EVALUATION OF THE FUNCTIONAL CAPACITY OF PATIENTS ATTENDED IN A PERIOPERATIVE OUTPATIENT CLINIC OF THE FEDERAL DISTRICT

Avaliação da capacidade funcional de pacientes atendidos em um ambulatório perioperatório do Distrito Federal

Evaluación de la capacidad funcional de pacientes atendidos en un ambulatorio perioperatorio del Distrito Federal

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ABSTRACT: **Objective:** To identify the functional capacity of patients attended at the perioperative evaluation outpatient clinic of the Regional Hospital of Gama (APA-HRG), Federal District, as well as establish relationship with the cardiac stratifications employed. **Method:** Observational, descriptive, retrospective study with data collection of records from preoperative consultations of 292 patients screened as high risk, performed by a team of medical anesthesiologists and nurses, performed in the APA-HRG in the period from June 2014 to June 2016. **Results:** The sample profile consisted, for the most part, of female subjects (78.77%), of over 60 years of age (48.35%), not obese (69.44%), referred mainly by the gynecological clinic (39.79%), diagnosed with systemic arterial hypertension (44.17%) and smokers (12.67%). Functional capacity was classified as excellent in 63.18% (>10 metabolic equivalents) of patients. There was a significant association between the metabolic equivalents and the stratification of the American Society of Anesthesiologists, the Revised Cardiac Risk Index and the Functional Classification of the New York Heart Association. **Conclusion:** Most of the charts analyzed were of patients with excellent functional capacity, presenting a significant association with the stratifications studied.
Key words: Aged. Exercise test. Perioperative care. Patient Care Team.

RESUMO: **Objetivo:** Identificar a capacidade funcional de pacientes atendidos no ambulatório de avaliação perioperatória do Hospital Regional do Gama (APA-HRG), no Distrito Federal, bem como estabelecer relação com as estratificações cardíacas utilizadas. **Método:** Estudo observacional, descritivo, retrospectivo, com coleta de dados dos registros nos prontuários das consultas pré-operatórias de 292 pacientes triados como alto risco, executadas por equipe de médicos anestesiologistas e enfermeiros, realizadas no APA-HRG no período de junho de 2014 a junho de 2016. **Resultados:** O perfil da amostra constituiu-se, em sua maioria, por indivíduos do gênero feminino (78,77%), maiores de 60 anos (48,35%), não obesos (69,44%), encaminhados principalmente pela clínica ginecológica (39,79%), diagnosticados com hipertensão arterial sistêmica (44,17%) e tabagistas (12,67%). A capacidade funcional foi classificada como excelente em 63,18% (>10 equivalentes metabólicos) dos pacientes. Foi constatada associação significativa entre os equivalentes metabólicos e as estratificações da American Society of Anesthesiologists, do Índice de Risco Cardíaco Revisado e da Classificação Funcional da New York Heart Association. **Conclusão:** A maioria dos prontuários analisados era de pacientes com excelente capacidade funcional, apresentando associação significativa com as estratificações estudadas.
Palavras-chave: Idoso. Teste de esforço. Assistência perioperatória. Equipe de assistência ao paciente.

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RESUMEN: Objetivo: Identificar la capacidad funcional de pacientes atendidos en el ambulatorio de evaluación perioperatoria del Hospital Regional do Gama (APA-HRG), en el Distrito Federal, así como establecer relación con las estratificaciones cardíacas utilizadas. **Método:** Estudio observacional, descriptivo, retrospectivo, con colecta de datos de los registros en los historiales médicos de las consultas preoperatorias de 292 pacientes seleccionados como alto riesgo, ejecutadas por equipo de médicos anestesistas y enfermeros, realizadas en el APA-HRG en el período de junio de 2014 a junio de 2016. **Resultados:** El perfil de la muestra se constituye, en su mayoría, por individuos del género femenino (78,77%), mayores de 60 años (48,35%), no obesos (69,44%), encaminados principalmente por la clínica ginecológica (39,79%), diagnosticados con hipertensión arterial sistémica (44,17%) y tabaquistas (12,67%). La capacidad funcional fue clasificada como excelente en un 63,18% (>10 equivalentes metabólicos) de los pacientes. Fue constatada asociación significativa entre los equivalentes metabólicos y las estratificaciones de la American Society of Anesthesiologists, del Índice de Riesgo Cardíaco Revisado y de la Clasificación Funcional de la New York Heart Association. **Conclusión:** La mayoría de los historiales médicos analizados era de pacientes con excelente capacidad funcional, presentando asociación significativa con las estratificaciones estudiadas.

