Anesthetic Techniques and Complications, Challenges in Hysterectomies in Obese Patients

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Abstract

Background: *Obesity poses challenges in surgical settings, and anesthetic technique selection is crucial due to unique physiological factors in obese patients. This study compares three anesthesia methods for hysterectomies in obese patients, assessing efficacy and safety, with a focus on postoperative complications.*

Method: *This retrospective observational study collected data from obese patients (BMI >30 kg/m2, age >18 years) undergoing hysterectomy at Hospital ÁngelesMetropolitano between 2017-2020 using simple random sampling. Descriptive statistics and chi-square tests were employed. The study was approved by the Local Health Research Committee, ensuring anonymity and confidentiality.*

Results: *The study compared epidural block, general anesthesia, and mixed block with sedation anesthesia in 30 obese hysterectomy patients. Obesity grade distribution was similar across anesthesia types (60-70% grade I, 30-40% grade II). Most patients had low perioperative risk scores. Transoperative complications were higher with general anesthesia (30%) compared to epidural (0%) and mixed block (10%), though not statistically significant (P=0.383). No significant differences in preoperative or postoperative complication rates were observed between groups.*

Conclusion: *No significant differences in complication rates were observed between the groups. Larger studies are needed to verify these findings and assess long-term outcomes.*

Keywords: *Obesity, Anesthetic technique, Hysterectomies, Postoperative complications, Epidural block, General anesthesia, Perioperative risk, Transoperative complications, Regionalanesthesia.*

1. INTRODUCTION

Obesity is a constantly increasing public health condition, posing significant challenges in the planning and execution of surgical procedures [1]. Hysterectomy is a common procedure performed on obese patients, requiring special attention in the choice of anesthetic technique [2]. The decision on the type of anesthesia to employ becomes a crucial element in ensuring the safety and success of the procedure, considering the physiological and metabolic peculiarities associated with obesity [3].

This research aims to address the comparison of different types of anesthesia used in obese patients undergoing hysterectomy, with a specific focus on postoperative complications.

2. METHODS

This observational study conducted from 2017 to 2020 at Hospital Ángeles Metropolitano in Mexico City focused on obese patients who underwent hysterectomies. A total of 30 medical records were analyzed using simple random sampling, aiming for a 95% confidence level, 80% power, and a 60% anticipated difference in complication rates between treatments.

Efforts to mitigate bias included random sampling and clear inclusion/exclusion criteria. We aimed to minimize potential confounders by standardizing our sample across age, obesity grade, comorbidities, and preoperative conditions. Patients were selected based on specific criteria: BMI ≥ 30 kg/m2, age over 18, and availability

of relevant clinical information in their medical records. Exclusion criteria included postpartum hysterectomies, psychiatric disorders, medical contraindications for surgery or anesthesia, and cases with coding errors or data discrepancies.

Statistical analysis employed SPSS version 23.0, applying descriptive statistics and normality tests. Continuous variables were reported using means and standard deviations or medians with minimum and maximum values based on distribution. Chi-square tests assessed associations between variables such as complications, obesity grades, and anesthesia types, with significance set at $P < 0.05$.

The study, approved by the Local Health Research Committee, maintained confidentiality by using numeric identifiers instead of names throughout data processing and communication.

3. RESULTS

In this study, we investigated the effectiveness of three anesthesia methods: epidural block (BPD), general anesthesia, and mixed block with sedation (M+S). In 30 obese patients undergoing hysterectomy, with each group comprising 10 patients. The mean ages were 42.50 (±5.75), 42.10 (±7.06), and 48.10 (±3.03) years for the BPD, general anesthesia, and M+S groups, respectively.

Regarding previous surgical procedures, the most common surgeries were cesarean section (30%), bilateral tubal ligation (13%), and cholecystectomy (10%). Less frequent surgeries included myomectomy, fibroadenoma excision, appendectomy, umbilical hernia repair, and strabismus correction, with 11 patients having no prior surgeries. In terms of diagnoses and past medical history, large and medium-sized myomatosis (12 and 11 patients, respectively) and abnormal uterine bleeding (10 patients) were the most frequent.

