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# QUALITY OF RECOVERY AFTER OPEN GYNECOLOGICAL SURGERY

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## ABSTRACT

**Introduction**: Hysterectomies are one of the most common major open gynecologic surgeries. Open gynecological surgery results in a large wound and severe postoperative pain, and adequate postoperative analgesia is necessary. As part of multimodal analgesia strategies, regional anesthesia techniques are widely used in such surgeries to reduce opioid consumption and enhance analgesic efficacy. Spinal anesthesia, as a regional anesthesia technique, and Rectus Sheath Block (RSB) can provide adequate anesthesia and are explored in this prospective randomized study.

**Objective**: The aim of this study was to evaluate and compare the effect of standard general endotracheal anesthesia, regional block-spinal anesthesia, and bilateral Ultrasound (US)-guided RSB on the quality of recovery after open gynecological surgery.

**Patients and Methods**: This prospective randomized study was carried out on 51 females, ASA I or II presented for elective gynecological surgery randomly classified into 3 equal groups (each of 17 patients): Group C (n=17) is control group where the patients received standard general endotracheal anesthesia; patients in Group S (n=17) - received regional- spinal block with applied intrathecal 20 mg (4.0 ml) of 0.5 % hyperbaric bupivacaine and 20 μg fentanyl; patients in Group R (n=17)- received Rectus sheath block with 40 ml ropivacaine 0.375% (20ml each side) before the surgery and standard endotracheal anesthesia. The primary outcome, the quality of recovery, was assessed by the 15-item Quality of Recovery questionnaire (QoR-15). Secondary outcomes included intraoperative opioid consumption, time to first flatus, time to first discharge from bed, postoperative nausea and vomiting (PONV), postoperative analgesic consumption and patient satisfaction.

**Results and conclusion**: Postoperative global QoR-15 scores in the patient group R were in the range of 101.94-117.30 (103-119), and those among the in-patient Group S were in the range of 98.71-107.58 (102-109). The patients from Group R, with applied preoperative RSB, had reduced intraoperative opioid consumption, moderate time to first flatus and time to first discharge from bed, low postoperative analgesic consumption, and shorter post-anesthesia care unit discharge time ($p<0.05$). Patients from Group S, with applied spinal anesthesia, had less or absent initial postoperative pain, abbreviated time to first flatus and time to first discharge from bed, a lower incidence of postoperative nausea and vomiting (PONV), and an early ability to ambulate. Regarding patient satisfaction, for patient group C was average, group S displayed moderate patient satisfaction and group R had high patient satisfaction. According to the obtained results, the use of regional techniques (RSB or spinal anesthesia) are recommended for open gynecological surgery.

**Keywords**: quality of recovery, Qor-15, rectus sheath block, spinal anesthesia, open gynecological surgery

## INTRODUCTION

Multimodal anesthesia strategies for managing postoperative pain are increasingly becoming important components in anesthesia protocols for conducting surgical interventions aimed at faster Enhanced Recovery After Surgery-ERAS [1]. The multimodal analgesic protocol should be specific to the surgical intervention and may include opioids, non-opioid systemic analgesics such as acetaminophen, nonsteroidal anti-inflammatory drugs, gabapentinoids, ketamine, and local anesthetics administered by infiltration, regional block, or via intravenous route [2]. The publication of the original Enhanced Recovery After Surgery Society Guidelines for gynecologic oncology in 2016 [3, 4], a recent meta-analysis, concluded that ERAS in gynecologic oncology was associated with a decrease in hospital length of stay (LOS) of 1.6 days, 32% reduction in complications, 20% reduction in readmission, no change in 30-day postoperative mortality, and mean cost savings per patient [5].

With the development of ultrasound, RSB has become popular in the anesthesia of various abdominal surgeries due to its high success rate and rare complications [6, 7]. RSB is a regional anesthetic technique in which a local anesthetic is injected into the space between the rectus abdominis muscle and its posterior sheath using ultrasound. It provides an analgesic effect for midline incisions by blocking the 7th to 11th intercostal nerve branches located in the rectus abdominis sheath [8].

