COMPLICATIONS IN ELDERLY PATIENTS IN THE POST-ANESTHETIC CARE UNIT (PACU)*

Complicações em idosos em Sala de Recuperação Pós-Anestésica (SRPA)

Las complicaciones en los pacientes de edad avanzada en la Sala de Recuperación

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ABSTRACT: Objective: To analyze complications in the elderly in the Post-Anesthetic Care Unit (PACU). **Method:** A prospective, exploratory study with quantitative method, performed in a large university hospital in Belo Horizonte. The sample consisted of 50 subjects aged 60 years or older who underwent elective surgery and were classified according to the American Society of Anesthesiologists (ASA) as I or II. Data were collected through a semi-structured guide. **Results:** Hypothermia was the most frequent complication, followed by hypoxemia, delirium and altered level of consciousness, especially in the 60–69 years old age group. Pain, nausea and vomiting showed no significant values. **Conclusion:** The control and monitoring of complications presented are key activities of the nursing team in preventing the worsening of the health status of elderly patients in the anesthetic recovery period (ARP).
Keywords: Perioperative nursing. Recovery room. Aged. Postoperative complications.

RESUMO: Objetivo: Analisar complicações em idosos na Sala de Recuperação Pós-Anestésica (SRPA). **Método:** Estudo prospectivo, exploratório, com método quantitativo, realizado em um hospital universitário de grande porte da cidade de Belo Horizonte. A amostra foi composta por 50 sujeitos com idade maior ou igual a 60 anos submetidos à cirurgia eletiva e classificados de acordo com a *American Society Anesthesiologists* (ASA) como I ou II. Os dados foram coletados por meio de um roteiro semiestruturado. **Resultados:** A hipotermia foi a complicação com maior frequência, seguida de hipoxemia, *delirium* e alteração do nível de consciência, principalmente na faixa etária de 60 a 69 anos. Dor, náusea e vômito não apresentaram valores expressivos. **Conclusão:** O controle e o monitoramento das complicações apresentadas são atividades fundamentais da equipe de Enfermagem na prevenção do agravamento do estado de saúde do paciente idoso no período de recuperação anestésica (RA).
Palavras-chave: Enfermagem perioperatória. Sala de recuperação. Idoso. Complicações pós-operatórias.

RESUMEN: Objetivo: Analizar las complicaciones en las personas mayores en la Unidad de Recuperación Pos-Anestésica. **Método:** Estudio prospectivo y exploratorio con el método cuantitativo, desarrollado en un gran hospital de Belo Horizonte. La muestra consistió en 50 sujetos con edades mayores o iguales a 60 años, sometidos a cirugía electiva y clasificados de acuerdo con la Sociedad de Anestesiólogos Americanos (ASA) I o II. Los datos fueron recolectados a través de un guión semiestructurado. **Resultados:** La hipotermia fue la complicación más frecuencia, seguido por hipoxemia, *delirio* y alteración del nivel de conciencia, especialmente en el grupo de edad de 60–69 años. El dolor, las náuseas y los vómitos no mostraron valores significativos. **Conclusión:** El control y seguimiento de las complicaciones que se presentan son las actividades clave del equipo de enfermería en la prevención de un empeoramiento del estado de salud de los pacientes ancianos en período de recuperación de la anestesia.
Palabras clave: Enfermería perioperatoria. Sala de recuperación. Anciano. Complicaciones postoperatorias.

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*This study was financially supported by Fundação de Amparo à Pesquisa do Estado de Minas Gerais (FAPEMIG — APQ 655-13). Term Paper of the Undergraduate Course in Nursing of Universidade Federal de Minas Gerais.
Received: 13 Apr. 2015 – Approved: 27 May 2015
DOI: 10.5327/Z1414-4425201500020002

INTRODUCTION

Studies show that complications in the Post-Anesthetic Care Unit (PACU) are related to respiratory, cardiovascular and central nervous system (CNS) disorders, which results in hypothermia, pain, hypoxemia, nausea, vomiting, urinary retention and anxiety[1].

Changes related to senescence and comorbidities predispose the elderly, those aged over 60 years, to complications associated with the surgery. The aging process causes physiological changes in all systems, which can bring increased risks to the elderly undergoing surgery, due to reduced ability to maintain fluid balance, maintenance of body temperature, decreased lung compliance, circulatory impairment related to atherosclerotic processes, and aggravating comorbidities of the general health status of the elderly, such as systemic hypertension (SM) and *diabetes mellitus* (DM)[2].

