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Risk for surgical position injuries arising from the supine position

Risco para lesões por posicionamento cirúrgico decorrentes da posição supina

Riesgo de lesiones de posicionamiento quirúrgico derivadas de la posición supina

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ABSTRACT

Objective: to relate the risk score for injuries due to surgical positioning resulting from the supine position with sociodemographic, clinical, surgical aspects and the occurrence of complications. **Method:** longitudinal observational study carried out with 89 patients in the supine position. Sociodemographic and clinical variables and the Risk Scale for the Development of Surgical Positioning Injuries were applied. Descriptive, bivariate and logistic regression analyzes were adopted, considering a significance level of α=0.05. **Results:** age increased by 1.11 times (p<0.001) and obesity by 13.77 times (p=0.01) the chance of increased risk of injury. The proportion of pain (34.1%) and pressure injury in the sacrococcygeal region (91.7%) stood out in patients at higher risk (p=0.05). **Conclusion:** obese and elderly people had a higher risk of injury. Pain and occurrence of pressure injury in the sacrococcygeal region were the predominant complications in patients at higher risk.

Descriptors: Patient Positioning; Pressure Ulcer; Supine Position; Perioperative Care.

RESUMO

Objetivo: relacionar o escore de risco de lesões por posicionamento cirúrgico decorrentes da posição supina com aspectos sociodemográficos, clínicos, cirúrgicos e ocorrência de complicações. **Método:** estudo observacional longitudinal realizado com 89 pacientes em decúbito dorsal. Aplicadas variáveis sociodemográficas e clínicas e a Escala de Risco para Desenvolvimento de Lesões por Posicionamento Cirúrgico. Adotadas análises descritivas, bivariadas e de regressão logística, considerando-se um nível de significância de α=0,05. **Resultados:** a idade aumentou em 1,11 vezes (p<0,001) e a obesidade em 13,77 vezes (p=0,01) a chance de aumento do risco de lesões. A proporção de dor (34,1%) e lesão por pressão na região sacrococcígea (91,7%) destacou-se nos pacientes de maior risco (p=0,05). **Conclusão:** obesos e idosos apresentaram maior risco de lesões. Dor e ocorrência de lesão por pressão na região sacrococcígea foram as complicações predominantes nos pacientes de maior risco.

Descritores: Posicionamento do Paciente; Lesão por Pressão; Decúbito Dorsal; Assistência Perioperatória.

RESUMEN

Objetivo: relacionar el puntaje de riesgo de lesiones por posicionamiento quirúrgico derivado de la posición supina con aspectos sociodemográficos, clínicos, quirúrgicos y la ocurrencia de complicaciones. **Método:** estudio observacional longitudinal realizado con 89 pacientes en decúbito supino. Se aplicaron variables sociodemográficas, clínicas y la Escala de Riesgo para el Desarrollo de Lesiones de Posicionamiento Quirúrgico. Fueron adoptados análisis descriptivos, bivariados y de regresión logística, considerando un nivel de significancia de α=0,05. **Resultados:** La edad aumentó en 1,11 veces (p<0,001) y la obesidad en 13,77 veces (p=0,01) la probabilidad de mayor riesgo de lesión. La proporción de dolor (34,1%) y lesión por presión en la región sacrococcígea (91,7%) se destacó en los pacientes de mayor riesgo (p=0,05). **Conclusión:** Las personas obesas y ancianas tenían mayor riesgo de lesiones. El dolor y la aparición de lesión por presión en la región sacrococcígea fueron las complicaciones predominantes en los pacientes de mayor riesgo.

Descriptores: Posicionamiento del Paciente; Úlcera por Presión; Posición Supina; Atención Perioperativa.

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INTRODUCTION

Pressure Injuries (PI), resulting from surgical positioning, represent one of the main postoperative complications. All surgical patients are exposed to the risk of developing PI due to several factors, such as the patient's clinical condition, surgery, anesthesia, clinical environment, long time of immobility, blood loss, positioning and support surfaces, which are substantial factors for the occurrence of these lesions[1-2].

Extended surgical time is an extremely relevant factor, because when associated with other risk factors, it contributes even more to the appearance of complications, increasing the risks of injuries resulting from positioning[1,3]. Prolonged immobilization on the operating table increases the risk of injury that worsens when associated with rigid surfaces and inadequate or non-existent use of support surfaces, which aim to assist in reducing pressure[3-4].

