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ORIGINAL ARTICLE

Cost–benefit in preoperative studies of patients undergoing ambulatory surgical procedures classified as ASA 1. A single-center observational study.

Fidel Ernesto Calzadilla Alvarez [1] ID *, César Carrera Barroso [1] ID .
1. Anesthesiology Service, Alcívar Hospital, Guayaquil, Ecuador.

Surgery

Abstract

Introduction: Patients with ASA 1 classification have a low risk of perioperative complications, and preoperative tests (POTs) do not reduce the risk of complications. As a result, many health organizations recommend that POTs only be performed in patients with ASA 1 classification when clinically indicated. The study aimed to determine the usefulness of requesting complementary presurgical tests for healthy patients (ASA 1) regarding their cost and complications.

Methods: The present observational study was conducted at the Alcívar Hospital in Guayaquil, Ecuador, from August to September 2022 with patients undergoing ambulatory surgery, classified as group 1 with POT and group 2 without POT. The variables recorded were age, type of anesthesia, procedure performed, and associated costs. The means were compared with Student's t-test.

Results: The study included 62 patients, 24 in group 1 (40%) and 28 (60%) in group 2. There were 22 (33.4%) men and 40 (66.6%) women. There were no age differences between the groups. There were more patients with general anesthesia in Group 2: 86.8% versus 62.5% in Group 1 (P =0.025). The total cost of the preoperative tests was $3,960.0. There was a significant difference between the average costs of group 1 with POT: 3,625 ± 6,997 USD versus group 2 without POT: 6,250 ± 10,913 USD $P < 0.001$. There were no complications in any group.

Conclusions: There is no relationship between postoperative complications and the request for preoperative studies in patients with ASA 1 classification.

Keywords:

MeSH: Preoperative Period; Surgery, Plastic; Ambulatory Surgical Procedures; Cost-Effectiveness Analysis

Abbreviations

ASA stands for American Society of Anesthesiologists or American Society of Anesthesiologists. The ASA classification is a system used to assess a patient's general health before surgery. The ranking goes from 1 to 6, with 1 being the highest overall health and 6 being the lowest overall health.
ASA 1: Healthy patient without significant systemic disease.

POT: Preoperative test

Supplementary information

No supplementary materials are declared.

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Author contributions

Fidel Calzadilla Alvarez: Conceptualization, data curation, formal analysis, fund-raising, research, writing - original draft.
César Carrera Barroso: Conceptualization, data curation, formal analysis.
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Availability of data and materials

Not declared.

Introduction

Patients with ASA 1 classification are considered healthy and without underlying diseases. They are the patients with the lowest risk of perioperative complications [1-3].

Several studies have investigated the benefits of preoperative testing in ASA 1 patients. Overall, these studies have found that preoperative testing is of no benefit in reducing the risk of complications [4-7].

Some studies have found that preoperative testing may increase the risk of complications. This is because preoperative tests can reveal medical problems that were not previously known, which may require additional treatment.

As a result of these findings, many healthcare organizations now recommend that preoperative testing only be performed in ASA 1 patients when clinically indicated, with suspicion of underlying disease that could affect the risk of perioperative complications [6-8].

This study aimed to determine the usefulness of requesting complementary presurgical tests for healthy patients (ASA 1) regarding their cost and the presence of complications.

Materials and methods

Study design

The present study is observational. The source is prospective.

Scenery

The study was conducted in the Alcívar Hospital surgery service in Guayaquil, Ecuador. The study period was from August 1, 2022, to September 30, 2022.

Participants

Patients aged 15 years or older, classified as surgical risk, were included. ASA 1 and who underwent outpatient surgical procedures. Patients who did not complete the procedure or whose data were not fully collected were excluded.

Study groups

Due to the variability of preoperative institutional prescriptions, the study groups were naturally divided into the following groups:

Group 1: Patients in whom POTs were requested.

Group 2: Patients in whom POTs were not requested.

The assignment to each group was not random; it depended on the knowledge, attitudes, and practices of the institutional surgeons and anesthesiologists. A simple classification was made.

Variables

The variables were age, type of anesthesia, procedure performed, type of examination requested in the corresponding group, total cost, and global savings.

Data sources/measurements

The source was direct; an electronic form was filled out from the data collected during the study period. The information was treated confidentially; personal data that would allow the identification of the study subjects were not included.

Biases

To avoid possible interviewer, information, and memory biases, the principal investigator always kept the data with a guide and records approved in the research protocol. Observation and selection bias was avoided by applying the participant selection criteria. Two researchers independently analyzed each record in duplicate, and the variables were recorded in the database once their concordance was verified.

Study size

The sample was nonprobabilistic, of the census type, where all possible cases of the study period were included.

