International Journal of Medical Science and Clinical Research Studies

ISSN(print): 2767-8326, ISSN(online): 2767-8342

Volume 05 Issue 01 January 2025

Page No: 153-163

DOI: https://doi.org/10.47191/ijmscrs/v5-i01-27, Impact Factor: 7.949

# Clinical Characteristics Related to Complications in Abdominal Gynecological Surgery

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**ABSTRACT**

Background: Gynecological conditions account for a significant number of surgical procedures performed worldwide, with complication rates reported between 0.2-34%. In Mexico, complication rates range from 2.15% to 15.06%. Factors such as age, obesity, comorbidities (hypertension, diabetes), and prolonged surgical time are associated with a higher risk of complications, including postoperative infections.

Objective: To determine the clinical characteristics related to complications in abdominal gynecological surgery.

Materials and Methods: A retrospective, descriptive, cross-sectional, and analytical study was conducted on women undergoing scheduled surgery by the Gynecology service at the Hospital de Ginecoobstetricia UMAE-CMNO IMSS during the period from January 2023 to December 2023. The study aimed to determine the frequency of postoperative complications and their relationship with clinical characteristics. The sample size calculation used the proportion formula and finite population, requiring a minimum sample of 156 patients. However, all gynecological surgeries performed during the study period were included. After obtaining approval from the Local Research Committee in Health 1310, data was collected from the hospital's surgical productivity registry platform. Surgical data was obtained from both electronic and physical clinical records to identify postoperative complications. The data collection tool was entered into a Microsoft Excel database, and statistical analysis was performed using IBM SPSS (version 30.0).

Results: A total of 392 patients were included in the study. Among them, 78 patients (19.9%) experienced complications. The most common complication was hemorrhage (9.2%), followed by wound dehiscence (3.6%), bladder injury (3.1%), surgical wound infection (2.6%), fever (1.5%), vaginal dome hematoma (1.0%), intestinal injury, and urinary tract infection (both at 0.8%), paralytic ileus (0.3%), along with other complications such as vascular injury and death (0.3%).

When analyzing the groups, it was found that patients in the complication group had a higher Body Mass Index (BMI) compared to those without complications. Additionally, the surgical time, estimated bleeding, and hospital stay days were significantly higher in the complication group. Both groups showed similar characteristics in terms of age, parity, prior abdominal surgeries, comorbid conditions, smoking, ASA risk classification, and preoperative hemoglobin levels.

Conclusions: The frequency of postoperative complications in this study aligns with findings reported in most international studies, with hemorrhage being the most common complication. BMI was significantly associated with a higher risk of complications, including bleeding, need for transfusions, and prolonged surgical times.

**KEYWORDS:** Histerectomy, gynecological surgery, postoperative complications.

**ARTICLE DETAILS**

**Published On:**
**28 January 2025**

**Available on:**
**https://ijmscr.org/**

## THEORETICAL FRAMEWORK

Gynecological conditions are a major cause of surgical procedures worldwide, with complication rates varying significantly: from 0.2–34% in international literature, up to 26% in continental studies, and 2.15–15.06% in Mexico.[1–4] Factors such as age, comorbidities, obesity, anemia, and surgical history are crucial determinants of complication incidence.[5–10] For instance, an elevated Body Mass Index (BMI) is associated with longer surgical times and increased risk of postoperative infections.[11]

Age, overall patient health, parity, pre-existing medical conditions, obesity, anemia, and cancer, as well as the quality of surgical supervision or execution, significantly influence complication rates.[5–6] Some studies have linked higher complication rates with hypertension and smoking.[7] Additionally, patients with prior abdominal surgeries develop adhesions in up to 90% of cases and in 54–70% following laparoscopic procedures. Adhesions are also more common in those with endometriosis, prior radiotherapy, neoplasms, concomitant abdominal inflammation, infections, or foreign bodies, increasing risks of small bowel obstruction, chronic abdominal pain, infertility, and challenges during reoperation.[8]

Among gynecological procedures, hysterectomy is the most commonly performed. Over 600,000 are conducted annually in the United States, while in Mexico, laparotomy remains the predominant approach, although minimally invasive techniques are on the rise.[4–15] Common postoperative complications include infections, paralytic ileus, bowel obstruction, and iatrogenic injuries.[16–18] Urinary tract injuries, particularly ureteral injuries, occur in 0.2–1% of cases.[19–21]

