Prevalence and risk factors of pressure ulcers in a Tunisian hospital

Prévalence et facteurs de risque d'escarres dans un hôpital Tunisien

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RÉSUMÉ

Introduction : A l'hôpital Charles Nicolle, nous n'avons pas de données sur la fréquence des escarres, les facteurs de risque, la prévention et le traitement.

Objectif : Etudier la prévalence des escarres chez les patients hospitalisés, mesurer le risque, analyser les mesures préventives et curatives et évaluer les facteurs prédisposant.

Méthodes: Enquête type un jour donné incluant les patients hospitalisés à l'exclusion des urgences, de néonatologie et de pédiatrie. L'échelle de mesure de risque utilisée était l'échelle de BRADEN. L'analyse des facteurs de risque a été réalisée avec le logiciel SPSS version 19.

Résultats: Un total de 473 patients a été inclus. L'âge moyen était de 52.26 ans. Près de 10 % des patients avaient un risque d'escarre modéré à élevé. La prévalence des patients porteurs d'escarre était de 5,3 % avec une prévalence de 4.7% d'escarre nosocomiale. La prévalence était relativement plus importante dans les services de réanimation et de chirurgie générale.

Le sacrum et les talons ont été les principales localisations retrouvées avec des escarres de stade 3 (46,4%) ou 2 (37,5%) principalement. La moitié a été traitée avec les pansements modernes. Un score de BRADEN <18 est très bien corrélé avec la présence d'escarre (96% des patients porteurs d'escarre). L'âge et le sexe n'ont pas été identifiés comme des facteurs de risque significatifs.

Conclusion : L'escarre reste un problème important au sein de l'établissement, il s'agit d'une pathologie évitable quand on applique une prévention adéquate et sa prise en charge nécessite une approche pluridisciplinaire

Mots-clés

Escarre, Facteurs de risque, Prévalence, Prévention

SUMMARY

Background: The aim of this study was to investigate the prevalence of pressure ulcers in hospitalized patients at the Charles Nicolle Hospital in Tunis, measure the risk of their occurrence, analyze preventive and curative measures undertaken and evaluate factors predisposing to pressure ulcers.

Methods: A one-day survey was performed in all hospitalized patients. Emergency services, neonatology and pediatrics were excluded. The Braden scale was used to measure the patient's risk for the development of pressure ulcers. Analysis of risk factors was performed using SPSS Version 19 software.

Results: A total of 473 patients was included. The mean age was 52.26 years. Nearly 10% of patients had a moderate or a high risk of developping pressure ulcers with a Braden score less than 18. The prevalence of patients with pressure ulcers was 5.3% with a prevalence of 4.7 % of nosocomial pressure ulcer. There was no significant difference in prevalence between medical and surgical services. The prevalence was relatively more important in intensive care and general surgery. The most frequent sites were sacrum and heels. Stages 3 (46.4%) and 2 (37.5%) were the mainly stages descriped. Evaluation of management of bedsores formed revealed that half was treated with modern wound dressings. Statistical analysis revealed that a Braden score <18 is correlated with pressure ulcers (96% of patients with bedsores. Patients transferred from other services, patients recently operated or those with probably inadequate diet seem to be more at risk of developing pressure ulcers. In contrast, age and sex were not identified as significant risk factors.

Conclusion: Pressure Ulcer remains a significant problem in hospital. This problem is preventable when applying adequate prevention but its management requires a multidisciplinary approach.

Key-words

Pressure Ulcer. Prevalence. Risk factors

The pressure ulcer can cause discomfort and pain to the patient and also a nosocomial infection which might extend the hospital stay. Measuring the hospital prevalence of pressure ulcers is a way to assess the efficiency of prevention and care strategies. According to a national survey carried out in all the French hospitals in 2004, nearly 9 % of hospitalized patients had at least one pressure ulcer (1).

Several factors can raise the risk of pressure ulcers, we can distinguish the extrinsic factors , namely pressure on the skin, friction, shearing and maceration and intrinsic factors notably immobility, malnutrition, peripheral neuropathy, age, state of the skin, decrease in circulatory flow and psychological condition (2). Thus, the pressure ulcer represents a multifactorial pathology which requires multidisciplinary care. Identifying patients likely to develop pressure ulcers by means of a risk measure scale can help clinical judgment and lead to take efficient prevention measures.

