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Comparison of the effect of general anesthesia and combined epidural anesthesia on the anesthetic management of gynecological oncological surgery

Jinekolojik onkoloji cerrahisinin anestezi yönetiminde genel anestezi ile genel anesteziye eklenen epidural anestezinin etkisinin karşılaştırılması

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Abstract

Objective: To evaluate the potential advantages of combined general and epidural anesthesia for major gynecological oncological surgeries.

Materials and Methods: The data of 690 gynecological cancer were retrospectively examined, and 223 patients who met the inclusion criteria were included in the study. The patients were divided into two groups: Group G (123 patients who received general anesthesia only) and Group C (100 patients who received combined epidural and general anesthesia. The perioperative follow-up data were comparatively analyzed.

Results: Operation times in Group G were significantly lower than those in Group C (p=0.018). The blood product replacement rate was higher in Group G (p<0.05). Additionally, intraoperative bleeding rates were lower in Group C (p<0.05). Postoperatively, the analgesic requirement time of Group C was significantly later than that of Group G (p=0.0001). The first mobilization time of Group C was substantially earlier (p=0.0001). Thrombosis and cardiac complications were considerably less frequent in group C, although allergic complications were more common (p<0.05). The length of hospital stay was shorter in Group C (p<0.05).

Conclusion: Combined epidural and general anesthesia in gynecological oncological surgeries may improve postoperative outcomes, including reduced analgesic requirements, earlier patient mobilization, shorter hospitalization, and decreased rates of complications, particularly cardiovascular and thrombotic events.

Keywords: General anesthesia, epidural anesthesia, major abdominal surgery, complications, gynecological oncology

Öz

Amaç: Ameliyat sonrası komplikasyonları önlemek amacıyla majör jinekolojik onkolojik ameliyatlarda genel ve epidural anestezi kombinasyonunun avantajlarını araştırmak.

Gereç ve Yöntemler: Bu çalışmaya 690 hastanın verileri retrospektif olarak değerlendirilmiş ve araştırma kriterlerimizi karşılayan 223 hasta çalışmaya dahil edilmiştir. Hastalar, aldıkları anestezi türüne göre iki gruba ayrılmışlardır: Genel anestezi alan 123 hasta Grup G'yi; genel anestezi ile birlikte kombine epidural anestezi uygulanan 100 hasta ise Grup C'yi oluşturmuştur. Her iki grubun hastaları, ameliyat sonrası süreçleri karşılaştırmalı olarak incelenmiştir.

Bulgular: Operasyon süreleri, Grup G'de Grup C'ye kıyasla anlamlı olarak daha kısa bulunmuştur (p=0,018). Grup C'de kan basıncının daha stabil olduğu gözlemlenmiştir. Ayrıca, Grup G'de daha fazla fibrinojen transfüzyonu yapıldığı belirlenmiştir. Buna karşın, Grup C'de intraoperatif kanama oranları, Grup

PRECIS: Combining epidural anesthesia and general anesthesia in major gynecologic oncology may improve postoperative outcomes including decreased postoperative analgesic requirements, earlier mobilization, reduced length of stay and decreased risk of cardiovascular and thrombotic complications.

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G'ye göre daha düşük tespit edilmiştir. Ameliyat sonrası dönemde, Grup C'nin analjezik ihtiyacı Grup G'ye kıyasla anlamlı olarak daha uzun süreli olmuştur (p=0,0001). Aynı zamanda Grup C'de ilk mobilizasyon süresi anlamlı derecede daha kısa bulunmuştur (p=0,0001). Tromboz ve kalp komplikasyonları Grup C'de daha az sıklıkla görülürken, bu grupta hastanede ve yoğun bakım ünitesinde kalış süreleri daha kısa, alerjik komplikasyonlar ise daha sık rastlanmıştır.

Sonuç: Jinekolojik onkolojik cerrahilerde kombine epidural ve genel anestezi, ameliyat sonrası analjezik gereksinimlerinin azalması, erken mobilizasyon, kısa hastanede kalış süresi ve özellikle kardiyovasküler ve trombotik olaylar olmak üzere komplikasyonların azalması dahil postoperatif sonuçları iyileştirebilir.