Surgical site infections are among the most frequent complications, affecting 7.84–11.8% of procedures in low- and middle-income countries.[13,25–27] These infections lead to higher rates of reoperation, hospitalization, and mortality, with a significant impact on obese patients due to the depth of subcutaneous tissue.[29] Venous thromboembolism, more common in patients with gynecological cancers, also poses a substantial risk following pelvic surgeries.[30] Lastly, postoperative fever occurs in 39–50% of cases, although it does not always indicate an underlying infection.[31]

This overview underscores the importance of thorough preoperative preparation and a profound anatomical knowledge by the surgeon to minimize complications and improve surgical outcomes.

## SCIENTIFIC BACKGROUND

Previous studies have reported intraoperative and postoperative complication rates of 24.16% in major and minor gynecological surgeries.[32] In Colombia, Ortiz-Martínez et al. reported a prevalence of 3.8%, with longer hospital stays for abdominal surgeries (11.5 days) compared to vaginal (7.5 days) and laparoscopic procedures (7.3 days), mainly due to complications such as reoperations (0.51%), bladder injuries (0.34%), and surgical site infections (1.52%).[3]

In Mexico, Aguilar et al. reported postoperative complications in 2.15% of patients undergoing abdominal hysterectomy.[4] In Cuba, Urgellés et al. identified risk factors such as hypertension (14.9%), smoking (13.7%), and anemia (6.8%).[7] Kaya et al. concluded that factors such as age over 38 years, prolonged surgical time (>99 minutes), hemoglobin drop >2 g/dL, and ASA III status significantly increase complications, particularly surgical site infections (OR 12.8).[12]

Elevated BMI has also been associated with higher morbidity. Sawah et al. reported increased postoperative infection rates in patients with higher BMI (6.4% vs. 1.6%). [11] Similarly, Brunes et al., in a cohort of over 12,000 hysterectomies, observed higher complication rates among obese patients (OR 1.8), including increased perioperative bleeding.[6] Margulies et al. identified chronic hypertension (21%-36%), diabetes (6%-12%), advanced age (46.7 vs. 48.4 years), and elevated BMI (28.7 vs. 34.4 kg/m²) as additional factors contributing to higher postoperative complication rates.[14]

## METHODOLOGY

### Type and design

Retrospective, descriptive, cross-sectional and analytical study.

## STUDY POPULATION

Women treated in the Gynecology service of the Gynecology and Obstetrics Hospital of the High Specialty Medical Unit (UMAE-CMNO-IMSS) in Guadalajara, Jalisco, Mexico between January 1 and December 31, 2023.

## SAMPLE SIZE CALCULATION

A minimum sample of 156 patients was calculated, considering a prevalence of post-surgical complications of 3.8%3, expected difference of 3% and 95% two-tailed reliability (1.96). All gynecological surgeries performed in the period from January 2023 to December 2023 were included.

The following formula was used to calculate the sample size:

$$N = \frac{(Z\alpha)^2 (p)(q)}{\delta^2}$$

Parameters

Zα Reliability: 1.96

P Study event: 3.8%

Q Non-occurrence of the event: 96.2%

Δ Precision: 5%

However, all records of patients undergoing abdominal gynecological surgery during the study period that met the selection criteria were included.

## SELECTION CRITERIA

Inclusion Criteria:

- Records of women who underwent gynecological surgery via the abdominal route within the Gynecology Department of the UMAE CMNO Gyneco-Obstetrics Hospital during the period from January 2023 to December 2023.
- Complete clinical records containing the necessary information for the present study.

Exclusion Criteria:

- Records of patients with documented complications occurring after 30 days post-abdominal surgery.
- Records of patients who requested voluntary discharge following the surgical event.

## STUDY DESCRIPTION

A retrospective, descriptive, cross-sectional, and analytical study was conducted following authorization from the Local Research Committee in Health 1310 of the Gyneco-Obstetrics Hospital (CMNO-IMSS), with institutional registration number R-2024-1310-034. The hospital's surgical productivity registration platform, "INDOQC," was used to obtain the records of the surgical scheduling from the Gynecology service, covering surgeries performed from January 2023 to December 2023. Next, electronic clinical records were reviewed, and physical clinical records were requested from the archive department to obtain and document the variables studied. The post-surgical evolution of patients was examined in their clinical records to determine the presence or absence of post-operative complications, including those occurring from day 1 to day 30 after the surgical intervention.