At Charles Nicolle hospital, we have no data relating to the frequency of pressure ulcers, risk factors involved, prevention and care methods. The main aim of our study is to measure the prevalence of pressure ulcers in hospital. The secondary aims consist in measuring risk and analyzing risk factors for pressure ulcers as well as assessing means of prevention in patients at risk.

METHODS

This is a standard study «on one given day ». All the patients of a same department are seen the same day. The survey turned on all the medical and surgical hospitalization units of Charles Nicolle hospital where the minimum stay is over 24 hours. The emergency, neonatology and pediatrics departments have been excluded.

The collection form has been worked out and verified by the team entrusted with pressure ulcers and chronic wounds at the hospital.

First, the prevalence of pressure ulcers acquired the day of the survey is measured. Since the presence of pressure ulcers is not always mentioned in the medical record, an interview with the patient or possibly with a third person is necessary. Furthermore, in immobilized patients, an interview with the nurse responsible and a skin examination are systematically performed. When a pressure ulcer is noticed, an assessment of the stage, location and care is undertaken. The stages of pressure ulcers have been classified in reference to the National Pressure Ulcer Advisory Panel (NPUAP) classification (3). The stages of healing have also been taken into account notably the granulation and epidermalization. The assessment of the management of bedsores care has been carried out through an evaluation of the traceability of care on the file or the follow-up form, the performing or not of a bacteriological sampling and the kind of dressing used: Conventional dressings or active dressings made from hydrocolloid, hydroactive, hydrogel or hydrofibre.

Secondly, the pressure ulcer risk has been measured through the BRADEN scale which allows classifying patients as having a low, moderate, high or very high risk of developing pressure ulcers. Then, an assessment of the preventive measures taken for patients considered at risk has been performed by asking the patient or possibly a third person. Thus, prevention is considered complete when a pressure relief support is used (bedsore mattress, pressure sore cushion or heel brace), when a change of position is regularly made and when a nutritional care is provided, notably by a dietician, in case it is necessary. Otherwise, the prevention is considered incomplete.

To study the risk factors of pressure ulcers, a statistical analysis is carried out by means of the SPSS version 19. Chi 2 test is used with a significance threshold of 0,05.

RESULTS

General characteristics of the population

The collection of data lasted 15 days, including a total of 473 patients. The sex ratio was 1,12 man per one woman (53% of men and 47% of women). The average age was 52.26 years with extremes from 5 to 85 years. (Table 1)

Table 1: Characteristics of patients included in the survey (n=473)

Variable	Headcount (N)	Percentage (%)
Sex		
Female	223	47
Male	250	53
Age (in years)		
Average	52.26	
Extremes	5-85	
Sector of activity		
Medicine	255	54
Surgery	201	42,5
Resuscitation	17	3,5
Recent surgery		
Yes	91	19.2
No	382	80.8
Patient coming from		
Home	429	90.7
Transfer service	31	6.5
Other	13	2.8

Prevalence of pressure ulcers formed and care

The prevalence of patients having pressure ulcers the day of the survey was 5,3 % (56 pressure ulcers in 25 patients among a total of 473 patients) with an average of 2,24 pressure ulcers per patient. No significant difference between the prevalence at the level of medicine and surgery units (5.1% in medicine and 5.5% in surgery). 52 pressure ulcers (93%) have been acquired during

hospitalization that is a prevalence of 4.7% of nosocomial pressure ulcer (Table 2). An average of BRADEN score of 13.4 has been found in patients with pressure ulcers with extremes ranging from 8 to 23.

Table 2: Number of patients with pressure ulcers /unit

Sector of activity Unit	Number of patients with pressure ulcers	Percentage in relation to number of patients with pressure ulcers (%)	Percentage in relation to number of patients admitted in the unit (%)
Resuscitation	7	28	41.7
Surgery			
General surgery	5	20	7.1
Orthopaedic surgery	3	12	6,6
Urology	3	12	6,2
ENT	1	4	4,2
Gynecology	-	-	-
Maxillofacial	-	-	-
Ophtalmology	-	-	-
Medicine	1	4	5,9
Cardiology	1	4	1,7
Nephrology	3	12	6,8
Pneumology	1	4	4,3
Internal Med	-	-	-
Rheumatology	-	-	-
Endocrinology	-	-	-
Gastroenterology	-	-	-
Dermatology	-	-	-

The highest frequency of pressure ulcers has been recorded in patients in the resuscitation unit with 7 patients (28%), that is a prevalence of pressure ulcers in resuscitation of 41,2% followed by patients in general surgery with 5 patients (20%), that is a prevalence of pressure ulcers in general surgery of 7,1%. The sacral area and heels have been the main locations. The dry or moist ulceration (stage 3) and de-epidermization or blisters (stage 2) have been the most frequently found stages (see figure 1).