Although the occurrence of complications is greater in older patients, there is evidence that the age is not itself an independent risk factor, i.e., morbidity and mortality rates are more related to the patient's clinical condition than chronological age[3].

Considering that elderly patients may be at increased risk of complications in the anesthetic recovery period (ARP), due to having a more vulnerable clinical condition, we raise the question: what are the most frequent complications in elderly patients in the ARP period?

Given the above, this study aimed to analyze the most frequent complications in elderly patients in the ARP.

OBJECTIVE

To analyze the complications of elderly patient in the PACU.

METHODS

Prospective, exploratory study, with quantitative method, performed in a large federal hospital of the Unified Health System network (SUS) in the city of Belo Horizonte (MG).

The research field was the PACU, which has nine beds. The study period was from June to September 2013.

The research project was approved by the Research Ethics Committee of Universidade Federal de Minas Gerais (CEP-UFMG), compliant to Resolution No. 466/2012 of the National Health Council, under protocol nos. CEP-UFMG 274,655 and CAAE 14887213.4.0000.5149.

The Informed Consent (IC) was signed by all participants after being informed by the researcher about the study and its objectives. Clarifications and the signing of the consent were carried out in the patients' rooms, when they were still in the preoperative phase.

The sample consisted of 50 subjects and was defined according to the number of predictor variables initially proposed, using 10 subjects for each of the variables. The predictive variables were age, elective surgery, classification according to the scale by the American Society of Anesthesiologists (ASA) as I and II, and minimum duration of anesthesia and surgery of one hour.

Inclusion criteria were subjects aged 60 years or over undergoing all kinds of anesthesia, except for regional anesthesia, with a minimum duration of one hour, elective surgery, with a minimum duration of one hour, and physical classification according to the scale ASA (I and II).

For data collection, a structured instrument was elaborated with the characterization of the patient, of the anesthetic-surgical procedure and of the complications in the ARP.

The characterization of the patient and of the anesthetic-surgical procedure was obtained with data such as gender, age, type of surgery, surgery time, anesthesia time, physical scale according to the ASA classification, preexisting comorbidities and preoperative systolic blood pressure (SBP), to enable comparisons with blood pressure levels in the PACU.

For analysis of the complications presented in the ARP, vital signs were checked, the Aldrete-Kroulik Index (AKI) was applied and patients were observed for the presence of pain, nausea, vomiting and delirium.

In the assessment of vital signs, hypotension or hypertension were considered if the basic SBP was 20% lower or higher than the pre-anesthetic SBP level[4]. For heart rate (HR), bradycardia or tachycardia were considered if the value was lower than 60 or higher than 100 beats per minute, respectively. Concerning the axillary body temperature, hypothermia was considered if values were lower than 36°C, and hyperthermia if values were higher than 37,8°C[5].

The respiratory rate (RR) was considered within the normal range for adults when the values were between 12 and 22 breaths per minute, and bradypnoea and tachypnea when values are below 12 and above 22 breaths per minute, respectively[6].

As for the AKI, in the muscle activity parameter, it assesses the patient's ability to move limbs, spontaneously or on command, and allows the assessment of patients with subarachnoid or epidural blocks and evaluates residue of muscle relaxants[7].

Breath tests the ability to take a deep breath and to cough, whether dyspnea is apparent and if there is hypopnea and hyperpnea. Circulation, although difficult to evaluate, checks the differences of patients' basic SBP regarding pre-anesthetic blood pressure levels, allowing the analysis of complications such as hypotension and hypertension. Consciousness assesses alertness, spontaneous or on command, analyzing changes in level of consciousness[4,7].

Peripheral oxygen saturation (SpO_2) enables the evaluation of the percentage of peripheral oxygenation. This parameter determines complications such as hypoxemia[5].

From the verbal report by the elderly, pain, nausea, vomiting, delirium (by incongruous speech), temporal-spatial disorientation and difficulty in concentrating were analyzed.

The data were evaluated upon arrival of the elderly to the PACU, considered as moment 0 minutes, and after that, every 15 minutes, up to 60 minutes.

Data were stored in Microsoft Office Excel 2007 and processed in Statistical Package for Social Sciences (SPSS), version 14.0. Categorical variables were demonstrated by absolute and relative frequencies, and continuous variables were expressed as minimum, maximum, mean and standard deviation.