Subsequently, data collection was entered into a Microsoft Excel spreadsheet, where the patients were classified into two groups—those with complications and those without complications—for analysis of the relationship between each group and clinical characteristics.

## DATA ANALYSIS

After the verification and validation of the database, the information was analyzed using IBM SPSS (version 30.0). The results were expressed using descriptive statistics for qualitative variables through frequency and percentage, and for quantitative variables according to their distribution with means, standard deviation, median, and min-max values.

The clinical characteristics of patients were compared based on the presence or absence of post-operative complications. Patients were divided into two groups: those with complications and those without complications. For quantitative data, the Kolmogorov-Smirnov test was used to assess the normality of the distribution. Since the data did not follow a normal distribution, non-parametric tests were used: the Mann-Whitney U test was employed to compare quantitative variables, and the Pearson chi-square test was used for qualitative variables. The p-value for significant interpretation was set at p: <0.05.

## RESULTS

During the study period, 461 patients were identified from the surgical scheduling of the Gynecology service at HGO UMAE CMNO; among these, 392 patients who met the inclusion criteria were studied.

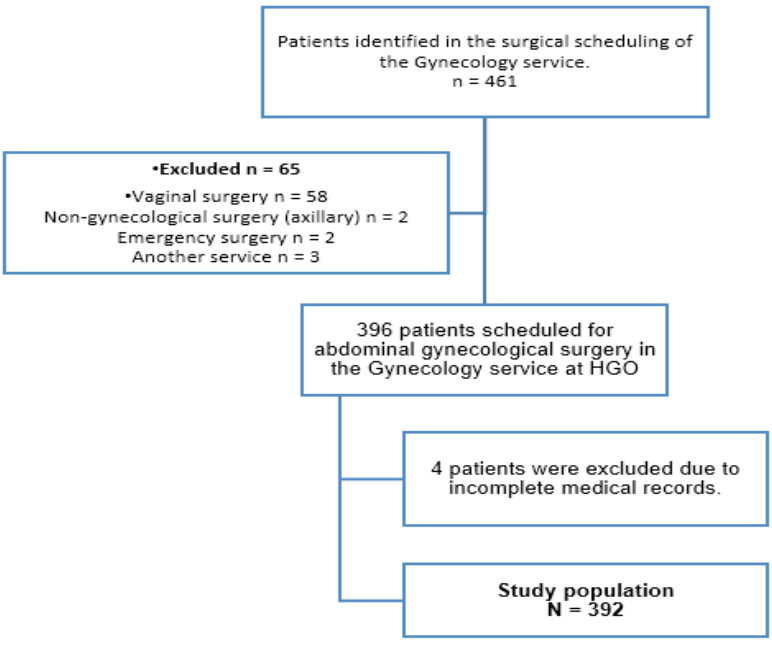


**Figure 1. Algorithm of the study population.**

## Clinical Characteristics Related to Complications in Abdominal Gynecological Surgery

The average age of the patients included in the study was 45.8 years, with a median of 45 and a mode of 44, ranging from 16 to 81 years. The predominant age group was 41-50 years, the rest of the clinical characteristics of the population are shown in Table 1.

| *Table 1* | | | |
|---|---|---|---|
| . | **n (%)** | | |
| Age (years) * | 45.85 (16-81) | ± | *9.47* |
| <= 30 | 18 (4.6%) | | |
| 31 – 40 | 84 (21.4%) | | |
| 41 – 50 | 195 (49.7%) | | |
| 51+ | 95 (24.2%) | | |
| BMI * | 30.19 (13-62) | ± | *6.57* |
| Groups by BMI | | | |
| Underweight | 2 (0.5 %) | | |
| Normal weight | 68 (17.3 %) | | |
| Overweight | 135 (34.4 %) | | |
| Obesity grade I | 107 (27.3 %) | | |
| Obesity grade II | 51 (13 %) | | |
| Obesity grade III | 29 (7.4%) | | |
| Parity | | | |
| Nulliparous | 63 (16.1 %) | | |
| Primiparous | 32 (8.2 %) | | |
| Multiparous | 297 (75.8 %) | | |
| Comorbid | | | |
| No | 194 (49.5 %) | | |
| Yes | 198 (50.5 %) | | |
| Smoking | | | |
| No | 333 (84.9 %) | | |
| Yes | 59 (15.1 %) | | |
| Previous abdominal surgeries | | | |
| None | 73 (18.6 %) | | |
| One | 125 (31.9%) | | |
| Two | 92 (23.5%) | | |
| Three or more | 102 (26%) | | |

