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SCIENTIFIC ARTICLE

Epidemiological profile of patients seen in the pre-anesthetic assessment clinic of a university hospital

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KEYWORDS
Preanesthetic evaluation;
Surgery;
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Abstract
Objective: Assess the demographic and clinical characteristics of surgical patients seen in the Pre-anesthetic Assessment Clinic of the Hospital Universitário Gaffrée e Guinle (APA/HUGG), in order to assist in the pursuit for quality, effectiveness, and resource rationalization of hospital management.
Method: Cross-sectional descriptive study with 491 patients undergoing elective surgery, treated at APA/HUGG Clinic from March to December 2014. The following variables were assessed: sex, age, BMI, smoking status, associated diseases, classification of MET's and ASA, presence of decompensated disease, medical associated appointments interconsultation, specialty and surgical risk, history of prior anesthetic-surgical procedure, and complications.
Results: There was a predominance of female (64.8%) and overweight patients (55.9%), aged 18–59 years. The prevalence of associated diseases was high (71.3%), with hypertension pressure prevailing (50.1%). Most patients had clinically compensated morbidity (96.3%) and long-term use of medication (77.4%). Regarding the surgical characteristics, the most frequent specialty was general and medium risk surgeries. The analysis of the characteristics by age showed that the elderly have more associated diseases and long-term use of medication, in addition to predominance of ASA II–III.

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Conclusion: The epidemiological profile of surgical patients seen at the APA/HUGG was female, age 18–59 years, overweight, with associated diseases, long-term use of medication, without clinical decompensation, ASA II and MET's ≥4. Knowledge of the clinical characteristics of surgical patients is critical to schedule the perioperative care, allowing the improvement of quality and safety in anesthesia and surgery.

PALAVRAS-CHAVE
Avaliação pré-anestésica;
Cirurgia;
Cuidados pré-operatórios

Perfil epidemiológico de pacientes atendidos no ambulatório de avaliação pré-anestésica de um hospital universitário

Resumo
Objetivo: Verificar as características demográficas e clínicas dos pacientes cirúrgicos atendidos no Ambulatório de Avaliação Pré-Anestésica do Hospital Universitário Gaffrée e Guinle (APA/HUGG), com o objetivo de auxiliar na busca de qualidade, efetividade e racionalização de recursos da gestão hospitalar.
Método: Estudo descritivo transversal, feito com 491 pacientes de operação eletiva, atendidos no Ambulatório de APA/HUGG de março a dezembro de 2014. Foram estudadas as variáveis: sexo, faixa etária, índice de massa corporal (IMC), tabagismo, doenças associadas, classificação da capacidade funcional (METs), (ASA), doença descompensada, interconsultas, especialidade e porte cirúrgicos, história de procedimento anestésico-cirúrgico prévio e possíveis complicações.
Resultados: Predominaram pacientes do sexo feminino (64,8%), na faixa de 18 a 59 anos (55,9%) e com sobrepeso (38,3%). A prevalência de doenças associadas foi elevada (71,3%) sendo a hipertensão arterial a principal (50,1%). A maior parcela dos pacientes apresentava morbidade clinicamente compensada (96,3%) e uso contínuo de medicamento (77,4%). Em relação às características cirúrgicas, a especialidade mais frequente foi a cirurgia geral e o porte médio. A análise das características por faixa etária mostrou que os idosos apresentaram mais doenças associadas e uso contínuo de medicação além de predomínio de ASA II e III.
Conclusão: O perfil epidemiológico dos pacientes cirúrgicos atendidos na APA/HUGG foi: sexo feminino, faixa etária de 18 a 59 anos, sobrepeso, com doenças associadas, em uso de medicação contínua, sem descompensação clínica, ASA II e METs ≥ 4. O conhecimento das características clínicas dos pacientes cirúrgicos é fundamental para o planejamento dos cuidados perioperatórios e permite avançar na qualidade e segurança em anestesia e cirurgia.

