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RISK OF INJURIES RELATED TO SURGICAL POSITIONING: AN ASSESSMENT IN A BRAZILIAN UNIVERSITY HOSPITAL

RISCO DE LESÃO RELACIONADA AO POSICIONAMENTO CIRÚRGICO: AVALIAÇÃO EM HOSPITAL UNIVERSITÁRIO BRASILEIRO

RIESGO DE LESIONES RELACIONADAS A LA POSICIÓN QUIRÚRGICA: EVALUACIÓN EN UN HOSPITAL UNIVERSITARIO DE BRASIL

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Objective: to assess the risk for the development of injuries related to surgical positioning. Method: a cross-sectional study with a sample comprised by adults undergoing elective surgeries (n=146) in Paraná, Brazil. The Risk Assessment Scale for the Development of Injuries arising from Surgical Positioning was applied, with extraction of sociodemographic variables. Descriptive and inferential analyses were performed. Results: men (49.3%) and women (50.7%) presented equal distribution of appointments, mostly in the Orthopedics specialty (39.7%). The following stood out as per the scale applied: use of conventional mattress + cotton field cushions as a support surface (100%); supine position (78%); upper limbs with opening less than 90º (70.5%); regional anesthesia (54.1%), and surgical time of 1h-2h (46.6%). A mean score of 17.6±3.29 points was found and 75.3% of the sample presented low risk for the development of injuries related to surgical positioning. Conclusion: around 25% of the sample presented a higher risk of injuries arising from surgical positioning.

Descriptors: Pressure Ulcer. Patient Positioning. Perioperative Nursing. Patient Safety. Risk Assessment.

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Objetivo: avaliar o risco para desenvolvimento de lesões relacionadas ao posicionamento cirúrgico. Método: estudo transversal com amostra (n=146) de adultos cirúrgicos eletivos do Paraná, Brasil. Aplicou-se a Escala de Avaliação de Risco para o Desenvolvimento de Lesões decorrentes do Posicionamento Cirúrgico e extração de variáveis sociodemográficas. Procedeu-se análise estatística descritiva e inferencial. Resultados: homens (49,3%) e mulheres (50,7%) tiveram distribuição equânime, atendidos majoritariamente pela ortopedia (39,7%). Pela escala aplicada, destacou-se: uso de colchão convencional + coxins de campo de algodão como superfície de suporte (100%); posição supina (78%); membros superiores com abertura inferior a 90 º (70,5%); anestesia regional (54,1%) e tempo cirúrgico de 1-2h (46,6%). Constatou-se escore médio de 17,6±3,29 pontos e 75,3% da amostra apresentou baixo risco de desenvolver lesões do posicionamento cirúrgico. Conclusão: em torno de um quarto da amostra apresentou maior risco de lesão decorrente da posição cirúrgica.

Descritores: Lesão por Pressão. Posicionamento do Paciente. Enfermagem Perioperatória. Segurança do Paciente. Medição de Risco.

Objetivo: evaluar el riesgo de desarrollar lesiones relacionadas con la posición quirúrgica. Método: estudio transversal con una muestra (n=146) de adultos sometidos a cirugías electivas en Paraná, Brasil. Se aplicó la Escala de Evaluación del Riesgo de Desarrollar Lesiones a raíz de la Posición Quirúrgica y se extrajeron variables sociodemográficas. Se realizó un análisis estadístico descriptivo e inferencial. Resultados: hubo distribución igualitaria entre hombres (49,3%) y mujeres (50,7%), atendidos mayoritariamente en la especialidad de Ortopedia (39,7%). Al aplicar la escala se destacó lo siguiente: utilización de colchón convencional + almohadones de campo de algodón como superficie de apoyo (100%); posición supina (78%); extremidades superiores con abertura de menos de 90º (70,5%); anestesia regional (54,1%) y duración de la cirugía de 1 a 2 horas (46,6%). Se verificó una puntuación media de 17,6±3,29 puntos y el 75,3% de la muestra presentó bajo riesgo de desarrollar lesiones a raíz de la posición quirúrgica. Conclusión: aproximadamente el 25% de la muestra presentó un riesgo más elevado de lesiones resultantes de la posición quirúrgica.

Descriptores: Úlcera por Presión. Posicionamiento del Paciente. Enfermería Perioperatoria. Seguridad del Paciente. Medición de Riesgo.