Quantitative variables

Descriptive statistics were used. The results are expressed as frequencies (categorical variables) and medians (numerical variables). Categorical data are presented in proportions. The costs of procedures were a market investigation with a cutoff date of August 2022.

Statistical analysis

Inferential statistics are used, using proportions and frequencies. The ratios were compared with chi-square tests. The means were compared with Student's t-test. The statistical package used was SPSS 27.0 (IBM Corp. Released 2020. IBM SPSS Statistics for Windows, Version 27.0. Armonk, NY: IBM Corp).

Results

Participants

The study included 62 patients, 24 in group 1 (40%) and 28 (60%) in group 2. There were 22 (33.4%) men and 40 (66.6%) women.

Study group characteristics

No significant age differences existed between the study groups (Table 1). The list of procedures is cited in Table 2. There were more patients with general anesthesia in group 2 (P =0.025) (Table 1); there were more patients with neuraxial anesthesia in group 1 (P =0.009), and there were no differences between the type of anesthesia sedation between the groups.

Main results

There were no complications in any of the study groups.

The approximate average price of the preoperative tests was USD 165.0, with a minimum and maximum value (Table 2). Considering this value and based on the number of patients operated on, the total value of the tests was USD 3,960.

The average referential costs of the procedures and surgeries included in this analysis are presented in Table 3. The frequency of procedures was higher in the group of women due to the higher incidence of cosmetic surgery procedures: rhinoplasty, change of implant, liposculpture, lipo abdominoplasty, and bichectomy (Table 4). The total cost of the preoperative tests was $3,960.0. There was a significant difference between the average costs of group 1 with PPO: 3,625 ± 6,997 USD versus group 2 without PPO: 6,250 ±10,913 USD P <0.001 (Table 5).

Discussion

The study found no significant differences in age or gender between the two groups. However, there were more patients with general anesthesia in group 2 (P = 0.025) and more with neuraxial anesthesia in group 1 (P = 0.009). There were no significant differences in the type of sedation anesthesia between the groups.

There were no complications in any of the study groups.

The average approximate costs of the preoperative studies were USD 165.0, with a minimum value of $110 and a maximum of USD 220. The study found that the average cost of the procedures was $3,750 for Group 1 and $4,500 for Group 2. There were no significant differences in the average price of the procedures between the two groups. However, the average cost of preoperative testing was significantly higher in Group 2 than in Group 1.

The average cost of procedures and preoperative testing was significantly higher in Group 2 than in Group 1. Other studies also found no evidence that preoperative testing is necessary for otherwise healthy patients undergoing day surgery [9 - 10].

The indiscriminate request for complementary studies has led to several situations that could be avoided, such as canceling surgical procedures due to false positive results obtained or unnecessary spending by health establishments or patients on tests that most likely will not change the course of surgery.

The expenses for carrying out preoperative studies are directly related to the critical analysis of the need based on evidence. The savings could be enormous in the health system, establishing a mandatory follow-up protocol. New prospective studies should be considered in the future, applying protocols.

Conclusions

The present study of 62 healthy patients (ASA 1) who underwent ambulatory surgical procedures found no significant differences in the age of the patients. However, it was established that the group of women was twice that of men**,** with a substantial difference. There were more patients with general anesthesia in Group 2 (P = 0.025) and more with neuraxial anesthesia in Group 1 (P = 0.009).

Table 1. Age and type of anesthesia between the study groups.

Age group	Group 1 (POT) n=24	Group 2 (without POT) n=38	*P*
15-24 years	3 (4.8%)	10 (16.1%)	0.193
25-34 years	4 (6.5%)	11 (17.8%)	0.271
35-44 years	5 (8.1%)	2 (3.2%)	0.059
45-54 years	2 (3.2%)	9 (14.5%)	0.1233
55-64 years	6 (9.7%)	4 (6.5%)	0.131
>64 years	4 (6.5%)	2 (3.2%)	0.139
Type of anesthesia			
General	15 (62.5%)	33 (86.8%)	0.025
Neuroaxial	7 (29.2%)	2 (5.3%)	0.009
Sedation	2 (8.3%)	3 (7.9%)	0.632

POT: Preoperative tests.

Table 2. Cost of preoperative studies (USD).

Study	Minimum	Maximum	Average
Blood count	$10	$20	$15
Urea	$5	$10	$7.5
Creatinine	$5	$10	$7.5
ALT(GPT)	$5	$10	$7.5
AST (GOT)	$5	$10	$7.5
Glucose	$5	$10	$7.5
Sodium	$5	$10	$7.5
Potassium	$5	$10	$7.5
Clotting time	$5	$10	$7.5
Prothrombin time	$5	$10	$7.5
Total cholesterol	$5	$10	$7.5
Triglycerides	$5	$10	$7.5
Albumin	$5	$10	$7.5
Electrocardiogram	$20	$40	$30
Chest X-ray	$20	$40	$30

Table 3. Referential costs of the procedures (USD).