ASA classification, Goldman Score, and Detsky Score assess perioperative risk. Most patients had ASA II, indicating mild systemic disease: 100% in BPD and M+S, and 70.0% in general anesthesia. BPD and M+S had all patients rated as Goldman I and Detsky 1, while in general anesthesia, 70.0% were Goldman I and Detsky 1, and 30.0% were Goldman II and Detsky 2 (Table 1).

Table 1. *Perioperative risk and type of anesthesia; Comparison of perioperative risk assessment tools by anesthesia type, showing the distribution of ASA, Goldman, and Detsky classifications across different anesthesia methods (BPD, General, M+S) in a sample size of 10 cases for each type.*

Tools to determine perioperative risk		Type of anesthesia		
		BPD n= 10	General n= 10	M+S n= 10
ASA Classification	I	0 (0.0%)	1 (10.0%)	0 (0.0%)
	II	10 (100%)	7 (70.0%)	10 (100%)
	III	0 (0.0%)	2 (20.0%)	0 (0.0%)
	IV	0 (0.0%)	0 (0.0%)	0 (0.0%)
	V	0 (0.0%)	0 (0.0%)	0 (0.0%)
	VI	0 (0.0%)	0 (0.0%)	0 (0.0%)
Goldman Classification	I	10 (100%)	7 (70.0%)	10 (10.0%)
	II	0 (0.0%)	3 (30.0%)	0 (0.0%)
	III	0 (0.0%)	0 (0.0%)	0 (0.0%)
	IV	0 (0.0%)	0 (0.0%)	0 (0.0%)
Detsky classification	1	10 (100%)	7 (70.0%)	10 (10.0%)
	2	0 (0.0%)	3 (30.0%)	0 (0.0%)
	3	0 (0.0%)	0 (0.0%)	0 (0.0%)

Distribution of obese patients across different anesthesia techniques (BPD, General, M+S)

Obesity	BPD n= 10	General n= 10	M+S n= 10
Grade I	6 (60.0%)	7 (70.0%)	7 (70.0%)
Grade II	4 (40.0%)	3 (30.0%)	3 (30.0%)
Total	10 (100%)	10 (100%)	10 (100%)

Regarding our study prior surgeries included cesarean section (9 patients), bilateral tubal ligation (4 patients), and cholecystectomy (3 patients). Other less frequent prior surgeries

were also reported, with 11 patients having no previous surgeries. Large and medium-sized myomatosis (12 and 11 patients, respectively) and abnormal uterine bleeding (10 patients) were the most prevalent, underscoring the significant burden of uterine fibroids and abnormal bleeding among women undergoing OH (Table 2).

Table 2. *Summary of Patient Characteristics; Summary of prior surgeries and prevalent conditions among patients undergoing obstetric hysteroscopy (OH).*

Patient Characteristics	Number of Patients (N)	Percentages (%)
Prior Surgeries		
Cesarean Section	9	30.0
Bilateral Tubal Ligation	4	13.3
Cholecystectomy	3	10.0
No Previous Surgeries	11	36.7
History of Myomatosis		
Large	12	40.0
Medium	11	36.7
Abnormal Uterine Bleeding	10	33.3

Preoperative issues were rare, with one case each of anemia in the BPD group and abdominal pain in the general anesthesia group. Transoperative complications varied, with the general anesthesia group having the highest rate (30.0%), compared to none in BPD and 10.0% in mixed anesthesia with sedation ($\chi 2 = 8.538$; P= 0.383). Complications included adhesiolysis, peri-appendicitis, and dome bleeding. Technical difficulty was similar between the general anesthesia and mixed anesthesia with sedation groups (70.0%), slightly lower in the BPD group (50.0%) ($\chi 2=0.300$; P=0.861). Complications observed during surgery included adhesions, endometriotic foci, and challenges related to extensive adipose tissue and a highly vascularized bladder. Post-surgery complications were low in the BPD and general anesthesia groups (20.0%), with no cases in the mixed anesthesia with sedation group ($\chi 2= 8.308$; P=0.404). Complications included surgical wound abscess, urinary tract infection, and fever. However, there was no statistical significance in preoperative, intraoperative, and postoperative complications (Table 3).