Spinal anesthesia provides safe and effective anesthesia and analgesia. Its block placement techniques with or without ultrasound assistance, options of spinal needles, local anesthetics and adjuvants, duration of action, and side effect profiles, thus making spinal anesthesia an important modality in current early recovery after surgery for a broad spectrum of surgical procedures. These include ambulatory lower extremity orthopedic procedures and major chest, abdominal, and spine surgeries [9].

## OBJECTIVE

The aim of this study was to evaluate and compare the effect of standard general endotracheal anesthesia, the effect of spinal anesthesia [10] and the Rectus abdominis sheath block (RSB) [11] on postoperative recovery and analgesia using the Quality of Recovery Scale-QoR-15, during open gynecological surgeries.

## MATERIALS AND METHODS

A prospective randomized study was carried out on 51 females, undergoing open gynecological surgery was conducted at the Specialized Hospital for Gynecology and Obstetrics "Mother Teresa" – Skopje, North Macedonia.

The study included 51 patients randomly classified into 3 equal groups (each group consisting of 17 patients) who met the inclusion criteria. Inclusion criteria: Patients scheduled for open gynecological surgery, age between 20-60 years, BMI < 32%, no serious comorbidities (ASA-American Society of Anesthesiologists classification) of 1-2.

Exclusion criteria: Any history of allergy to ropivacaine, ketoprofen and tramadol, coagulopathy, needle site infection, and patients with an ASA classification >2.

Patients in control Group C (n=17) received standard general anesthesia according to protocol: Premedication of 8 mg dexamethasone and 4 mg ondansetron were administered, as to prevent postoperative nausea and vomiting. 2. Induction into general endotracheal anesthesia was performed with the application of propofol 2 mg/kg, fentanyl 0.4 μg/kg, and rocuronium 0.8 mg/kg, to facilitate intubation. 3. Maintenance, with propofol 20 μg/kg/h and remifentanil 25 μg/kg/h.

Patients in Group S (n=17) received regional block spinal anesthesia under following protocol: 1. Preoperative preparation: Premedication of 8 mg dexamethasone and 4 mg ondansetron was administered, as to prevent postoperative nausea and vomiting. 2. received regional-spinal block with applied intrathecal 20 mg (4.0 ml) of 0.5 % hyperbaric bupivacaine and 20 μg fentanyl as adjuvant and sedation with midazolam 0.3 mg/kg.

Patients in Group R (n=17) received standard general anesthesia and ultrasound-guided RSB bilaterally para-umbilically, with 40 ml ropivacaine 0.375% (20ml each side) was administered.

Intraoperatively, hemodynamics and respiratory parameters were monitored with non-invasive methods for continuous perioperative monitoring. Cardiac activity was monitored with electrocardiography (ECG), mean arterial pressure (MAP), heart rate per minute (bpm), peripheral arterial saturation (SpO2), and end-tidal carbon dioxide (EtCO2), recorded at identical 15-minute intervals throughout the operation (15 min, 30 min, 45 min, 1 hour and 1.5 hours for measurement of the parameters) and mean arterial pressure (MAP), heart rate per minute (bpm), on 0 h, 6 h and 12 h after the operation.

The primary outcome was the assessment of the quality of recovery on the first postoperative day. The presence of postoperative nausea and vomiting, the quality of recovery according to the Quality of Recovery Questionnaire (QoR-15), were assessed also. This scale provides detailed measurement of the postoperative condition, and mental state. It was developed by Stark et al. (2013), and now days becomes increasingly preferred for its practicality, requiring just a few minutes to administer [12,13,14]. This questionnaire is divided into the following two parts: section 1 provides the evaluation of the physical condition of the patient (10 questions scored from 0 to 10; 0 = very poor, and 10 = excellent postoperative recovery quality); and section 2 presents the mental condition of the patient including pain evaluation. It has five questions scored from 10 to 0 (10 = strong pain, and 0 = none at all). The usefulness and value of this scale has been proven by multiple studies confirming that it represents a comprehensive, patient-oriented measure for recovery after surgery [13-15]. Providing essential support for patients during hospital stay is important consider their post-discharge period [16]. Secondary outcomes included the intraoperative opioid consumption, time to first flatus, time to first discharge from bed, postoperative nausea and vomiting (PONV), post-anesthesia care unit discharge time and postoperative analgesic consumption.