Anahtar Kelimeler: Genel anestezi, epidural anestezi, majör abdominal cerrahi, komplikasyonlar, jinekolojik onkoloji

Introduction

Gynecologic cancers have many risk factors, management algorithms, and varying outcomes, and they are among the most prevalent cancers concerning women worldwide[1]. Many gynecologic tumors are managed with chemotherapy and/or radiotherapy, but some require neoadjuvant therapy. Surgical procedures are essential for some patients. On the other hand, the preferred method for the surgical treatment of gynecological cancers is radical excision surgery[2], which includes total abdominal hysterectomy and bilateral salpingo-oophorectomy (TAH + BSO)[3]. Protocols for optimal perioperative pain management in patients undergoing cytoreductive surgery for gynecologic malignancies include preemptive analgesia, neuraxial and regional techniques, local anesthetic infiltration, and multimodal analgesia[4]. The level of postoperative pain can vary widely, ranging from minor discomfort after minimally invasive cancer surgery to more severe pain following open debulking procedures. Therefore, an individualized perioperative analgesic plan, depending on the surgical approach, is critical. The administration of intravenous general anesthetics, particularly opioids, may lead to adverse effects, such as vomiting, nausea, and ileus, and can increase postoperative morbidity and mortality[5]. Epidural anesthesia combined with general anesthesia is a practicable approach to curbing the need for perioperative anesthesia, alleviating postoperative pain, and mitigating the possibility of complications[5]. Epidural anesthesia is particularly advantageous in patients with cardiovascular or pulmonary system diseases who have a high risk of deep vein thrombosis[6]. Therefore, regional anesthesia may be an effective method for reducing postoperative pain and minimizing the side effects of opioids. However, recent studies have reported contradictory outcomes in patients undergoing gynecologic oncology surgery regarding pain control and postoperative complications[6,7].

Perioperative complications related to anesthesia in gynecological surgeries include myocardial infarction (MI), arrhythmias, atelectasis, hypothermia, and blood loss[8]. In addition, pulmonary thromboembolism, thrombophlebitis, hemodynamic changes (hypotension, hypertension, bradycardia, tachycardia, MI, arrhythmias), fluid-electrolyte imbalances, and blood sugar irregularities may occur during the postoperative period. Epidural anesthesia combined with general anesthesia may reduce these complications[9]. In long-term surgeries, standard anesthetics may not be sufficient to suppress adrenergic, autonomic, and somatic responses accompanied by catastrophic complications due to surgical stimuli and intubation; therefore, additional regional anesthesia combined with general anesthesia is recommended[10,11].

The present study aimed to compare the effects of general and combined epidural anesthesia on the anesthetic management of gynecological oncological surgery.

Materials and Methods

A retrospective analysis was conducted on perioperative and postoperative complications in patients with cervical, endometrial, and ovarian cancer who underwent gynecologic oncologic surgery at Gaziantep University Şahinbey Research and Education Hospital between 01.01.2015 and 01.09.2020. Ethical approval for our study was obtained from the Gaziantep University Clinical Research Ethics Committee in the decision dated 21.10.2020 and numbered 2020/318. This study was conducted in accordance with the current guidelines of the Helsinki Declaration.

Patient Selection Criteria and Subgroups

The study included gynecological oncology patients aged 18-85 with American Society of Anesthesiologists (ASA) I-III risk classifications who underwent general or combined epidural anesthesia for TAH+BSO surgery with midline incisions. The study excluded patients with ASA IV-V risk classifications, those who were treated with other protocols or surgical options, and those with insufficient data. Retrospective data from 690 gynecological oncology patients operated on between 01.01.2015 and 01.09.2020 was reviewed, and 223 patients met the study criteria. The patients were divided into two subgroups: Those who received general anesthesia (Group G, n=123; 55.16%) and those who received combined epidural anesthesia (Group C, n=100; 44.84%).

