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# Analysis of Preoperative Test Screening in Patients Undergoing Elective Surgery at the Gynecology Department of the "*Rafael Ángel Calderón Guardia*" Hospital during 2009

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## Abstract

**Aim:** To evaluate the use of preoperative tests in patients undergoing an elective surgery at the *Dr. Rafael Ángel Calderón Guardia* Hospital during 2009.

**Methods:** A cross-sectional observational analytical study was conducted. Two hundred and seventy two clinical histories, from patients who underwent surgery between 1 January 2009 and 3 June 2009, were analyzed. The analyzed variables were: age, coexisting morbidity prior to surgery, number and type of preoperative tests performed, missing and additional, and type of surgery performed. The number and type of preoperative tests required for each patient, depending on their morbidity, was decided according to the 2002 Guidelines of the American Society of Anesthesiologists (ASA).

**Results:** The mean of preoperative tests performed for each patient was 4.3 (SD $\pm$ 2.1). According to morbidity, the tests prescribed by ASA were fully conducted in only 44.9% (CI: 95% 38.8-51.0) of the patients. The mean of missed preoperative tests per patient was 1.7 (SD + 1.1). Ninety three percent (CI: 95% 89.3-95.7) of patients underwent a mean of 2.5 (SD+1.6) additional preoperative tests. Of the additional preoperative tests performed, 9.5% showed abnormal results. Only 7.6% (CI: 95% 2.5-16.8) of the medical records with abnormal results, recorded actions towards correcting these abnormalities and surgery was cancelled only for 3% (CI: 95% 0.4-10.5) of these patients.

**Conclusion:** This study evidenced the inadequate use of preoperative tests, not only because they were not fully conducted in approximately 50% of patients, but also because a majority of them were requested a considerable amount of unjustified tests.

**Key words:** preoperative tests, gynecology.

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Abbreviations: ASA, American Society of Anesthesiology; CCSS, Caja Costarricense del Securo Social (Social Security Institution); Rafael Ángel Calderón Guardia Hospital, HCG.

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Preoperative assessment is an integral part of a patient's preparation for surgery. It is very important because it can estimate risk associated with the procedure and allows the adoption of necessary measures in order to reduce this risk.[1]

This assessment is based mainly on two aspects: the patient's clinical history and physical examination; as well as laboratory and imaging tests. The latter should be made based on the patient's age, its related medical disorders and the data obtained from the clinical history and physical examination.[2-4]

Medical tests and preoperative assessment should selectively aim at identifying which patients have contraindications for surgery, it helps anticipate the potential adverse outcomes, and guide postoperative treatment. Therefore, their choice depends on the possible impact they have on the scheduled surgery.[5,6]

In general terms, the overall assessment is the anesthesiologist's task. However, sometimes it requires the participation of other specialists such as cardiologists or internists. Nonetheless, it is essential that the most commonly used methods are familiar to the surgeon, so as to provide relevant information about the patients' health and assess the operatory risk.[7,8]

Unfortunately, the relevance assigned to these aspects is sometimes underestimated. This favors the surgeon's request for a set of unnecessary examinations or tests, which make the patient uncomfortable and increase the cost of its attention.[9-12]

Based on the abovementioned, the research's main objective is to assess the use of preoperative tests in patients undergoing an elective surgery at the Gynecology Department of the Dr. Rafael Calderon Guard Hospital (herein, HCG).

## Methods

A cross-sectional observational analytical study was conducted to meet the objectives of the study. The investigation was approved by the Hospital's Bioethics Committee; document CLOBI-HCG-037-07-09.

By means of a consecutive survey, 272 clinical histories of patients undergoing elective surgery in the Gynecology Department of the HCG, from 1 January 2009, were analyzed. The sample's size was calculated based on 927 surgeries scheduled by the Gynecology Department during 2008 and according to a 50% maximum prevalence in the inappropriate use of preoperative tests. The StatCalc System of the EpiInfo 2002 Program was used to predict a 5% error and 95% confidence range. Each patient was identified through the Surgery Room list, where elective surgeries are recorded on a daily basis.