## STATISTICAL ANALYSIS

Data processing was performed using the statistical software programs Microsoft Excel, MedCalc 23.0. and JASP.

The data are presented with their mean, standard deviation (SD), standard error (SE) and 95% CI, and for the descriptive parameters of the populations of interest with absolute numbers and percentages.

The Mann-Whitney U-test and ANOVA tests were used when comparing and testing hypotheses.

Statistical significance level was set to a value of $p < 0.05$.

## RESULTS

The characteristics of the study group including age, ethnicity, Body mass index, ASA classification, education, use of medications, cigarette and alcohol consumption, including some other important medical data were analyzed. Table 1 presents some demographic data.

On the Table 1 presents age, body height, weight, mass index and ASA classification in the groups, the homogeneities of the groups ($p > 0.05$) are clearly visible. Following the patient demographic distributions, it was found that they were mainly distributed in ASA Score-American Society of Anesthesiology (ASA) score of 2 (62 %), no smokers (86%) and an Elementary school degree >45% and by the ethnicity: Albanian 49%, Macedonian 43%, and 8% other.

Tables 2, 3, and 4 present the results obtained from the QoR-15 of the groups as well as statistical data completed in the preoperative, postoperative and before discharged from the hospital.

In the perioperative period, patients with general anesthesia (group C) the score of mean physical well-being showed the following pattern: an initial preoperative value of 34.53 (32.59-36.47), on the first postoperative day of 17.53 (13.84-21.22), and before discharge from the hospital value of 32.53 (29.18-35.88). Preoperatively, the value of the mean mental well-being score was 53.82 (49.56-58.09), and during the first postoperative day, there was a decrease in the mean mental well-being score to 32.53 (30.05-35.01). Before discharge from the hospital, the mean mental well-being slightly increased to 52.00 (49.05-54.95). The mean total QoR-15 score for the preoperative period had a value of 88.35 (83), and showed a decrease in value on the first postoperative day of 50.06 (49), and continued with the score before discharge of 84.53 (86.5).

**Table 1.** *Statistical demographic patient data in Groups (M±SD)*

| GROUPS | Age | Body height | Body weight | Body mass index (BMI) | ASA I II III |
|---|---|---|---|---|---|
| C-control Gr (n=17) | 50.24±6.07 | 162.76±6.35 | 75.35±13.02 | 28.48±14.87 | 9 8 0 %-25 74.2 |
| S- tested Gr (n=17) | 60.76±9.07 | 156.71±5.86 | 70.76±10.92 | 28.92±4.89 | 7 10 0 %-25 74.2 |
| R- tested Gr (n=17) | 50.00±10.39 | 163.12±9.25 | 81.24±13.31 | 30.59±5.15 | 3 14 0 %-25 7.2 |
| T test | t1= -3.69 t2= -0.08 | t1= 2.89 t2= -0.13 | t1= 1.04 t2= -1.19 | t1= -0.12 t2= -0.38 | |
| P | P1= 0.001 P2= 0.94 | P1= 0.007 P2= 0.90 | P1= 0.31 P2= 0.24 | P1= 0.90 P2= 0.71 | |
| p< 0.05 | statistical | significant differences | | | |