Introduction

Since the last decades of the twentieth century, the quality of services and health systems has become a central and common theme throughout world. Quality and safety form a binomial that should guide improvements in structures, outcomes, and processes.[1] Pre-anesthetic evaluation (PAE) is inserted in this context as a fundamental aspect to increase the anesthetic-surgical safety and quality of care. Inadequate and/or insufficient PAE is associated with increased surgical morbidity and mortality.[2] However, when performed on an outpatient basis, it has many advantages, such as improvement of patient's clinical status, reduced anxiety, and faster postoperative recovery in addition to increased contact of the patient with the anesthesiologist.[3–5] The Brazilian Federal Council of Medicine (*Conselho Federal de Medicina – CFM*) through the Resolution 1.802/06.1 declared the pre-anesthetic evaluation as essential, and recommended its completion before hospital admission.[6]

PAE is defined as a set of measures that precede the anesthetic care required for the operation and consists of collecting and recording information through interviews, medical history, physical examination, laboratory tests, and evaluations by medical specialists. Its objectives are to identify associated diseases, evaluate drug therapy, determine the need for perioperative interventions, formulate the anesthesia plan (choice of drugs, intraoperative or postoperative monitoring), and establish measures to guide intraoperative decisions.[7,8] Moreover, it is the time to obtain consent and provide information and guidance to the patient.[9,10]

The increasing complexity of surgical procedures, associated with increases in life expectancy, has allowed increasingly complex patients to be referred to the anesthetic-surgical practice. Similarly, evaluation and

preoperative care expanded out of the operating room and thus expanded the role of the anesthesiologist as an evaluator of these procedures. The outpatient preoperative clinical visit made by the anesthesiologist is a relatively new model, so that the concept of a pre-anesthetic assessment clinic was initially introduced just over 50 years[11] and has been gradually implemented in Brazil.

Knowledge of the demographic and clinical characteristics of the population candidate for surgical procedures of a hospital is critical to business planning and physical dimension of the operating theater and care systems, such as admission/discharge and day hospital. It also helps in multidisciplinary effort, education and training of human resources, and in the operation of support sectors, such as laboratory, transfusional agency, and pharmacy. It is a very useful tool in the search for safety, quality, effectiveness, and streamlining of hospital management resources. The aim of this study was to determine the demographic and clinical characteristics of surgical patients seen at the Pre-anesthetic Assessment Clinic of the Hospital Universitário Gaffrée e Guinle (HUGG).

Methods

Descriptive, cross-sectional study performed from March to December 2014. It was approved by the Research Ethics Committee, No 27505514.4.0000.5258, and all patients who agreed to participate gave Written Informed Consent (WIC).

The study population consisted of patients with surgical diseases of elective treatment, referred for preoperative evaluation by the following clinics: general surgery, digestive tract surgery, and colon surgery and proctology (specialties that in this study comprised the general surgery group), urology, gynecology, thoracic surgery, vascular surgery, otorhinolaryngology, orthopedics, neurosurgery, plastic surgery, and ophthalmology. Exclusion criteria were patients aged under 18 years and absence or failure to complete the evaluation form. Pre-anesthetic consultation followed the guidelines for ambulatory anesthesia and surgery approved by the American Society of Anesthesiologists (ASA).[12] Data were collected by the researcher, through a data collection form, who collected information from interview and physical examination registered in individual pre-anesthetic evaluation forms (a form developed and used by the Department of Anesthesiology [SANE/HUGG]). PAE consultations were made by three SANE-HUGG anesthesiologists.

The following groups of variables were considered:

1. *Demographic and anthropometric variables*: Sex; age stratified in two groups (18–59 years and ≥60 years); weight and height used to calculate body mass index (BMI).[13]
2. *Clinical variables*: Presence of one or more associated diseases identified by history and/or physical examination and identified by history and/or physical examination and their quantitative; history of smoking; use of medications; functional classification according to metabolic equivalents – MET (Duke Activity Status Index), Duke Activity Status Index,[14] physical status ASA,[15] need for referral to specialist according to clinical criteria, and the occurrence of clinically decompensated associated disease.
3. *Surgical procedure variables*: Surgical specialty, surgery classification proposed by Eagle,[16] and previous history of surgery and/or anesthesia and possible complications.

For sample size calculation, we obtained the historical average number of patients seen in the Pre-anesthetic Assessment Clinic of HUGG. We use the calculation for finite population samples and sampling procedures without replacement and obtained a sample of 329, which ensures a 95% confidence interval and a significance level of $p \leq 0.05$. The SPSS software version 17.0 for Windows (Statistic Package for Social Sciences, Chicago, IL, USA) was used for data processing through descriptive statistics; qualitative variables are described as percentages and continuous variables as mean and standard deviation. To check the distribution of characteristics by age group and sex we used the chi-square test (95% confidence interval and a $p \leq 0.05$ as significant).

Results

We analyzed 491 patients in total. Of the 500 consecutive patients initially recruited, six refused to participate and three did not meet the study criteria.