RESULTS

The results are shown with the characterization of the patient, of the anesthetic-surgical procedure, and of the complications in the ARP.

The characterization of the patient and of the anesthetic-surgical procedure consisted of gender, age, classification according to the ASA scale, comorbidities, type of surgery, type of anesthesia, duration of anesthesia and duration of surgery.

Table 1 shows that the women had the highest rate, with 28 elderly (66.0%), and 25 elderly (50.0%) aged between 60 to 69 years old, and 4 (8.0%) aged over 80.

With regard to the ASA classification, 45 (90.0%) were ASA II, the most common comorbidities were hypertension, 17 (34.0%), and hypertension associated with DM, 9 (18.0%). It is noteworthy that 10 of the elderly (20.0%) showed no comorbidity, and other comorbidities were identified in 12 patients: dyslipidemia, obesity, depression and smoking (24.0%).

The most common type of anesthesia was general, 21 (42.0%), followed by regional associated with sedation, 12 (24.0%). In regional anesthesia, the epidural and spinal were considered; in other anesthetics, the plexus and field blocks were considered.

Table 1. Frequency distribution of the elderly, according to sociodemographic, clinical and surgical data. Belo Horizonte, 2013.

Variables	Gender				Total	
	Male		Female			
	n	%	n	%	n	%
Age (years)						
60–69	10	45.5	15	53.6	25	50.0
70–79	10	45.5	11	39.3	21	42.0
≥80	2	9.0	2	7.1	4	8.0
ASA*						
I	5	22.7	0	0.0	5	10.0
II	17	77.3	28	100.0	45	90.0
Comorbidities						
SM	6	27.3	11	39.3	17	34.0
DM	0	0.0	2	7.1	2	4.0
SM and DM	4	18.1	5	17.9	9	18.0
Other	6	27.3	6	21.4	12	24.0
None	6	27.3	4	14.3	10	20.0
Type of anesthesia						
General	9	18.0	12	24.0	21	42.0
General+regional	3	6.0	1	2.0	4	8.0
Regional	2	4.0	6	12.0	8	16.0
Regional+sedation	5	10.0	7	14.0	12	24.0
Other	3	6.0	2	4.0	5	10.0
Time of anaesthesia (min)						
60–120	5	22.7	12	42.9	17	34.0
121–180	7	31.8	7	25.0	14	28.0
≥181	10	45.5	9	32.1	19	38.0
Duration of surgery (min)						
60–120	11	50.0	19	67.8	30	60.0
121–180	7	31.8	5	17.9	12	24.0
≥181	4	18.2	4	14.3	8	16.0

*Classification according to the American Society of Anestesiology (ASA).
SH: systemic hypertension; DM: *diabetes mellitus*.

The time of anesthesia over 180 minutes and the time of surgery between 60 and 120 minutes were the most frequent, 19 (38.0%) and 30 (60.0%), respectively.

Regarding the type of anesthesia and surgical procedures, inguinal hernia repair was performed in 11 (22.0%), and gynecological procedures in 10 (20.0%) (Table 1).

Complications presented by the elderly were analyzed by AKI, vital signs, demonstration or report of pain, nausea, vomiting and delirium. These values were analyzed from the time of entry, considered as minute 0, up to one hour of stay in the PACU, i.e., 60 minutes.

Table 2 shows the distribution of AKI values according to the length of stay in the PACU.

It is observed that, after 60 minutes of PACU stay, although most have obtained grade 2 in 5 physiological signals, that a considerable percentage of elderly had grade 1, 18 of them (38.3%) for SpO_2, 16 (34.0%) for level of consciousness, 14 (29.7%) for circulation, 10 (21.2%) for activity and 3 (6.3%) for breath. Muscle activity with note 1 at 60 minutes can be explained by regional anesthesia and sedation, only regional and others, with, respectively, 4 (8.4%), 3 (6.4%) and 3 (6.4%) of the total of 10 elderly, respectively.

The physiological signs activity and breathing did not have grade 0 at any moment for the level of consciousness; 1 elderly obtained grade 0 up to 15 minutes of stay in the PACU.

For circulation, over the 60 minutes of stay, 2 elderly had grade 0, and, after 60 minutes, 1 of these still remained with this assessment, that is, with 50% of difference in their basic blood pressure.