Surgical positioning injuries are frequent although the literature presents different percentages. A systematic review of the literature, conducted between 2000 and 2015, analyzed 19 studies and estimated the prevalence of these injuries at 18.96%[2]. Another study with 278 patients submitted to elective surgeries found an injuries incidence of 77%[3].

The concern with patient safety is not recent, since thousands of patients suffer damage or die from lack of safety, either in medical or hospital procedures[3,5]. This is a problem that stands out daily and present in all sectors of health care, with the possibility of temporary or definitive sequelae to the patient[3-4,6].

PI are indicators of quality of health care and patient safety and are a challenge for the clinical practice of nursing, since they have na impact on patient's satisfaction and increase hospitalization time and costs for health institutions, especially regarding the treatment of injuries[3,5]. Given the magnitude of the problem, a recent study estimated that the costs of PI treatment acquired in hospitals, in the United States of America, can exceed US$26.8 billion[6].

There are different possible and necessary surgical positions for the procedures, and the supine position is the most used in the various surgical specialties, but despite allowing the patient's body alignment, this position also has risks[3-4].

Studies show that several complications may arise in the supine position, being PI the most frequent (12-13-14). However, it is believed that there is no measurement of the risk score for injuries due to surgical positioning, since the chance of complications increases with low-risk patients [3-4,13].

Preventing PI is one of the main priorities in the face of the challenge of reducing hospitalization time and costs. Among the prevention strategies, we highlight the use of adequate support surfaces, patient nutrition, patient repositioning, perioperative evaluation and awareness of risk factors inherent to the patient[7-8].

There is no ideal method to identify patients at risk of developing PI from surgical positioning. However, ELPO (assessment scale of risk for surgical positioning injuries) stands out as a valid, reliable and fast-applied instrument[4]. Knowing the factors that contribute to PI from surgical positioning, guide nurses' decision-making to prevent complications associated with the procedure and to promote safe and quality nursing care[5,7,15].

Perioperative nursing constantly seeks to increase the quality of care and safety of surgical patients. Therefore, knowing the risk score for surgical positioning injuries is essential to assist nurses' decision-making, provide better surgical positioning and improve the quality of nursing care and safe care. The aim of this study was to relate the risk score of injuries from surgical positioning resulting from the supine position, with sociodemographic, clinical and surgical aspects and the occurrence of complications.

METHOD

Study Design

This is an observational, longitudinal, prospective and quantitative study. The study followed the recommendations of Strengthening the Reporting of Observational Studies in Epidemiology (STROBE).

Context and Population

The study was carried out in a surgical center of a federal public teaching hospital that has 547 beds and serves several medium and high complexity specialties. The surgical center has 16 operating rooms and eight post-anesthetic recovery beds.

Patients aged 18 years or older were included in the study; classified as physical status according to the scale of the American Society of Anesthesiologists (ASA) in I or II; submitted to surgical procedure in a supine position; and with

anesthesia time greater than or equal to one hour. The patients excluded were those with amputation in the lower limbs; impaired physical mobility; edema in the lower limbs; pain not related to the surgical site; PI identified in the immediate preoperative period or even with formation of hyperemia/erythema in the body that suggested PI. formation; submitted to major surgery with indication of referral to the Intensive Care Unit; in contact precaution, since they would not be referred to the Post-Anesthetic Recovery Room (PARR); submitted to local anesthesia; and with hearing, cognitive impairment or aphasia.

The sample calculation was performed through the OpenEpi Program, Version 3, having as parameters an anticipated frequency of 50 and the number of procedures that met the inclusion criteria of this study, conducted in 2017, with a significance level of 5%, thus defining the sample of n= 105 subjects. The recruitment process of the participants was non-probabilistic.

Data Collection

Data were obtained from January to April 2018, through a characterization instrument, composed of sociodemographic and clinical variables related to the anesthetic-surgical procedure, and ELPO. ELPO, developed and validated in Brazil, assesses the risk of developing injuries resulting from surgical positioning, whose score ranges from 7 to 35 points: the higher the score, the higher the risk of the patient developing lesions from positioning, and patients with a score equal to or higher than 20 points are classified at a higher risk[4] .

Prior to data collection, a pilot test was performed with 10 patients, who were not included in the sample, to analyze the applicability of the collection instrument and the dynamics required within the surgical center room.

