

# SURGERIES PERFORMED ON ELDERLY PATIENTS IN A PUBLIC HOSPITAL IN THE STATE OF SÃO PAULO

*Cirurgias realizadas em idosos em um hospital público do interior de São Paulo*

*Cirugías realizadas en idosos en un hospital público del interior de São Paulo*

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**ABSTRACT: Objective:** To identify the prevalence of surgical procedures performed in the elderly in a surgical center of a public hospital in the state of São Paulo and to characterize such procedures. **Method:** Cross-sectional, retrospective, quantitative study. The sample consisted of 7,483 surgical procedures performed in the elderly, between 2013 and 2015. Data were collected from the surgical information system of the institution under study. **Results:** The age range was between 60 and 70 years of age; the highest average anesthesia recovery time was between 71 and 80 years. The specialties that performed the most procedures were: orthopedics, urology and ophthalmology. The most commonly used anesthetics were: general inhalation, intravenous, local with sedation and spinal; 37,3% used anesthesia, however the type was not described in the patient medical records. There were 1,140 deaths resulting from the procedures or complications; three of them occurred in the surgical center, while the others occurred in the intensive care unit or ward. **Conclusion:** The data presented here reinforce the need for new models of care, with improvements in geriatric multidisciplinary care, in perioperative care for the elderly.

**Keywords:** Surgery. Elderly population. Population dynamics.

**RESUMO: Objetivo:** Identificar a prevalência dos procedimentos cirúrgicos realizados em idosos em um centro cirúrgico de um hospital público do interior do estado de São Paulo e caracterizar tais procedimentos. **Método:** Estudo transversal, retrospectivo, quantitativo. A amostra constou de 7.483 procedimentos cirúrgicos em idosos, realizados entre 2013 e 2015. Os dados foram coletados a partir do sistema de cirurgia da instituição sede do estudo. **Resultados:** A faixa etária na qual prevaleceram os procedimentos foi entre 60 e 70 anos de idade; a maior média de tempo para recuperação da anestesia foi entre 71 e 80 anos. As especialidades que mais realizaram procedimentos foram: ortopedia, urologia e oftalmologia. As anestésias mais empregadas foram: geral inalatória, endovenosa, local com sedação e raquideana; 37,3% usaram o serviço de anestesia, porém não estava descrito em prontuário qual foi o tipo de anestesia realizada. Os óbitos decorrentes dos procedimentos ou complicações das cirurgias foram 1.140; três deles ocorreram no centro cirúrgico e os demais, em enfermarias ou unidades de cuidados intensivos. **Conclusão:** Os dados aqui apresentados reforçam a necessidade de novos modelos de assistência, com melhorias da assistência multidisciplinar geriátrica, no atendimento perioperatório aos pacientes idosos.

**Palavras-chave:** Cirurgia. População idosa. Dinâmica populacional.

**RESUMEN: Objetivo:** Identificar la prevalencia de los procedimientos quirúrgicos realizados en ancianos en un centro quirúrgico de un hospital público del interior del estado de São Paulo y caracterizar tales procedimientos. **Método:** Estudio transversal, retrospectivo, cuantitativo. La muestra constató de 7.483 procedimientos quirúrgicos en ancianos, realizados entre 2013 y 2015. Los datos fueron recolectados a partir del sistema de cirugía de la institución sede del estudio. **Resultados:** El grupo de edad en el que prevalecieron los procedimientos fue entre 60 y 70 años de edad; la mayor media de tiempo para la recuperación de la anestesia fue entre 71 y 80 años. Las especialidades que más realizaron procedimientos fueron: ortopedia, urología y oftalmología. Las anestésias más empleadas fueron: general inhalatoria, endovenosa, local con sedación y raquídea; 37,3% usaron el servicio de anestesia, pero no estaba descrito en prontuario cuál fue el tipo de anestesia realizada. Las muertes derivadas de los procedimientos o complicaciones de las cirugías fueron 1.140; Y tres de ellos ocurrieron en el centro quirúrgico y los demás, en enfermería o unidades de cuidados intensivos. **Conclusión:** Los datos aquí presentados refuerzan la necesidad de nuevos modelos de asistencia, con mejoras de la asistencia multidisciplinaria geriátrica, en la atención perioperatoria a los pacientes ancianos.

**Palabras clave:** Cirugía. Población anciana. Dinámica poblacional.

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## INTRODUCTION

The demographic transition is a worldwide phenomenon, whereby, the number of young people progressively decreases and there is a considerable increase in the over 60 population. Brazil has also experienced an increase in the population of this age group. According to the Brazilian Institute of Geography and Statistics (IBGE), the aging index rose from 31.7% in 2001 to 51.8% in 2011. This shows that there is, on average, a person aged 60 or over for every two people under the age of 15. It is estimated that by 2050 there will be 2 billion elderly people in the world, and that in Brazil there will be about 28 million elderly people<sup>2</sup>.

