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SCIENTIFIC ARTICLE

Preoperative Evaluation: Screening using a Questionnaire

Florentino Fernandes Mendes* [1], **Eduardo Lopes Machado** [2], **Maurício de Oliveira** [2], **Fernando Rudem Brasil** [3], **Gibrahn Eizerik** [3], **Patrick Telöken** [4]

1. PhD, Adjunct Professor, Department of Surgery, Universidade Federal de Ciências da Saúde de Porto Alegre (UFCSPA), Porto Alegre, RS, Brasil; Principal of Centro de Ensino e Treinamento, Sociedade Brasileira de Anestesiologia, UFCSPA, Porto Alegre, RS, Brazil
2. Anesthesiologist, Santa Casa de Misericórdia de Porto Alegre, Porto Alegre, RS, Brazil
3. Resident Physician, UFCSPA, Porto Alegre, RS, Brazil
4. MD, Department of Surgery, Royal Perth Hospital, Perth, Australia

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Abstract

Background and objective: Prior to elective surgery it is essential to know in advance the patient's clinical condition. The aim of this study was to compare the preoperative evaluation (POE) through questionnaire responses with preanesthetic evaluation by the anesthesiologist.

Method: Prior to their preoperative evaluation, patients answered a questionnaire with information regarding age, weight, height, scheduled surgery, past medical and surgical history, allergies, medications and doses used, social history (illicit drugs, alcohol, smoking), functional capacity and exercise tolerance. Preoperative evaluation was performed by an anesthesiologist who had no access to the questionnaire data or knowledge about the research. The questionnaire data were compared with the preoperative evaluation by two independent investigators, in order to answer the questions: 1) Was the questionnaire evaluation effective - could the patient undergo surgery without the need for face-to-face consultation? 2) Has been there any relevant information - ability to change the anesthetic approach - not assessed by the questionnaire, but assessed by the face-to-face consultation? 3) Has been there any information added by the health questionnaire that was missed by face-to-face consultation? For statistical analysis, the paired Student's t-test was used for parametric data and chi-square test for categorical data, with $p < 0.05$ considered significant.

Results: Of the 269 eligible patients there was one refusal, and four agreed to participate but did not complete the questionnaire, in addition to 52 losses, totaling 212 participants. Questionnaire data added to the consultation in 109 cases (51.4%). The screening questionnaire alone was effective for 144 patients (67.93%), with no need for consultation. The anesthesiologist evaluation

**Corresponding author*: Florentino Fernandes Mendes, Departamento de Cirurgia Clínica. Rua Osmar Amaro de Freitas, 200, Porto Alegre, Rio Grande do Sul, Brasil. CEP: 91210-130.

E-mail: florentinomendes@gmail.com

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referred patients for surgery on their first visit in 178 opportunities (84%). In the identification of cases of non-referral to surgery, the questionnaire showed a negative predictive value of 94.4%, positive predictive value of 38.2%, sensitivity of 76.5%, and specificity of 76.4%. Statistically significant ($P < 0.05$) clinical factors associated with non-referral to surgery were: age over 65 years, BMI > 30, low functional capacity, hypertension, diabetes mellitus, asthma, renal failure, hepatitis, and ischemic heart disease.

Conclusion: The questionnaire was effective for screening patients who needed further evaluation and/or changes in treatment regimen prior to elective surgery. Moreover, the questionnaire added data not covered by clinical evaluation.

Introduction

Preoperative evaluation (POE) is performed to ensure comfort and safety to patients and improve operating room performance [1-3]. It is mandatory before any elective anesthesia [4-6], as it is essential to know in advance the clinical condition of the patient [7]. A study of intraoperative incidents showed that 11% of serious incidents are due to poor preoperative evaluation. Of note, half of these incidents could have been avoided [8].

The lack of knowledge about the clinical condition of patients is responsible for the cancellation of many procedures shortly before the scheduled time, a fact that generates unnecessary cost and inconvenience to physicians and patients. The organizational structure of a clinic for preoperative evaluation varies according to the hospital. Whereas economic and logistical issues may prevent a careful face-to-face preoperative evaluation, several authors argue that completing a structured questionnaire may facilitate an effective evaluation [9,10]. This would serve as a screening tool to identify patients at high risk for perioperative complications and give opportunity for the referral of patients to a clinic for preoperative evaluation and/or specialist consultation [10].