There was a predominance of female (64.8%); mean of 56.12 ± 15.3 years (18–90 years); 55.9% of patients were assigned to the group of up to 59 years. Of the patients, 67.2% were overweight, with 38.3% in the overweight group and 28.9% in the obese group (grade I, II, and III), shown in Table 1.

Associated diseases were identified in most patients (71.3%), and the association of two or more diseases was identified in 32% of the sample. The most prevalent associated disease was systemic arterial hypertension (SAH), which affected half of the patients (50.1%), followed by diabetes mellitus (11.4%), lung disease (9.5%), and dyslipidemia (7, 9%). Regarding life habits, 11% of patients were smokers. The continued use of medication was seen in 77.4%. Among the most commonly used drugs, angiotensin-converting enzyme (ACE) inhibitors and angiotensin II receptor blockers (ARBs) were used by 36.9% of patients, whereas 25.5% used diuretics and 11.2% other antihypertensive drugs (β-blockers, Ca^{+} channel blockers, etc.). These groups of drugs were followed by oral or injectable antidiabetic agents used by 14.9%, corticosteroids by 5.3%, immunosuppressant and chemotherapy agents by 1.6%, and anticoagulants by 1.4% of the sample (Table 1).

According to the functional classification used, 65.6% of the sample were classified with moderate functional capacity (MET ≥4); 22.4% with excellent capacity (MET ≥10), and 12% with low capacity (MET <4). Regarding the physical status classification proposed by ASA, 64.4% of patients were classified as ASA II. Referral to specialists was required in 6.7% of patients, with predominance of cardiology. Only 3.7% of patients had a clinically decompensated disease during PAE (Table 1).

The distribution of patients by surgical specialties is shown in Table 2. The general surgery group was predominant (36.5%), followed by urology (17.9%) and gynecology

Table 1 Demographic, anthropometric, and clinical variables.

Variable	*n*	%
Sex		
Female	316	64.4
Male	175	35.6
Age		
18–59 years	275	56
≥60 years	216	44
Body mass index		
Underweight	11	2.2
Eutrophic	150	30.5
Overweight	188	38.3
Obesity grade I, II and III	142	28.9
Associated diseases		
Yes	350	71.3
No	141	28.7
Two or more associated	157	32
SAH	246	50.1
DM	56	11.4
Smoker		
Yes	54	11
No	437	89
Use of drugs		
Yes	380	77.4
No	111	22.6
Functional classification (MET)		
<4 METs	59	12
≥4 METs	322	65.6
≥10 METs	110	22.4
Physical status (ASA)		
ASA I	131	26.7
ASA II	316	64.4
ASA III	44	9
Need for referral		
Yes	33	6.7
No	458	98.3
Decompensated disease		
Yes	18	3.7
No	473	96.3
Total	491	100

SAH, Systemic Arterial Hypertension; DM, diabetes mellitus.

(13.8%); about half of operations were medium-sized (52.5%). Most patients (72.7%) had a previous history of surgical interventions and only 4.7% reported the occurrence of complications in anesthetic-surgical procedures.

Tables 3 and 4 show the distribution of characteristics by age group, whose analysis was performed using the chi-square test and adopting a significance level of $p \leq 0.05$. There were significant differences for sex, with the highest concentration of women in the older group ($p < 0.001$); there was predominance of associated diseases in the older group ($p < 0.001$), as well as smokers ($p = 0.006$), use of medication ($p < 0.001$), MET ($p < 0.001$), ASA ($p < 0.001$),

Table 2 Variables related to surgical procedure.

	N	%
Specialty		
General surgery[a]	183	37.3
Urology	88	17.9
Gynecology	68	13.8
Ophthalmology	57	11.6
Other	95	19.4
Surgery classification		
Minor	164	33.4
Mid-size	258	52.5
Major	69	14.1
Previous surgical procedure		
Yes	356	72.5
No	135	27.5
Previous anesthetic-surgical complications		
Yes	23	4.7
No	468	95.3
Total	491	100

[a] General surgery comprises surgical procedures general surgery, abdominal surgery, and coloproctology.

surgical specialty ($p < 0.001$), size of surgery ($p = 0.016$), and previous surgical procedure ($p = 0.022$). Tables 5 and 6 show the distribution of characteristics by sex. There was a predominance of women in the obesity group ($p = 0.007$) and in continuous use of medication ($p = 0.013$); men was predominant in the smoker group ($p < 0.001$) and also in the functional classification MET ≥10 ($p < 0.001$). There were also significant differences between sexes in distribution by surgical specialty ($p < 0.001$), with predominance of female in gynecology and ophthalmology specialties and male predominance in urology, in addition to female predominance in previous history of surgical procedures ($p = 0.039$) and anesthetic-surgical complications ($p = 0.045$).