Data collection occurred in the perioperative period. In the immediate preoperative period, the researcher obtained the patient's consent and data related to sociodemographic characteristics (age, gender, profession, self-reported color) and clinical (weight, height, self-reported comorbidities and ASA classification).

From weight and height, Body Mass Index (BMI) was calculated, following the World Health Organization's classification for adults: very underweight (BMI <16.99 kg/m2), underweight (17-18.49 kg/m2), adequate weight (18.5- 24.99 kg/m2), overweight (25-29.99 kg/m2) and obesity (≥30 kg/m2). Obesity and malnutrition reported on the ELPO scale were defined by this classification adopted, respectively, BMI ≥30 kg/m2 and <16.99 kg/m2.

In the intraoperative period, the researcher followed the patient's entire stay in the operating room, continuously observed all procedures performed and recorded data related to the anesthetic-surgical procedure and the ELPO score. The variables observed in this period were the estimated time of surgery, type of anesthesia, support surfaces used, position of the patient's limbs on the operating table and protective devices used. It was considered the non-use of support surface, when only the fixed foam mattress of the operating table was used.

In the postoperative period, the researcher evaluated the patient in two moments: their transfer from the operating table to the transport stretcher, Time 0'; and after one hour of the procedure end, in the PARR, Time 60'. The variables analyzed in both times were level of consciousness, presence of pain, edema and PI.

The state of consciousness was evaluated and recorded, classifying the patient as lucid/oriented; awakens, if requested; and non-responding, according to parameters used in the Aldrete and Kroulik Scale (EAK) to assess the level of patient awareness in the PARR. A Verbal Numerical Scale was used to quantify pain, if present, in which the patient estimated his pain on a scale from 0 to 10, being 0 "absence of pain" and 10 "the worst pain ever felt"[14]. To evaluate edema, Godet Signal was considered with the classification of locker, quantified by "crosses" according to the depth of the skin, being 1+ (2mm), 2+ (4mm), 3+ (6mm) and 4+ (8mm). The patient was evaluated by inspection and the identified PI were classified according to the National Pressure Ulcer Advisory Panel (NPUAP)[16].

Data Analysis

The collected data were analyzed with the aid of software R (version 3.5.0) by means of frequency distribution for categorical variables and measures of central tendency and variability for quantitative variables. Logistic regression was used to analyze the intervening factors in the ELPO score. First, using the Forward method, a univariate analysis was performed, which consisted of the adjustment of a Logistic Regression by variable. The variables with a p-value lower than 0.25 were selected for multivariate analysis, and then the Backward method was applied, using a Multivariate Logistic Regression model. To verify whether the adjusted model was adequate, some measurements of quality of

adjustment were calculated: Pseudo R^2 (Nagelkerke), Hosmer-Lemeshow test and accuracy parameters (AUC, Sensitivity and Specificity). To measure the relevance of each variable in the multivariate models, partial R^2 was used. The analyses considered a significance level of 5% (α=0.05).

Ethical Aspects

The study was approved by the Research Ethics Committee (COEP) of the Federal University of Minas Gerais (UFMG), CAAE 57859416.3.0000.5149, Opinion number 1,138,002.

RESULTS

The target population consisted of 107 patients, however 18 were excluded, five for anesthesia time during surgery ≤ 1 hour; four for different repositioning of supine position variations during the procedure; one for ASA IV classification, already in the intraoperative period; one for loss of the researcher at the time of surgical positioning; and seven for referral to the Intensive Care Unit (ICU) after the surgical procedure, remaining a sample of 89 participants.

There was a predominance of female patients (60.7%); mix-raced (55.1%); overweight or some degree of obesity (50.6%); patients with comorbidities (58.4%), being systemic arterial hypertension (SAH) (24.7%) more prevalent; with a mean age of 49.6 (SD= 18.1) years. The most frequent surgical region was abdomen and pelvis (48.3%) and most patients were classified as ASA II (68.5%) (Table 1).

Table 1. Sociodemographic and clinical characterization of participants (n=89). Belo Horizonte Brazil, 2018.