Identifying the clinical conditions imposing risk and improving the clinical condition of patients in the preoperative period reduces mortality and postoperative morbidity [4-6,8-10]. However, performing diagnostic tests indiscriminately may have negative consequences [11,12], such as increased health care costs, procedure delay, and more importantly, potential exposure of patients to unnecessary risks. This knowledge has motivated the search for a more efficient evaluation process, with cost minimization, reduced further testing, and health care improvement [10].

The aim of the present study was to evaluate the effectiveness of using a questionnaire to identify patients at risk requiring face-to-face preoperative evaluation, as well as to identify the profile of patients treated at our institution.

Method

After approval by the Ethics Research Committee and obtaining written informed consent, all patients attending the first consultation for preoperative evaluation at the outpatient preoperative evaluation (OPE) of the Anesthesiology Service/Santa Casa de Porto Alegre (SASC) from August 1 to September 1, 2011, were selected to participate in the study. Before preoperative consultation, patients completed the questionnaire voluntarily with information on age, weight, height, scheduled surgery, previous surgical and medical history, allergies, medications and doses, social history (drugs, alcohol, smoking), functional capacity, and exercise tolerance (Appendix 1). An anesthesiologist who had no access to the questionnaire data or knowledge of the study performed the preoperative consultation. We compared data obtained from questionnaire with the preoperative consultation by two independent investigators, in order to answer the following questions: 1) Was the questionnaire evaluation effective - could the patient undergo surgery without the need for face-to-face consultation? 2) Has been there any relevant information - able to change the anesthetic approach - not assessed by the questionnaire, but assessed by the face-to-face consultation? 3) Has been there any information added by the health questionnaire that was missed by face-to-face consultation? In case of disagreement among investigators regarding the answer to the questions, we requested the opinion of a third investigator, and the decision was made by consensus.

Data were stored in Access software and analyzed using the statistical package SPSS v.18.0 (SPSS Inc., Chicago, USA). Categorical variables are expressed as absolute and relative frequencies and the association was performed using the chi-square test with Yates correction or Fisher exact test, when indicated. Quantitative variables are expressed as mean and standard deviation and compared using the paired Student's t-test. Test performance measurement was calculated with its respective 95% confidence interval. A level of 5% was considered significant.

Results

During the period of data collection, 315 consultations were conducted at OPE, of which 46 did not meet the inclusion criteria. From 269 eligible patients, one refused to participate, four agreed to participate but did not complete the questionnaire and 52 were lost to data collection, totaling 212 participants.

Tables 1 and 2 present the anthropometric data, major comorbidities, and referral to surgery during face-to-face consultation. The questionnaire added data to consultation in 109 cases (51.4%). In 22 cases (10.4%), some relevant data not assessed by the questionnaire but able to change the anesthetic approach due to consultation was found. Screening by questionnaire alone was effective in 144 patients (67.93%), dismissing the need for face-to-face consultation.

Patients were referred to surgery in the first consultation at the OPE in 178 opportunities (84%). To identify cases of non-referral to surgery after OPE, the health questionnaire

Table 1. Anthropometric Data and Characteristics of the Sample.

	N *	% *
Sex		
Female	136	64,2%
Male	76	35,8%
Place of origin		
Capital	85	40,1%
Metropolitan region	38	17,9%
Interior region	89	42%
BMI		
< 25	69	32,5%
≥25 e < 30	77	36,3%
≥30	66	31,1%
Physical status (ASA)		
I	77	36,5%
II	117	55,4%
III	16	7,6%
IV	1	0,5%
Previous surgery		
Yes	145	68,4%
No	67	31,6%
Age (years)	47,51 ± 16,26 §	
Education (years)	7,08 ± 3,34 §	
Weight (kg)	75,54 ± 16,21 §	
Height (cm)	163,58 ± 9,59 §	

*Data expressed as absolute and relative frequencies; §: data expressed as mean ± standard deviation. BMI: Body Mass Index. ASA: American Society of Anesthesiologists.

showed a negative predictive value of 94.44% (136/144), positive predictive value of 38.23% (26/68), sensitivity of 76.47% (26/34) and specificity of 76.40% (136/178) (Table 3).