Introduction

Patient safety has become a more evident worldwide concern in the last decades, as performance of unsafe acts – a reality that exists since health care production – has been recognized as a bridge for the occurrence of adverse events (AEs). They can increase treatment costs, hospitalization times and demand for care. They have the potential to cause irreversible harms to the patients, thus violating the basic principle of care, which is to solve the individuals' current problem and not causing further harms to them[1-2].

Among the AEs, those of a surgical nature gain prominence in the search for safe care, due to the complexity and undeniable risks of the anesthetic-surgical act. In addition, it is known that the advances in surgical techniques have significantly increased the volume of procedures performed; however, a rise is also noticed in the number (or finding) of AEs resulting from these interventions[1].

Patient positioning during a surgical procedure has been a constant concern for the health team, as it can cause harms to the patient when performed inadequately[3]. The ideal surgical position is as anatomic as possible, respecting physiology and ensuring body alignment, in order to avoid hyperextension of the limbs and exert minimal pressure on tissues, vessels and other body structures[4-6]. In this sense, the importance of the engagement of all professionals who work in the Surgical Center (SC) to provide adequate positioning during the intraoperative period stands out, aiming to meet the patient's specificities, the operating team's preferences and those corresponding to the surgical technique to be performed, as well as to allow constant monitoring by the professionals involved[4-5].

In the national and international literature, the data found in relation to the occurrence of injuries resulting from surgical positioning are discrepant: from 2.2% to 77% in studies from the Brazilian states of Piauí[7], Pernambuco[8] and Minas Gerais[3,9]; and from 6.7%[10] to 40.4% in research studies conducted in Turkey[11]. Linked to the direct implication in care (un) safety[1], this oscillation between social, epidemiological and organizational realities reinforces that the analysis of injuries resulting from surgical positioning deserves to be attentive and systematic.

In the clinical practice, recognized as care managers, nurses can make use of means, instruments and strategies that help prevent positioning injuries during the intraoperative period, avoiding iatrogenic events that can prolong the patient's recovery time and increase the care-related costs[3]. A Brazilian nurse developed and validated an instrument to assess the risk of developing pressure injuries during the transoperative period; such instrument was called Risk Assessment Scale for the Development of Surgical Positioning Injuries (*Escala de Avaliação de Risco para Desenvolvimento de Lesão Decorrente do Posicionamento Cirúrgico*, ELPO)[3]. ELPO has been used in hospitals in Brazil[5,7-9,12] and has achieved international recognition[13], increasing visibility and credibility of Nursing as a science.

Use of the ELPO scale brings about important contributions to the elaboration of care protocols that guide patient positioning during the intraoperative period, constituting a strategic element for promoting surgical patient safety[3]. Thus, it is believed that studies that show the risk of surgical positioning injuries are important both to disseminate feasible instruments to verify the risk, as well as to increase the number of diagnoses regarding this problem of patient (un)safety, establishing itself in timely data for benchmarking.

Given he social/epidemiological context that justifies this study, the following question was formulated: Which is the risk for developing skin injuries related to surgical positioning among patients undergoing elective surgeries in a public university hospital from Paraná, Brazil? Given the above, the research objective was to assess the risk for the development of injuries related to surgical positioning.

Method

This cross-sectional study was guided by the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) tool and carried out in the SC of a public teaching hospital located in the municipality of Cascavel, inland of Paraná, Brazil, which exclusively serves the Unified Health System (*Sistema* Único *de Saúde*, SUS) and has approximately 215 beds. The SC in question has five active operating rooms. During the study period, it performed 1,367 (100%) surgical procedures, of which 480 (35.1%) were classified as elective in the sector, evidencing the profile of the institution, which is a reference for urgency and emergency care in the macro-region.

The study sample was characterized as non-probabilistic and of the consecutive type. Patients of both genders were included, aged over 18 years old and undergoing surgeries classified as elective (regardless of the specialty) performed in the morning period between February 1st and April 30th, 2019. The surgical patients excluded were those that were in isolation (contact, droplets or aerosols), as well as those subjected to urgency/emergency procedures). The morning shift represented a criterion imposed for viability of the study, in terms of availability of the research team.

Data collection was conducted from Monday to Friday and was in charge of duly trained Nursing residents by means of the study and collective consensus of the data extraction

procedures and standardization of courses of action, as the weekends were intended for urgency/emergency surgeries.