Surgery	Minimum	Maximum	Average
Rhinoplasty	$2,500	$5,000	$3,750
EDA + Coloscopy	$2,500	$5,000	$3,750
Arthroscopy, knee	$3,000	$6,000	$4,500
Colonoscopy	$1,500	$3,000	$2,250
Removal material	$500	$1,000	$750
Circumcision	$500	$1,000	$750
Endoscopy	$1,000	$2,000	$1,500
Cystoscopy	$500	$1,000	$750
Fascetary lock	$2,000	$4,000	$3,000
Implant change	$2,000	$4,000	$3,000
Node excision	$1,000	$2,000	$1,500
Uterine curettage	$2,000	$4,000	$3,000
Lipo-ADP	$5,000	$10,000	$7,500
Liposculpture	$3,000	$6,000	$4,500
Lithotripsy	$2,000	$4,000	$3,000
REC-catheter	$500	$1,000	$750
Rhinoplasty, BCH	$3,000	$4,000	$5,750
Septumplasty	$1,000	$2,000	$1,500
Varicocele	$2,000	$2,000	$2,000

EDA: endoscopy. ADP: abdominoplasty. BCH: bichectomy.

There were no significant differences in the type of sedation anesthesia between the groups. There were no complications in any of the study groups. The average costs of the procedures were $3,625 for Group 1 and $6,250 for Group 2. The average preoperative test prices were $165 for Group 1 and $0 for Group 2. The study found that procedures in which no POT was requested were more expensive (twice) than those in which POT was asked.

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Table 4. Frequency of procedures and surgeries performed.

	Men n=22	Women n=40
Rhinoplasty	2	17
Endoscopy + Coloscopy	2	9
knee arthroscopy	6	0
colonoscopy	2	4
removal of material	2	0
circumcision	2	0
endoscopy	2	1
cystoscopy	1	1
Fascetary lock	1	0
implant change	0	1
node excision	0	1
Uterine curettage	0	1
Lipoabdominoplasty	0	1
Liposculpture	0	1
lithotripsy	0	1
catheter repositioning	0	1
Rhinoplasty + Bichectomy	0	1
septumplasty	1	0
Varicocele	1	0

Table 5 . Frequency of procedures and surgeries performed.

Surgery	Group 1 (POT) n=24	Group 2 (without POT) n=38	Group 1 (POT) n=24	Group 2 (without POT) n=38
Rhinoplasty	7	12	$26,250	$45,000
EDA + Coloscopy	5	6	$18,750	$22,500
Arthroscopy, knee	2	4	$9,000	$18,000
colonoscopy	3	3	$6,750	$6,750
removal of material	1	1	$750	$750
circumcision	1	1	$750	$750
endoscopy	1	2	$1,500	$3,000
cystoscopy	1	1	$750	$750
Fascetary lock	1	0	$3,000	$0
Implant change	0	1	$0	$3,000
node excision	0	1	$0	$1,500
Uterine curettage	1	0	$3,000	$0
Lipoabdominoplasty	0	1	$0	$7,500
Liposculpture	0	1	$0	$4,500
lithotripsy	0	1	$0	$3,000
catheter repositioning	0	1	$0	$750
Rhinoplasty + BCH	0	1	$0	$5,750
septumplasty	0	1	$0	$1,500
Varicocele	1	0	$2,000	$0
POT	24	0	$3,960	0
Subtotal	-	-	$76,460	$125,000
Average cost	-	-	3,625	6,250
SD	-	-	6,997	10,913

POT: preoperative tests. EDA: endoscopy. BCH: bichectomy. SD: standard deviation.

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Statements

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Not required for economic studies.

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Not needed.

Conflicts of interest

The authors declare they have no conflicts of interest.

Author Information

Fidel Ernesto Calzadilla Alvarez, Doctor of Medical Sciences from the Holguín University of Medical Sciences (Cuba, registration 2014). First-degree specialist in Anesthesiology and Resuscitation from the Holguín University of Medical Sciences (Cuba, registration 2014). Head of the Anesthesiology service, Hospital Alcívar. Email: fidel.calzadilla@gmail.com

ORCID https://orcid.org/0009-0005-4045-8993

César Carrera Barroso, Physician from the Catholic University of Santiago de Guayaquil, (Guayaquil, 2019).
Correo: cecarrera945@gmail.com

ORCID https://orcid.org/0009-0002-0385-7977

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Correspondence: Fidel Ernesto Calzadilla Alvarez,
Email: fidel.calzadilla@gmail.com
ORCID 0009-0005-4045-8993
Address: Colonel 2301 and Azuay. Department of Anesthesiology, Hospital Alcívar, Guayaquil, Ecuador. Telephone: 5934 3720100