As for SpO_2, 1 elderly was admitted to the PACU with grade 0, also presenting this grade at 30 minutes; at 60 minutes, no patient had grade 0 in SpO_2 (Table 2).

Table 2. Frequency distribution of the elderly according to the values of the Aldrete-Kroulik Index and the length of stay in the Post-Anesthetic Care Unit. Belo Horizonte, 2013.

AKi	Time									
	0		15		30		45		60	
	n	%	n	%	n	%	n	%	n	%
Consciousness										
0	1	2.0	1	2.0	0	0.0	0	0.0	0	0.0
1	18	36.0	19	38.0	24	48.0	21	42.8	16	34.0
2	31	62.0	30	60.0	26	52.0	28	57.1	31	65.9
Activity										
0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
1	19	38.0	17	34.0	13	26.0	11	22.4	10	21.2
2	31	62.0	33	66.0	37	74.0	38	77.5	37	78.7
Breathing										
0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
1	7	14.0	6	12.0	4	8.0	3	6.1	3	6.3
2	43	86.0	44	88.0	46	92.0	46	93.8	44	93.6
Circulation										
0	2	4.0	1	2.0	2	4.0	1	2.0	1	2.1
1	14	28.0	15	30.6	14	28.0	15	30.6	14	29.7
2	34	68.0	33	67.3	34	68.0	33	67.3	32	68.0
Oxygen saturation										
0	1	2.0	0	0.0	1	2.0	0	0.0	0	0.0
1	21	42.0	26	52.0	21	42.0	21	42.8	18	38.3
2	28	56.0	24	48.0	28	56.0	28	57.1	29	61.7

AKI: Aldrete-Kroulik Index.

Table 3 shows the variation of the vital signs regarding the mean, standard deviation and minimum and maximum values.

At 60 minutes, changes were observed in minimum values for SBP, diastolic blood pressure (DBP), HR, RR and body temperature; as for the maximum values, only DBP and body temperature showed no changes.

Over time, significant variations in the minimum and maximum values were also observed, such as SBP at 202 mmHg at 0 minute, DBP at 32 mmHg at 30 minutes, HR at 40 bpm at 15 minutes, RR at 6 and 25 at 30 and 15 minutes, respectively, and body temperature at 32°C upon admittance to the PACU (Table 3).

Table 4 shows the distribution of values of changes in vital signs in the elderly along their PACU stay. It was observed that, after 60 minutes of stay in the PACU, changes in vital signs were still present.

The greatest frequency of change was for body temperature, with 37 hypothermic elderly (74.0%), followed by bradycardia, with 9 (18.0%), and hypotension and hypopnea with 8 elderly (16.0%).

Regarding high blood pressure, tachycardia and tachypnea, after 60 minutes of stay, 4 (8.0%), 3 (6.0%) and 2 (4.0%) subjects presented these complications, respectively, and no elderly presented hyperthermia. At 45 and 60 minutes, 1 and 3 subjects had been discharged from the PACU, with 98.0 and 94.0% of the total sample, respectively (Table 4).

Delirium was identified in 17 elderly (34.0%), of which 4 had pain upon entry to the PACU. With respect to pain, 8 elderly subjects (16.0%) showed that complaint upon entry. Other complications presented were rash, tremors and bladder distention, 1 elderly (2.0%) with each condition, respectively.

Table 3. Characterization of the range of values of vital signs, according to the time spent in the Post-Anesthetic Care Unit. Belo Horizonte, 2013.

Vital signs	Time				
	0	15	30	45	60
SBP					
Mean (SD)	124.9 (23.44)	124.9 (24.71)	122.4 (23.08)	124.5 (24.91)	123.7 (23.29)
Minimum	83	70	71	68	83
Maximum	202	194	199	182	178
DBP					
Mean (SD)	69.6 (13.82)	68.2 (14.94)	68.1 (15.25)	69.0 (13.81)	69.8 (14.23)
Minimum	42	36	32	35	40
Maximum	107	104	103	98	99
HR					
Mean (SD)	72.9 (12.90)	70.8 (12.30)	70.4 (13.0)	71.5 (13.48)	71.2 (14.64)
Minimum	43	40	39	41	45
Maximum	98	97	101	102	105
RR					
Mean (SD)	14.3 (3.73)	14.5 (4.02)	14.4 (3.80)	14.4 (3.52)	14.9 (4.02)
Minimum	7	7	6	7	7
Maximum	23	25	23	23	26
Axillary temperature					
Mean (SD)	34.3 (0.96)	34.7 (0.88)	34.8 (0.82)	35.1 (0.78)	35.2 (0.80)
Minimum	32.0	32.2	33.1	33.2	33.2
Maximum	36.1	36.0	36.3	36.5	36.4

DP: standard deviation; SBP: systolic blood pressure; DBP: diastolic blood pressure; HR: heart rate; RR: respiratory rate.