The ELPO Scale, created and validated in Brazil[3], was used for the assessment of the risk of developing injuries related to surgical positioning. The scale evaluates seven items: surgical positioning, surgical time, type of anesthesia, support surface, position of the limbs, comorbidities and patient's age. Each variable is evaluated by means of a *Likert*-type scale with values between one and five points, and the final sum of the ELPO items can vary from 7 to 35 points. Total scores ≤19 indicate lower risks of developing an injury from surgical positioning and total scores ≥20 indicate higher risks for developing such injuries[3].

In addition to the evaluation by means of the ELPO scale, sociodemographic and clinical data (gender, age and surgical specialty) were collected, and the Braden scale injury risk assessment was extracted from the medical records. The data collected in a printed form were introduced in *Microsoft® Office Excel* spreadsheets, version 16.12, in order to organize and perform the descriptive analyses. The Bioestat program, version 5.3, was used to perform the inferential statistical analysis of the categorical variables, by means of the Chi-Square and Fisher's Exact tests. A 5% significance level was adopted, expressed through p-value ≤0.05. The current research followed all the ethical precepts and was approved under CAAE n. 50066815.8.0000.0107 by the Research Ethics Committee of *Universidade Estadual do Oeste do Paraná*, host to the survey hospital. The patients and/or family members/guardians participating in the study formally agreed to participate by reading and signing the Free and Informed Consent Form in the preoperative period.

Results

The study sample consisted of 146 patients that met the eligibility criteria among all those (n=480) who underwent elective surgeries in the time frame.

Equal distribution between men and women was identified. As per Braden's classification, more than half of the patients presented low risk of developing pressure injuries. The most frequent surgical specialty was Orthopedics, followed by General Surgery (Table 1).

Table 1 – Characterization of the patients subjected to elective surgical procedures. Cascavel, Paraná, Brazil – 2019. (N=146)

Variables	n	%
Gender		
Male	74	50.7
Female	72	49.3
Surgical specialty		
Orthopedics	58	39.7
General Surgery	48	32.8
Neurological Surgery	14	9.6
Gynecology	8	5.5
Oral and Maxillofacial	5	3.4
Coloproctology	4	2.7
Urology	3	2.1
Plastic Surgery	3	2.1
Cardiac Surgery	2	1.4
Vascular	1	0.7

Source: Created by the authors.

The ELPO variables highlighted were the following: use of conventional mattress + cotton field cushions as a support surface; supine surgical position and positioning of the upper limbs with opening less than 90º (Table 2).

Table 2 – Distribution of the patients undergoing elective surgeries according to the variables of the Risk Assessment Scale for the Development of Injuries arising from Surgical Positioning. Cascavel, Paraná, Brazil – 2019. (N=146)

Variables	n	%
Surgical position		
Supine	114	78.0
Trendelenburg	9	6.2
Lithotomic	9	6.2
Prone	9	6.2
Lateral	5	3.4
Type of anesthesia		
Regional	79	54.1
General	62	42.5
General + Regional	3	2.0
Local	1	0.7
Sedation	1	0.7
Surgical time		
From 1 to 2 hours	68	46.6
From 2 to 4 hours	60	41.1
Up to 1 hour	7	4.8
More than 6 hours	6	4.1
From 4 to 6 hours	5	3.4
Support surface		
Conventional mattress + Cotton field cushions	146	100
Position of the limbs		
Upper limbs opening <90º	103	70.5
Anatomical	22	15.1
Knee elevation <90º and lower limbs opening <90º or neck with mento-sternal misalignment	13	8.9
Knee elevation >90º and lower limbs opening >90º or upper limbs opening >90º	5	3.4
Knee elevation >90º or lower limbs opening >90º	3	2.1
Comorbidities		
No comorbidities	87	59.6
Vascular disease	23	15.8
Obesity or malnutrition	19	13.0
Pressure injury, neurological pathology or Deep Vein Thrombosis	10	6.8
Diabetes *mellitus*	7	4.8
Age		
18-39 years old	60	41.1
40-59 years old	51	34.9
60-69 years old	18	12.3
70-79 years old	13	9.0
>80 years old	4	2.7

Source: Created by the authors.

The mean score obtained after applying ELPO to the sample under study was 17.6±3.29 points, varying from 13 to 28. It was found that most of the patients evaluated presented lower risk for the development of injuries related to surgical positioning.

Table 3 presents the results of the associations between the variables under study and the risk classification according to the assessment by means of the ELPO Scale.

