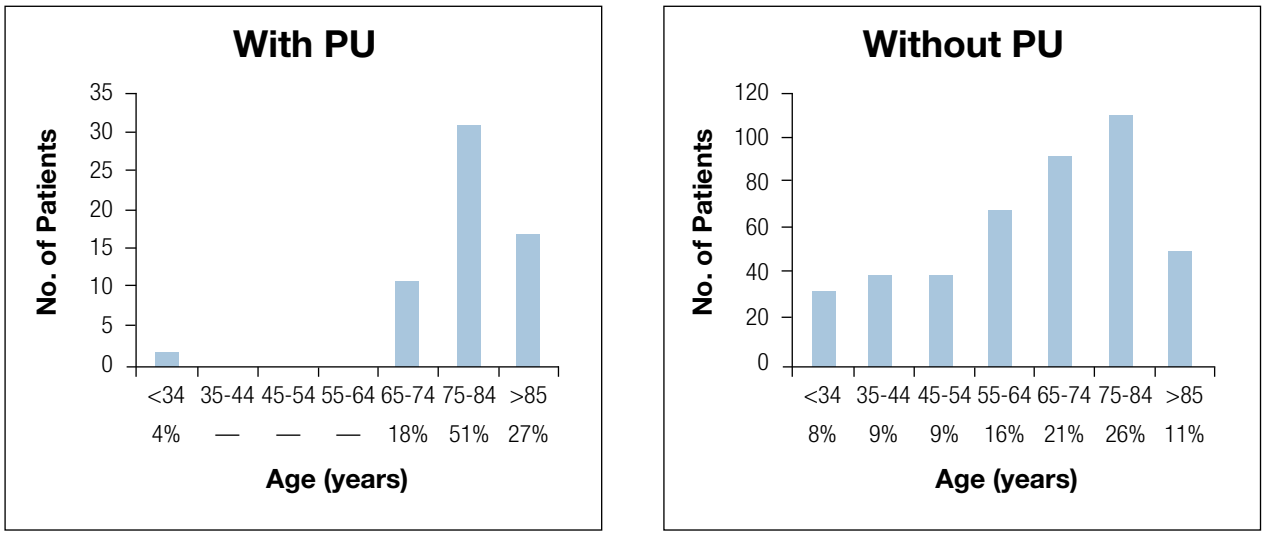
Characterization of the patients with PU

More than half of the patients with PU (n=35; 57.4%) were admitted to hospital with pneumonia, bronchopneumonia or non-specified respiratory infection. The remainder were admitted with main diagnoses of urinary tract infection (n=8; 13.10%), decompensated diabetes mellitus (n=3; 4.9%), pressure ulcers (n=1; 1.6%), and other causes (n=14; 23%).

Almost all these patients were admitted to the Emergency Service of the HUC (95%); of the remaining patients, one (1.7%) was admitted via transfer from another service, and two (3.3%) in a programmed way, via External Consultation.

Of the PU patients, 79% (n=48) already had PU on admission (*Fig. 3*), while 20% (n=12) developed PU during hospitalization. The remaining 1% relates to a patient for whom no data was available regarding the presence of PU on admission.

Thus, on admission, a total of 120 PUs were counted, giving an average of 2.5 (±2.2) ulcers per patient with pre-existing PUs. Proportionally, and considering the global population on admission, there was one PU for every 4 patients admitted. The average severity of the PUs on admission was 2.5 (±1.0),



Characterization of the sample: age profile

FIG. 2

according to the NPUAP classification.

On the date of discharge, a total of 164 PUs were counted, with 50 new PUs recorded and complete regression of 6 PUs in relation to the pre-existing number of PUs.

It was observed that 50% (n=25) of new PUs appeared in patients who also presented PU on hospital admission. Of all the patients with pre-existing PUs, 29% (n=14) developed new ones during hospitalization. Thus, the average number of PUs per patient, among those with PUs before hospitalization, increased to 3.0 (±2.6). The average severity of the pre-existing ulcers remained practically unaltered on discharge (2.6 ±1.0). The average severity for the total new ulcers in these patients was 1.8 ±0.8 (classified according to the NPUAP).

The remaining 50% with PU were new ulcers appearing in patients who did not previously have PU. In these patients, the average severity of the ulcers on was 1.4 (SD).

In terms of the global population, the ratio recorded on discharge was 1 PU for each 3 patients.

