

Skin lesions in the intraoperative period of cardiac surgery: incidence and characterization*

LESÕES DE PELE NO INTRA-OPERATÓRIO DE CIRURGIA CARDÍACA: INCIDÊNCIA E CARACTERIZAÇÃO

LESIONES DE PIEL EN EL INTRAOPERATORIO DE CIRUGÍA CARDÍACA: INCIDENCIA Y CARACTERIZACIÓN

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ABSTRACT

The main objective of this exploratory, descriptive cohort study was to verify the incidence of patients submitted to cardiac surgery who developed skin lesions during the intraoperative period, and characterize the lesions. Data collection was performed at the Surgery Department of a public teaching hospital, of tertiary health care, mostly surgical, specialized in cardiology, and located in São Paulo. The study sample consisted of 182 patients. The study was performed with a significant $p \leq 0.05$ in nonparametric statistical tests. The incidence found for patients submitted to cardiac surgery who developed skin lesions due to the preoperative period was 20.9%. It was observed that 19.2% of lesions were Pressure Ulcers (PU) in stage I; 1.1% of lesions were abrasive; 1.1% incisive; 0.5% lacerative; 0.5% superficial electrical burns; and 0.5% PU in stage II.

DESCRIPTORS

Thoracic surgery
Perioperative nurse
Intraoperative period
Skin
Wounds and injuries
Pressure ulcer

RESUMO

Neste estudo exploratório, descritivo e de coorte o objetivo principal foi verificar a incidência de pacientes submetidos à cirurgia cardíaca que desenvolveram lesões de pele no período intra-operatório, caracterizar as lesões. A coleta de dados foi realizada no Centro Cirúrgico (CC) de um hospital público de ensino, de atenção terciária à saúde, predominantemente cirúrgico, especializado em cardiologia no Município de São Paulo. A amostra do estudo foi de 182 pacientes. O estudo foi feito com um p significativo ($\leq 0,05$) frente aos testes estatísticos não-paramétricos. Quanto à incidência de pacientes submetidos à cirurgia cardíaca, que desenvolveram lesões de pele em decorrência do período intra-operatório, obteve-se incidência de 20,9%. Tivemos que 19,2% das lesões apresentaram-se como Úlceras por Pressão (UP) no estágio I; 1,1% das lesões caracterizaram-se como abrasão; 1,1% feridas incisivas; 0,5% laceração; 0,5% queimadura elétrica superficial e 0,5% UP no estágio II.

DESCRIPTORIOS

Cirurgia torácica
Enfermagem perioperatória
Período intra-operatório
Pele
Ferimentos e lesões
Úlcera por pressão

RESUMEN

Estudio exploratorio, descriptivo y de corte, que objetivó principalmente verificar la incidencia de pacientes sometidos a cirugía cardíaca que desarrollaron lesiones de piel en período intraoperatorio, y caracterizar tales lesiones. Recolección de datos realizada en Centro Quirúrgico (CC) de hospital público de enseñanza, de atención terciaria de salud, predominantemente quirúrgico, especializado en cardiología, del municipio de San Pablo. La muestra se constituyó con 182 pacientes. El estudio se realizó con un p significativo ($\leq 0,05$) frente a tests estadísticos no paramétricos. Respecto a incidencia de pacientes sometidos a cirugía cardíaca que desarrollaron lesiones de piel derivadas del período intraoperatorio, se obtuvo incidencia de 20,9%. El 19,2% de las lesiones se presentaron como Úlcera por Presión (UP) en estadio I; 1,1% de las lesiones correspondieron a abrasión; 1,1% a heridas por incisión; 0,5% laceraciones; 0,5% quemadura eléctrica superficial y 0,5% UP en estadio II.

DESCRIPTORIOS

Cirugía torácica
Enfermería perioperatoria
Periodo intraoperatorio
Piel
Heridas y traumatismos
Úlcera por presión

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INTRODUCTION

Maintenance of coetaneous integrity is a care action to be individually provided to each patient jointly with other care procedures in the intra-operative period, using technical and scientific knowledge. The prevention of skin injuries is associated with clinical aspects related to patients, mechanical, chemical and electrical accidents, as well as with procedures performed during the intra-operative period. The nursing team should pay attention to patients' position while in surgery.

Perioperative nursing is grounded on six principles: integrity, individuality, participation, continuity, documentation and assessment. Documentation needs to be considered a goal in any modality of care. Considering that a surgical patient remains for a certain period of time in a condition of absolute dependency on nursing care, records of actions performed are extremely important from an ethical and legal point of view⁽¹⁾.

A patient who has undergone cardiac surgery requires nursing care in the perioperative period. The nurse identifies the care required after a detailed assessment of the patient's data. A care plan is devised based on the patient's relevant diagnoses, such as: immobility, high risk of lesions due to surgical position and high risk of lesions regarding tissue integrity related to Extra Corporeal Circulation (ECC) and hypothermia.