The increase in life expectancy is due to the reduction in infant mortality, which has progressively reached all age groups, including the death rates of the elderly population, which has experienced a large decline. It is also due to advances in health technologies and the development of public policies for the elderly<sup>3</sup>.

Aging is an irreversible, natural and individual biological process. The term aging is marked by changes in shape and function throughout life that occur in organisms after sexual maturation and that progressively compromise functionality, mobility and independence, influencing the elderly's ability to respond to environmental stress and the maintenance of homeostasis, as well as the high prevalence of chronic-degenerative diseases, which will cause this population to require qualified assistance from the health services at all levels of attention<sup>4</sup>.

As a consequence of a longer life expectancy, treatments and surgeries tend to be more routine. The World Health Organization (WHO) predicts that more than 60 million people will undergo surgeries for traumatic reasons and more than 30 million to treat malignancies each year<sup>5</sup>. Surgical complications are more common in the elderly population because of the slower organism, impaired physical mobility, the greater probability of infections and the difficulties arising from the underlying diseases themselves, making it necessary to prepare professionals to care for geriatric patients<sup>5</sup>.

Few studies consider the profile of surgeries performed in the elderly, or the characteristics of this population. In general, studies that evaluate surgical procedures in the elderly focus on surgeries performed in single areas<sup>6-8</sup>. Hospital management appears to focus on the costs of surgeries, specifically oncological surgeries, analyzing

actions to reduce costs and the transfer of these costs from health insurance companies<sup>9</sup>.

Considering the increase in life expectancy in the population, the scarcity of studies related to the theme and the importance of health care for the elderly in all areas, we propose to carry out this study with the objective of providing support for the improvement of care to the elderly person in the surgical center (SC) and the management of the SC unit.

## OBJECTIVE

To identify the surgical procedures performed in elderly patients in a SC of a public hospital in the the state of São Paulo and to characterize such procedures.

## METHODS

A cross-sectional, retrospective study with a quantitative, non-probabilistic approach.

The present study was conducted at Hospital das Clínicas (HC) in the city of Botucatu, in the state of São Paulo. It is estimated that the hospital caters for 1.5 million users, who come from 68 municipalities of the Bauru Regional Health Department (DRS VI). The HC has 385 beds, 52 being intensive care beds (30 adults, 15 neonates and 7 pediatric), 198 doctor consultation rooms and 31 specialized rooms. The institution conducts an average of 2 million exams, 650 thousand consultations and 25 thousand hospitalizations per year.

It is considered the largest public health unit in the Botucatu region, linked to the Unified Health System (SUS). The Hospital das Clínicas of the Botucatu Medical School (HCFMB) has 170 nurses and more than 800 nursing technicians.

The SC of the institution has 13 operating rooms, which hosts surgeries I, II, III and IV, of various specialties, according to the weekly schedule established for each team. Approximately 13 surgical teams, anesthesiologists and nursing staff, among other professionals, work in the SC. In 2014, the service performed 8,967 surgeries.

Data were collected from the surgical information system. The procedures that took place in SC of the HCFMB, between 2013 and 2015, in users 60 and older were included. Procedures with incomplete data in

the patient medical record were excluded. The variables analyzed were: sex (male and female), age (in years), surgery performed (classified according to the Management System for Procedures, Medications and Orthoses and Prostheses and Special Materials of SUS - SIGTAP) anesthesia, length of hospital stay (in days), medical specialty, surgical time (in minutes) and death during surgery.

The results were presented using descriptive statistics, with absolute and percentage frequencies for the categorized variables, average and median. The data were entered and tabulated in a Microsoft Excel worksheet which is presented in table form.

The project was submitted to the Research Ethics Committee (CEP) of the Faculty of Medicine of Botucatu, under Opinion No. 1,526,015, dated May 3rd, 2016.

The waiver of the Informed Consent Form was requested and authorized, due to the use of secondary data.

## RESULTS

The study sample consisted of data from 7,483 surgical procedures performed on elderly patients, older than 60 years, between 2013 and 2015, 51% were performed in males. The age group in which the most procedures occurred was between 60 and 70 years of age, in both sexes.

The mean surgical time was higher in this age group, and lower in the other groups.

The highest average time for anesthesia recovery appeared in the 71 to 80 age group, followed by the 60 to 70 age group. The mean hospitalization rate predominated in the 60 to 70 age group (Table 1).