As regards medical care of pressure ulcers, the survey revealed that only half of them are taken care of with modern dressings according to the treatment protocol of the hospital.

The remainder did not have the benefit of any local treatment. Seven pressure ulcers (25%) have been discovered during the survey. The pressure ulcers found in the patients have been recorded in the medical file for only four patients, the specific follow-up form has been filled in for one single patient and only one bacteriological sampling has been taken.

Measuring the risk of pressure ulcer in patients with no pressure ulcers:

About 10 % of patients had a moderate to high risk of pressure ulcer with a BRADEN score below 18. No preventive measure has been taken for these patients, except for those with pressure ulcers with the aim of preventing the appearance of new pressure ulcers.

Measuring the adequacy of prevention in patients with pressure ulcers showed that only 4 % have had the benefit of complete prevention.

Prevention was incomplete for more than half of the patients (68%) and non-existent for nearly one third of patients (28%). At least one specific support for pressure ulcers has been used in 60% of patients with pressure ulcers, the change in position has been performed in 15 patients (60%) and only 3 patients (12%) have had the benefit of an assessment by a nutritionist.

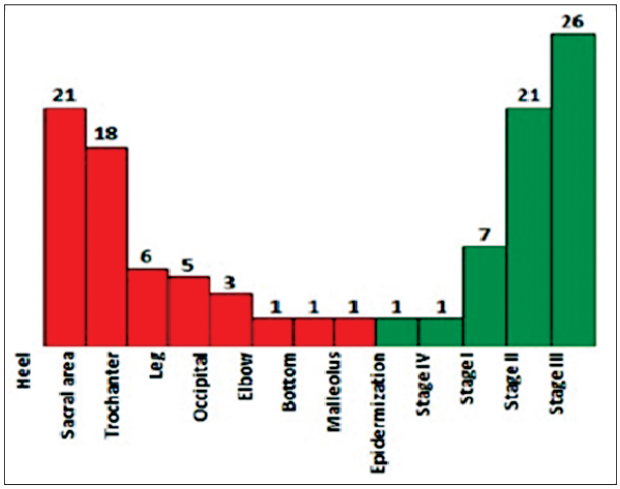

Figure 1: Locations and stages of pressure ulcers

Assessment of risk factors in patients with pressure ulcers

The statistical analysis of data collected with patients having pressure ulcers has revealed that a BRADEN score below 18 is very well correlated with the presence of pressure ulcers (96% of patients with pressure ulcers ; $p<0,001$).

The patients transferred from other departments ($p=0,019$) or with the notion of recent surgery ($p<0,001$) as well as the patients who probably have inadequate or poor feeding according to the BRADEN scale ($p<0,001$) seem to be more at risk to develop pressure ulcers. On the contrary, the age over 65 years and the sex of patients have not been identified as statistically significant risk factors (see table 3).

Table 3: risk Factors of pressure ulcers formed

Assessed factor	With no pressure ulcers (N= 448)	With pressure ulcers (N=25)	Odds Ratio [Confidence interval of 95%]	P
Sex	Man =233 Woman =215	Man =17 Woman =8	1.96 [0.83-4.63]	0.119
Age > 65years	115	10	1.93 [0.84-4.42]	0.116
Patient Origin : Transfer service	26	5	8.12 [2.59-25.5]	0.019
Surgery (<6 months)	78	13	0.19 [0.1-0.35]	< 0.001
BRADEN score< =18	24	24	424 [55.01-3268.17]	< 0.001
Score BRADEN <= 15	19	11	17.74 [7.11-44.23]	< 0.001
Poor or inadequate feeding	98	15	5.36 [2.34-12.3]	< 0.001
Immobility or reduced mobility	28	20	60 [20.95-171.81]	< 0.001