Palabras-clave: Anciano. Prueba de esfuerzo. Atención perioperatoria. Grupo de atención al paciente.

INTRODUCTION

According to the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística* – IBGE)[1], the segment of the Brazilian population that grows the most is the elderly, with a projection of 44.44% for the year 2060. By 2025, the country can be in sixth place in the world ranking in number of elderly people[2]. As a result, the volume of non-cardiac surgeries in elderly patients, associated with comorbidities, has increased. This fact culminates in a higher risk of postoperative morbidity and mortality[3].

Among the main risk factors related to death in non-cardiac surgeries are cardiovascular diseases, mainly coronary artery disease (CAD)[4-6]. This evidence points to the need to meet this growing demand for multi professionals who perform perioperative assessments in order to identify factors that increase surgical risk and to devise strategies that reduce it, aiming at a satisfactory surgical result[7,8]. In this sense, the functional capacity of each patient, which is a reliable predictor of cardiac risk, is determined and helps establish the need for additional tests and specific pharmacological therapy before and during the planned surgery[9].

Usually, good functional capacity is defined based on the levels of metabolic equivalence (MET). A MET unit is defined as 3.5 mL/kg/min and represents the basal oxygen consumption of an average man of 70 kg at rest[10]. For reference purposes, activities of daily living such as eating, dressing, using the bathroom and showering generally require 1 to 2 MET, while sports as intense as swimming, tennis and skiing require more than 10 MET[11].

In order to evaluate the functional capacity of the patient in the perioperative period, the ergometric test is an examination of low financial cost, easy execution and high reproducibility, compatible with the reality of several regions and municipalities in Brazil. It is evident how the gradient of severity in the test is greatly related to the perioperative evolution. When at low loading, the onset of ischemic response is related to the increase in perioperative cardiac events[5,12]. The performance of this test is not indicated for the group of very low risk patients, since it does not add benefit, not even for high-risk patients due to the need for invasive stratification[5].

Anamnesis is another way used to determine tolerance to a patient's exercise. Patients are asked to describe the nature and frequency of their physical activities. As an alternative to the formal test, this is another information to evaluate the patient's ability to safely undergo surgery[13].

Simple questions allow a reasonable estimate of the patient's functional capacity. For example, one may ask whether the patient is able to walk four blocks without stopping because of limiting symptoms and climbing two floors of stairs without stopping because of limiting symptoms. Affirmative responses confirm adequate functional capacity, since such activities test the patient's tolerance to effort at a level of 4 to 5 MET, the equivalent of surgical stress[10].

On the other hand, negative responses to both questions are generally associated with older patients, who are prone to diabetes, obstructive pulmonary disease, congestive heart failure, hypertension, and higher values for the physical status classification of the American Society of Anesthesiologists (ASA). In addition, they predict a greater probability of poor postoperative evolution[13].

Considering the specific characteristics of the surgical patient and the importance of the physical exercises to obtain the improvement of the quality of care provided to the patient, the perioperative evaluation outpatient clinic of a general hospital is a service focused on perioperative evaluation. A multi professional team (anesthesiologists and nursing

staff), trained in evidence-based practices, provides individualized perioperative care to the patient, seeking better results.

At the perioperative evaluation visit, performed at the perioperative evaluation outpatient clinic of the Regional Hospital of Gama (APA-HRG), the nurse and the anesthesiologist apply the risk stratification of obstructive sleep apnea syndrome (score STOP-BANG), functional capacity (MET) and risk of venous thrombosis (safety zone). The anesthesiologist also uses the ASA physical status classification and cardiac risk by the functional classification of the New York Heart Association (NYHA), Lee's Individual Reserve Capacity Requirement (IRCR) and cardiac risk for non-cardiac procedures[14,15].