Upon analyzing the variable surgical specialties, it was verified that the orthopedic procedures were the most predominate, followed by urology, ophthalmology, vascular surgery, gastrointestinal surgery, neurosurgery, cardiac surgery, otorhinolaryngology, general surgery and thoracic surgery. Table 2 shows the procedures divided by age group.

Table 3 shows the main surgical procedures performed in patients, in the age group studied.

Table 4 shows the predominance of anesthesia performed in surgical procedures. It can be verified that general inhalation anesthesia and the intravenous anesthesia were the most used, followed by local anesthesia with sedation and spinal anesthesia. It is worth mentioning, that 37% of the surgeons used anesthesia but they did not record it in the patient's chart.

The analysis of deaths due to the procedures or surgical complications revealed a total of 1,140 deaths in elderly patients, three of them occurred in the SC and the other in the intensive care units or ward. Table 5 shows the characteristics of patients who died.

**Table 1.** Distribution of surgeries according to gender, time of surgery, time of anesthesia recovery and days of hospitalization.

Variables	60 - 70 years n (%)	71 - 80 years n (%)	81 - 90 years n (%)	91 years or older n (%)	Total
Sex					
Female	1.930 (47)	1.081 (49)	575 (56)	94 (60)	3.680
Male	2.180 (53)	1.117 (51)	444 (44)	62 (40)	3.803
Total	4.110 (100)	2.198 (100)	1.019 (100)	156 (100)	7.483
Surgical indicators					
Surgery length(minutes)					
Average	128	114	101	83	106.5
Median	107	99.5	97	50	98.2
Anesthesia recovery time (minutes)					
Average	80.5	88.5	84	88.5	85.3
Median	94.5	284	61	66	172.5
Length of hospital stay (days)					
Average	12.5	12	12	9	11.3
Median	16	14	13.5	9	13.7

**Table 2.** Distribution of surgeries according to specialty and age group.

Variables Speciality	60 - 70 years n (%)	71 - 80 years n (%)	81 - 90 years n (%)	91 years or older n (%)	Total n (%)
Orthopedics	674 (16)	370 (17)	278 (27)	63 (40)	1.385 (18.5)
Urology	578 (14)	227 (10)	54 (5)	10 (6)	869 (11.6)
Ophthalmological	382 (9)	332 (15)	142 (14)	8 (5)	864 (11.5)
Vascular	405 (10)	302 (14)	121 (12)	22 (14)	850 (11.4)
Gastro-surgery	458 (11)	234 (11)	107 (10)	10 (6)	809 (10.8)
Neurology	368 (9)	152 (7)	57 (6)	9 (8)	586 (7.8)
Cardiac surgery	221 (5)	140 (6)	80 (8)	12 (8)	453 (6.2)
Otorhinolaryngology	215 (5)	104 (5)	41 (4)	4 (3)	364 (4.9)
General surgery	171 (4)	75 (3)	39 (4)	11 (7)	286 (3.8)
Thoracic	126 (3)	52 (2)	12 (1)	1 (0.64)	191(2.6)
Other specialities	-	-	-	-	816 (10.9)

**Table 3.** Distribution of the main surgical procedures performed in the elderly.

Surgical Procedures	n	(%)
Surgical treatment of proximal femoral fracture	270	17.6
Exploratory laparotomy	259	16.8
Tracheostomy	182	11.8
Intraocular lens implant facectomy	157	10.2
Amputation / disarticulation of finger	128	8.3
Deviation of ulcer / devitalized tissue	125	8.1
Endoscopic resection of prostate	119	7.7
Arterial embolectomy	114	7.4
Cholecystectomy	97	6.3
Vaginal hysterectomy	87	5.7

**Table 4.** Distribution of surgeries according to anesthesia performed in elderly patients.

Types of anesthesia	n	(%)
General inhalation and intravenous	2.012	26.9
Local/sedation	1.221	16.3
Spinal	1.172	15.7
Blocks	237	3.2
Epidural	51	0.7
Uninformed	2.790	37.3
Total	7.483	100.0

**Table 5.** Characteristics of deaths in elderly patients.

Death	Intraoperative n	Post-operative n	Total
Period	3	1.137	1.140
Sex			
Female	0	472	472
Male	3	665	668
Average hospital stay (days)	10	13	-
Anesthesia recovery time (minutes)	-	92	-
Predominate anesthesia	General	General	-
Predominate speciality	Cardiac/vascular	Vascular/gastrointestinal surgery/neurosurgery	-
Surgery time (minutes)	376	135	-
Age(years)	79	72	-

## DISCUSSION

The sample of this study was composed of data from 7,843 elderly patients submitted to surgical procedures between 2013 and 2015.