Clinical characteristics of the study population:
*Data is presented as mean, ± standard deviation, (minimum-maximum).

According to BMI, 34.4% of the patients were overweight, and up to 47.7% were found to have some degree of obesity (Figure 2).

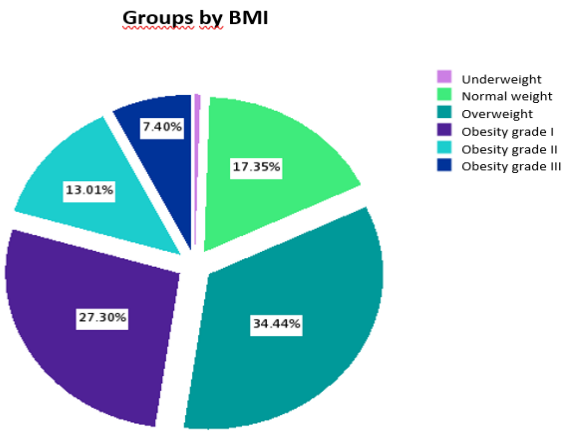


*Figure 2. Groups by BMI*

The study included 75.8% of multiparous patients. A little more than half of the population, 50.5%, had at least one comorbidity. Additionally, 15.1% of the patients reported active smoking, and regarding previous abdominal surgeries, 31.9% had undergone one surgery, 23.5% two surgeries, and 26% had undergone three or more abdominal surgeries.

Among the 198 patients with comorbidities, 135 had hypertension, accounting for 34.4% of the study population. Additionally, 71 patients had diabetes, and 45 had thyroid diseases. Less common comorbidities included dyslipidemia, rheumatological diseases, chronic renal disease, coagulopathies, and liver diseases, among others (Table 2).

*Table 2*

| Comorbid | n = 198 (%) | N = 392 |
|---|---|---|
| Diabetes Mellitus | 71 (35.9%) | 18.10% |
| Systemic arterial hypertension | 135 (68.20%) | 34.40% |
| Thyroid disease | | |
| Hypothyroidism | 42 (21.2%) | 10.70% |
| Hyperthyroidism | 3 (1.5%) | 0.80% |
| Heart disease | 14 (7.1%) | 3.60% |
| Others | 52 (26.3%) | 13.30% |
| Dyslipidemia | 10 | 2.55% |
| Rheumatologic disease | 9 | 2.29% |
| Chronic kidney disease | 7 | 1.78% |
| Coagulopathy | 9 | 2.29% |
| Neurological disease | 6 | 1.53% |
| Asthma | 2 | 0.51% |
| Breast cancer | 3 | 0.76% |
| Metabolic disease | 4 | 1.02% |
| Liver disease | 2 | 0.51% |

Comorbidities presented in the study population.

The indications for abdominal gynecological surgery, according to preoperative diagnoses, included uterine fibroids in most patients (39.54%), abnormal uterine bleeding (25.26%), ovarian tumors (18.11%), endometrial hyperplasia (8.67%), and less common conditions such as endometrial thickening (2.55%), adenomyosis (2.30%), endometriosis (1.28%), and others (2.30%). These included cervical dysplasia, endometrial polyps, and hormone-dependent breast cancer (Table 3).

The most commonly performed surgery was the hysterectomy, accounting for 82.9% of cases, followed by unilateral oophorectomy in 9.7% of the study population. Less common procedures included bilateral oophorectomy, cystectomy, and other less frequent surgeries mentioned in Table 3.