All patients undergoing elective surgery in the Gynecology Department of the HCG, from 1 January to 3 June 2009 (moment in which the required sample size was completed) were included.

All patients with an incomplete record in any of the variables of interest or who did not belong to the hospital's attraction area were excluded.

In case a selected patient fulfilled the exclusion criteria; she was replaced by a new patient in a consecutive manner.

The analyzed variables were: age, coexisting morbidity prior to surgery, number and type of preoperative tests performed, missing and additional.

The number and type of preoperative tests required for each patient, depending on their morbidity, was decided according to the 2002 Guidelines of the American Society of Anesthesiologists.[2]

Preoperative test was understood as the laboratory or imaging analysis requested by Outpatient Services and conducted on a date prior to surgery, according to each patient's number and type of diseases, and that may influence or modify the development and outcome of surgery.

Missing preoperative test was understood as the laboratory or imaging analysis that should have been conducted for each patient, according to coexisting morbidity, but that was no requested by the patient's physicians.

Additional preoperative test was understood as the laboratory or imaging analysis requested by Outpatient Services and conducted on a date prior to surgery, regardless of the patient's number and type of diseases. Its appropriateness should have been demonstrated in the medical record in order to justify the necessity of conducting them.

Qualitative variables were analyzed by means of frequencies and proportions. The results that derived from the quantitative variables were expressed by measures of central tendency and dispersion. The

Chi square statistical test (X2) was used to show the relationship between qualitative variables. The t Student test was used to compare the difference in means between two groups. Fisher's exact tests and the "U" of Mann-Whitney test were used, when necessary. The significance level was set at $p < 0.05$. The Excel 2007 program was used to prepare charts and the SPSS 12.0 program for data processing and preparing figures.

## Results

We excluded 11 patients from the research: for 3 of them, it was not possible to obtain their medical record, and the in the rest of the cases (8), the patients did not belong to the attraction area.

Of the 272 patients studied, the mean age was 49.9 years (SD $\pm$ 12.1). The most frequent procedure was total abdominal hysterectomy plus bilateral salpingo-oophorectomy, with 76 cases (27.9%; CI 95% 22.7-33.7). The total of procedures performed is shown in Table 1.

Of the research's patients, 54.8% (n=149; CI 95% 48.7-60.8) had at least one associated medical condition. Table 2 shows that arterial hypertension was the most frequent associated pathology, with 110 cases (40.4%; CI 95% 34.6-46.5); 19.9% (n=54; CI 95% 15.3-25.1) did not carry out family planning, therefore there was a probability of pregnancy at the time of surgery.

**Table 1. Frequency of most commonly practiced procedures, study on preoperative tests, Gynecology Department, HCG, 2009**

| Procedure | Frecuency | Percentage |
|---|---|---|
| Abdominal hysterectomy plus bilateral salpingo-oophorectomy | 76 | 27.9 |
| Simple abdominal hysterectomy | 53 | 19.5 |
| Vaginal hysterectomy | 44 | 16.2 |
| Instrumented uterine curettage | 37 | 13.6 |
| Others | 62 | 22.8 |
| Total | 272 | 100.0 |

**Table 2. Frequency of associated preoperative morbidity, study on preoperative tests, Gynecology Department, HCG, 2009**

| Associates morbidity | Frecuency | Percentage |
|---|---|---|
| Artery hypertension | 110 | 40.4 |
| Obesity | 23 | 8.5 |
| Diabetes mellitas | 22 | 8.1 |
| Smoker | 18 | 6.6 |
| Others | 39 | 14.3 |
| Total | 212 | 77.9 |

None of the patients were defined as an alcoholic; 6.6% (n=18; CI 95% 4.0-10.3) smoked at the time of the study and 7.4% (n=20; CI 95% 4.5-11.1) were taking at least one drug that required preoperative testing to assess whether its effects could influence the patient's evolution during surgery.