During preanesthetic evaluation, there were statistically significant clinical factors associated with non-referral to surgery ($p < 0.05$) such as age over 65 years, BMI > 30, low functional capacity, hypertension, diabetes mellitus, asthma, kidney failure, hepatitis, and ischemic heart disease.

Discussion

The questionnaire used as a screening method was sufficiently consistent to determine which patients needed face-to-face evaluation. Moreover, in half the cases, the questionnaire provided additional information to that obtained by traditional evaluation.

During preoperative evaluation, most diagnoses are based on history and physical examination [13]. Aimed at increasing safety and comfort for patients and physicians without causing significant increase in costs or logistical difficulties, we instituted a screening questionnaire. The questionnaire showed high negative predictive value (94.4%), which makes it a reliable method to identify which patients may have the preoperative consultation waived, an ideal characteristic for a screening test. Thus, we can remotely and safely triage patients and avoid unnecessary and costly trips, as 60% of our sample population lives in other cities.

Table 2 - Major Comorbidities and Referral during Consultation.

Comorbidities #	Yes/No	%	POE referral (%)		p
AH	67/145	31.6%	Yes	45/67 (67.2%)	0.001
			No	133/145 (91.7%)	
Depression	39/173	18.4%	Yes	30/39 (76.9%)	0.27
			No	148/173 (85.5%)	
Palpitation/arrhythmia	33/179	15.6%	Yes	25/33 (75.8%)	0.25
			No	153/179 (85.5%)	
Smoker	27/185	12.7%	Yes	24/27 (88.9%)	0.58
			No	154/185 (83.2%)	
Malignancy	22/190	10.4%	Yes	15/22 (68.2%)	0.058
			No	163/190 (85.8%)	
Diabetes Mellitus	20/192	9.4%	Yes	13/20 (65%)	0.024
			No	165/192 (85.9%)	
Asthma	20/192	9.4%	Yes	13/20 (65%)	0.024
			No	165/192 (85.9%)	
Kidney failure	18/194	8.5%	Yes	10/18 (55.6%)	0.003
			No	168/194 (86.6%)	
Neurological Disease	14/198	6.6%	Yes	10/14 (71.4%)	0.24
			No	168/198 (84.8%)	
Hepatitis	14/198	6.6%	Yes	8/14 (57.1%)	0.013
			No	170/198 (85.5%)	
Stroke	8/204	3.8%	Yes	6 /8(75%)	0.61
			No	172/204 (84.3%)	
AMI	6/206	2.8%	Yes	2/6 (33.3%)	0.007
			No	176/206 (85.4%)	

#Data expressed as absolute and relative frequencies and classified in descending order of occurrence. POE: Preoperative Evaluation. AH: Arterial Hypertension. AMI: Acute Myocardial Infarction.

Table 3. Screening through the Questionnaire. Need for Face-to-face Evaluation Referral from the OPE.

OPE – Consultation	Face-to-face evaluation required	Face-to-face evaluation not required	Total
Yes	26	8	34 (16.04%)
No	42	136	178 (83.96%)
Total	68 (32.07%)	144 (67.93%)	212 (100%)

OPE: Outpatient Preoperative Evaluation.

The use of information technology is a useful tool and may be used to collect information and preoperative evaluation, considering that many candidates for surgery are relatively healthy and do not require full evaluation in a preoperative evaluation clinic [14].

Digner reported a telephone preoperative evaluation of outpatient surgery candidates and demonstrated that it not only allowed the selection and preparation of patients for outpatient procedures, but also reduced the number of hospital visits and length of stay [15]. A similar study was conducted with ASA I-II patients undergoing outpatient breast surgery [16].

There is an increased request for services provided by anesthesiologists and a clear need for reassessment and adequacy of these services to meet demand. The initial priority should be the development of an efficient mechanism for acquiring information from patients before surgery, without requiring a hospital or evaluation center visit, and, thus, direct the human resources to areas that are most needed [10].

It is important to note that postoperative evaluation using a self-administered health questionnaire requires correct reading, understanding, and completion by the patient. Some patients may have difficulty completing the questionnaire, or do so incompletely, particularly those with visual impairment and/or low level of education. Indeed, there were four patients in our study who agreed to participate but did not complete the questionnaire, perhaps due to difficulty understanding, especially considering that the patients' average education was 7.08 years of schooling. The average level of education found is near the national average, estimated by IBGE (Brazilian Institute for Geography and Statistics) in 7.2 years, which does not seem to have influenced the quality of responses [17]. It is noteworthy that among the 212 cases only 8 patients not referred to surgery after face-to-face consultation were not identified by the questionnaire due to screening failure (4 four for lack of additional tests, 3 due to lack of clinical conditions, and 3 for administrative problems).