*Table 3*

| | n (%) |
|---|---|
| Preoperative diagnosis | |
| Uterine myomatosis | 155 (39.5%) |
| Abnormal uterine bleeding | 99 (25.3%) |
| Endometriosis | 5 (1.3%) |
| Ovarian tumor | 71 (18.1%) |
| Adenomyosis | 9 (2.3%) |
| Endometrial thickening | 10 (2.6%) |
| Endometrial hyperplasia | 34 (8.7%) |
| Other | 9 (2.3%) |
| Type of surgery | |
| Hysterectomy | 325 (82.9%) |
| Unilateral ophorectomy | 38 (9.7%) |
| Bilateral oophorectomy | 7 (1.8%) |
| Cystectomy | 11 (2.8%) |
| Other | 11 (2.8%) |
| Exploratory laparotomy | 6 |

| | |
|---|---|
| Bilateral tubal occlusion | 2 |
| Myomectomy | 1 |
| Salpingectomy | 2 |

Preoperative diagnoses and type of surgery.

Pre- and postoperative data are shown in Table 4. The average preoperative hemoglobin level for the study population was 12.88 g/dL ± 2.03, and 27.6% of the patients had anemia before the surgical procedure. According to the ASA (American Society of Anesthesiologists) risk classification, 57.9% of the patients were classified as ASA class II, 33.4% as class I, and only 8.7% were classified as ASA class III.

The average blood loss during gynecological surgery was 485.2 ± 1164.7 ml; however, this value is skewed due to one case of reported blood loss of 22,000 ml, which significantly affects the standard deviation. Therefore, a modified average of 429 ± 412.6 ml was calculated after excluding this value. Among the study population, 28 (7.1%) patients required a blood transfusion, with a maximum reported transfusion of 11 blood packs. The average surgical time was 132.74 ± 48.13 minutes, and the average hospital stay was 2.1 ± 0.69 days. It was observed that 91.1% of the study subjects had a hospital stay of 2 days or less (Table 4).

| *Table 4* | |
|---|---|
| | **n (%)** |
| Preoperative hemoglobin (g/dL) * | 12.88 ± 2.03 (5.7-16.9) |
| Anemia | |
| No | 284 (72.4%) |
| Yes | 108 (27.6%) |
| ASA risk | |
| I | 131 (33.4%) |
| II | 227 (57.9%) |
| III | 34 (8.7%) |
| Surgical time (min) * | 132.74 ± 48.13 (31-371) |
| Estimated bleeding (ml)* | 485.2 ± 1164.7 (10-22000) |
| Length of stay (days) | 2.1 ± 0.69 |
| <=2 | 357 (91.1%) |
| 3-4 | 30 (7.70%) |
| >4 | 5 (1.3%) |
| Type of anesthesia | |
| Regional | 369 (94.1%) |
| General | 23 (5.9%) |
| Anesthetic complication | 9 (2.3%) |
| Post-puncture headache | 2 (0.5%) |
| Cardiac arrhythmias | 2 (0.5%) |
| Bronchospasm | 1 (0.3%) |
| Reaction to anesthetics | 1 (0.3%) |
| Others | 3 (0.8%) |
| Blood transfusion | 28 (7.1%) |
| Transfused packed red blood cells * * | (0-11) |

Pre- and postoperative data of the study population.
*Data are presented as mean, ± standard deviation, (minimum-maximum).

Out of the 392 patients who underwent gynecological surgery, 78 patients (19.9%) experienced one or more complications. The most common complication observed was bleeding, reported in 36 patients, accounting for 46.2% of all complications and 9.2% of the total sample. This was followed by surgical wound dehiscence in 14 patients (3.6% of the population), bladder injury in 12 patients (3.1%), surgical site infection in 10 patients (2.6%), fever in 6 patients (1.5%), vaginal vault hematoma (1.0%), intestinal injury, and urinary tract infection, each with a frequency of 0.8%. Paralytic ileus was reported in 1 patient (0.3%). No ureteral injuries, venous thrombosis, or pelvic abscesses were

reported, so these are not included in the tables of information. Other complications, each with a frequency of 0.3%, included intestinal evisceration, hypovolemic shock, abdominal wall abscess, vaginal vault bleeding, urinary retention, and one case of vascular injury, which led to the patient's death, representing 0.3% of the sample. This same case corresponds to the patient in whom the atypical blood loss value of 22,000 ml was reported (Table 5).