LITERATURE REVIEW

The maintenance of patients' skin integrity was identified by the American Nurses Association as an important indication of the quality of nursing care. Other organizations, including the Association of Perioperative Registered Nurses (AORN) developed guidelines and recommended practices focused on the care and integrity of patients' skin⁽²⁾.

Nursing care promoted to the patient in the intra-operative period reflects on the post-operative period⁽³⁾. Many skin lesions begin in the surgical room and end up aggravated in the post-surgical period⁽⁴⁾. The national literature is still in an incipient phase in relation to studies addressing skin lesions that develop and are observed in the intra-operative period.

Surgical patients are the first candidates for tissue ischemia due to diminished capillary blood flow caused by a prolonged time of immobility and pressure. Intentional or non-intentional episodes of hypotension confer on the patient increased intolerance to pressure⁽⁴⁾. Studies indicate

that the onset of skin lesions such as pressure ulcers (PU) are inherent to the intra-operative period due to diminished sensorial perception, prolonged immobility and the impossibility of moving the patient during the surgery^(2,5).

OBJECTIVE

- To characterize the sample in relation to socio-demographic and clinical variables of patients who have experienced cardiac surgery
- To verify the incidence of patients who have experienced cardiac surgery and who developed skin lesions in the intra-operative period and healing process

METHOD

This exploratory, descriptive, cohort study was conducted in the surgical center of a university public hospital. It provides tertiary health care, predominantly surgical care specialized in cardiology, in the city of São Paulo, SP, Brazil. The study was approved by the Research Ethics Committee for analysis of research projects (Protocol No. 0570/08). Free and informed consent forms was read and signed by all the participants and each kept one copy.

Data collection was carried out between October 2009 and February 2009. A total of 222 patients were selected to participate in the study, 36 of which did not agree to participate, two others had their surgery cancelled, and two could not be evaluated in all the study's phases. Hence, the sample was composed of 182 patients.

Two instruments were used in data collection: Instrument 1 – Data collection in the immediate pre-operative period; Instrument 2 – post surgery data collection in the surgery room. One nurse was specifically trained to evaluate patients and to complete the instruments. The level of significance was fixed at $\alpha = 0.05$ for non-parametric statistical tests.

RESULTS

As shown in Table 1, most of the studied patients were male (67%), aged on average 63 (53 – 70) years old. The participants were predominantly Caucasian (63.2%) followed by those of mixed ancestry (24.2). The patients displayed a Body Mass Index (BMI) average of 26.15 (23.3 – 29) and their duration of hospitalization had a median of six days (2 – 11).

The prevention of skin injuries is associated with clinical aspects related to patients, mechanical, chemical and electrical accidents, as well as with procedures performed during the intra-operative period.

Table 1 - Characteristics of the sample concerning socio-demographic profile of patients submitted to cardiac surgery - São Paulo, SP, Brazil - 2008-2009

Characteristics		
Age	63.00	(53-70)
Body mass index	26.15	(23.3-29)
Duration of hospitalization	6.00	(2.00-11.00)
Gender		
Male	122	67%
Female	60	33%
Race		
Caucasian	115	63.2%
African-American	15	8.2%
Mixed Ancestry	44	24.2%
Asians	8	4.4%

Note: (n=182). Data expressed in median (Lower quartiles - upper quartiles) and absolute (n) and relative (%) frequency

This study presented an incidence of 20.9% (38) of patients who developed skin lesions due to the intra-operative period of cardiac surgery (Table 2).

Table 2 - Incidence of patients who presented skin lesions due to the intra-operative period - São Paulo, SP, Brazil - 2008-2009

	Incidence of patients who presented skin lesions		
	No	Yes	Total
	N%	N%	N%
Total of patients in the sample	144 (79.1%)	38 (20.9%)	182 (100.0%)

Table 3 lists the characteristics of skin lesions and their frequency found in this study's sample. A total of 35 (19.2%) lesions were PU in stage I; two (1.1%) were skin abrasions; two (1.1%) incision wounds; one (0.5%) laceration; one (0.5%) superficial electrical burn and one (0.5%) PU stage II.

Table 3 - Characterization of skin lesions during the intra-operative period and their frequency - São Paulo, SP, Brazil - 2008-2009

Type of lesion	Frequency	%
PU Stage I	35	19.2
Abrasion	2	1.1
Incision wounds	2	1.1
Laceration	1	0.5
Superficial electrical burn	1	0.5
PU Stage II	1	0.5

Table 4 presents the site of lesions, the frequency and type of lesion at each site.