**Table 2.** *The results of QoR-15 scores- for patient Group C (n=17) measured in three time periods*

| Timing | QoR 15 Questionnaire Indicators | Mean | Median | SD | Margin of error | 95% Confidence interval |
|---|---|---|---|---|---|---|
| **Preoperative** | Mental well-being | 53.82 | 52 | 11.928 | 4.268 | 49.56-58.09 |
| | Physical well-being | 34.53 | 31 | 5.409 | 1.935 | 32.59-36.47 |
| | Preoperative QoR-15 score | **88.35** | 83 | 17.337 | 6.204 | 82.15-94.55 |
| **Postoperative day 1** | Mental well-being | 32.53 | 32 | 6.938 | 2.482 | 30.05-35.01 |
| | Physical well-being | 17.53 | 17 | 10.314 | 3.690 | 13.84-21.22 |
| | Postoperative day 1 QoR-15 score | **50.06** | 49 | 17.252 | 6.173 | 43.89-56.23 |
| **Before discharged from hospital** | Mental well-being | 52.00 | 52 | 8.231 | 2.945 | 49.05-54.95 |
| | Physical well-being | 32.53 | 34.5 | 9.348 | 3.345 | 29.18-35.88 |
| | Before discharge QoR-15 score | **84.53** | 86.5 | 17.579 | 6.290 | 78.24-90.82 |

**Table 3**. *The results of QoR-15 scores- for patient Group S (n=17) preoperative, postoperative data on day1 and before discharge from the hospital*

| Timing | QoR 15 Questionnaire Indicators | Mean | Median | SD | Margin of error | 95% Confidence interval |
|---|---|---|---|---|---|---|
| **Preoperative** | Mental well-being | 63.65 | 65 | 13.986 | 5.004 | 58.65-68.65 |
| | Physical well-being | 35.06 | 37 | 5.471 | 1.957 | 33.1-37.02 |
| | Preoperative QoR-15 score | **98.71** | 102 | 19.457 | 6.962 | 91.75-105.67 |
| **Postoperative day 1** | Mental well-being | 45.94 | 43 | 10.164 | 3.637 | 42.3-49.58 |
| | Physical well-being | 22.00 | 24 | 2.586 | 0.925 | 21.07-22.93 |
| | Postoperative day 1 QoR-15 score | **67.94** | 67 | 12.750 | 4.562 | 63.38-72.5 |
| **Before discharged from hospital** | Mental well-being | 69.29 | 69 | 10.164 | 3.637 | 65.56-72.93 |
| | Physical well-being | 38.29 | 40 | 9.405 | 3.365 | 34.92-41.66 |
| | Before discharge QoR-15 score | **107.58** | 109 | 19.569 | 7.002 | 100.58-114.58 |

**Table 4.** *The results of QoR-15 scores- for patient Group R (n=17) preoperative, postoperative data on day1 and before discharge from the hospital*

| Timing | QoR 15 Questionnaire Indicators | Mean | Median | SD | Margin of error | 95% Confidence interval |
|---|---|---|---|---|---|---|
| **Preoperative** | Mental well-being | 67.59 | 69 | 13.928 | 5.004 | 62.59-72.59 |
| | Physical well-being | 34.35 | 34 | 7.070 | 2.530 | 31.82-36.88 |
| | Preoperative QoR-15 score | **101.94** | 103 | 20.999 | 7.534 | 94.41-109.47 |
| **Postoperative day 1** | Mental well-being | 49.88 | 50 | 12.108 | 4.332 | 45.55-54.21 |
| | Physical well-being | 35.71 | 39 | 10.838 | 3.878 | 31.83-39.59 |
| | Postoperative day 1 QoR-15 score | **85.59** | 89 | 22.946 | 8.211 | 77.38-93.8 |
| **Before discharged from hospital** | Mental well-being | 72.65 | 72 | 9.962 | 3.564 | 69.09-76.21 |
| | Physical well-being | 44.65 | 47 | 5.086 | 1.819 | 42.83-46.47 |
| | Before discharge QoR-15 score | **117.30** | 119 | 15.048 | 5.384 | 111.92-122.68 |