Discussion

The primary objectives of the pre-anesthetic evaluation are to promote safety in surgery and anesthesia by reducing surgical morbidity and mortality, in addition to improve the quality of care and reduce perioperative care costs. Studies performed in Australia[2,17] reported that 14% of anesthetic-surgical complications and 39% of deaths attributed to anesthesia were unequivocally associated with insufficient and/or inadequate preoperative evaluation.

In our country there is a strong trend toward PAE expansion in outpatient settings, although there are still difficulties in the implementation of these services even with evidence of improved quality of care, reduced morbidity and mortality, and improvement in performance indicators.[18–20] In the HUGG, the outpatient PAE has been conducted for 20 years at SANE. There is a scarcity of research on pre-anesthetic evaluation regarding the epidemiological profile of surgical patients both in the Brazilian and international medical literature, so that most studies are focused on the analysis of results of implementing outpatient clinics of pre-operative evaluations.[19,20]

Table 3 Distribution of anthropometric and clinical characteristics by age group.

Characteristic	Age group		Total *n* (%)	*p*-value
	18–59 years, *n* (%)	≥60 years *n* (%)		
Sex				**<0.001**
Female	195 (70.9)	121 (56.0)	316 (64.4)	
Male	80 (29.1)	95 (44.0)	175 (35.6)	
BMI				**0.285**
Underweight	6 (2.2)	5 (2.3)	11 (2.2)	
Eutrophic	82 (29.8)	68 (31.5)	150 (30.5)	
Overweight	98 (35.6)	90 (41.7)	188 (38.3)	
Obesity grade I, II and III	89 (32.4)	56 (24.6)	142 (28.9)	
Associated diseases				**<0.001**
No	113 (41.1)	28 (13.0)	141 (28.7)	
One	103 (37.5)	90 (41.7)	193 (39.3)	
Two or more	59 (21.5)	98 (45.4)	157 (32.0)	
SAH	95 (34.5)	151 (69.4)	246 (50.1)	**<0.001**
DM	18 (6.5)	38 (17.6)	56 (11.4)	**<0.001**
Smoker				**0.006**
Yes	33 (12.0)	21 (9.7)	54 (11)	
No	242 (88.0)	195 (90.2)	437 (89)	
Use of drugs				**<0.001**
Yes	193 (70.2)	187 (86.6)	380 (77.4)	
No	82 (29.8)	29 (13.4)	111 (22.6)	
Functional classification (MET)				**<0.001**
<4 METs	10 (3.6)	49 (22.7)	59 (12.0)	
≥4 METs	165 (60.0)	157 (72.7)	322 (65.6)	
≥10 METs	100 (36.4)	10 (4.6)	110 (22.4)	
Physical status (ASA)				**<0.001**
ASA I	105 (38.2)	26 (12.0)	131 (26.7)	
ASA II	154 (56.0)	162 (75.0)	316 (64.4)	
ASA III	16 (5.8)	28 (13.0)	44 (9)	
Need for referral				0.182
Yes	14 (5.1)	19 (8.9)	33 (6.7)	
No	261 (94.9)	197 (91.2)	458 (98.3)	
Decompensated disease				0.576
Yes	10 (3.6)	8 (3.7)	18 (3.7)	
No	265 (96.4)	208 (96.3)	473 (96.3)	
Total	275 (100)	216 (100)	491 (100)	

SAH, Systemic Arterial Hypertension; DM, Diabetes Mellitus. Numbers in bold are statistically significant.

The predominance of women (65%) in this sample is similar to that seen in the country according to the Brazilian Institute of Geography and Statistics (IBGE) census of 2010.[21] The explanation lies in the largest Brazilian women population, quantitatively, in addition to the predominance of women in the older age group. This feature represents the so called feminization of aging process,[22] a configuration explained by the fact that male mortality is higher than female, as well as by the increased demand and use of health services by women.[23]

Although most patients were in the age group of 18–59 years (55.9%), similar to that found in the study by Gusman[18] conducted in a university hospital of Botucatu (São Paulo, Brazil), it should be noted that older patients have achieved a significant rate in the sample studied (44.1%). This fact expresses what has been observed in recent decades in the country; that is, the progressive reduction of population growth and changes in the age group structure demonstrated, among other facts, due to the increased elderly population. This population aging process identified by a narrow base and a broad top of the age pyramid is confirmed by the last population census of 2010.[21] This implies the need for trained health professionals and institutions to care for this growing group of patients.