Table 3 – Association between the study variables and the risk of developing injuries related to surgical positioning. Cascavel, Paraná, Brazil – 2019. (N=146) (continued)

Variables	Classification by the ELPO scale				p-value
	Lower Risk		Higher Risk		
	n	%	n	%	
Gender					0.0273(1)
Male	62	42.5	12	8.2	
Female	48	32.9	24	16.4	
Comorbidities					<0.0001(1)
Yes	27	18.5	32	22	
No	83	56.8	4	2.7	
Surgical specialty					
Orthopedics					0.0596(1)
Yes	49	33.5	9	6.2	
No	61	41.8	27	18.5	
General Surgery					0.0292(1)
Yes	42	28.8	6	4.1	
No	68	46.6	30	20.5	
Position of the limbs					
Knee elevation >90º and lower limbs opening >90º or upper limbs opening >90º					0.0002(2)
Yes	-	-	6	4.1	
No	110	75.4	30	20.5	
Knee elevation >90º or lower limbs opening >90º					0.5612(2)
Yes	2	1.4	1	0.7	
No	108	74	35	23.9	
Knee elevation <90º and lower limbs opening <90º or neck with mento-sternal misalignment					0.0034(2)
Yes	5	3.4	8	5.5	
No	105	71.9	28	19.2	
Upper limbs opening <90º					0.0009(1)
Yes	86	58.9	17	11.6	
No	24	16.5	19	13	
Anatomical position					0.9677(1)
Yes	5	3.4	17	11.6	
No	31	21.3	93	63.7	
Surgical position					0.0001(2)
Lithotomic					
Yes	1	0.7	8	5.5	
No	109	74.6	28	19.2	
Prone					0.0008(2)
Yes	2	1.4	7	4.8	
No	108	74	29	19.8	
Trendelenburg					0.0410(2)
Yes	4	2.7	5	3.4	
No	106	72.6	31	21.3	

Table 3 – Association between the study variables and the risk of developing injuries related to surgical positioning. Cascavel, Paraná, Brazil – 2019. (N=146) (continued)

Variables	Classification by the ELPO scale				p-value
	Lower Risk		Higher Risk		
	n	%	n	%	
Surgical position					
Lateral					0.3591(2)
Yes	3	2	2	1.4	
No	107	73.3	34	23.3	
Supine					0.0001(1)
Yes	100	68.5	14	9.6	
No	10	6.9	22	15	
Surgical time					
More than 6 hours					0.0036(2)
Yes	1	0.7	5	3.4	
No	109	74.6	31	21.3	
From 4 to 6 hours					0.0133(2)
Yes	1	0.7	4	2.7	
No	109	74.6	32	22	
From 2 to 4 hours					0.5057(1)
Yes	43	29.5	17	11.6	
No	67	45.9	19	13	
From 1 to 2 hours					0.0052(1)
Yes	59	40.4	9	6.1	
No	51	35	27	18.5	
Up to 1 hour					0.4493(2)
Yes	6	4.1	1	0.7	
No	104	71.2	35	24	
Type of anesthesia					
General + Regional					0.5612(2)
Yes	2	1.4	1	0.7	
No	108	73.9	35	24	
General					0.0205(1)
Yes	40	27.4	22	15.1	
No	70	47.9	14	9.6	
Regional					0.0212(1)
Yes	66	45.2	13	8.9	
No	44	30.1	23	15.8	
Sedation					0.7534(2)
Yes	1	0.7	-	-	
No	109	74.6	36	24.7	
Local					0.7534(2)
Yes	1	0.7	-	-	
No	109	74.6	36	14.7	
Support surface					
Foam operating table mattress (conventional) + Cotton field cushions					0.0000(2)
Yes	110	75.3	36	14.7	
No	-	-	-	-	
Patient's age					
>80 years old					0.0032(2)
Yes	-	-	4	2.7	
No	110	75.3	32	22	

Table 3 – Association between the study variables and the risk of developing injuries related to surgical positioning. Cascavel, Paraná, Brazil – 2019. (N=146)

(conclusion)

Variables	Classification by the ELPO scale				p-value
	Lower Risk		Higher Risk		
	n	%	n	%	
Patient's age					
70-79 years old					0.0099(2)
Yes	5	3.4	7	4.8	
No	105	71.9	29	19.9	
60-69 years old					0.3533(2)
Yes	11	7.5	5	3.4	
No	99	67.8	31	21.3	
40-59 years old					0.6356(1)
Yes	36	24.6	14	9.6	
No	74	50.7	22	15.1	
18-39 years old					0.0003(1)
Yes	58	39.7	6	4.1	
No	52	35.6	30	20.6	

Source: Created by the authors.