In relation to the site of lesions: 20 (11%) were located on the sacrum coccyx; six (3.3%) on the left buttocks; four (2.2%) on the right hand; three (1.6%) were located on the left leg; two (1.1%) on the left chest and one lesion (0.5%) was found on the left hand, right scapula, left malleolus, right arm, right eyelid, mouth and right chest.

Table 4 - List of sites of skin lesions due to the intra-operative period, frequency and characteristics of lesions - São Paulo, SP, Brazil - 2008-2009

Site of lesions	Frequency	Type
Sacrum coccyx	20	PU-I
Left buttocks	4	PU-I
Left buttocks	1	PU-II
Left buttocks	1	Superficial burn
Right hand	4	PU-I
Left leg	3	PU-I
Left chest	1	Incision wound
Left chest	1	Laceration
Left hand	1	PU-I
Right scapula	1	PU-I
Left malleolus	1	PU-I
Right arm	1	PU-I
Right eyelid	1	Abrasion
Mouth	1	Incision wound
Right chest	1	Abrasion

DISCUSSION

Data in table 1 show that the median age in the sample was 63 years old (53-70). The World Health Organization⁽⁶⁾ chronologically classifies elderly individuals as those older than 65 years old in developed countries and older than 60 years old in developing countries. This classification is justifiable given the increased life expectancy of the Brazilian population and the world population in general in recent decades and the prevalence of heart disease among elderly individuals. The incidence of unstable angina and arterial vascular disease affect lower limbs and carotid arteries, and also the proportion of myocardial revascularization surgeries, isolated or combined with valvulopathy, is significantly higher among older individuals⁽⁷⁾.

In relation to days of hospitalization prior to the surgical procedure, a median of six days (2-11) was identified. Many patients were hospitalized the day before the surgery because they already had preoperative exams while others required several days for taking exams and preoperative preparation. In a study addressing skin care provided to patients who underwent cardiac surgery, the author indicates a high duration of hospitalization as an important factor in the development of skin lesions⁽⁸⁾.

Most of the individuals in the sample were men (67%) and predominantly Caucasian (63.2%). The sample's clinical profile presented in Table 1 indicates that the diagnosis of most patients were coronary insufficiency (49.5%), in which the main surgical proposal was coronary surgery (60.4%). The most found associated diseases were hypertension (83.5%) followed by non-insulin-dependent diabetes mellitus (22.5%). Diabetes Mellitus affects approximately 100 million individuals worldwide and is an impor-

tant factor of morbidity, increasing by 2-4 times the risk of coronary artery disease (CAD) in exposed patients⁽⁹⁾. Risk factors, related to the use of alcohol and smoking, were present in 20.9% and 13.2% respectively.

In relation to the characteristics of patients' skin evaluated in the preoperative period related to color: most presented pale pink skin (76.4%); texture of skin was predominantly normal (56%) followed by thin skin (35.7%). In the assessment concerning skin turgor, 67% of the sample presented normal turgor and 33% diminished turgor. Assessment of skin moisture indicated 61.5% of patients had normally moist skin; 37.9% dry skin and 0.5% had skin diaphoresis.

The sample in this study presented predominantly pinkish clear skin (76.4%) within the normal parameters in relation to texture (56%), turgor (67%) and moisture (61.5%). Clinical studies addressing PU do not mention the characteristics of patients' skin in relation to skin color, texture, turgor or moisture⁽¹⁰⁻¹²⁾.

In the discussion of data presented in Table 2, incidence studies are frequently performed to convey the importance of the problem and the study and to compare results. The rate of incidence is determined by the number of new cases that appeared in a period divided by the number of people exposed to risk in the same period. The sample of this study that included 182 patients exposed to the risk of lesions and the incidence found of patients who presented skin lesions in to the intra-operative period was 20.9% (38).

In a study with patients having cardiac surgery, the authors report an incidence of 21.6% of PU in patients detected in the immediate postoperative period⁽¹³⁾. An experimental study with surgical patients reported that 21.5% of the patients developed PU six days post surgery⁽¹⁴⁾. Another study found 21.2% of patients experienced PU two days post surgery⁽¹⁵⁾.

In a study that addressed lesions in the sacral region of patients who have had cardiac surgery, the author found an incidence between 12% and 17%⁽¹⁶⁾, similar to the results of other studies with surgical patients that report an incidence of 12% and 15.6%^(1,17).

A study conducted with 337 patients addressing risk factors for PU in patients after cardiac surgery reports that all patients left the surgery room with intact skin and 4.7% (16) of these patients presented lesions four days subsequent to the surgery. This result shows an incidence below what was found in this study, though the author infers that one of the causes for the low incidence was that the nursing team increased care in relation to the risks of developing lesions during the follow-up of patients for the study⁽⁴⁾.