The lack of a physical examination performed in advance by the anesthesiologist is a limitation of non-traditional methods of preoperative evaluation. Airway assessment before any anesthesia is a relevant issue, but it does not need to be made well in advance. Anesthesiologists are prepared to assess and manage the airway in a very short time period. Thus, a prolonged plan is not always necessary, as long as the difficult airway management tools are promptly provided [10].

Another limitation of this study is the short period of data collection, which may receive the seasonal variation effects on presentation or exacerbation of comorbidities.

The use of a POE questionnaire is considered a screening test and should have a high negative predictive value and sensitivity. Despite the high negative predictive value (94.4%) found in this study, sensitivity (76.5%) needs to be improved. Therefore, in addition to exploring other risk factors and family history, the questionnaire should be modified in order to increase sensitivity.

Sandberg et al. reported that without effective communication, the patient may not understand the diagnosis, proposed treatment, or effectively consider the available options [18]. Increased satisfaction has been demonstrated with improved communication during preoperative evaluation in an assessment clinic [19,20]. Future clinics should focus on new methods to communicate and educate the patient.

In short, the use of a questionnaire appears to be effective in identifying patients requiring further evaluation. The implementation of such a system allows individualized preoperative evaluation according to patient's needs, without unnecessary increase in costs caused by routine face-to-face evaluation. More importantly, it allows the early identification of situations that are risk-related and/or require management.

Appendix 1

HEALT QUESTIONNAIRE

Questionnaire nº _____

1. Identification

Sex: □ Male □ Female Age:_____ Weight: _____kg Height:_____

City where you live: _____

How many years of education do you have? _____

What surgery you will undergo? _____

2. Have you undergone any surgery? □ Yes □ No

Which one(s)? _____

_____

Was there a problem during surgery? □ Yes □ No

Which one(s)? _____

3. Do you have or had any of the problem/health conditions listed below?

High blood pressure	□ Yes	□ No	Faint	□ Yes	□ No
Heart attack	□ Yes	□ No	Seizures	□ Yes	□ No
Chest pain	□ Yes	□ No	Neurological disease	□ Yes	□ No
Shortness of breath	□ Yes	□ No	CVA (stroke)	□ Yes	□ No
Flutter/arrhythmias	□ Yes	□ No			
Heart stent (spring)	□ Yes	□ No	Hepatitis	□ Yes	□ No
			Cancer	□ Yes	□ No
Diabetes	□ Yes	□ No			
Thyroid disease	□ Yes	□ No	Psychiatric illness	□ Yes	□ No
			Depression	□ Yes	□ No
Kidney failure	□ Yes	□ No			
Hemodialysis	□ Yes	□ No	Excessive bleeding during:		
			- surgery	□ Yes	□ No
Asthma	□ Yes	□ No	- dentist	□ Yes	□ No
Smoker	□ Yes	□ No	- spontaneous	□ Yes	□ No
Ex-smoker	□ Yes	□ No			
Cough everyday	□ Yes	□ No			
Flu/fever for 14 days	□ Yes	□ No			

Other disease (s) _____

4. Physical activity

Do you walk two blocks (200 meters)?	□ Yes	□ No
- And do you feel chest pain or shortness of breath?	□ Yes	□ No
Can you climb two stair flights (two floors)?	□ Yes	□ No
- And do you feel chest pain or shortness of breath?	□ Yes	□ No
Can you run short distances (100 meters)?	□ Yes	□ No
- And do you feel chest pain or shortness of breath?	□ Yes	□ No

5. Do you use drugs regularly/every day? □ Yes □ No

Name	Dose	How many times per day

6. Allergies □ Yes □ No

I am allergic to: _____

_____

7. Use of alcoholic beverages? □ Yes □ No

Which one(s): (wine, beer, whiskey, rum, vodka, other)? _____

Drinks per week in the last month: _____

8. Drug use (marijuana, cocaine, amphetamines or other) □ Yes □ No

9. Other information that you consider important: _____

_____

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