Note: Conventional sign used:
- Numerical data equal to zero not resulting from rounding.

(1) Chi-square test.
(2) Fisher's Exact test.

The study identified a statistically significant difference in the risk of developing injuries in patients who belonged to the female gender (p=0.0273), were under general anesthesia (p=0.0205), had comorbidities (p=0.0001), and were using a conventional foam mattress + cotton field cushions (p=0.0000).

Discussion

Current literature data[3,8,12,14] reinforce that surgical time, the position adopted, the support surfaces, body alignment, the anesthesia performed, presence of comorbidities, lifestyle, nutritional status, weight and age are factors associated with the risk for the development of injuries related to surgical positioning. Many of these variables are considered in the evaluation by means of the ELPO scale[3], supporting the prediction potential of this instrument, although development of an injury, including those related to surgical positioning, may be an outcome that is not fully expected.

It can be observed that the researched sample (n=146; 100%) presented homogeneous distribution between men (n=72; 49.3%) and women (n=74; 50.7%); however, a significant difference was found when comparing the gender variable to the risk of injuries (p=0.0273), indicating that women presented higher risk. On the other hand, a number of studies[15-16] evidence that there is no significant difference in the development of pressure injuries between the genders, favoring the inference that care with surgical positioning of men and women should follow the same rigor.

Most of the patients evaluated had no self-reported comorbidities (n=87; 59.6%), which can be explained by the fact that the study only evaluated patients undergoing elective surgeries, which, according to the surgical safety recommendations, should present clinical conditions that do not contraindicate the intervention. It is known that comorbidities can interfere in the recovery of surgical patients, delaying healing times, extending hospitalization times, and contributing to hospital expenses[7,8,12]. The comparison in the comorbidity variable with the risk of injuries due to surgical positioning was statistically significant (p=0.0001). This result

reinforces the lower risk of those patients who do not have comorbidities, with evidence in the literature for increased risk of developing injuries with the following comorbidities: vascular diseases, diabetes, obesity or malnutrition and previous pressure injury/ neuropathy, or deep vein thrombosis[3].

A total of 111 (76%) patients aged between 18 and 59 years old were evaluated, showing that this is a population at a lower risk of developing injuries; as well as a fact possibly linked to the most common surgical specialty in the research scenario, which was Orthopedics, commonly related to trauma-associated procedures. In turn, this is considered as the prevalent problem among men of reproductive age[17].

The lower risk of developing injuries was statistically significant among patients aged 70-79 years old (p=0.0099) and in those over 80 years old (p=0.0032), which can be justified by the low percentage (n=17; 11.6%) of this population in the sample. This somehow contradicts a number of studies which point out that severity of the injury can be intensified in patients at age extremes due to physiological conditions, especially fragile skin structure and/or weakened nutritional status[7-8].

The Braden Scale aims at identifying the patients at risk of developing pressure injuries, consisting of a validated tool widely used in the clinical practice to guide nurses' decision-making[11]. In relation to the Braden classification, 91 (62.3%) patients presented low risk for the development of pressure injuries, in accordance with the findings related to the mean score of 17.6 (±3.29) found in the risk assessment by means of the ELPO scale in the sample under study, indicating lower risk of injury resulting from surgical positioning. Analysis of such finding allows inferring that the lower risk identified can be attributed to the profile of the procedures evaluated (elective) and to short surgical times. However, even though there was predominance of patients at a lower risk of developing injuries, the fact that 24.7% (n=36) of the patients reached scores above 20 points in the ELPO scale reinforces the importance of identifying the clientele with greater vulnerability in order to prevent such problems in a more targeted and systematic way.

The most frequent surgical specialty in the sample under study was Orthopedics (n=58; 39.7%). The aforementioned hospital is accredited as a high-complexity institution specialized in Traumatology, Orthopedics and Neurosurgery, and is a reference for urgency and emergency care for two health regions (43 municipalities), which corroborates the significant flow of surgeries in such specialties. Orthopedic surgeries often require a position that does not always favor the anatomical position. Therefore, efforts must be made in an attempt to minimize injuries resulting from stretching or pressure on nerves, muscles or other body structures[4-5]. It is important to note that care in positioning the patient during the intraoperative period must consider the surgical team's needs, the resources available at the institution and the patient's ability to tolerate being kept in the same position during the anesthetic-surgical procedure[4].