Table 3. *Surgical clinical features and type of anesthesia; Comparison of surgical outcomes by anesthesia type (BPD, General, M+S), detailing pre-, intra-, and post-surgery complications, with chi-square test statistics and p-values.*

Surgical clinical features		Type of anesthesia		
		BPD n= 10	General n= 10	M+S n= 10
Pre-surgery complications	Yes	1 (10.0%)	1 (10.0%)	0 (0.0%)
$\chi^2 = 4.071$; p=0.396	No	9 (90.0%)	9 (90.0%)	10 (100%)
Hemo-transfusion	Yes	1 (10.0%)	1 (10.0%)	0 (0.0%)
$\chi^2 = 1.071$; p=0.585	No	9 (90.0%)	9 (90.0%)	10 (100%)
Intraoperative complications	Yes	0 (0.0%)	3 (30.0%)	1 (10.0%)
$\chi^2 = 8.538$; p=0.383	No	10 (100%)	7 (70.0%)	9 (90.0%)
Technical difficulty	Yes	5 (50.0%)	7 (70.0%)	7 (70.0%)
$\chi^2 = 0.300$; p=0.861	No	5 (50.0%)	3 (30.0%)	3 (30.0%)
Post-surgery complications	Yes	2 (20.0%)	2 (20.0%)	0 (0.0%)
$\chi^2 = 8.308$; p=0.404	No	8 (80.0%)	8 (80.0%)	10 (100%)

4. DISCUSSION

4.1. Key Results

The analysis of surgical clinical features revealed no statistically significant differences among the three anesthesia methods—epidural block (BPD), general anesthesia, and mixed block with sedation (M+S)—across several outcomes. Pre-surgery complications occurred in 10.0% of patients in both the BPD and general anesthesia groups, with none in the M+S group (χ^2=4.071, p=0.396). The incidence of hemo-transfusion was similarly low, with one case each in the BPD and general anesthesia groups, and none in the M+S group (χ^2=1.071, p=0.585). Intraoperative complications were more frequent in the general anesthesia group (30.0%) compared to the M+S group (10.0%) and absent in the BPD group, though these differences were not statistically significant (χ^2=8.538, p=0.383). Technical difficulty was reported in 50.0% of BPD cases and 70.0% in

both the general and M+S groups (χ^2=0.300, p=0.861).

Post-surgery complications were observed in 20.0% of cases in the BPD and general anesthesia groups, with no complications in the M+S group (χ^2=8.308, p=0.404). These findings suggest that while there are trends indicating potential benefits of BPD and M+S in specific contexts, there is no statistically significant evidence to favor one anesthesia method over another in terms of overall complication rates.

4.2. Limitations

Our study has limitations due to the small, homogeneous sample size, lack of long-term follow-up data, retrospective design relying on medical records, and single-institution setting focused on short-term outcomes. Despite efforts to standardize the sample, unaccounted confounders and biases may have influenced results. Larger, diverse samples with extended follow-up are necessary to validate findings and gain deeper insights into optimal anesthesia management for obese hysterectomy patients. Further research is encouraged to build upon our initial findings and improve patient care.

4.3. Interpretation

Obstetric hysterectomy (OH) is an urgent procedure following pregnancy complications or worsened pre-existing conditions, often needed to control postpartum hemorrhage when conservative measures fail, posing significant maternal risks [4].

Globally, OH incidence ranges from 1.0 to 1.3 per 1,000 births, with higher rates after cesarean section [5]. In Mexico, it's estimated at 0.5-0.9% [6]. Common risk factors include prior cesarean, age over 35, multiparity, uterine instrumentation, and multiple pregnancies [7-8].