DISCUSSION

The prevalence of patients with pressure ulcers at Charles Nicolle hospital has been estimated at 5,3 % that is 56 pressure ulcers in 25 patients. A single pressure ulcer at stage of epidermisation (P3) has been recorded in our survey in a patient who has also other pressure ulcers under development which thus has no effect on the prevalence figure and allows us to compare our result with those of other surveys that do not in general take into account the stages of healing. Several works have reported a more or less high prevalence compared with ours, ranging between 7 and 18% (4-13), this could be explained by the relative young age of our population compared with the other surveys where the middle age ranges between 65 and 80 years against 52 years in our survey. It is in fact probably for the same reason that the age has not been identified as a statistically significant risk factor for the appearance of pressure ulcers in our survey (p=0,116) contrary to what we often find in literature (14-18) although the prevalence found in patients aged over 65 was a little higher 8% compared with 4.3% in patients less than 65 years old. A Spanish survey carried out in 2002 in patients whose average age is 82 (19) reports that in the geriatric population in chronic stay , the prevalence of pressure ulcers is much higher than in young patients with figures reaching up to 35.7%. On the other hand, the prevalence of pressure ulcers acquired during hospitalization found in our survey (4,7%) is consistent with the values reported in other surveys which provide figures ranging between 5 and 7% (4, 12, 20).

Although the men seem more at risk of developing pressure ulcers than women in our survey (17 men against 8 women), this criterion has not been identified as a significant risk factor. Actually the sex is rarely reported in literature as a factor likely to have an effect on the forming of pressure ulcers but in some works we can find that females are more likely to develop pressure ulcers (4, 17) or else males (21).

The prevalence of pressure ulcers in intensive care or resuscitation units is more important than in the other units. This can be explained by the fact that patients in the resuscitation unit have several risk factors, namely immobility, sedation, ventilator dependency, and so on. The prevalence found in our survey for resuscitation units (medical and surgical) stood at 41.2%. This prevalence can be included among the highest values reported in literature where prevalence ranges between 14 and 41% (4, 5, 22).

Measuring the risk of pressure ulcer represents an interesting tool in the prevention strategy, thus adequate prevention means are provided for the patients identified as at risk, therefore reducing the subjectivity of health caregivers. Several scales to measure pressure ulcer risk are available, the oldest being that of NORTON created in 1962, it is simple to use but it does not take into account the nutritional status. The scale of WATERLOW is more complex, the age, sex and medicines taken by the patient are taken into account by this scale. For our survey, we have chosen to use the BRADEN scale which is an anglo-saxon scale simple and easy to use, taking into account the main risk factors to develop pressure ulcers, namely mobility, sensitivity, humidity, activity, nutrition and friction. The validity of BRADEN scale has been much discussed in literature (23) but since the year 2001 its use has been recommended by ANAES (2). The use of a scale for risk measure should not replace the clinical judgment which remains an essential element in assessing the pressure ulcer risk.

A BRADEN score below 18 allows to identify patients at risk of developing a pressure ulcer according to the multicentric study published in 1998 on the validity of the BRADEN score in predicting the pressure ulcer risk (24). The threshold value of the BRADEN scale has however been discussed in several works which have looked for its validity in different populations and thus several threshold values are proposed. Values of 15 and 16 have been suggested in several works (25,4,5). In France, the ANAES recommends the use of a score below or equal to 15 to identify patients at risk (2). In our population, the average BRADEN score found in patients with pressure ulcers was 13,4 with extremes ranging from 8 to 23. The statistic analysis revealed that a score below 15 was associated to the presence of pressure ulcers ($p < 0.001$), which is in keeping with the results of other studies (4,5). The threshold value being contested, a BRADEN score below 18 has also been analyzed in the statistical survey and turned out to be also statistically significant ($p<0.001$).

Protein-energy malnutrition, just as immobilization represents a favorable ground for the forming of pressure ulcers, it actually causes a loss in the fat layers and thus

a loss of the role of pressure schock absorber, hypoalbuminemia with occurrence of oedema and nutritional anemia and therefore a tissue anorexia at lower pressures. According to a literature review published in 2012, these factors are the two strong elements predictive of the risk to develop pressure ulcers (26). Since some data were not often available in our study, notably albumin levels and BMI, the nutritional assessment could not be done properly; nevertheless, the BRADEN scale allows to identify patients with poor or inadequate feeding, by integrating this factor into the statistical analysis, it has indeed been correlated with increased risk of pressure ulcer occurrence ($p < 0.001$). Immobility has also been identified as a significant risk factor for pressure ulcer occurrence ($p < 0.001$) and patients who had surgery during the six months ahead of hospitalization were more at risk of developing pressure ulcers ($p<0.001$). The probable association between surgery and immobilization might account for that. This correlation between pressure ulcers and recent surgery has been found in another work with a significance threshold of 0.002 (14). The patients transferred from another department also seem to be more at risk to develop pressure ulcers, probably in connection with the extension of their stay in hospital.