The Brazilian population aging process has changed its epidemiological profile, showing a high mortality rate due

Table 4 Variables related to surgical procedure classified according to age groups.

Variables related to surgical procedure	Age group		Total *n* (%)	*p*-value
	18–59 years *n* (%)	≥60 years *n* (%)		
Specialty				<0.001
General surgery[a]	108 (39.3)	71 (32.9)	183 (37.3)	
Urology	33 (12.0)	55 (25.5)	88 (17.9)	
Gynecology	56 (20.4)	12 (5.6)	68 (13.8)	
Ophthalmology	8 (2.9)	49 (22.7)	57 (11.6)	
Other	66 (24.0)	29 (13.4)	95 (19.4)	
Surgery classification				**0.016**
Minor	77 (28.0)	87 (40.3)	164 (33.4)	
Mid-size	157 (57.1)	101 (46.8)	258 (52.5)	
Major	41 (14.9)	28 (13.0)	69 (14.1)	
Previous surgical procedure				**0.022**
Yes	189 (68.7)	167 (77.3)	356 (72.5)	
No	86 (31.3)	49 (22.7)	135 (27.5)	
Previous anesthetic-surgical complications				0.275
Yes	11 (4)	12 (5.6)	23 (4.7)	
No	264 (96)	204 (94.4)	468 (95.3)	
Total	275 (100)	216 (100)	491 (100)	

[a] General surgery comprises surgical procedures general surgery, abdominal surgery, and coloproctology.
Numbers in bold are statistically significant.

to chronic non-communicable diseases instead of infectious and parasitic diseases. The increasing prevalence of chronic disease brings with it the need for continuous treatments and increased occurrence of varying degrees of dysfunction and addiction, which has direct implications for the surgical patient management. This fact is of significant relevance to the social demands and public spending on health, with significant relevance to trends in countries in more advanced stages of the demographic transition. Therefore, a research agenda in hospital care, quality of care, and health expenses should seek appropriate hospital infrastructure to absorb this population change, considering the need for physical facilities and the training and allocation of human resources based on the complexity of the problems and age group that tends to prevail in the coming decades.

The BMI assessment allowed the identification of a predominant group classified as overweight (35%) and obese (28.9%), with predominance of women in these groups, which is similar in part to that reported in the assessment by the IBGE,[24] in which overweight (BMI $\geq$25 kg m^{-2}) was diagnosed in 50% of men and 48% of women and obesity (BMI $\geq$30 kg m^{-2}) in 12.5% of men and 16.9% of women. The frequency of both overweight and obesity increased in the age group of 45–54 years for men and 55–64 years for women, declining from there, different from that observed in this study in which there was no statistical difference regarding BMI assessment by age group. Similar findings were reported by Vigitel Brazil in 2013 (*Vigilância de fatores de risco e proteção para doenças crônicas por inquérito telefônico*[25]); so in that the comparison of the last IBGE[24] surveys, the frequency of overweight individuals increased by more than one percentage point per year, which points toward the possibility that in about 10 years the excess weight may reach two thirds of the adult population in Brazil.

Obesity is a major public health problem worldwide, with an increasing trend in recent years. This condition is associated with increased mortality and one of the complicating factors in the control of chronic, non-communicable diseases (NCDs), particularly cardiovascular and diabetes, very prevalent conditions in surgical patients. Moreover, it is known that obesity is a major risk factor for postoperative complications, particularly respiratory and infectious.[26] This finding implies the need for a multidisciplinary approach for disorder identification and monitoring before, during, and after surgery, in order to minimize the adverse consequences that may occur to this specific group of patients.

In this study, 71.3% of the patients had an associated disease, and 32% of the total sample had two or more. Among the more prevalent ones there is hypertension, in half of the cases, and diabetes mellitus with only these two conditions accounting for 61.5% of the associated chronic diseases. The prevalence of associated diseases was higher in older subjects, as discussed above, but with no statistical difference by sex. NCDs are currently one of the major public health problems, and estimates from the World Health Organization (WHO) indicate that NCDs accounted for 63% of 36 million deaths worldwide in 2008.[29] Historical series of mortality statistics available for the capitals of the Brazilian states indicate that the proportion of deaths from NCDs increased by more than three-folds between 1930 and 2006.[24]

The 2013 National Health Survey[27] indicates that NCDs are a health problem of great magnitude and relevance, as

Table 5 Distribution of anthropometric and clinical characteristics by sex.