Our findings can be contextualized within the broader literature on anesthesia methods and intraoperative complications. For instance, a retrospective study with a large sample size examining primary or repeat cesarean deliveries reported a relatively low rate of intraoperative complications, ranging from 3% to 4% of cases. Importantly, this study found no significant increase in the incidence of complications during surgery among obese patients compared to non-obese patients [9].

In our study on obese patients undergoing hysterectomy, we observed varying intraoperative complication rates across different anesthesia methods. The general

anesthesia group had the highest rate (30.0%), while the BPD group had no complications, and the M+S group had a lower rate (10.0%), though these differences were not statistically significant (X^2=8.538, p=0.383). Preoperative issues were uncommon, with only one case each of anemia (BPD group) and abdominal pain (general anesthesia group). Most patients did not require blood transfusion. Although the overall complication rates were higher than those reported for cesarean deliveries, the BPD method demonstrated no intraoperative complications, aligning with the low rates observed in broader literature. However, there was no statistically significant difference in preoperative, intraoperative, and postoperative complications across the anesthesia methods.

Obesity complicates OH due to anatomical constraints and altered surgical stress response, necessitating careful surgical and anesthetic planning [10]. Anesthesia options, such as epidural, general, or mixed blockade, impact intraoperative outcomes and safety. Morbid obesity increases risks of difficult intubation, failed labor analgesia, and high spinal blockade compared to non-obese patients [11-12]. However, data on anesthetic complications in morbidly or super-obese pregnancies and the BMI cutoffs defining these categories are limited.

Camarena et al. (2023) investigated hysterectomy among Mexican women, noting that 50% had no prior surgeries, with cesarean sections being the most prevalent. Vega et al. (2017) similarly found that over half of Mexican women undergoing hysterectomy had prior cesarean sections and were multiparous [11]. Regarding multiparity, both Camarena et al. and our study show that over 50% of women were multiparous, although differences exist in mean sample age. Vega et al. reported a lower mean age compared to our findings and those of Camarena et al [11].

From the population of our study, cesarean section was the most common prior surgery among women undergoing hysterectomy, corroborating the findings of many other studies [13]. Some studies report a 20% higher risk of complications in women with a history of cesarean section compared to those without, and a 34% higher risk in women with more than two cesarean sections [14]. Women who underwent one cesarean delivery exhibited a higher likelihood of requiring reoperation following a hysterectomy, in contrast to those who solely

had vaginal deliveries. Conversely, individuals who underwent two or more cesarean deliveries showed a similar risk of reoperation after a hysterectomy compared to women with only one cesarean delivery [14-16].

In our study, the reported perioperative and postoperative complications were not statistically significant. One possible explanation, aside from the sample size, is that the BMI of the patient population was not high enough to pose a significant risk. However, the literature has extensively documented the complications and common issues associated with anesthesia for obese patients.

A study comparing the perioperative outcomes and anesthetic-related complications of morbidly obese (BMI 40 to 49.9) and super-obese (BMI >50) patients undergoing cesarean delivery revealed significant differences. The super-obese patients experienced higher requirements for ephedrine and norepinephrine, increased intravenous fluid administration, greater intraoperative bleeding, and more frequent hypotensive episodes compared to the morbidly obese patients. Nevertheless, both groups exhibited similar incidences of neonatal birth asphyxia, postpartum hemorrhage, blood transfusion requirements, uterine atony, and lengths of hospital stay [17].

While our study did not find statistically significant complications, potentially due to the patient population's BMI not being exceedingly high, the literature highlights the increased risks associated with anesthesia for obese patients, particularly in the super-obese category.

FUNDING

5. CONCLUSION

Our study compared the effects of epidural block (BPD), general anesthesia, and mixed block with sedation (M+S) on obese patients undergoing hysterectomy, finding no statistically significant differences in preoperative, intraoperative, or postoperative complications among the methods. Preoperative issues and blood transfusion needs were minimal across groups. Further research with larger, diverse samples is needed to confirm these findings and guide anesthesia management for obese hysterectomy patients.

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