OBJECTIVE

To identify the functional capacity of patients treated in APA-HRG, Federal District, as well as establish relationship with the cardiac stratifications employed.

METHOD

This is an observational, descriptive, retrospective study, with data collection from the visits conducted from June 2014 to June 2016 at APA-HRG, a regional hospital located in Brasília, Federal District.

The population consisted of the medical records of candidates for elective surgery referred by the surgical specialties to APA-HRG. The sample consisted of 292 medical records of patients screened as high risk. According to the service protocol, high-risk patients were considered those who were older than 65 years, or less than 65 years with a morbid history (allergies, systemic diseases, use of medications on a continuous basis) and/or physical and/or cognitive limitation and/or previous history of complication in surgical-anesthetic procedure.

The study included medical and physical records of patients over 18 years of age, with elective treatment surgical diseases referred to general surgery clinics and subspecialties, gynecology and orthopedics, evaluated by APA-HRG. The exclusion criteria were the medical records of patients whose surgery was not performed until June 2017.

Of the total sample, 50 medical records of patients seen in the second half of 2014 were included, 125 in 2015 and 117 in the first half of 2016.

For the data collection, a form recorded in the physical or electronic medical records of the patients, gathering the main information contained in the standard questionnaire of the service of preoperative visits, was used. In addition to the sociodemographic and anthropometric variables (gender, age, body mass index, comorbidities and smoking habits), the physical status classification by ASA and functional classification by MET (Chart 1) were collected, as well as cardiac risk assessments: Lee, NYHA and cardiac risk for non-cardiac procedures.

The instrument used to assess functional capacity was taken from the current Guidelines of the American College of Cardiology/American Heart Association (ACC/AHA), adapted from the Duke Activity Status Index[16].

Data analysis was performed through descriptive statistics of socioeconomic and demographic data, as well as the comparison of clinical and cardiac stratifications with functional capacity (inferential analysis).

The categorical variables were described by means of absolute (n) and relative (%) frequencies and the associations were tested using the c^2 test with a significance level of 5% ($p < 0.05$). The variables were analyzed using the statistical software R (R Development Core Team 2008 version 3.3 for Windows®).

Regarding the critical analysis of the risks, because the research used only physical or electronic medical records, the risks related to work were minimal. The study assured the patients' anonymity, as it focused on the data in general and not on the individual patients.

The project was approved by the Research Ethics Committee of the Foundation of Education and Research in Health Sciences (*Fundação de Ensino e Pesquisa em Ciências da Saúde* – FEPECS), CAAE 60740916.8.0000.5553, in accordance

Chart 1. Classification of functional capacity in levels of metabolic equivalence (MET) used by the perioperative evaluation outpatient clinic of the Regional Hospital of Gama.

Metabolic equivalent (MET)	Type of activity
Excellent (>7 MET)	Practice soccer, swimming, tennis, running for short distances
Moderate (4 to 7 MET)	Walk with speed of 6,4 km/h
Poor (<4 MET)	Little activity, short hikes (two blocks), with maximum speed of 4.8 km/h

MET: The oxygen consumption (VO2) of a 40-year-old man with 70 kg at rest is 3.5 mL/kg, or the corresponding 1 MET Source: Fleisher et al.[9].

with the requirements of Resolution 466 of December 12, 2012, of the National Health Council (*Conselho Nacional de Saúde* – CNS).

RESULTS

The profile of the studied sample consisted, for the most part, of female subjects (78.77%), of over 60 years of age (48.35%), not obese (69.44%), referred mainly by the gynecological clinic (39.79%), diagnosed with systemic arterial hypertension (SAH) (44.17%) and smokers (12.67%), as shown in Table 1.

Regarding functional capacity, 277 medical charts were evaluated, and of these, 11 (3.97%) had poor functional capacity (1 to 4 MET), in contrast to 175 (63.18%) ones classified as excellent (>10 MET), as shown in Table 2.

In the relation between MET, the classification system of the physical condition of the patient (ASA) and the cardiac risk stratification (Lee and NYHA), p-values were found to be a significant association in all cases. That is, depending on the MET classification, the classification of the stratification is also changed (Table 3).