In the perioperative period, patients with applied spinal anesthesia (group S), the score of mean physical well-being showed the same pattern, with an initial preoperative value of 35.06 (33.1-37.02), on the first postoperative day of 22.00 (21.07-22.93), and before discharge from the hospital at 38.29 (34.92-41.66). Preoperatively, the value of the mean mental well-being score of 63.65 (58.65-68.65), and during the first postoperative day, decreased in the mean mental well-being score to 45.94 (42.3-49.58), and before discharge from the hospital, the mean mental

**Table 5.** *Intraoperative data for patients in the three groups (Mean± SD)*

| Intraoperative data | Group C Mean± SD | Group S Mean± SD | Group R Mean± SD | t- student test | p |
|---|---|---|---|---|---|
| Anesthesia time (min) | 123.53 ±45.8064 | 109.41±23.3105 | 130.59±24.8043 | t1=1.327 t2=0.558 | p=0.26 p=0.5 |
| Operation time (min) | 103.82±41.9709 | 95.29±20.4992 | 110.59±24.2952 | t1=0.753 t2= 0.57 | p=0.457 p=0.5689 |
| Intraoperative. propofol (mg) | 585.29±105.443 | 0±0 | 588.24±126.403 | t2=0.073 | p=0.9 |
| Intraoperative fentanyl (µg) | 191.18±78.5281 | 0±0 | 170.59±35.6143 | t2=0.098 | p=0.33 |
| Intraoperative remifentanil (µg) | 1229.41±259.486 | 0±0 | 0±0 | 0 | **p=0.00** * |
| Intraoperative crystalloids (ml) | 1882.35±271.952 | 1717.65±424.61 | 2000.00±293.683 | t1=1.3467 t2=1.211 | p=0.1875 p=0.234 |
| Intraoperative colloids (ml) | 117.65±223.606 | 235.29±257.247 | 29.41±121.267 | t1=1.423 t2=1.4305 | p=0.164 p=0.161 |
| Urine output (ml) | 1085.29±646.263 | 641.18±646.235 | 1026.47±516.635 | t1=2.0035 t2=0.2931 | **p=0.05** * p=0.771 |

* p< 0.05 - statistical significant differences

**Table 6.** *Postoperative data for patients in the three groups*

| Postoperative data | Group C **Mean± SD** | Group S **Mean± SD** | Group R **Mean± SD** | **t-student test** | **p** |
|---|---|---|---|---|---|
| Postoperative paracetamol (mg) | 1323.53 ±436.606 | 764.71±562.295 | 735.29±664.211 | t1=3.23<br>t2=3.05 | **p=0.0028**<br>**p=0.0046** |
| Postoperative tramadol (mg) | 135.29±44.2530 | 188.24±111.143 | 100.00±50 | t1=0.587<br>t2=2.161 | p=0.5<br>**p=0.03*** |
| Postoperative metamizole (gr) | 18.53±3.5207 | 20±8.6602 | 9.12±4.4142 | t1=1.242<br>t2=6.886 | p=0.2<br>**p=0.0001*** |
| Postoperative ketoprofen (mg) | 141.18±104.817 | 230.59±143.198 | 85.88±83.5956 | t1=2.07<br>t2=1.7 | **p=0.045***<br>p=0.09 |
| Duration of PACU stay (min) | 183.82±65.7995 | 136.47±60.8729 | 133.24±57.4712 | t1=2.187<br>t2=2.39 | p=**0.0362***<br>**p=0.0225*** |
| Time to first flatus (min) | 1421.18±187.953 | 1024.12±145.647 | 1200.59±96.725 8 | t1=6.851<br>t2=4.31 | **p=0.0001***<br>**p=0.0001*** |
| Time to first discharging from bed (min) | 1326.47±63.7932 | 1179.12±75.9571 | 1206.18±88.943 | t1=6.124<br>t2=4.531 | **p=0.0001***<br>**p=0.001*** |
| PONV | 5.82±4,3798 | 7.94 ±3.0917 | 7.35±4.2857 | t1=1.633<br>t2=1.03 | p=0.112<br>p=0.31 |
| Urine output total 24 h (ml) | 2064.71±764.607 | 2352.94±704.554 | 2682.35±683.95 4 | t1=1.143<br>t2=2.482 | p=0.261<br>**p=0.0185*** |
| Patient satisfaction | 7.29±1.8439 | 8.24±1.0325 | 8.65±1.1147 | t1=1.857<br>t2=2.095 | p=0.072<br>**p=0.013*** |