The increase in the elderly population in Brazil and in the world shows a greater demand for hospitals and, consequently, entrance into the SC<sup>10</sup>. When the total number of surgical procedures was analyzed, there was no significant prevalence of males or females; however, when the age groups between 60 and 80 years were analyzed, there was a prevalence of males. Such an occurrence leads us to believe that self-care may be more deficient among men, leading to higher hospitalization rates and surgeries.

The average and median time of the surgical procedures did not show great variations between the age groups, however it should be emphasized that the surgical time is directly related to several complications, such as surgical site infections, which is increased in 13, 17 and 37% for every 15, 30 and 60 minutes of surgery, respectively<sup>11</sup>.

The length of hospital stay also did not show significant variations between the age groups. The common comorbidities in the studied age groups can prolong hospitalization time, making the individual vulnerable to adverse events that worsen the prognosis and cause burdens to hospitals<sup>12</sup>.

Aging as a biological process leads to the decline of organic functions and the occurrence of chronic degenerative diseases as a consequence of morphological, biochemical and functional changes. These may cause the individual to experience a surgical situation at some moment of senility. Thus, it can be verified (Tables 2 and 3) that the surgical specialties, as well as the procedures performed, involve all the organic systems. However, lifestyle and habits can dictate the quality of the aging process; therefore, it is of great importance that senility is considered from the earliest phases of life.

The high prevalence of orthopedic surgical procedures (Table 2), with the majority being for femur fracture (Table 3) should be highlighted. A study conducted in countries belonging to the European Union showed that 610,000 hip / femoral fractures occurred in elderly people over 70 years of age<sup>14</sup> in 2010, and in Brazil between 2008 and 2012, there were 38,755 femoral fractures, evidencing that this occurrence has been increasing in recent decades.

Fractures are the result of falls and bone fragility and result in loss of independence and high morbidity and mortality rates, increasing costs for the health system<sup>15</sup>. In view of this reality, the importance of implementing the preventive measures recommended by the WHO is emphasized<sup>16</sup>.

General inhalation anesthesia and intravenous anesthesia were the most used in the elderly patients. This study questions whether general anesthesia can be detrimental to the elderly brain, since, not infrequently, elderly patients present deterioration of cognitive function postoperatively, which may lead to increased morbidity and mortality<sup>17</sup>. Spinal anesthesia, as well as other anesthetic modalities, has advantages over general anesthesia, such as: stable hemodynamic variables, less blood loss, less postoperative pain, faster recovery time and less postoperative confusion; however, the sympathetic block can cause hypotension, bradycardia and cardiac arrest<sup>18</sup>.

The high number of surgical teams that used anesthesia in elderly patients, but who did not make any records in the Electronic Patient Record (PEP) was alarming. Although the quality of patient medical record keeping was not an objective of this study, it is important to emphasize the importance of this finding, since the PEP aims to contribute to the efficiency and quality of care, to integrate health organizations and to facilitate their management and research<sup>19</sup>. The fact that there is no record in the patient medical records regarding the type of anesthesia used in certain surgical procedures is significant information due to the importance of this information for the planning and the implementation of perioperative care.

A death rate of 14.53% was found. A study evaluating mortality in elderly patients with hip fractures revealed a rate of 11.9% of deaths during hospitalization, related to comorbidities, infections during hospitalization and time between hospitalization and surgery for more than 7 days<sup>20</sup>. Surgery time and age were also higher in deaths that occurred in the intraoperative period, i.e., within the SC, reaffirming the risk of long surgeries, especially in older patients. Long procedures may serve as markers for complex cases.

Vascular surgeries had the highest amount of postoperative deaths, both in the hospitalization units and in the intensive care units followed by gastrointestinal surgery and neurosurgery, which are both complex surgical specialties.

Due to the increase of cardiovascular diseases in the study population, due to genetics and lifestyle habits incompatible with their underlying diseases, intraoperative and postoperative complications increase and, as a result mortality is also high<sup>9</sup>.

## CONCLUSION

The present study identified the main causes that lead elderly patients to need surgical procedures and that, in order to improve the service, it is important to understand the pattern of surgical care changes for this group of patients. The data presented here reinforce the need

for new models of care, with a view to improving the multidisciplinary geriatric care in the preoperative care provided to the elderly. Improving the quality of the electronic medical record completion is also fundamental for new research. Specific electronic documents for anesthesia and immediate recovery can provide greater safety for the professional and for the patient, besides contributing to academic and research activities.

This study is limited due to the collection of retrospective data, the non-probabilistic sample and due to being performed in only one context. In addition, the results found here can not be generalized, and more studies on this theme should be performed with other methodological designs and other samples of elderly patients.

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