In Table 4, when analyzing the relationship between MET and cardiac risk by the non-cardiac procedure, 44.76% of the patients obtained excellent MET and were submitted to non-cardiac procedures considered as intermediate risk, as well as the 26.35% that obtained moderate MET. This group

Table 1. Demographic and anthropometric variables of the researched population served by the perioperative evaluation outpatient clinic of the Regional Hospital of Gama. Federal District, 2016.

Variables	n	%
Gender		
Female	230	78.77
Male	62	21.23
Age (years)		
<20	01	0.41
20 to 40	41	16.94
41 to 60	83	34.3
> 60	117	48.35
BMI (Kg/m^2)		
<30	200	69.44
>30	88	30.56
Field of expertise		
General	68	23.53
Gynecology	115	39.79
Mastology	05	1.73
Trauma and orthopedics	85	29.41
Vascular	06	2.08
Others	10	3.46
Related diseases		
SAH	125	44.17
DM	12	4.24
SAH+DM	35	12.37
No	111	39.22
Smoking		
Yes	37	12.67
No	200	68.49
Former smoker	55	18.84

BMI: Body mass index; SAH: systemic arterial hypertension; DM: diabetes mellitus.

Table 2. Evaluation of the metabolic equivalent in the population served by the perioperative evaluation outpatient clinic of the Regional Hospital of Gama. Federal District, 2016.

MET	n	%
Excellent	175	63.18
Moderate	91	32.85
Poor	11	3.97

MET: levels of metabolic equivalence.

Table 3. Test of χ^2 between the metabolic equivalent (MET) and the stratifications performed by the perioperative evaluation outpatient clinic of the Regional Hospital of Gama. Federal District, 2016.

	χ^{2*}	Degrees of freedom	p
ASA	37.638	4	0.000
LEE	31.284	6	0.000
NYHA	22.661	4	0.000

ASA: American Association of Anaesthesia; LEE: revised cardiac risk index; NYHA: New York Heart Association; *program SPSS version 25.0.0.0.

Table 4. Relationship between the metabolic equivalent and cardiac risk by the non-cardiac procedure performed by the perioperative evaluation outpatient clinic of the Regional Hospital of Gama. Federal District, 2016.

MET	Cardiac risk by the non-cardiac procedure performed (%)		
	Low	Intermediate	High
Excellent	15.89	44.76	2.52
Moderate	5.41	26.35	1.09
Poor	0.72	2.89	0.36

MET: metabolic equivalent.

of patients represents the majority of the sample and they were safely released to surgery without further testing following the ACC/AHA guidelines.

DISCUSSION

In the current study, the majority of the sample belonged to the female gender (78.77%) and was over 60 years old (48.35%). Population-ageing in Brazil has occurred throughout the country, with greater survival of the female population, which reached a life expectancy of 72.6 years, in 2000, almost 8 years longer than men. For this reason, gynecology was the specialty most attended (39.7%) in this study[17].

The study also showed higher incidence of patients diagnosed with SAH (44.17%) in relation to the associated pathologies. Similarly, in another study, 71.3% of the patients evaluated in the preoperative period had related diseases[18]. Concomitant to the ageing population, the increase in the prevalence of chronic non-communicable diseases demands the need for continuous treatments and the increase of variable degrees of dysfunctions and dependencies brings direct implications to the care of surgical patients[18].

This study found an expressive number of obese patients (30.56% with >30 kg/m^2 body mass index), which exacerbates the national picture, in which the prevalence is 19.6% among women and 18.1% among men in Brazil[19]. This data is relevant for the design of the surgical risk, since obesity is a conditioning factor for cardiovascular disease[20].

Regarding smoking, the majority of the sample (68.49%) was non-smoker, an expected figure, according to the Brazilian reality. According to data from the Vigilance of Risk Factors and Protection for Chronic Diseases by Telephone Inquiry (*Vigilância de Fatores de Risco e Proteção para Doenças Crônicas por Inquérito Telefônico* – VIGITEL) in 2016, the percentage of smokers over 18 years old in Brazil is 10.2%, 12.7% among men and 8% among women[19].