Study Design and Principles of Anesthetic Management

General anesthesia is the standard approach for our clinic's midline surgeries performed for patients with gynecologic oncology. All patients included in the study were operated using the same algorithm used in the anesthesia procedures. The patients, whose general condition was moderate-well and cooperative, received a dose of 0.03-0.05 mg/kg intravenous (IV) midazolam 15-20 minutes before the surgery for anxiolysis and amnesia. Standard monitoring was performed in all cases (SpO_2, NIK- and IKK2-binding protein, electrocardiogram). IV fentanyl (1-2 mcg/kg) and propofol (2 mg/kg) for general anesthesia inductions, and IV rocuronium (0.4-0.5 mg/kg) for

muscle paralysis were administered to all cases. In addition, a standard cardiac protocol for general anesthesia was used in patients with limited cardiac reserve and ejection fraction below 40%. IV midazolam 0.04-0.06 mg/kg, IV fentanyl 2-3 mcg/kg, and IV propofol 1 mg/kg were administered for general anesthesia induction in these cases; moreover, IV rocuronium 0.3-0.4 mg/kg was administered for muscle paralysis. Endotracheal intubations were performed using an endotracheal tube with an internal diameter of 7.5 mm.

In the maintenance of general anesthesia, drugs were preferred, considering the patients' hemodynamic and blood pressure parameters. Sevoflurane 1.3-2 lt/min or desflurane 5-6 lt/min are preferred for inhalation anesthesia. In addition, IV remifentanil was administered at 0.1-0.5 mcg/kg/min. In addition, anesthesia maintenance was performed in the volume-controlled mode in all patients. The ventilator settings were 8-10 mL/min tidal volume, 34-41 mmHg end-tidal carbon dioxide pressure, 3.5/4 lt/min fresh gas flow amount, and 40-45% FiO_2 level. Furthermore, 10 mg IV rocuronium was administered intermittently to continue muscle paralysis.

Before the initiation of general anesthesia in Group C, the patients were seated or placed in the lateral decubitus. The area for local anesthesia was then cleaned with a skin antiseptic. Subsequently, 10-20 mg of 2% subcutaneous lidocaine was applied to the skin projections of the L3-L4 or L4-L5 intervals. Afterward, the epidural space was entered with a 17-18 gauge thick and 9-10 cm long Tuohy needle with the entry angle facing the cephalic using either the loss of resistance or the hanging drop technique. The epidural catheter was placed into 3-4 cm of the epidural interval. A 3 mL of 2% lidocaine containing adrenaline was injected into the patients as a "test dose" through an epidural catheter. Then, 30-40 mL of isobaric 0.5% bupivacaine was administered into the epidural space after assessing the vital signs. At the end of the procedure, the patients were placed in the supine position, and general anesthesia induction was started as standard.

IV 0.1-0.5 mg/kg was administered as an antiemetic at the end of the surgery. For postoperative analgesia, 1 mg/kg IV tramadol was administered at the end of the surgery in Group G. Moreover, 3-4 mg of HCL was administered through the epidural catheter approximately 1 hour before the end of the surgery in Group C. At the end of the surgery, IV sugammadex was administered 2-2.5 mg/kg in patients aged >55 years to antagonize the residual neuromuscular blockade in both groups. Furthermore, patients aged below 55 years, a total dose of 1 mg of intravenous atropine sulfate and 2.5 mg of intravenous neostigmine was administered. The patients were extubated when they reached sufficient muscle strength and then transferred to the postoperative care unit. Patients with Aldrete scores >8 at the end of postoperative care were transferred to the inpatient department[12].

Data Collection Principles

Demographic data such as age (years), body mass index [body mass index (BMI), kg/m^2], ASA risk scores[13], primary malignancies, and comorbidities of the patients in both groups were recorded. Undesirable conditions such as hypotension, hypertension, bradycardia, tachycardia, MI, and arrhythmia observed during the perioperative period were documented and categorized as cardiac complications. In addition, the volume and type of IV fluid replacement (mL; crystalloid or colloid), the amount of bleeding (mL), and data on blood product transfusions, including the type [erythrocyte suspension (ES), fresh frozen plasma (FFP), fibrinogen], and amounts (units or international units), were recorded according to the data of the perioperative period. According to intraoperative records, patients with blood loss were defined as those who lost 1000 mL or more of blood during the operation or required blood product replacement. The first analgesic administration time (minutes), first mobilization time (hours), and complications, including pruritus, urinary retention, allergic reaction, and cardiac complications in the postoperative period, were scanned and recorded. The Hospital Data System documented the use of postoperative compression stockings and incidences of thrombophlebitis and thromboembolism. Finally, we recorded the patients' length of stay (days), any transfers to the intensive care unit, and the outcomes of their postoperative treatment, including discharge, transfer to another service, or death.