Characteristics	Sex		Total *n* (%)	*p*-value
	Female *n* (%)	Male *n* (%)		
Age group				**<0.001**
18–59 years	195 (70.9)	80 (29.1)	275 (56)	
≥60 years	121 (56.0)	95 (44)	216 (44)	
BNI				**0.007**
Underweight	8 (2.5)	3 (1.7)	11 (2.2)	
Eutrophic	82 (25.9)	68 (38.9)	150 (30.5)	
Overweight	118 (37.3)	70 (40.0)	188 (38.3)	
Obesity grade I, II and III	108 (34.2)	34 (19.5)	142 (28.9)	
Associated diseases				0.692
No	87 (27.5)	54 (30.9)	141 (28.7)	
One	123 (38.9)	70 (40)	193 (39.3)	
Two or more	106 (33.6)	51 (29.2)	157 (32)	
SAH	162 (51.3)	834 (47.4)	246 (50.1)	0.236
DM	34 (10.8)	22 (12.6)	56 (11.4)	0.321
Smoker				**<0.001**
Yes	29 (9.2)	25 (14.3)	54 (11.0)	
No	287 (90.8)	150 (85.7)	437 (89.0)	
Use of drugs				**0.013**
Yes	255 (80.7)	125 (71.4)	380 (77.4)	
No	61 (19.3)	50 (28.6)	111 (22.6)	
Functional classification (MET)				**<0.001**
<4 METs	31 (9.8)	28 (16)	59 (12)	
≥4 METs	231 (73.1)	91 (52)	322 (65.6)	
≥10 METs	54 (17)	56 (32)	110 (22.4)	
Physical status – ASA				0.151
ASA I	82 (25.9)	49 (28)	131 (26.7)	
ASA II	211 (66.8)	105 (60)	316 (64.4)	
ASA III	23 (7.3)	21 (12.0)	44 (9)	
Need for referral				0.633
Yes	20 (6.3)	13 (7.4)	33 (6.7)	
No	296 (94.9)	153 (91.2)	458 (98.3)	
Decompensated disease				0.474
Yes	11 (3.5)	7 (4.2)	18 (3.7)	
No	305 (96.5)	168 (95.8)	473 (96.3)	
Total	316 (100)	175 (100)	491 (100)	

SAH, Systemic Arterial Hypertension; DM, Diabetes Mellitus. Numbers in bold are statistically significant.

they account for over 70% of the causes of deaths in Brazil. Cardiovascular diseases, cancer, diabetes, chronic respiratory diseases, and neuropsychiatric disorders, which are the main NCDs, have accounted for a high number of deaths before age 70 and loss of quality of life, causing disabilities and a high degree of limitation of ill people in their work and leisure activities.

Also according to the 2013 National Health Survey (NHS), the proportion of individuals aged 18 and older who reported diagnosis of hypertension in Brazil was 21.4%, corresponding to 31.3 million people, with a higher proportion of women (24.2%) compared to men (18.3%).[27] In this survey, among the total number of people between 60 and 64 years of age 44.4% reported a diagnosis of hypertension, a proportion that was 52.7% among people aged 65–74 years and 55% among people aged 75 years or more, data very similar to those found by Vigitel in 2013.[25] In the present study, it was found that 50.1% of patients had systemic arterial hypertension (SAH) with no statistical difference in the analysis by sex. Probably reflecting the number of elderly in the population studied, in which the rate of NCDs and, among them SAH, is higher than that of the general population.

SAH is the second most common risk factor associated with surgical morbidity. The practice of postponing the

Table 6 Variables related to surgical procedure classified according to sex.

Variables related to surgical procedure	Sex		Total *n* (%)	*p*-value
	Female *n* (%)	Male *n* (%)		
Specialty				**<0.001**
General surgery[a]	115 (36.4)	68 (38.8)	183 (37.3)	
Urology	26 (8.2)	62 (35.4)	88 (17.9)	
Gynecology	68 (21.5)	0 (0)	68 (13.8)	
Ophthalmology	44 (13.9)	13 (7.4)	57 (11.6)	
Other	63 (25.4)	32 (13.3)	95 (19.4)	
Surgery classification				0.101
Minor	112 (35.4)	52 (29.7)	164 (33.4)	
Mid-size	167 (52.8)	91 (52)	258 (52.5)	
Major	37 (11.7)	32 (18.3)	69 (14.1)	
Previous surgical procedure				**0.039**
Yes	189 (68.7)	167 (77.3)	356 (72.5)	
No	78 (24.7)	57 (32.6)	135 (27.5)	
Previous surgical anesthetic complications				**0.045**
Yes	19 (6)	4 (3.3)	23 (4.7)	
No	297 (94)	171 (97.7)	468 (95.3)	