Of the total 170 PUs recorded for all the admissions, the principal location was the sacrococcygeal region, which was affected in 62% (n=38) of the patients with PU. Similarly, 48% (n=29) presented PU on the calcaneous, 46% (n=28) on the femoral trochanter, 21% (n=13) on the malleolus, 16% (n=10) on the dorsal thoracic region (scapular area), 8% (n=5) on the upper limb (olecranium), 5% (n=3) on the auricular pavilion and 2% (n=1) on the occipital region.

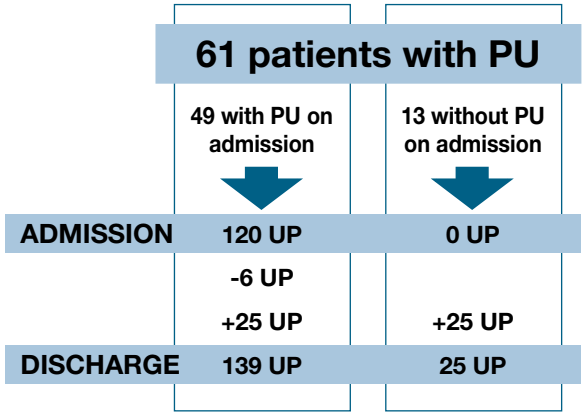
In absolute terms, the anatomical area mostly affected by PU was the trochanters, with 25% of 170 ulcers (42), followed by the calcaneal (40 PU; 23%), sacrococcygeal (38 PU; 22%), malleolar (18 PU; 11%), dorso thoracic (13 PU; 8%), upper limb (5 PU; 3%), and other regions (15 PU, 9%).

According to the records, 89% (n=54) of PU patients were totally confined to bed throughout their hospitalization, and only 10% (n=6) had been placed in positions other than decubitus. The remainder (2%) consists of a patient with insufficient data recorded for this aspect.

Descriptive comparison of the subpopulation aged over 65 years

Of all the 59 patients with PU aged over 65 years, 36% (n=21) were reported as being institutionalized in retirement homes.

A total of 36 patients (61%) presented some type of documented neuropathy (*Fig. 4*), stroke being the most frequent (in 67% of cases). Dementia was also common, being present in 21% of the elderly PU



Number of PUs on admission and on discharge.

FIG. 3

patients with neuropathy. The remaining 12% relates to other, less representative conditions, particularly vertebro-medullary trauma with sequelae (n=1; 3%), cranioencephalic trauma with sequelae (n=1; 3%), subaracnoid hemorrhage (n=1; 3%) and paraplegia of nonspecific cause (n=1; 3%).

Other chronic co-morbidities were listed as diagnosis in this group of patients, particularly arterial hypertension (in 41%, n=24), diabetes mellitus (in 39%, n=23), congestive cardiac insufficiency (in 37%, n=22), malignant neoplasia (in 19%, n=11) and chronic venous insufficiency (10%, n=6).

On the other hand, of the 253 patients without PU in the same age group, only 10% (n=25) were institutionalized. 15% of the patients in this group (n=39) were documented as having a diagnosis of neuropathy, 45% with arterial hypertension (n=113), 31% with diabetes mellitus (n=79), 40% with congestive cardiac insufficiency (n=101), 15% with malignant neoplasia (n=38) and 2% with chronic venous insufficiency (n=5).

DISCUSSION AND CONCLUSIONS

The analysis of the data obtained in this study reveals that the morbidity rate relating to pressure ulcers in the Medicine Service I is, as expected, very high (12.2%). This proportion is particularly relevant when we consider only individuals aged 65 or over, for which group the rate is 23.3%. These values are in line with the estimates for similar populations, published in recent articles. Advanced age (>65 years) is, therefore, clearly a risk condition with statistical significance ($p<0.001$) for the development of PU, in direct form, through the association of degenerative skin alterations, but also in indirect form, through the association with multiple co-morbidities, various drugs, and restricted mobility.