*Table 5*

| | | n = 78 (%) | N = 392 |
|---|---|---|---|
| Bladder injury | | 12 (15.4%) | 3.1% |
| Intestinal injury | | 3 (3.8%) | 0.8% |
| Hemorrhage | | 36 (46.2%) | 9.2% |
| Fever | | 6 (7.7%) | 1.5% |
| Surgical wound dehiscence | | 14 (17.9%) | 3.6% |
| Surgical wound infection | | 10 (12.8%) | 2.6% |
| Vaginal vault hematoma | | 4 (5.1%) | 1.0% |
| Urinary tract infection | | 3 (3.8%) | 0.8% |
| Paralytic ileus | | 1 (1.3%) | 0.3% |
| Other complications | Intestinal evisceration | 1 (1.3%) | 0.3% |
| | Hypovolemic shock | 1 (1.3%) | 0.3% |
| | Abdominal wall abscess | 1 (1.3%) | 0.3% |
| | Vaginal vault bleeding | 1 (1.3%) | 0.3% |
| | Vascular injury and death | 1 (1.3%) | 0.3% |
| | Urinary retention | 1 (1.3%) | 0.3% |
| | Total | 6 (7.7%) | 1.5% |

Frequency of postoperative complications.

Table 6 shows the comparisons of clinical characteristics between patients who developed complications and those who did not. The average age of both groups is similar, ranging between 45 and 46 years. The age group of 41-50 years had the highest number of complications, with 46 cases (59% of all complications) compared to other age groups, though there was no statistically significant difference when compared to the group without complications. In the group with complications, a higher BMI was observed compared to the group without complications (31.89 ± 7.59 vs 29.92 ± 6.37), with a statistically significant difference. When analyzing the group with complications according to BMI categories, patients classified as overweight had a higher percentage of complications compared to grades of obesity (34.6% vs 30.8%, 11.5%, and 12.8% for grades I, II, and III, respectively). However, there was no significant difference between groups according to BMI grades.

Table 7 shows that the most frequently observed comorbidity was hypertension, with no significant differences between groups with and without complications. The second most common comorbidity was diabetes mellitus.

*Table 6*

| | **No complications n=314 (80.1%)** | **With complications n=78 (19.9%)** | ***Valor p*** |
|---|---|---|---|
| Age (years) | 45.6 ± 10.26 | 46.3 ± 6.9 | *0.402** |
| Age groups | | | *0.190* |
| <= 30 | 17 (5.4%) | 1 (1.3%) | |
| 31 - 40 | 69 (22%) | 15 (19.2%) | |
| 41 - 50 | 149 (47.5%) | 46 (59%) | |
| 51+ | 79 (25.2%) | 16 (20.5%) | |
| BMI | 29.92 ± 6.37 | 31.89 ± 7.59 | *0.032** |
| Groups by BMI | | | *0.169* |
| Underweight | 2 (0.6%) | 0 | |
| Normal weight | 60 (19.1%) | 8 (10.3%) | |
| Overweight | 108 (34.4%) | 27 (34.6%) | |
| Obesity grade I | 83 (26.4%) | 24 (30.8%) | |
| Obesity grade II | 42 (13.4) | 9 (11.5%) | |
| Obesity grade III | 19 (6.1%) | 10 (12.8%) | |

| | | | |
|---|---|---|---|
| Parity | | | *0.976* |
| Nulliparous | 50 (15.9%) | 13 (16.7%) | |
| Primiparous | 26 (8.3%) | 6 (7.7%) | |
| Multiparous | 238 (75.8%) | 59 (75.6%) | |
| Comorbid | | | *0.631* |
| No | 153 (48.7%) | 41 (52.6%) | |
| Yes | 161 (51.3%) | 37 (47.4%) | |
| Smoking | | | *0.932* |
| No | 266 (84.7%) | 67 (85.9%) | |
| Yes | 48 (15.3%) | 11 (14.1%) | |
| Previous abdominal surgeries | | | *0.572* |
| None | 61 (19.4%) | 12 (15.4%) | |
| One | 103 (32.8%) | 22 (28.2%) | |
| Two | 72 (22.9%) | 20 (25.6%) | |
| Three or more | 78 (24.8%) | 24 (30.8%) | |

Clinical characteristics according to the group with and without complications.
BMI: Body Mass Index.
Statistical test used: Pearson Chi-square.
*Mann Whitney U statistical test was used.