[a] General surgery comprises surgical procedures general surgery, abdominal surgery, and coloproctology.
Numbers in bold are statistically significant.

operation due to severe uncontrolled hypertension is related to a classic study showing that hypertension is associated with perioperative cardiovascular complications.[30] In a systematic review and meta-analysis of 30 observational studies,[31] it was identified that there is little evidence that systolic blood pressure under 180 mmHg and diastolic blood pressure under 110 mmHg are associated with perioperative complications. Therefore, it is a consensus among most authors that moderate degree of hypertension (180 × 110 mmHg) without target-organ damage should not be a reason to postpone or suspend operations. For severe hypertension, the benefits of delaying a surgical procedure to control blood pressure should be weighed against the risks of postponing the curative operation. One should always keep in mind that the blood pressure improvement time should be respected, sudden corrections should be avoided and a postoperative clinical follow-up ensured.[32] Another challenge posed by this morbidity is the correct identification and assessment of possible lesions in target organs and associated morbidities, such as underlying coronary disease, congestive heart failure, hypertrophy and/or left ventricular overload, cerebral atherosclerosis, and impaired renal function. While uncontrolled isolated SAH is considered a minor risk factor[16] and when accompanied by hypertrophy or left ventricular overload is known to be an independent cardiovascular risk factor.[33]

In this sample, the occurrence of patients with decompensated hypertension (>180 × 110 mmHg) was very low, but according to the above, it is believed that it is during the outpatient preoperative assessment that the hypertensive patient should be identified and treated through internal medicine and/or cardiology appointments and proper guidance to strict adherence to drug prescription. Moreover, it is during this time that a careful evaluation of possible lesions in target organs allows a correct stratification of cardiovascular risk and planning the perioperative surgical anesthetic management.

According to Sartorelli,[34] the prevalence of type 2 diabetes mellitus has exponentially increased, particularly in developing countries. Whereas in developed nations, the increase occurs mainly in the older age population, so that in those aged 45–64 years the prevalence is expected to triple, while in those aged 20–44 years and 65 years or more it is expected to double. According to Vigitel Brazil,[25] in 2013 the frequency of previous diagnosis of diabetes was 6.9%, with 6.5% for men and 7.2% for women. According to the 2013 NHS,[27] 6.2% of the Brazilian population aged 18 or older reported having been diagnosed with diabetes, reaching 20% of the age group of 65–74 years. The results obtained in our population show a prevalence of 11.5%, also with higher percentages in the elderly group (17.6%) without statistical difference between sexes. Because DM is an important predictor of postoperative death and ischemic heart disease is the most common cause of postoperative morbidity in these patients,[35] strict preoperative assessment is required, involving a referral to a specialist whenever needed.

The results obtained in this study compared with those found by the 2013 NHS regarding hypercholesterolemia (8.1% vs. 12.5%), occurrence of asthma (5.1% vs. 4.4%), and heart diseases (5, 2% vs. 5.0%) were similar.

Most patients (77.4%) are on continuous use of medications. This circumstance brings several perioperative implications, such as the need for additional tests, which otherwise would be unrequested. Furthermore, the use of some medications may pose a risk of interaction with anesthetics. The occurrence of such event depends on the extent

of medication use, age and weight of the patient, and concurrence with enzyme induction, among others.[36]

During PAE, after identifying the continued use of any drug, the decision to maintain, discontinue or change the drug should be based on the evaluation of each case, which sometimes requires interaction with other medical specialty. It is worth noting that in this study, because SAH was the most frequent associated disease, so it was the use of antihypertensive drugs. Among these, the angiotensin-converting enzyme (ACE) inhibitors and angiotensin II receptor blocker (ARB) were the most used (36.8%), followed by diuretics (25.5%). Such medications are the subject of recent controversies regarding its perioperative maintenance.[37] This is due to the fact that there is still insufficient evidence for defining which groups of patients or which operations would benefit or not from discontinuing the perioperative use of ACE inhibitors and ARB blockers.