* p< 0.05 - statistical significant differences

well-being had a slightly increased score to 69.29 (65.56-72.93). The mean total QoR-15 score for the preoperative period had a value of 98.71 (102) and showed a decrease in value on the first postoperative day of 67.94 (67). This continued with the score before discharge of 107.58 (109).

Preoperatively, patients with applied bilateral US-guided RSB and standard general anesthesia (Group R) had a mean physical well-being score of 34.35 (31.82-36.88) and during the first postoperative day had mean physical well-being score of 35.71 (31.83-39.59). These are lower compared to preoperative score regards of reduction of the

pain score. Before discharging from hospital this group had mean physical well-being score of 44.65 (42.83-46.47) and showed an increase of the score dye to mainly higher pain score. Preoperatively, the group had a mean mental well-being score of 67.59 (62.59-72.59), and during the first postoperative day, there was a decreased mean mental well-being score of 49.88 (45.55-54.21). Before discharge from the hospital, the mean mental well-being score was slightly higher, at 72.65 (69.09-76.21). The mean total QoR-15 score for the preoperative period had a value of 101.94 (103), showing a decrease in the value on the first postoperative day to 85.59 (89), and this continued with a score of 117.30 (119).

The perioperative medical data of the participants in the three groups are presented on Table 5. The statistical analysis of intraoperative data for patients of group C gives an anesthesia time in minutes, with an overall time of 123.53 minutes (107.14-139.92) and a mean operation time of 103.82 minutes (88.8-118.84). Intraoperative mean propofol consumption was 585.29 milligrams (547.56-623.03), and mean fentanyl consumption was 191.18 micrograms (163.08-219.28). These were used for induction into general anesthesia. Intraoperative remifentanil consumption was 1229.41 micrograms (1136.56-1322.27) for the endurance of analgesia, as a part of general anesthesia. Urine intraoperative output had an overall value of 1085.29 milliliters (854.04-1316.55).

The values of intraoperative data for patient Group S provides a mean anesthesia time in minutes, giving an overall duration of 109.41 minutes (101.07-117.75) and a mean operation time of 95.29 minutes (87.96-102.63). Intraoperative propofol, fentanyl, and remifentanil consumption are excluded. Urine intraoperative output had an overall value of 641.18 milliliters (409.94-872.41).

Also, the values of intraoperative data for patient Group R provides a mean anesthesia time in minutes, at an overall time of 130.59 minutes (121.71-139.46), and a mean operation time of 110.59 minutes (101.89-119.28). Intraoperative mean propofol consumption was 588.24 milligrams (543-633.47), and mean fentanyl consumption was 170.59 micrograms (157.84-183.33) used for induction into general anesthesia. Intraoperative remifentanil is excluded. Urine intraoperative output with an overall of 1026.47 milliliters (841.6-1211.34).

During the analysis of the differences between the Groups C: S= t1 and C: R=t2 with t-student test, only a statistically significant higher use of opioids (remifentanil) in the control group C ($p<0.05$) was found.