In relation to the characterization of lesions presented in Table 3, 35 (19.2%) out of the 38 lesions presented characteristics that indicated PU in stage I, two (1.1%) were abrasion lesions, two (1.1%) had the characteristics of incision wounds, one (0.5%) was a laceration, one (0.5%) was

a lesion with characteristics of a superficial electrical burn and one (0.5%) had characteristics of PU in stage II.

Another study identified PU with 62% in stage I, 29% in stage II and 4% in stage III⁽⁸⁾. Another study found that 45% of PU were in stage I⁽¹⁸⁾. Other studies report a higher occurrence of pressure ulcers in stage I^(13-14,17). In the study with PU preventive devices in surgical patients found a higher incidence of PU in stage II⁽¹⁹⁾. Studies addressing PU in surgical patients indicate that a lesion in stage I is the most frequent, data corroborated by this study.

Many skin lesions begin in the surgical room and are aggravated in the post surgical period⁽²⁾. The nursing team should be very attentive at the time to position the patient for surgery, check whether there are folds in the sheets, whether all resources are being used to provide appropriate protection, and whether the accessories available in the facility are being used.

A lesion with characteristics of stage I PU is not always considered in the daily routine of surgical environments. The importance of noting this type of early lesion is that it is a powerful piece information to prevent it from worsening. Care should be provided by the nursing staff in the postoperative period such as changing the patient's position, using devices to reduce pressure and monitor the progression of the lesion. Studies report that most of the stage I PU lesions improve with the region's overall skin integrity; that is, postoperative care is crucial to the improvement of skin lesions^(2,8,14,17-18).

Table 4 presents the lesion sites during the intra-operative period. Most of the lesions found in the study's sample were located in the sacrum coccygeal (20), followed by the region of the left buttock (six), right hand (four), left leg (three) and others.

It is worth noting that the areas of skin pressure most frequently occur in the dorsal position, which is the most common position. This position permits access to body cavities (cranial, thoracic and abdominal) and the four limbs⁽²⁰⁾.

Patients composing this study's sample and who had surgery remained in the dorsal position during the entire procedure in 100% of cases. The dorsal position favors greater pressure in the sacral region due to the bony prominence and because it is a central point of an individual's weight distribution. Usually, the areas susceptible to lesions are directly related to bad surgical positioning, protection resources and position accessories.

In a study addressing nursing care and surgical position in the intra-operative period, the author describes the difficulties of the nursing staff performing appropriate surgical positioning, such as lack of appropriate protection resources, difficulty receiving cooperation from the surgical team to properly mobilize the patient, lack of protocols or specific training programs for surgical training, among others⁽²¹⁾. In a study with cardiac surgery patients, most of the

lesions occurred in the sacral region, with an incidence of 57.2%, followed by 21.41% of lesions on the back, and 14.2% on the heels⁽¹³⁾.

A study addressing the immediate postoperative period, with an incidence of 15.6% (65), found 39 lesions in the sacral region, 40 on the buttocks and 16 on the heels⁽¹⁷⁾. In another study with surgical patients, 29.7% were on the heels and 18.9% on the sacral region⁽¹⁵⁾.

Most of the lesions that occurred on the sacral region had characteristics of PU in stage 1. In the dorsal position the potential areas of pressure are occipital, scapular, sacral and calcaneal areas. These offer greater interface between the surgical table while these regions are prone to the development of lesions, especially PU⁽²²⁾. All the study's patients were positioned in the dorsal position due to the access required for cardiac surgery.

CONCLUSION

This study's main objective was to verify the incidence of patients undergoing cardiac surgery who developed skin lesions in the intra-operative period and to characterize lesions developed by patients, not their causes. In this context the results related to the sites and characteristics of lesions are presented though the causes that determined the lesions were not investigated, whether they were caused

by pressure, electrical or monitoring devices, or by chemical solutions.

Further research addressing this subject is extremely important. As previously described, studies related to skin lesions mentioned in this study showed evidence of pressure ulcers. This study focused on the importance of evaluating patients in order to identify other types of skin lesions resulting from the intra-operative period. Hence, individualized nursing care can bolster the prevention of skin lesions in the intra-operative period.

Much has been studied regarding skin integrity related to the prevention of pressure ulcers but there are few studies focusing on skin lesions in the intra-operative period. This study reveals the incidence of skin lesions in the intra-operative period in a small number of patients but prompts nurses to consider more carefully the type of care to be provided to patients. Moreover, it indicates the need for studies addressing the subject since some variables could not be deeply investigated and others still need to be addressed.

Nurses should be concerned to be with patients in the intra-operative period and provide the best care possible, ensuring the safety of their patients. Patients need to be reevaluated throughout their entire stay in the surgical environment. Documentation and records concerning the entire care provided, mobilization of patients, protection used and where they were used, as well as clinical condition, are all essential.

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