Statistical Analysis

All data were analyzed using Statistical Package for the Social Sciences software for Windows (v25.0; IBM, Armonk, NY, USA), MedCalc version 20.013 and R-Studio v2023.091. Individual and aggregate data were summarized using descriptive statistics, including means, standard deviations, and medians [interquartile range (IQR)]. Categorical variables are expressed as numbers of cases and percentages (%). The normality of data distribution was analyzed using the Shapiro-Wilk test. Normally distributed parametric data were compared with the Student t-test, whereas the Mann-Whitney U test was used for non-parametric data that did not show a normal distribution. P-values of <0.05 were considered statistically significant. The categorical variables were evaluated using the chi-square test.

Results

Two hundred twenty-three patients were included in the study: 123 (55.16%) in Group G and 100 (44.84%) in Group C. The mean age of participants was 59.55±10.2 years in Group G and 60.10±11.82 years in Group C, showing no significant difference between the groups (p=0.732). The ASA risk score and BMI were also similar between the groups, with no significant differences (p=0.494 and p=0.718, respectively; Table 1). In comparing the surgery duration between the groups, Group G had a median duration of 2 hours (IQR: 2-2.5), while Group C also had a median duration of 2 hours but with a more comprehensive IQR: 2-3. This difference was statistically significant (p=0.018), indicating that the surgical duration was longer in group C than in group G.

Comorbidity rates were 71.5% in Group G and 70% in Group C (p = 0.801). The distribution of primary tumor origins (ovaries,

endometrium, and cervix) was comparable between the two groups, with no statistically significant differences (p=0.850). Other comorbidities, such as hypertension, diabetes mellitus, and aortic stenosis, were also not significantly different between the groups (Table 2). However, asthma was more prevalent in Group C (18%) than in Group G (8.1%), showing statistical significance (p=0.027).

A significant difference was observed between Groups G and C regarding the use of compression stockings. In Group G, 86.2% of patients wore compression stockings, compared with 45% in Group C, a highly significant difference (p<0.001). The odds of wearing compression stockings were 7.62 times higher in Group G than in Group C [odds ratio (OR): 7.62, 95% confidence interval (CI): 3.99-14.5]. The perioperative hemodynamic stability significantly differed between the groups.

Group G had a higher rate of hypertensive patients (63.4%), whereas group C had only 14% hypertensive cases during the operation (p<0.001). The odds ratio for perioperative

Table 1. Comparison of age, ASA risk score, BMI, and surgical duration

Parameters	Group G (n=123), (55.16%)	Group C (n=100), (44.84%)	p
Age (years, mean ± SD)	59.55±10.2	60.10±11.82	0.732
ASA risk score [median (IQR)]	2 (2-3)	2 (2-3)	0.494
BMI [kg/m^2, median (IQR)]	29.3 (26.3-33)	29.6 (26.1-31.3)	0.718
Duration of surgery [hours, median (IQR)]	2(2-2.5)	2 (2-3)	**0.018***

Total number of patients: 223, n (%): Number of patients in each group and percentage
IQR: [(min) 25%-(max) 75%]
*: p<0.05 statistically significant
ASA: American Society of Anesthesiologists, BMI: Body mass index, SD: Standard deviation, IQR: Interquartile range

Table 2. Comparison of the types of comorbidities and primary tumor origins among the study groups

Parameters	Group G (n=123), (55.16%)	Group C (n=100), (44.84%)	p
Comorbidity			
Positive	88 (71.5%)	70 (70%)	0.801
Negative	35 (28.5%)	30 (30%)	
Primary tumor			
Ovary	53 (43.1%)	43 (43%)	0.850
Endometrium	44 (35.8%)	33 (33%)	
Cervix	26 (21.1%)	24 (24%)	
Hypertension			
Positive	52 (42.3%)	43 (43%)	0.913
Negative	71 (57.7%)	57 (57%)	
Diabetes mellitus			
Positive	32 (26%)	30 (30%)	0.509
Negative	91 (74%)	70 (70%)	
Hypothyroidism			
Positive	7 (5.7%)	12 (12%)	0.093
Negative	116 (94.3%)	88 (88%)	
Asthma			
Positive	10 (8.1%)	18 (18%)	**0.027***
Negative	113 (91.9%)	82 (82%)	
Hyperlipidemia			
Positive	2 (1.6%)	4 (4%)	0.508
Negative	121 (98.4%)	96 (96%)	