***Table 7***

| **Comorbid** | **No complications n=314 (80.1%)** | **With complications n=78 (19.9%)** | ***Valor p*** |
|---|---|---|---|
| Diabetes Mellitus | 56 (17.8%) | 15 (19.2%) | *0.774* |
| Systemic arterial hypertension | 110 (35%) | 25 (32.1%) | *0.62* |
| Thyroid disease | | | *0.836* |
| Hypothyroidism | 34 (10.8%) | 8 (10.3%) | |
| Hyperthyroidism | 2 (0.6%) | 1 (1.3%) | |
| Heart disease | 11 (3.5%) | 3 (3.8%) | *0.551** |
| Other comorbidities | 45 (14.3%) | 8 (10.3%) | *0.346* |

Frequencies of comorbidities in groups with and without complications. Statistical test used: Pearson Chi-square.
*Fisher's exact statistical test was used.

Table 8 shows the preoperative and postoperative data for both groups. The average preoperative hemoglobin did not have a statistically significant difference between groups; however, the presence of anemia was significantly lower in the complication group (16.3% vs 29.9%), which was contrary to what was expected. The ASA risk classification did not show significant differences between groups. The surgical time (125.75 ± 40.59 min vs 160.86 ± 63.78 min), estimated blood loss (334.63 ± 225.5 ml vs 1109.74 ± 2488.2 ml), and hospital stay days (2.01 ± 0.43 vs 2.48 ± 1.24) were significantly greater in the complication group compared to the group without complications. In terms of estimated blood loss, even after removing the outlier value of 22,000 ml reported in one patient, the adjusted average for that value in this group was calculated to be 838.44 ± 675.3 ml, and the p-value remains statistically significant. Blood transfusion was higher in the complication group compared to the group without complications (24.4% vs 2.9%), which corresponds to the most frequently reported complication: hemorrhage.

**Table 8**

| | **No complications n=314 (80.1%)** | **With complications n=78 (19.9%)** | ***Valor p*** |
|---|---|---|---|
| Preoperative hemoglobin (g/dL) | 12.79 ± 2.09 | 13.30 ± 1.65 | *0.93* |
| Anemia | | | *0.034** |
| No | 220 (70.1%) | 64 (82.1%) | |
| Yes | 94 (29.9%) | 14 (16.3%) | |

| | | | |
|---|---|---|---|
| ASA risk | | | *0.716** |
| I | 105 (33.4%) | 26 (33.3%) | |
| II | 180 (57.3%) | 47 (60.3%) | |
| III | 29 (9.2%) | 5 (6.4%) | |
| Surgical time (min) | 125.75 ± 40.59 | 160.86 ± 63.78 | *<0.001* |
| Estimated bleeding | 334.63 ± 225.5 | 1109.74 ± 2488.2** | *<0.001* |
| Length of stay (days) | 2.01 ± 0.43 | 2.48 ± 1.24 | *<0.001* |
| Hospital stay groups (days) | | | *<0.001* |
| <=2 | 300 (95.5%) | 57 (73.1%) | |
| 3-4 | 12 (3.8%) | 18 (23.1%) | |
| >4 | 2 (0.6%) | 3 (3.8%) | |
| Blood transfusion | 9 (2.9%) | 19 (24.4%) | *<0.001* |
| Transfused packed red blood cells | 0.02 ± 0.21 | 0.49 ± 1.39 | *<0.001* |

Comparison of pre- and postoperative data from both groups with and without complications.
Statistical test used: Mann-Whitney U.
*Pearson's Chi-square test was used.
**Adjusted mean and SD 838.44 ± 675.3 ml.

The three most common preoperative diagnoses that resulted in postoperative complications were uterine myomatosis (42.3%), abnormal uterine bleeding (30.8%), and ovarian tumor (10.3%). However, there were no significant differences when comparing these diagnoses with the group of patients without complications.

## DISCUSSION

This study analyzed the relationship between clinical characteristics and postoperative complications in abdominal gynecologic surgery. It was found that 19.9% of patients experienced at least one complication, with hemorrhage being the most frequent (9.2%). Significant differences were observed in BMI, surgical time, estimated blood loss, and hospital stay between patients with and without complications.