Table 4. Distribution of elderly according to alterations in vital sign values during the time spent in the Post-Anesthetic Care Unit. Belo Horizonte, 2013.

Alterations in vital signs	Time									
	0		15		30		45		60	
	n	%	n	%	n	%	n	%	n	%
SBP										
(<20%) Hypotension	11	22.0	10	20.0	11	22.0	9	18.0	8	16.0
(>20%) Hypertension	5	10.0	6	12.0	3	6.0	4	8.0	4	8.0
HR										
(<60) Bradycardia	7	14.0	10	20.0	9	18.0	8	16.0	9	18.0
(>100) Tachycardia	0	0.0	0	0.0	1	2.0	2	4.0	3	6.0
RR										
(<12) Bradypnea	10	20.0	12	24.0	12	24.0	8	16.0	8	16.0
(>22) Tachypnea	1	2.0	2	4.0	2	4.0	1	2.0	2	4.0
Axillary temperature										
(<36.0°C) Hypothermia	48	96.0	49	98.0	47	94.0	45	90.0	37	74.0
(>37.8°C) Hyperthermia	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Total	50	100.0	50	100.0	50	100.0	49	98.0	47	94.0

SBP: systolic blood pressure; HR: heart rate; RR: respiratory rate.

As for the nausea symptom, 2 (4.0%) reached the PACU with such a complaint, and only one old presented vomiting in the length of stay.

DISCUSSION

The results of this study demonstrated greater frequency of decreased body temperature, with 37 hypothermic elderly (74.0%), oxygen saturation level in 18 hypoxemic elderly (38.3), delirium in 17 elderly (34.0%), level of consciousness, with 16 (34%), bradycardia, with 9 (18.0%), hypotension, bradypnoea and pain in 8 (16.0%), respectively, in the 60 minute period of stay in the PACU. Other evident changes were hypertension, tachycardia, tachypnea, nausea and vomiting, less frequently.

The temperature drop situation is inherent to the surgical process in the elderly, due to alterations in the thermoregulatory system, caused by drugs, or by anesthesia, and factors such as positioning, operating room temperature, infusion of cold solutions in cavities or intravenously, exposure of cavities, duration of surgery, type of surgery and ventilation with non-heated gases[3,7].

When the general and regional anesthesia are combined, there is a greater risk of unintentional perioperative hypothermia. Hypothermia triples the incidence of myocardial adverse events, increases the risk of surgical site infections, bleeding, and is associated with increased length of hospital stay and health care costs. It also alters the pharmacokinetics and pharmacodynamics of most anesthetics, prolonging anesthesia recovery[8,9].

The patient develops hypothermia in the Operating Room (OR), and maintains this situation during ARP, triggering unwanted clinical manifestations. Perioperative warming of surgical patients is effective in reducing pain and surgical site infection, as well as the tremors. Systemic warming is also associated with less perioperative blood loss, preventing hormonal changes, increased catecholamines and coagulopathy[10,11].

Several studies show that prevention methods used in the OR are heated intravenous infusion (heated fluids), thermal blanket, common blanket and bandaging of limbs with orthopedic cotton. The heated infusion method used alone does not prevent the complications related to intraoperative hypothermia[11].

Nurses play an important role in the implementation of preventive measures for hypothermia in the OR, avoiding the complications it causes in the ARP. The importance of vigilant monitoring of the patient's temperature, especially the elderly, throughout the anesthetic-surgical process is essential to ensure that such patients maintain normothermia, reducing complications and providing comfort to the patient[9,11].

Hypoxemia was the second most frequent complication in this study. It is defined as the reduction in arterial oxygen content and is diagnosed by reduced SpO_2 (below 95% or decrease higher than 5% of the initial value), being identified by the elderly who received grade 1 according to the AKI.