Table 2. Continued

Parameters	Group G (n=123), (55.16%)	Group C (n=100), (44.84%)	p
Aortal stenosis			
Positive	5 (4.1%)	3 (3%)	0.669
Negative	118 (95.9%)	97 (97%)	
Heart failure			
Positive	7 (5.7%)	7 (7%)	0.689
Negative	116 (94.3%)	93 (93%)	

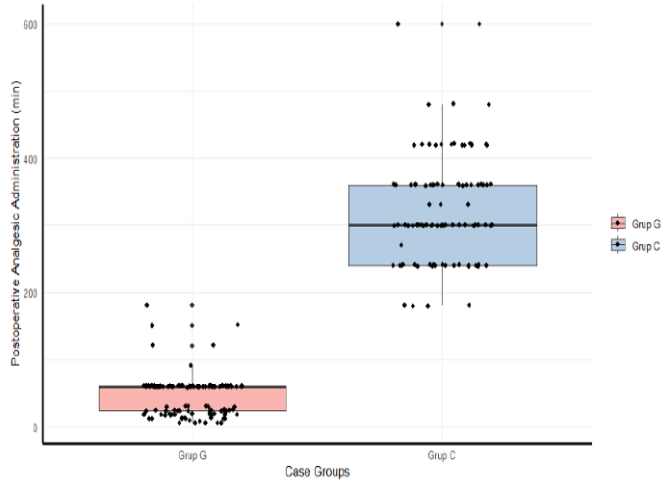
*: p<0.05 statistically significant

hypertension was 10.64 in Group G compared with Group C (OR: 10.64, 95% CI: 5.43-20.8). Regarding intraoperative bleeding, 67.5% of patients in Group G experienced bleeding, compared with 40% in Group C, which was statistically significant (p <0.001). The odds of bleeding were approximately three times higher in Group G than in Group C (OR: 3.11, 95% CI: 1.79-5.39).

Group G had a significantly higher mean FFP replacement (2.36±1.28 units) compared with Group C (2.15±0.98 units) (p=0.006). Similarly, ES replacement was higher in Group G (1.86±1.04 units) than in Group C (1.59±0.54 units) (p<0.001). The amount of Ringer's lactate solution administered was lower in Group G (1300 mL) than in Group C (1400 mL), with statistical significance (p=0.002). Furthermore, the postoperative analgesic administration period was significantly shorter in Group G (46±29.53 minutes) than in Group C (324.60±81.39 minutes) (p<0.001, Graph 1). The first mobilization time was earlier in Group C [5 (4.7-6) hours] than in Group G [9 (8-10) hours]; additionally, the length of hospital stay was shorter in Group C (5.14±1.81 days) than in Group G (8.11±3.57 days), both of which were statistically significant (p<0.001; Table 3).

Postoperative thrombosis occurred in 6.5% of patients in Group G, whereas no cases were reported in Group C (p=0.009). Additionally, postoperative cardiac complications were more frequent in Group G (17.1%) compared with Group C (0%), showing high statistical significance (p<0.001; Table 4).

Anesthetic-related side effects were significantly more frequent in Group C. Itching, urinary retention, and allergic reactions were observed only in Group C (p<0.001 for all comparisons). None of these side effects occurred in Group G, leading to statistically significant differences between the two groups (Table 5).



Graph 1. Period of postoperative analgesic administration in each case group

Discussion

Stress response and pain in patients with gynecological oncology due to major surgical trauma cause delayed mobilization, extended hospitalization, and excessive need for additional analgesics, thus delaying the healing process and recovery. It is also known that surgical stress suppresses the cell-mediated immune (CMI) system by increasing the levels of anti-CMI cytokines and catecholamines and has adverse effects on the healing process. Similarly, general anesthesia and systemic opioids also suppress CMI[14]. The perioperative epidural procedure is thought to blunt the surgical stress response by causing pro-tumorigenic cytokine and catecholamine release and counteract surgery-induced CMI inhibition by reducing the need for general anesthesia plus systemic opioids[15]. The stress response and pain that occur in patients after major surgical trauma cause delayed mobilization, prolonged hospital stays, and the need for additional analgesics, thus delaying the treatment and recovery processes[16].