Functional capacity was classified as excellent in 63.18% (>10 MET) of the patients. This result was expected, since according to the VIGITEL 2016 collection in the Federal District, the practice of free time physical activity increased by approximately 7.3% between 2009 and 2016, although physical activity is still reduced with aging[19].

According to data from the VIGITEL, in 2016 the frequency of physically inactive individuals was 10.3%

in the Federal District, the lowest of all Brazilian capitals[19]. In the region under administration of the Gama, of the total number of residents analyzed by the District Household Sample Survey (*Pesquisa Distrital por Amostra de Domicílios* – PDAD/DF), 64.50% have a Community Meeting Point (*Ponto de Encontro Comunitário* – PEC), 48.85% with bike path and 29.64% have tree-lined streets near their homes[21], and this possibly contributes to the active lifestyle of the population.

Only 3.9% of the sample were classified as having poor functional capacity (<4 MET). The risk of operative cardiac complications is higher for these patients. However, it is a well-known fact that poor physical condition is a modifiable risk factor and improvements in fitness over time have been demonstrated to improve prognosis. One study concluded that each increment of 1 MET in exercise capacity is associated with approximately 12% mortality reduction, regardless of the form of measurement, a powerful predictor of cardiovascular risk[22].

Most patients with established cardiovascular disease report decreased functional capacity[23]. Also to objectively discriminate the surgical risk for each specific condition of coronary artery disease (CAD) is fundamental for prevention and for a lower morbidity of perioperative events[5]. This study demonstrated, then, a significant association between MET and some of the cardiac stratification announced by the Brazilian Society of Cardiology: ASA, Lee and NYHA.

A study of 1,049 patients found that 30-day and long-term postoperative survival was significantly better regardless of the type of surgery in ASA P3 with functional independence than in those ASA P3 with limited functional capacity[24].

In patients with heart failure, as evidenced in the NYHA classification, loss of functional capacity is related to lower ejection fraction and lower cardiac output. In patients with ischemic heart disease, as evidenced by the IRCR, exercise is also limited by the eventual onset of myocardial ischemia[23].

According to the ACC/AHA protocol, after determining the patient's physical status and cardiac risk (step 1) and estimating their functional capacity (step 2), cardiac risk related to the different types of surgical procedures should be considered (step 3)[25].

This study revealed that the majority (74%) of the surgical procedures were at intermediate risk. The intrinsic risk of the surgical procedure corresponds to the probability of occurrence of perioperative cardiovascular events[5]. Extensive surgical procedures, particularly those in the abdomen or chest,

and those associated with large changes in blood volume and/or loss have increased risks[25]. 22.02% of them were classified as low risk. These small outpatient procedures are associated with a very low rate of morbidity and mortality[26].

The surgery can be performed when the patient presents lower predictors of cardiac risk, with moderate or excellent functional capacity, and if the procedure is of intermediate or low risk[8]. Thus, 44.76% of the patients who obtained excellent MET and would be submitted to non-cardiac procedures considered as intermediate risk, as well as the 26.35% who obtained moderate MET, were released for surgery safely, without requiring other tests, following the guidelines of the ACC/AHA[25].

The incorporation of the functional capacity evaluation in the perioperative nursing visit brings to the nurse and other professionals of the multi professional team a more complete risk investigation, since MET is an important predictor of mortality.

In this study we evaluated the MET through the questionnaire, since it is a more practical and accessible tool. Therefore, other works, including the ergometric test for MET verification, should be encouraged.

CONCLUSION

This study demonstrated that APA-HRG follows the current perioperative assessment guidelines announced by ACC/AHA.

The study showed a predominance of female patients, over 60 years of age, non-obese, smokers, diagnosed with SAH, referred in greater incidence by the gynecological clinic.

Most of the population of this study had functional capacity classified as excellent and would be at lower cardiovascular risk. It also verified a significant association between the functional capacity assessment (MET) and the ASA, Lee and NYHA stratifications. Thus, by conducting a perioperative evaluation based on the best scientific evidence, the MET provides nurses and anesthesiologists with important information to perform non-cardiac surgeries safely.

The need for other studies on the evaluation of functional capacity in preoperative patients is also verified, considering that there are few studies on this subject in the Brazilian literature.

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