Variables		N	%
Gender	Female	54	60.7
	Male	35	39.3
Color/Race	Mixed raced	49	55.1
	White	23	25.8
	Black	13	14.6
	Undeclared	3	3.4
	Yellow	1	1.1
BMI classification	Adequate weight	44	49.4
	Overweight	24	27.0
	Obesity level I	13	14.6
	Very underweight	5	5.6
	Obesity level II	2	2.2
	Obesity level III	1	1.2
	Underweight	0	0.0
Comorbidities	Yes	52	58.4
	No	37	41.6
Type of comorbidity	None	37	41.6
	SAH	22	24.7
	Other	15	16.9
	DM e SAH	8	9.0
	DM	7	7.9
Surgical region	Abdomen and pelvis	43	48.3
	Head and neck	22	24.7
	Anterior thorax	12	13.5
	Lower limbs	9	10.1
	Upper limbs	3	3.4
Classification of physical state	ASA II	61	68.5
	ASA I	28	31.5

Source: Search database.

Table 2 shows the results referring to the variables of ELPO scale, which were adopted in the surgical procedures observed. The mean time of the surgical procedure was 184.7 minutes (SD= 80.7), minimum of 60 and maximum of 418 minutes. Regarding the ELPO risk score, the mean was 19.1 (minimum of 15 and maximum of 27) and 41 (46.1%) patients had a risk score >19, that is, a higher risk of developing injuries related to surgical positioning.

Table 2 –Distribution of patients undergoing surgeries in a supine position according to ELPO variables (n=89). Belo Horizonte, MG, Brazil, 2018.

Variables		N	%
Surgery time	More than 2h up to 4 hours	53	59.6
	More than 4h up to 6 hours	19	21.3
	More than 1h up to 2h	17	19.1
Type of anesthesia	General	45	50.6
	Regional	29	32.6
	General + Regional	12	13.5
	Sedation	3	3.4
Support surface	No support surface use	89	100.0
Position of limbs	Opening of the upper limbs < 90º	45	50.6
	Anatomical Position	26	29.2
	Elevation of the knees < the 90º and opening of the lower limbs < 90° or neck without menthol-sternal alignment	11	12.4
	Elevation of the knees > 90º and opening of the lower limbs > 90º or opening of the upper limbs > 90º	5	5.6
	Elevation of the > 90º or opening of the lower limbs > 90º	2	2.2
Comorbidities	No comorbidities	43	48.3
	Obesity	21	23.6
	DM	13	14.6
	Vascular Disease	12	13.5
Age	18 to 39 years old	31	34.8
	40 to 59 years old	25	28.1
	60 to 69 years old	23	25.8
	70 to 79 years old	7	7.9
	> 80 years old	3	3.4

Source: Search database.

Regarding the support surface, it is important to highlight that all (89; 100%) patients received only the standard conventional mattress of the operating table, thus considered as non-use of these surfaces, because they are not differentiated from the conventional mattress.

To analyze the factors that influenced the ELPO score, we considered the dichotomized score at higher and lower risk. Logistic regression by variable showed that variables BMI classification, Type of comorbidity (DM and SAH), Surgical region, ASA, type of protection, electrocautery plate region, age and height were selected for multivariate analysis, since they presented p-value lower than 0.25.

Table 3 presents multivariate analysis, according to the final model. It can be highlighted that there was statistical significance (p=0.010) in the chance of > score 19, among the BMI classifications, and the chance of > score 19 was 13.77 [1.89; 100.23] times higher for patients classified as obese, compared to patients classified as underweight or with adequate weight. Regarding age, there was statistical significance (p<0.001) of age over the ELPO score, and when age increases 1 year, the mean chance of > score 19 tends to increase by 1.11 [1.06; 1.17] times. Regarding height, there was statistical significance (p=0.042) on the ELPO score, and when height increases 1 centimeter, the mean chance of the score > 19 tends to decrease by 0.91 [0.84; 1.00] times. The variables BMI classification, age and height explained 62.2% of the variability of the ELPO score. According to the Partial R^2, it is observed that the variable age (46.8%) is the most important for the classification of the score, followed by BMI (23.2%) and Height (9.3%). Using the Hosmer-Lemeshow test, the model presented good fit (p=0.639). The model presented 91.4% accuracy. The model was able to correctly predict 87.8% of the cases in which the ELPO score was > 19 and 81.3% of the cases in which the ELPO score was ≤ 19.

Table 3. Multivariate logistic regression involving the ELPO risk score and the sociodemographic and clinical variables of patients undergoing surgeries with supine position (n=89). Belo Horizonte, MG, Brazil, 2018.