Studies show that the risk factors for hypoxemia are age over 55 years, preoperative pulmonary function, the residual effect of the anesthetic used, the surgical field involved in the procedure and the duration of anesthesia. Studies show that there is a higher incidence of hypoxemia in patients classified as II and III according to ASA scale, which supports the present study, in which 90% of the elderly were classified as ASA II[12,13].

The hypoxemia frequency at time 0 was higher in the elderly who received general anesthesia or associated with local anesthesia, with 12 (24.0%) and 4 (8.0%), respectively.

A study conducted in a university hospital in São Paulo that evaluated the impact of changes in the O_2 saturation during the transportation of the patient from the OR to the PACU without the use of oxygen therapy showed that, out of 737 patients (83.5%) who underwent anesthesia, usually with or without regional block, 98 had statistically higher incidence of hypoxia compared with those who received exclusively regional block or associated with sedation[12].

In assessing the airways of the patient admitted to the PACU, the American Society of PeriAnesthesia Nurses (ASPAN) recommends observation of patency, administration of humidified oxygen and placement of pulse oximetry as hypoxemia prevention methods[14].

A study aimed to analyze the use of pulse oximetry during the perioperative period as a means to identify, prevent and intervene in complications related to hypoxemia points out that the use of this monitoring system substantially reduced the extent of perioperative hypoxemia, allowing the detection and treatment of related complications. In contrast, the study questions whether oximetry can protect the patient from postoperative complications against human negligence, that is, if only monitoring oxygen levels does not prevent complications, but, facing the findings, warns professionals related to the care of surgical patients to take the appropriate conduct[15].

Delirium was the third most frequent complication, and 17 elderly (34.0%) showed this condition upon admittance to the PACU. These results had association with the time and type of anesthesia. Of these 17 elderly, 9 (52.9%) remained for a longer time than 180 minutes in the anesthetic process, and 13 elderly subjects (76.4%) received general anesthesia or associated regional anesthesia.

The elderly are susceptible to developing delirium as a result of a variety of organic factors such as hypokalemia, hyponatremia and/or toxicity arising from the anesthetic medication. One hypothesis for the etiology of delirium is a decrease in cholinergic activity. The suppression of cholinergic cells is partly one of the mechanisms responsible for anesthesia, so general anesthesia has been implicated as a risk factor for postoperative delirium[16].

The altered level of consciousness was analyzed by AKI, assigning grade 1 to those who awakened if requested. After 60 minutes of stay in the PACU, 16 elderly (34.0%) showed this condition, more frequently in the specialty of gynecological surgery. However, studies show that this complication is associated with sedative, anesthetic residue, hypoxemia, pain or anxiety[17].

Hypotension and hypertension conditions were analyzed from the circulation parameter from the AKI, in which the elderly who were graded 1 or 0 if they presented a blood pressure with 20 to 49 or 50%, respectively, of difference from the preanesthetic value. Also, 14 elderly (28%) were graded 1 at moment 0, and that number remained after 60 minutes of stay in the PACU, 2 elderly (4%) were graded 0 upon admission to the PACU and 1 elderly remained with this grade after 60 minutes.

Several studies show that the factors that contribute to increased blood pressure in the ARP are age, anxiety, surgical anesthesia, catecholamine release, extubation, basic hypertension, as well as those associated with pain, fear of taking deep breaths, bandages and combinations of drugs[13].

Regional anesthesia promotes dilation of resistance and capacitance vessels, which results in decreased venous return, the filling pressure of the right heart chambers, systemic vascular resistance and debit[18].

Muscle activity was evaluated by AKI, and 19 elderly (38.0%) were graded 1 upon admittance to the PACU, that is, those patients moved only 2 limbs. From the results, it can be seen that such a framework is related to the type of anesthesia: isolated

regional anesthesia or associated with sedation. This complication is associated with the residual effect of muscle relaxants, leading to muscle weakness in the ARP[7,13].

Bradycardia and tachycardia showed a lower frequency upon admittance to the PACU, with 7 elderly (14.0%) presenting bradycardia and no elderly with tachycardia; however, over the 60 minutes spent in the PACU, there was an increase in the number of elderly people presenting such changes, in the 70–79 years age group, and with regional anesthesia or associated with sedation.

Studies show that bradycardia is related to neuraxial anesthesia, to the anesthetic technique used, to the classification according to the ASA scale, I and II, and to age higher than or equal to 61 years. As for tachycardia, it is related to stress, prolonged surgical time, pain and sympathomimetic and parasympatholytic drugs[18].