Among the study patients, 11% reported the use of tobacco, men with a higher percentage than women (14.3% vs. 9.2%). According to the 2013 NHS,[27] the prevalence of current users of tobacco products, smoked or non-smoked, daily or occasionally, was 15%, also with a higher percentage of users among men (19.2%) than among women (11.25%), a finding close to that reported in this study. Other studies with similar results are the study by Vigitel 2013,[27] which in all the 27 cities surveyed found an 11.3% frequency of adult smokers, and the study conducted at the University Hospital of the Federal University of Santa Catarina, which found a prevalence of 18.7% of smokers in the population studied.[28] Because smoking is an important risk factor for the onset of various chronic diseases, this habit remains as a global leader among the preventable causes of death.[29] It is undeniable that the circumstances described above is most relevant among patients candidate for surgical treatment.

The use of the Duke Activity Status Index[14] revealed that a minority of patients (12.6%) had poor functional capacity (MET <4). Particularly in this group, the increased cardiac risk was reported.[32] In a study of 600 patients undergoing non-cardiac surgery, perioperative myocardial ischemia and other cardiovascular complications were more common in patients with functional capacity below 4 MET, even after adjusting for other risk factors.[32] The functional capacity categorization performed for all patients during PAE aims to guide the choice of surgical procedure, choice of surgical technique and anesthetic agents, type of intraoperative monitoring, and postoperative surveillance level.

In this study, the most frequent physical status was ASA II, which means that most patients had moderate systemic disease without functional limitation. The prevalence of patients with ASA II was also found in other preoperative evaluation studies.[18–20] When analyzing this variable by age, it is seen a predominance of older people both in ASA II and ASA III. This confirms that this is the most prevalent group in the diagnosis of moderate to severe associated diseases, compensated or not.

Our result with only 6.7% of the patients who needed referral to medical specialties differs from the results of a study conducted by Bisinotto,[20] which showed that 11.9% of the study population had clinical decompensation and, therefore, needed referral, particularly to cardiology. We believe that this difference is due to the low frequency (3.7%) of patients with this condition in our sample.

In the United States, the elderly population accounts for 20–40% of surgical procedures, 50% of emergency operations, and 75% of surgical mortality.[38] The elderly morbidity in elective surgery ranges from 10% to 58%; this variation is due to lack of uniform definitions for the concept of complication, variability of the surgical procedures performed, and non-proportional division of individuals per group above 60 years old.[38] Mortality and morbidity in elective surgery has declined in recent decades due to improvements in security, anesthetic and surgical techniques and assessment, and preoperative care.[38] There is a consensus that mortality and surgical morbidity in this population are not related to age but to physiological aspects of aging and its response to surgical aggression. The presence of preexisting disease and the severity of the basic surgical condition make evaluation and preoperative care the key to success in the management of surgical elderly, prevention and treatment of possible complications.

In the study population, the predominant group was the general surgery group, followed by urology, gynecology, and ophthalmology groups. When analyzing the surgical variables by age and sex, it was found a predominance of older people in minor operations and in ophthalmology and urology, of women in gynecology and ophthalmology, and of men in urology. These findings are consistent with findings in the literature, with the most common surgical diseases in the elderly are the ophthalmological, urological, orthopedic, and surgical diseases of the digestive tract.[38] Regarding previous surgical procedure, the elderly and women represented the largest group, which confirms this group growing increase in all surgical procedures worldwide.[38]

Considering it is not mandatory to refer elective surgical patients to a pre-anesthetic evaluation in HUGG, and since the PAE clinic service capacity is lower than the demand for surgery in this hospital we believe that the main limitation of this study is the fact that there may be a tendency of surgeons to refer older patients with chronic diseases and candidates for major surgery to the PAE clinic, rather than younger patients candidates for minor surgery and without history of associated diseases. In this sense, it is worth thinking about the future possibility of standardizing the PAE procedure also in this respect, with all surgical patients being evaluated *in loco*.

Conclusion

Most patients referred to the PAE clinic of HUGG/UNIRIO were female, in the age group of 18–59 years, overweight, with high prevalence of associated diseases, on continuous medication, and without clinical decompensation. Regarding physical status and functional capacity, most subjects was classified as ASA II and MET $\geq$4. The analysis of characteristics by age group showed that older people had more associated diseases and were on continuous medication, in addition to having a predominance of physical status classified as ASA II and III. These results may support the plans for perioperative care and the multidisciplinary team work, thereby improving the quality and safety of patient care undergoing elective surgery in the study hospital.

Conflicts of interest

The authors declare no conflicts of interest.

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