The complication rate observed in this study falls within the range reported in previous research, such as 24.16% by Bahadur et al., 22.2% by Bohlin et al., and 27.2% by Brunes et al. However, these figures contrast with lower rates, such as 3.8% reported by Ortiz-Martínez et al. in Colombia and 2.15% reported by Aguilar et al. in Mexico. These discrepancies may be due to differences in the type of surgery, the population studied, or hospital characteristics. [3-4,6,32,34]

Hemorrhage was the most frequent complication in this study, accounting for 46.2% of total complications and 9.2% of the study population, aligning with literature that identifies it as a major cause of surgical morbidity and mortality. Hollman and Rodríguez, in their study in Mexico, identified hypovolemic shock as the most common intraoperative complication (9.1%), with a higher incidence than that reported by Bohlin et al. (2.6%).[5,34] Other notable complications in this study included wound dehiscence (3.6%) and bladder injury (3.1%), consistent with Mexican literature by Hollman and Rodríguez. Ortiz-Martínez et al. also reported a low incidence of bladder injury (0.34%) and wound dehiscence (0.17%).[3,5] However, studies like those of Ersoy et al. and Brunes et al. report significantly higher rates of surgical site infections (15.8% and 9.8%, respectively), which contrast with the 2.6% found in this study, where it is the fourth most frequent complication. These differences could be attributed to population characteristics in each study. [6,35]

A significant finding in our study is the occurrence of one death in the complication group (0.3%), which is infrequent in gynecologic surgery studies, as reported by Hollman and Rodríguez (0.22%).[5]

The group with complications had a significantly higher BMI (31.89 ± 7.59 vs 29.92 ± 6.37), supporting the relationship between elevated BMI and increased risk of postoperative morbidity, as reported by Sawah et al. and Brunes et al. (6.4% vs 1.6% in higher BMI categories). Although no significant differences were found between obesity grades, overweight was the nutritional status most associated with complications, differing from Brunes et al., who indicated a higher risk in women with obesity grade II-III (aOR 1.4) compared to those with normal weight.[6,11]

While comorbidities did not show significant differences between groups, hypertension was the most common condition (32.1% in the complication group), followed by diabetes mellitus (19.2%), consistent with reports from Urgellés et al., Hollman and Rodríguez, and Margulies et al., who identify hypertension as a risk factor. However, it differs from Ortiz-Martínez et al., who associated obesity alone (OR 12.47) with complications. This difference may be due to the exclusion of obesity as a comorbidity in our study. [3,5,7]

Regarding estimated blood loss, it was significantly greater in the complication group (1109.74 ± 2488.2 ml), although adjusted by excluding an outlier value, it remained significantly higher (838.44 ± 675.3 ml). These findings align with studies like Margulies et al. and Kaya et al., which link greater blood loss with postoperative complications, especially in prolonged procedures. Our study also confirmed this relationship, as the complication group had an average surgical time of 160.86 ± 63.78 minutes, compared to 125.75 ± 40.59 minutes in the non-complication group. [12,14]

This study identifies preoperative characteristics, such as low hemoglobin levels and elevated BMI, as significant risk factors requiring close monitoring before surgery. It is essential to implement standardized protocols to reduce surgical duration and prevent complications.

The strengths of this study include the analysis of multiple variables, an adequate sample size, and the identification of relevant clinical relationships, which align with international findings. However, its ability to establish causal relationships is limited due to its retrospective nature, and factors like surgeon experience or surgical techniques were not considered, which could have influenced the results.

## CONCLUSION

The results of this study provide a comprehensive understanding of the clinical characteristics associated with complications in abdominal gynecological surgery. It was found that 19.9% of patients experienced at least one postoperative complication, with bleeding being the most common. Obesity was significantly associated with an increased risk of complications, such as bleeding, the need for transfusions, and prolonged surgical times. Although comorbidities and smoking did not show significant differences, the duration of the procedure and hospital stay were longer in patients with complications, highlighting their impact on hospital management. The results reflect the characteristics of a Mexican population, offering valuable information for a region where data on gynecological surgical complications is limited. This highlights the need for personalized preoperative strategies to reduce BMI and optimize intraoperative management, with implications for improving the quality and safety of gynecological surgery in the region.

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