As for the HR upon admission to the PACU, 10 elderly (20.0%) had bradypnoea and only 1 (2.0%) had tachypnea; at 60 minutes of permanence, 2 elderly (4.0%) showed tachypnea.

The bradypnoea condition is related to the residual effect of opioids, neuromuscular blockers and fear associated with breathing due to pain and hypothermia. Tachypnea can be explained by an accumulation of carbon dioxide as a result of tremors and, sometimes, by the excitement of waking up from anesthesia (anxiety), this manifestation is a form of compensation for the elimination of carbon dioxide[13].

Dyspnea was analyzed by the AKI, in which patients received grade 1, wherein 7 elderly (14.0%) showed this complication at moment 0 of the ARP. In the elderly, this complication, as well as being closely associated with the factors mentioned above, such as bradypnoea, tachypnea, pain and anxiety, has the functional loss of age, lung and comorbidities such as smoking and obstructive pulmonary disease. This complication can lead to other consequences, such as decreased level of consciousness and hypoxemia.

Collaborating further to respiratory changes are the naturally shallower breathing of the elderly, reduction in muscle tone of the diaphragm and accessory muscles of respiration, hardening of the costal cartilages and increased respiratory dead space, dilation of the tracheobronchial tree, and worst alveolar ventilation[2,3].

Pain was one of the less frequent complications, with 8 elderly (16.0%) presenting such complaint upon admittance to the PACU. Pain in the immediate postoperative period is not only related to the surgical incision, but also to the nerve stimulation by chemicals released during surgery, occurrence of ischemia in certain areas due to pressure, vasospasm, muscle spasm, edema and surgical positioning, factors that interfere with the blood supply to the tissues, causing acute pain[19].

Besides being an unpleasant experience, the pain is linked to negative consequences such as the development of chronic pain syndrome, discomfort and delayed recovery. Because it is a subjective experience, its approach should involve the patient. Visual and numerical scales have been used for evaluation; however, these tools may fail if the patient is still sedated. In such cases, other clinical data, such as changes in the HR and blood pressure, have been used as a pain assessment parameter[20].

Currently there is a variety of pharmacological treatments for pain in the postoperative period; yet, the pain remains one of the complications that require observation and special care in the PACU. The choice of the best treatment is up to anesthesiologists and nurses in the PACU, providing assessment, prevention and monitoring and relief measures of pain conditions during that period[3].

Studies show that nausea and vomiting are also common complications in the ARP: even with new anesthetics and antiemetic agents, nausea and vomiting persist in 20-30% of patients[14]. However, in this study only 2 elderly (4.0%) had nausea and 1 (2.0%) showed vomiting.

Despite the different types of treatment, these symptoms are still present in patients in the ARP, which requires the creation of mechanisms to ensure the reduction of such occurrences, whether using conventional therapies or seeking new resources to improve patient comfort.

In São Paulo, nurses already have a legislation that regulates the use of Complementary Therapy, Law No. 13.717, of January 8, 2004, which provides for the use of therapies such as aromatherapy, reflexology, flower essences, etc., and therefore, nurses have another resource to use in their care plan[3,13].

CONCLUSION

In this study, the most frequent complications, evidenced by the results, were hypothermia, hypoxemia, delirium and altered level of consciousness.

Among age groups, elderly aged 60-69 years were the ones who showed changes in the PACU. This result shows that age is not precisely an independent indicator, i.e., morbidity and mortality are more closely related to the patient's clinical situation than to chronological age.

Over 60 minutes, the number of elderly people with complications (such as hypotension, bradycardia, tachycardia and tachypnea) had increased or remained the same; however, muscle activity, changes in respiration, SpO_2 and changes in consciousness presented a decrease. Although it showed a decrease in the ARP, hypothermia reached 74% of the elderly.

Elderly patients, in turn, require a continuous care from the nursing staff and other professionals in the ARP, because such conduct has a positive impact in the early detection and decrease of complications that are frequent after the anesthetic-surgical procedure, as evidenced in the present study, enabling the recovery of the elderly.

The nurse's role is essential in the PACU in the prevention of postoperative complications, which are planned in the preoperative period. Whereas the elderly population grows every year in quantity and complexity, an individualized and well-planned nursing care is necessary to reduce the damage in the postoperative period.

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