The supine position was significant (p=0.0001) when compared to the others and to the risk for injuries arising from surgical positioning. Most of the patients evaluated were in the supine surgical position (n=114; 78%), corroborating with the lower score of the ELPO scale risk assessment criterion that rates the type of surgical position[3]. Also known as anatomical position, the supine position allows body alignment and keeps the spine supported on the surgical table mattress, without excessive flexion, extension or rotation of the limbs[3,9,12]. The following stand out among the complications related to inadequate supine positioning: excessive pressure on bony prominences; brachial plexus injury; spinal cord injury; nerve damage (mainly radial and ulnar); dorsalgia; compartment syndrome; and other less frequent disorders[3-4,6,12]. It is noted that no care measure should be neglected for inferring that this position entails lower risk for the development of injuries.

In relation to positioning the patient's limbs on the operating table, the highest occurrence

of the sample evaluated corresponded to keeping the upper limbs at an angle of less than 90° (n=103; 70.5%), as recommended in the literature[4,6]. This is important because this position has a direct implication on the risk of brachial plexus injury and occlusion of the subclavian and radial arteries[6].

The risks for the occurrence of AEs can be minimized by using adequate devices/positioners, as evidenced in some studies[3,12]. The support surfaces used for the correct positioning of patients must be highly durable, come in a wide variety of shapes and sizes, favor uniform distribution of the patient's weight, be resistant to cleaning and disinfection processes, be made of anti-allergenic material, and be easy to handle. Currently, the market offers several resources to position the patient during the intraoperative period. The devices made of viscoelastic materials are the most indicated[3-4]. Despite scientific proof of the efficacy of such positioners in preventing surgical positioning injuries, all the patients evaluated at the study hospital were positioned on conventional mattresses and on cushions made with a cotton field as a support surface (n=146; 100%), which, by itself, is an important finding of the research and may lead to debates in favor of improvements.

In relation to the anesthesia procedure, the current study noticed that more than half of the patients evaluated (n=79; 54.1%) were subjected to rachianesthesia. There was a statistically significant difference between patients at a higher risk of developing injuries and those subjected to general anesthesia (p=0.0205). Anesthetic agents compromise the anesthetized individual's defense mechanism due to muscle relaxation and temporary inhibition of nociceptor sensitivity, thus favoring the development of surgical positioning injuries[4,7,9].

Surgical time is another factor that interferes with the development of injuries in the intraoperative period. The longer the surgical time, the greater the risk for the development of injuries[5,8-9,14]. In the current study, 45 (40.9%) surgical procedures were estimated to last more than two hours, a factor that can increase the risk of developing injuries[5,12,18]. It is worth reinforcing that, regardless of duration and size of the surgery, the patients should be positioned in order to prevent injuries[4].

Positioning of surgical patients must be based on scientific evidence, and development of care guidelines and use of tools to guide the assistance provided are fundamental. Using the ELPO scale brings about important contributions to perioperative Nursing, linked to safety in the complex intraoperative moment. However, it is important to assume that strict use of the scale does not correspond to the promotion of safety measures by itself; in other words, it is considered that the instrument is a way to rationalize identification of subjects with higher or lower risks for the development of injuries related to surgical positioning. However, it is up to the surgical team – and, in this sense, nurses are the protagonists – to effectively implement measures that protect the patient from these harms.

The absence of sample calculation and the low diversity of surgical specialties (in terms of equivalent volume) are cited as limitations of this research. However, it is believed that dissemination of the research contributes to the surgical patient safety movement and to the rational use of perioperative care management tools, with such emphasis.

Conclusion

It is concluded that the largest concentration of the investigated sample presented lower risks of injuries due to surgical positioning; however, the fact that approximately one fourth of the patients presented high risk highlights the importance of identifying those with greater vulnerability. Although pertinent and useful to the advancement of knowledge, the results of the comparison between demographic and clinical variables and the risk of injuries related to surgical positioning deserve cautious interpretation, as the surgical profile of the sample was well-delimited.

Monitoring the outcome of injuries in the patients identified as at higher risk and the

potential associated variables is considered to be a recommendation for future studies, in addition to including the evaluation of patients in emergency surgeries, which would perhaps subsidize interesting comparisons.

Finally, as a practical implication, the study points to the need to substitute the support surfaces used in the hospital evaluated (conventional mattresses and cotton cushions) by other resources available on the market to promote safer surgical positioning, in addition to the use of risk prediction tools in the context under study.

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