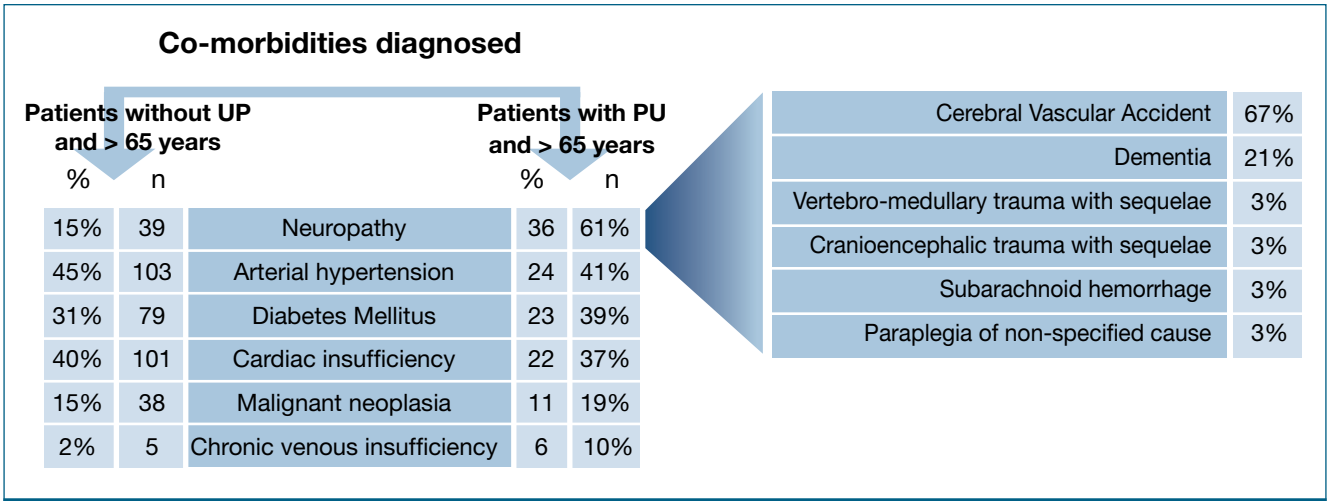
In fact, according to the records consulted, all the patients with PU showed severe limitations of mobility and autonomy, the vast majority being confined to bed and dependant on others for their mobilization.

Among all the co-morbidities commonly linked to elderly individuals, neurological disease is of particular relevance, being present in 61% of the individuals with PU, which is justified by its frequent association with sensorimotor and cognitive impairment, giving rise to immobility and deficiency in the response to pressure on the soft tissue. This fact is particularly relevant when we observe that the diagnosis of neuropathy with functional sequelae is significantly less frequent in individuals without PU of same age group, thus confirming its importance as a risk factor with statistical significance for the development of PU ($p<0.001$). On the other hand, it was verified that 48% of the total of patients in the global population with a diagnosis of neuropathy with sequelae also had PU.

On the other hand, no statistical significance was detected relating to the association between PU and the other co-morbidities evaluated ($p>0.05$), which were present in more or less equal proportions in both groups.

Similarly, it is interesting to note that 36% of elderly individuals with PU lived in retirement homes, while only 10% of the patients without PU, in the same age group, were institutionalized this difference means that the association between these two variables was statistically significant ($p<0.001$)

On the other hand, the existence of PU is a factor that is associated not only with a significantly longer hospitalization time ($p<0,001$), regardless of the diagnosis on admission, but also with a more disturbing prognosis, giving rise to a significantly higher mortality rate ($p<0.001$) when compared with individuals without PU. Thus, the prognostic value of this medical condition in patient assessment is confirmed, and the importance and of implementing aggressive preventative measures is evident, particularly for individuals considered to be at high risk. Risk assessment scales, such as those of Braden and Waterlow, are, according to the international literature,



Co-morbidities diagnosed.

FIG. 4

powerful weapons in the identification of potential PU patients, through the weighting of various criteria at the time the patient is admitted, thereby enabling the management of preventative resources to be more closely focused on the groups at higher risk, maximizing the efficacy of the procedures.[6] Despite controversies,[6] the application of these scales has been recommended as part of the routine initial assessment on patient admission. In this work, assessment scales were not considered, since they were not applied in a systematic way to the population studied, and there were insufficient records to reliably fulfill the various criteria for assessment on admission.

Despite all the evidence reinforcing the impact of PU on the patient's condition, it was verified that their presence was completely disregarded among the medical population, with only 34% of cases being reported in the patients' medical report on discharge. Thus, hospital statistical records are clearly biased, grossly underestimating the reality concerning PU among hospitalized patients.

It is also important to stress that in fact, the sacro-coccygeal, trochanterian and calcaneal regions were, almost systematically, the regions with most frequent records of PU, leading to the conclusion that these are likely to be the most vulnerable bone protuberances in terms of shear trauma and local pressure caused by the distribution of body weight with the patient positioned in dorsal or lateral decubitus. During hospitalization, it was observed that half of the ulcers that reappeared were recorded in patients who already presented PU, and a slight worsening of pre-existing ulcers was also noticed. On the other hand, in relation to the global population, the increase is considered small in the number of patients who presented integrity of the skin tegument on admission and developed pressure ulcers during hospitalization.

Finally, it should be mentioned that this study has a few limitations due to its retrospective nature, being based on medical and nursing records that were not completely uniform, therefore the results and conclusions are subject to possible bias. ■

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