A retrospective study by Guay[17] found that epidural anesthesia combined with general anesthesia reduced pain during movement and rest, reduced the amount of postoperative analgesic need, and prolonged the duration of analgesic need, resulting in more effective analgesia. Accordingly, the authors found a decrease in the incidence of arrhythmias that may occur with pain.

In our cases in which combined epidural injection was performed, the beneficial effects desired from the anesthetic drug

Table 3. Comparison of perioperative administration and hospitalization duration between groups G and C

Parameters	Group G (n=123), (55.16%)	Group C (n=100), (44.84%)	p
The unit of FFP replacement (units, mean ± SD)	2.36±1.28 n=86 (69.9%)	2.15±0.98 n=53 (53%)	**0.006***
Unite of ES replacement (units, mean ± SD)	1.86±1.04 n=84 (68.3%)	1.59±0.54 n=41 (41%)	**0.000***
Unite of fibrinogen replacement (units, mean ± SD)	1.88±1.44 n=96 (78%)	1.78±1.03 n=65 (65%)	0.075
RL level [mL, median (IQR)]	1300 (1000-1500) n=113 (91.9%)	1400 (1200-1800) n=97 (97%)	**0.002***
Period of postoperative analgesic therapy (minimum, mean ± SD)	46±29.53 n=123 (100%)	324.60±81.39 n=100 (100%)	**0.000***
The first mobilization time (hours, median (IQR))	9 (8-10) n=123 (100%)	5 (4.7-6) n=100 (100%)	**0.000***
Hospitalization period (day, mean ± SD)	8.11±3.57 n=123 (100%)	5.14±1.81 n=100 (100%)	**0.000***
Intensive care unit (day, mean ± SD)	0.58±1.72 n=123 (100%)	0.27±1.07 n=100 (100%)	0.138
Drained acid content (mL, mean ± SD)	1625±1333.41 n=16 (13%)	1430±2109.99 n=15 (15%)	0.722
Postoperative albumin infusion (flacon, mean ± SD)	2.69±1.40 n=16 (13%)	2.60±1.88 n=15 (15%)	0.717

First mobilization time: represents the time of the patient walking for the first time during the postoperative period.
*: p<0.05 statistically significant
FFP: Fresh frozen plasma, ES: Erythrocyte suspension, PSS: Physiological saline solution, RL: Ringer lactate, SD: Standard deviation

Table 4. Comparison of thrombosis and cardiac complications between Groups G and C

	Group G (n=123), (55.16%)	Group C (n=100), (44.84%)	p
Post-op thrombosis			
Positive	8 (6.5%)	0 (0%)	**0.009***
Negative	115 (93.5%)	100 (100%)	
Postoperative cardiac complications			
Positive	21 (17.1%)	0 (0%)	**0.000***
Negative	102 (82.9%)	100 (100%)	

*: p<0.05 statistically significant

Table 5. Comparison of the postoperative side effects of anesthetic administration between groups G and C

	Group G (n=123), (55.16%)	Group C (n=100), (44.84%)	p
Itching			
Positive	0, (0%)	17, (17%)	**0.000***
Negative	123, (100%)	83, (83%)	
Urinary retention			
Positive	0, (0%)	14, (14%)	**0.000***
Negative	123, (100%)	86, (86%)	
The allergic reaction			
Positive	1, (0.8%)	17, (17%)	**0.000***
Negative	122, (99.2%)	83, (83%)	

*: p<0.05 statistically significant

used were as follows: Rapid effect, high toxic drug dose limit, minimal impact on hemodynamics, and long anesthetic and analgesic effect duration. In our clinical practice, bupivacaine is widely used because of its long-acting properties, short onset of action, long duration of anesthesia and analgesia, and dissociative blockade. Based on our clinical study, Group C had a significantly prolonged duration of analgesic requirement and pain onset. This indicates that patients in Group C experienced more effective postoperative analgesia than those who received standard general anesthesia. Patients in Group C are expected to experience better postoperative pain relief than those receiving standard general anesthesia. This is because an epidural block is performed before surgery, and morphine is administered through an epidural catheter at the end of the procedure.

