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SCIENTIFIC ARTICLE

Indication of preoperative tests according to clinical criteria: need for supervision

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Abstract
Background and objectives: The indiscriminate order for additional tests on pre-anesthetic evaluation is common in clinical practice, which entails additional costs and the possibility of false-positive results. The aim of this study was to analyze whether preoperative tests in elective surgeries are ordered according to clinical criteria and assess the unnecessary costs for the institution.
Methods: Evaluation of preoperative investigations in adult patients undergoing elective non-cardiac surgery. Tests were ordered by surgeons according to the Anesthesia Service protocol. Demographic data, physical status, comorbidities, and type of ordered supplementary examination were evaluated. The tests performed were compared with the indicated tests. The cost of screening was based on Datasus' table.
Results: 1063 patients were evaluated. It was found that 41.9% of the tests performed on patients classified as ASA-I were not indicated. In ASA II group, 442 tests (17.72%) were made unnecessarily. The ordered percentages of blood count, creatinine, coagulation profile, chest X-ray, and ECG were high in groups ASA I–II. Only 40 (5.25%) of the examinations made in ASA III group were not indicated. In ASA IV group, 22.5% of the required tests were not performed. We highlight an annual saving of 13% (R$ 1923.13) if tests were done according to the protocol.
Conclusions: Preoperative tests are not always ordered according to clinical criteria, which results in higher costs for the institution.

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Introduction

Preoperative evaluation is the fundamental basis for managing surgical patient and it may reduce risks and contribute to a better surgical outcome.[1] In this context, we highlight the clinical history and physical examination, which in most cases are responsible for disease diagnosis.[2]

The selection of preoperative laboratory tests (specific or imaging tests) should be performed as a complementary measure to the clinical suspicion. The indiscriminate and routine testing is unnecessary and involves, besides the additional cost for the institution,[3] the possibility of false-positive results,[4] with more or less serious consequences for patients.

This research was conducted with the aim of analyzing whether preoperative tests in elective surgeries are ordered according to clinical criteria and evaluate the costs of these so-called ''routine''' tests for the institution.

Methods

After approval by the Human Research Ethics Committee, under the number 1059/2009/SC, and obtaining the written informed consent, the preoperative tests ordered for adult patients undergoing non-cardiac elective surgery were prospectively evaluated over a period of one year. The institution routine prescribes the preoperative examinations ordered by surgeons, according to the protocol given by the Anesthesiology Service. In the pre-anesthetic evaluation (PAE), anesthesiologists completed for this research a specific form that included patient demographics, physical status, existing comorbidity, and type of supplementary examination ordered by the surgeon. The tests (ordered by the surgeon) were compared with tests indicated according to the institution protocol.

The costs for each exam were based on the unified table of Datasus. Results are expressed as absolute frequency (relative frequency or percentage).

Results

A total of 1063 patients were evaluated, whose demographics and physical condition according to the American Society of Anesthesiologists (ASA) are shown in Table 1. Among patients, there was a higher prevalence of females, aged between 41 and 65 years, Caucasian, and ASA I–II.

Table 2 shows the protocol for ordering preoperative tests established by the anesthesiology team of the institution, according to the ASA physical status, comorbidities and type of surgery to be performed.

The correlation of ASA physical status classification with the exams is shown in Fig. 1. The high percentages of complete blood count, creatinine, coagulation profile, chest X-rays, and ECG ordered in patients ASA I–II draw attention.

Fig. 2 shows the type of preoperative examination ordered according to age. The emphasis is on the high percentage of exams ordered in patients up to 40 years.

The type of preoperative examination ordered according to the number of comorbid conditions is shown in Fig. 3. Even in patients without comorbidity, additional tests were widely ordered.

Table 1 Demographics and ASA physical status.

	n (%)
Sex	
Male	387 (36.4)
Female	647 (60.9)
Not registered	29 (2.7)
Age (years)	
18-40	355 (33.4)
41-65	429 (40.3)
Over 65	117 (11.0)
Not registered	162 (15.3)
Ethnicity	
White	916 (86.2)
Black	37 (3.5)
Yellow	16 (1.5)
Mixed	25 (2.4)
Not registered	69 (6.4)
ASA	
I–II	842 (79.2)
III	152 (14.3)
IV	13 (1.2)
Not registered	56 (5.3)

Fig. 4 shows the ordering of preoperative tests according to age and comorbidities. In general, it can be seen that the ordering pattern is repeated, even when young and healthy patients are compared to patients over 40 years of age with or without comorbid conditions.

Realization and indication of complementary tests were compared according to the institution protocol. Costs and number of tests performed and indicated in the PAE were compared (Tables 3–6). It was found that 41.9% of tests performed in patients classified as ASA I were not indicated (Table 3). In patients classified as ASA II, 442 tests (17.72%) were made without necessity (Table 4). Regarding patients classified as ASA III, only 40 (5.25%) of the performed tests were not indicated by the protocol. However, in patients classified as ASA IV, there were fewer ordered tests than recommended and 16 (22.5%) required tests were not made (Table 4).

Table 7 shows the total cost of the performed tests compared to the total cost of the indicated tests, regarding patients in general. We emphasize an annual savings of 13% if the tests were done according to the protocol established by the institution.

Discussion

In this study, the outstanding fact is that the preoperative laboratory tests ordered by the surgeon did not follow the protocol recommended by the department of anesthesiology; that is, the ordering does not meet the clinical criteria and, therefore, the cost of these tests is 13% higher for the institution.

Considered as a complementary part of the pre-anesthetic evaluation, preoperative tests confirm and document conditions that may affect the course of anesthesia and postoperative period.[4–7] Thus, anesthesiologists