A total of 1,687 preoperative tests were performed for a mean of 4.3 (SD $\pm$ 2.1) per patient. According to morbidity, the tests prescribed by ASA were fully conducted in only 44.9% (n = 122; CI 95% 38.8 - 51.0) of the patients.

Of the analyzed cases, 55.1% (n=150; CI 95% 49.0-61.2) of patients underwent incomplete preoperative studies, and the mean of missing tests was 1.7 (SD +1.1) per patient, for a total of 254 studies. Those which were most often omitted are shown in Table 3.

Ninety three percent (n=253; CI 95% 89.3-95.7) of patients underwent a mean of 2.5 (SD+1.6) additional preoperative tests, for a total of 693 tests. In 98.4% (n=249; CI 95% 96.0-99.6) of the reviewed clinical histories and physical examinations, no evidence to justify the need for such additional tests was found. The most common unnecessary preoperative tests performed are shown in Table 4.

Abnormal results were found only in 26.1% (n=66; CI 95% 20.8-32.0) of patients who underwent additional preoperative examinations. Of the 693 additional tests performed, only 9.5% were altered (n=68). Only 7.6% (n=5; CI 95% 2.5-16.8) of these patients' medical records recorded actions towards correcting abnormalities and surgery was cancelled only for 3% (n=2; CI: 95% 0.4-10.5) of them.

There were no significant age differences between those patients that underwent additional tests and those that did not (49.7 SD $\pm$ 11.8 vs. 52.8 SD + 15.5; *p* 0.55). The percentage of patients without associated morbidity who underwent additional

examinations was 91.9% (n=113; CI 95% 85.6-96.0), and the one of patients with associated morbidity, 94.0% (n=140; CI 95% 88.8-97.2). This difference was not statistically significant either (*p* 0.50).

## Discussion

Before requesting a laboratory or imaging test, it is necessary to question whether the result will add any value to the preoperative assessment obtained from the patient's clinical history and physical examination.

The main role of these preoperative tests is to detect abnormalities or diseases that have not been identified before and that will have a potential impact in the patient's preoperative handling.

**Table 3. Frequency of missing tests, study on preoperative tests, Gynecology Department, HCG, 2009**

| Missing tests | Frequency |
|---|---|
| Electrolytes | 117 |
| Electrocardiogram | 31 |
| Kidney function tests | 29 |
| Chest X-rays | 27 |
| ß Subunit (Pregnancy test) | 26 |
| Others | 24 |
| Total | 254 |

**Table 4. Frequency of additional preoperative tests, study on preoperative tests, Gynecology Department, HCG, 2009**

| Additional tests | Frequency |
|---|---|
| VDRL | 157 |
| Glucose | 135 |
| General urine test | 102 |
| Hepatic function test | 45 |
| Coagulation tests | 40 |
| Kidney function tests | 39 |
| HIV | 33 |
| Electrolytes | 33 |
| Lipid profile | 30 |
| Others | 79 |
| Total | 693 |

The inappropriate use of preoperative testing in the Gynecology Department of HCG was demonstrated. Not only about half of the patients underwent incomplete testing, but also a majority of them were requested an unjustified large number of them.

Furthermore, this has a significant impact on public administration. Due to this situation, the number of tests performed could also- and unnecessarily- increase the cost of patient care.

The worst part of this situation, as established in other existing publications,[13] is that even in the face of altered results, health professionals responsible for assessing the test, in the majority of cases do not undertake any action towards correcting the abnormality found by the test.

It is important to remember that in case of a perioperative complication, the fact that the abnormal result of an unnecessary laboratory or imaging test was overlooked, results in more exposure of the health professional to legal problems, than the fact of not having ordered it in the first place, if the clinical history or physical examination did not justify it.[14,15]

Given these results, it is necessary that the Hospital, and in particular the Gynecology Department, together with the medical specialties involved, make available protocols to avoid such a situation. It is necessary to emphasize that, in the majority of cases, a good clinical history and physical examination can avoid or at least justify, further testing.

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