A study by Warta et al.[18] reported that spinal anesthesia performed before laparoscopic hysterectomy reduces postoperative pain and opioid use. Upon analyzing the parameters measured in both groups during our study, it was observed that the operation times in Group C were longer. It is a well-known fact that older patients are at a higher likelihood of experiencing comorbid conditions. Moreover, exposure to general anesthetics during prolonged anesthesia periods can lead to complications and longer postoperative recovery times in this age group.

In our study, we compared the first mobilization times of the patients in two groups: Group C and Group G. Patients in Group C were mobilized earlier than those in Group G. A study by Liu et al.[19] found that adding epidural anesthesia to general anesthesia provided better pain control and analgesia, early mobilization, and a shorter hospitalization period. Similar results were observed in Group C of our study.

In a study by Motamed et al.[20],54 patients were divided into four groups. The first group received epidural morphine and bupivacaine, the second group received only morphine, the third group received only bupivacaine, and the fourth group received patient-controlled analgesia. Results showed that the first group had balanced and stable analgesia, shorter hospital stays, and fewer cases of hypotension. However, allergic reactions like itching were more common in the morphine-only group, and hypotension was more frequent in the bupivacaine-only group[20]. In our study, no situation was detected that disrupted the hemodynamic stability of the patients because bupivacaine was administered epidurally and morphine was distributed for analgesic purposes near the end of surgery. Again, in parallel to the study conducted by Motamed et al.[20],allergic reactions due to postoperative itching were higher. It is believed that the higher incidence of urinary retention in Group C may be due to the removal of urinary catheters. This is supported by the fact that 14 patients in Group C experienced urinary retention after surgery. In addition, bladder atony caused by epidural anesthesia may have also contributed to this issue. Similarly, Shir et al.[21] found that combining epidural neuraxial blockade with general anesthesia for central lower abdominal surgery reduced postoperative analgesic use and improved pain control. Ladjevic et al.[22] compared two groups of patients who underwent radical prostatectomy as lower abdominal surgery. One group received general anesthesia alone, while the other received combined epidural and general anesthesia. The researchers found that the group that received combined epidural anesthesia had better pain control and less perioperative bleeding than the group that received general anesthesia only. Likewise, our study found that patients in Group C had less perioperative bleeding, resulting in a lower need for blood products. Patients with coagulation problems were evaluated in group G because epidural catheters were not placed in this group. Because patients with coagulation problems are more likely to experience bleeding, this may have caused a relative increase in the favor of Group G. Moreover, the combination of the epidural catheter and spinal epidural may have resulted in less blood loss due to sympathetic denervation occurring distal to the level where regional anesthesia was applied, compared to patients who only received general anesthesia.

Study Limitations

We declare that greater standardization is necessary when comparing the two groups because the study's retrospective design and the data based on archival records constitute essential limitations. Therefore, these findings should be confirmed in prospective randomized controlled trials.

Conclusions

Combined epidural and general anesthesia in major gynecological oncological surgeries may improve postoperative outcomes. These advantages include decreased postoperative analgesic requirements, earlier mobilization, reduced hospitalization duration, and reduced risk of cardiovascular and thrombotic complications. This study emphasizes the potential efficacy of combined anesthesia as an anesthetic technique in this specific patient demographic. Furthermore, it underscores the significance of personalized perioperative care and the necessity for tailored strategies to optimize outcomes for diverse patient cohorts.

Ethics

Ethics Committee Approval: Ethical approval for our study was obtained from the Gaziantep University Clinical Research Ethics Committee in the decision dated 21.10.2020 and numbered 2020/318.

Informed Consent: Retrospective study.

Footnotes

Authorship Contributions

Surgical and Medical Practices: İ.M., B.K.U., Concept: İ.M., B.K.U., Design: İ.M., B.K.U., Data Collection or Processing: İ.T., Analysis or Interpretation: F.Ç., İ.T., M.C., S.G., M.G.U., Literature Search: F.Ç., İ.T., M.C., Writing: İ.M., B.K.U., F.Ç.

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