Variables	Initial model				Final modelo			
	O.R.	C.I. - 95%	P-value	R^2 partial	O.R.	C.I. - 95%	P-value	R^2 partial
BMI = Under/Normal weight	1.00	-	-		1.00	-	-	
BMI = Overweight	0.21	[0.03; 1.42]	0.110	16.8%	0.47	[0.13; 1.79]	0.270	23.2%
BMI = Obesity	5.04	[0.49; 51.61]	0.173		13.77	[1.89; 100.23]	0.010	
DM = No	1.00	-	-	5.8%				
DM = Yes	4.90	[0.64; 37.40]	0.126					
HAS = No	1.00	-	-	1.3%				
HAS = Yes	1.94	[0.33; 11.42]	0.464					
Surgical spec. = Head and neck	1.00	-	-					
Surgical spec. = Anterior thorax	1.50	[0.07; 29.95]	0.792					
Surgical spec = Abdomen and pelvis	1.47	[0.14; 15.24]	0.749	1.9%				
Surgical spec = Upper/lower limbs	3.48	[0.21; 58.08]	0.386					
ASA = ASA I	1.00	-	-	0.2%				
ASA = ASA II	1.40	[0.16; 12.41]	0.761					
Type of protection = None	1.00	-	-					
Type of protection = Cushion	0.89	[0.17; 4.75]	0.895	0.0%				
Type of protection = Cushion and/or pillow	0.99	[0.10; 9.63]	0.992					
Plate region = No region	1.00	-	-					
Plate region = Calf	1.67	[0.07; 39.86]	0.750					
Plate region = Posterior thorax	22.30	[0.33; 1524.23]	0.150	6.9%				
Plate region = Wide side of the thigh	4.13	[0.17; 102.14]	0.386					
Age	1.12	[1.05; 1.21]	0.001	30.0%	1.11	[1.06; 1.17]	0.000	46.8%
Height	0.92	[0.83; 1.01]	0.086	7.7%	0.91	[0.84; 1.00]	0.042	9.3%
Hosmer-Lemeshow test (p-value)		0.122				0.639		
Pseudo R^2 (Nagelkerke)		69.7%				62.2%		
AUC		0.934				0.914		
Sensitivity		0.829				0.878		
Specificity		0.958				0.813		

Source: Search database.

The main complications presented by the participants in Time 0' and Time 60' are in Table 4. In Time 0', the proportion of pain (34.1% vs 14.6%; p=0.05) and PI in the sacrococcygeal region was higher in patients with ELPO score >19 (91.7% vs 50.0%; p=0.05). In time 60', also, PI frequency was evidenced in the upper sacrococcygeal region in patients with ELPO score > 19 (88.9% vs 40.0%; p=0.05).

Table 4 - Distribution of complications in Time 0' with ELPO score. Belo Horizonte, MG, Brazil, 2018.

Variables		Score ≤ 19		Score > 19		P- value
		N	%	N	%	
Level of consciousness	Lucid /oriented	22	45.8	16	39.0	0.72*
	Wakes up if requested	23	47.9	21	51.2	
	No response	3	6.3	4	9.8	
Pain	Yes	7	14.6	14	34.1	0.05*
	No	38	79.2	23	56.1	
	No response	3	6.3	4	9.8	
Lower limbs edema	Yes	4	8.3	8	19.5	0.22**
	No	44	91.7	33	80.5	
PI area	Sacrococcygeal	5	50.0	11	91.7	0.05
	Scapula	5	50.0	5	41.7	1.00
	Other	5	50.0	0	0.0	0.01
PI	Stage 1	39	81.3	30	73.2	0.51**
	No injury	9	18.8	11	26.8	

continue

Distribution of Complications in Time 60' with ELPO score						
Variables		Score ≤ 19		Score > 19		P-value
		N	%	N	%	
Level of consciousness	Lucid /oriented	41	85.4	33	80.5	0.58*
	Wakes up if requested	7	14.6	8	19.5	
	No response	0	0.0	0	0.0	
Pain	Yes	14	29.2	16	39.0	0.37*
	No	34	70.8	25	61.0	
	No response	0	0.0	0	0.0	
Lower limbs edema	Yes	4	8.3	8	19.5	0.22**
	No	44	91.7	33	80.5	
PI area	Sacrococcyge	4	40.0	8	88.9	0.05
	Scapula	7	70.0	2	22.2	0.07
	Other	2	20.0	0	0.0	0.47
PI	Stage 1	38	79.2	33	80.5	1.00**
	No injury	10	20.8	8	19.5	

* Fisher's Exact Test; **Chi-Square Test

Source: Search database.