Measuring the pressure ulcer risk through the BRADEN scale has allowed to identify 48 patients (10,1%) as risk patients but none of them had the benefit of specific prevention. Only the patients who already had one or more pressure ulcers had the benefit of secondary prevention against the appearance of more bedsores. This can be explained by the fact that caregivers are more aware of providing means of prevention when the patient already suffers from a pressure ulcer. But even in patients with pressure ulcers, prevention was not systematic since it did not exist in about one third of patients. Prevention mattresses were used for 11 patients. The change in position has been made for 15 patients and only 3 patients had the benefit of assessment by a nutrition specialist, that is 20 % of patients with pressure ulcers and poor or not proper nutrition according to the BRADEN scale. This inadequacy in prevention measures taken for patients at risk or even those with pressure ulcers is not a specificity of our hospital. Actually this has been reported in many works which testify that prevention of pressure ulcers is generally inadequate or incomplete (4, 7, 27, 28). In addition to the lack of awareness of the caregivers regarding the problem of pressure ulcers, this lack of prevention can be explained by the the shortage of prevention equipment notably mattresses which are in general bought by patients when they can afford to.

Pressure ulcers at the level of heels and the sacral area were the two locations most found during the survey with respectively 37.5% and 32.1%. This result is consistent with the results of most works in literature (4, 5, 6, 8, 9). This is due to the fact that these two areas are subjected to intense pressure and often exposed to frictions and rubbing during changing of bed sheets. The maceration caused by possible dampness at the sacral level also contributes to the forming of pressure ulcers in this area. The use of appropriate mattress and cushion, the mobilization and regular position change as well as skin hygiene care hold a prime position in the prevention of pressure ulcers in these two areas.

Stage 3 was found in 46.4% of patients, followed by stage 2 (37.5%) and stage 1 (12.5%). As to stage 4, the most advanced, it was identified in a single patient. The most serious stages were found mainly in resuscitation patients where the prevalence of stages 3 and 4 stood at 57.1% contrary to what has been found in other surveys where stages 1 and 2 were the most recorded (4, 6, 9, 11, 29). Our survey thus shows that pressure ulcers are discovered at an advanced stage. This might be due to the lack of awareness of our caregivers about the importance of prevention and detection of risk patients.

The assessment of the care provided to pressure ulcers formed revealed that out of the 56 pressure ulcers recorded, 28 (50%) have been treated with modern dressings but we have not assessed the adequacy of this treatment with the internal protocol of the hospital, namely the previous rinsing or not with saline solution and the choice of the proper primary and secondary dressing. The other pressure ulcers have not been subjected to any local treatment that is in 17 patients (68% of patients with pressure ulcers) and in fact 7 pressure ulcers (12.5%) have been discovered during our survey after skin examinations. The non treated pressure ulcers were mainly of stage 1 or 2 (71%). The lack of care for these pressure ulcers cannot be due to an ignorance of the products available at the pharmacy or the internal protocol of the hospital since they did not even had the benefit of a conventional local treatment. This could only be due to the lack of awareness of the care giving team in relation to this frequent complication of hospitalization.

As regards the traceability of care, specific follow-up forms have been transmitted with the protocol of chronic wounds care in clinical services, but this form has been filled in for only one patient. As to four other patients, the pressure ulcer has been recorded in the medical file but without any details on the measures to take. Therefore the traceability of treatment relating to pressure ulcers was practically non-existent, thus testifying to the poor interest of caregivers in general for pressure ulcers.

Pressure ulcers remain an important problem within hospitals. The methods relating to their care are still badly followed. It should be noted that the treatment of pressure ulcers starts inevitably with increasing preventive measures to avoid the development of more pressure ulcers. The assessment of the risk to develop pressure ulcers should be done systematically for all hospitalized patients, notably those in long stay and in geriatric departments. Changing old practices remains among the most difficult things to do especially in our hospitals and the transmission of a protocol of information is clearly not

enough to allow that. Therefore awareness and structured training plans seem to be necessary at this stage to optimize and standardize prevention and care practices. We have to perceive pressure ulcers as a therapeutic failure rather than fate.

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