DISCUSSION

The supine position is chosen for most surgical procedures although the risks of postoperative risks and complications exist. A randomized controlled trial conducted with 104 patients demonstrated that the supine position can reduce the incidence of perioperative pressure injury[12]. The occurrence of pressure ulcer is 8.5% or more among patients undergoing surgical procedures lasting more than three hours[15]. On the other hand, a study conducted with 45 surgical patients, with prevalence of supine position (64.5%) identified that 31.1% of the participants were at high risk for surgical positioning injuries[13].

Most of the patients in the study were female and had comorbidities, especially systemic arterial hypertension. A study conducted with 278 patients submitted to elective surgeries identified female gender and age as a statistically significant factor for a higher risk of pressure injury resulting from surgical positioning[3]. When assessing the risk of developing perioperative injuries due to surgical positioning in 45 patients, a study found a statistically significant association between the risk of developing these injuries and systemic arterial hypertension[13].

The average duration of the surgical procedure, in the study, was approximately three hours. A meta-analysis study showed that surgery time is an important risk factor for the occurrence of pressure injuries in patients undergoing cardiovascular surgeries[14]. Another study conducted with surgical patients from different specialties also points to time as a risk factor[17].

Most of the patients investigated had lower risk for injuries due to positioning, a result similar to that of another study[13]. On the other hand, other results were different from this research, evidencing a higher risk[3,18]. It is important to emphasize that any perioperative patient has risk of developing PI, so it is essential that nurses evaluate the patient to detect risk factors early and prevent possible complications from the surgical procedure, implement preventive measures and ensure safe and quality care[3,9].

The results of this study showed that overweight/obesity and age increase the chance of higher risk (score >19) for the occurrence of PI from surgical positioning. Other studies have also found age or BMI as factors for a higher risk of occurrence of these injuries[3,19-20].

Obesity is increasing and considered an epidemic. Worldwide, approximately 2 billion people were considered overweight or obese in 2015, and rates increased with age[21]. A systematic review of the literature has shown that obesity costs will increase, not only in the health system, but in society in general and a projection for 2030 indicates that half of the world's adult population will be overweight or obese[22].

It is a fact that age is a risk factor, elderly people are more susceptible to develop complications and also pressure injuries resulting from surgical positioning due to physiological issues such as reduction of skin thickness, muscle mass and subcutaneous fat. However, an integrative review of the literature points to the need to evaluate other parameters such as body

composition since it shows a relationship with the occurrence of PI[23].

Complications such as pain and the occurrence of pressure injury due to supine position in the sacrococcygeal region were more prevalent in patients classified at higher risk of developing surgical positioning injury. A study conducted with 154 patients submitted to elective surgeries showed that patients who had lesions were classified at higher risk[20].

Pain is a frequent postoperative complication and patient-controlled analgesia is a frequently used strategy to minimize or eliminate pain. A meta-analysis showed that patient-controlled analgesia may be associated with increased risk of postoperative pressure injury[24].

The identification of the risk of developing PL from surgical positioning and its causes raises scientific evidence that contributes to the prevention of surgical complications in the daily clinical practice of the perioperative team[20].

The authors understand that the evaluation period of the patients, performed at Time 0' (out from the OR) and Time 60' (after 60 minutes in the PARR), may constitute a limiting factor of the present study, since literature reports that the appearance of PI from surgical positioning can occur within 72 hours of the postoperative period.

CONCLUSION

The results of this study showed that the higher risk chance (score >19) for the development of PI, resulting from surgical positioning, stood out in patients who had higher BMI and older age. Pain and the occurrence of PI, especially in the sacrococcygeal region, were the most prevalent complications in patients classified with higher risk.

This study allowed to expand evidence on the risk of developing surgical lesions in a supine position, since it is one of the most adopted positions in surgical procedures and is not risk-free, thus allowing to analyze the importance of knowing the risks associated with this position. Similarly, it showed the relevance of the work of the perioperative nursing team in surgical patients.

The time of monitoring the patient is considered the most relevant limitation of this study, since evidence show that PI can appear in the operating room and up to 72 hours after surgery. Thus, it is necessary to study patients in a supine position throughout the whole postoperative period.

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