Table 6 presents the overall of consumption of pain suppressant drugs in patient Group C in the period up to 48 hours after the operation, and shows a high use of these medications in the first 24 hours after operation. The mean paracetamol dose was 1323.53 mg (1167.29-1479.76), and the mean tramadol dose was 135.29 mg (119.46-151.13). There was a longer stay in the PACU of 183.82 minutes (160.28-207.37). There was also a longer duration of mean time to first flatus of 1421.18 minutes (1353.92-1488.43) and the mean time to first discharging from bed of 1326.47 minutes (1303.64-1349.3). PONV had a mean value of 5.82 (4.26-7.39), as well as a low patient satisfaction score of 7.29 (6.63-7.95).

The overall use of pain suppressant drugs in patient Group S used in the period up to 48 hours after the operation shows a high use of these medications in the first 24 hours after the operation: a mean paracetamol dose of 764.71 mg (563.49-965.92), and a highest mean tramadol dose of 188.24 mg (148.46-228.01). We also saw a short stay in the PACU, at 136.47 minutes (114.69-158.25). There was also a shorter duration of mean time to first flatus, at 1024 minutes (972-1076.24) and a mean time to first discharging from bed of 1179 minutes (1151.94-1206.3). PONV had a mean value of 7.94 (6.83-9.05), and there was a moderate patient satisfaction score of 8.24 (7.87-8.6).

The overall use of pain suppressant drugs in patient Group R used in the period up to 48 hours after the operation shows a low use of these medications in the first 24 hours after the operation: a mean paracetamol dose of 735.29 mg (497.61-972.97), and a mean tramadol dose of 100 mg (82.11-117.89). There was a shorter stay in the PACU of 133.24 minutes (112.67-153.8). Also there was a short duration of mean time to first flatus of 1200.59 minutes (1165.98-1235.2) and the mean time to first discharging from bed of 1206.18 minutes (1174.35-1238). PONV had a mean value of 7.35 (5.82-8.89), and a higher patient satisfaction score of 8.65 (8.25-9.05).

The obtained data in the tested Group S and R, were compared with the data of the control Group C. The analyzes of the compared data between Groups C: S= t1 and C: R=t2 with t-student

test, showed better performances in the Group S and Group R; statistically high significance ($p< 0.05$), with the advantage of the RSB ($p<0.001$).

## DISCUSSION

In this study, in the perioperative period, patients with applied general anesthesia in Group C, the score of mean physical well-being showed the following pattern:

• an initial preoperative value of 34.53 (32.59-36.47)

• on the first postoperative day of 17.53 (13.84-21.22)

• before discharge from the hospital value of 32.53 (29.18-35.88)

mainly caused by the total pain score decreased value. Preoperatively, the pattern was:

• the value of the mean mental well-being score of 53.82 (49.56-58.09)

• the first postoperative day a decrease mean mental well-being score to 32.53 (30.05-35.01)

• before discharge from the hospital, the mean mental well-being slight increase score to 52.00 (49.05-54.95).

The mean total QoR-15 score for the preoperative period had a value of 88.35 (83), showing a decrease in value on the first postoperative day of 50.06 (49), and continued with the score before discharge of 84.53 (86.5). Similar data were found in the study of Shen Y at al. (2021) [17].

In the perioperative period, patients with applied spinal anesthesia in Group S, the score of mean physical well-being showed the same pattern:

• initial preoperative value of 35.06 (33.1-37.02)

• on the first postoperative day of 22.00 (21.07-22.93)

• before discharge from the hospital value of 38.29 (34.92-41.66).

Preoperatively:

• the value of the mean mental well-being score of 63.65 (58.65-68.65)

• during the first postoperative day, had a decreased mean mental well-being score of 45.94 (42.3-49.58)

• Before discharge from the hospital, the mean mental well-being score slightly increased to 69.29 (65.56-72.93).

The mean total QoR-15 score for the preoperative period had a value of 98.71 (102), showing a decrease in the value on the first postoperative day of 67.94 (67), and this continued with the score before discharge at 107.58 (109). These data are similar to the findings of Taflan at al. (2025) [18].

Preoperative, patients with applied bilateral US-guided RSB and standard general anesthesia in Group R showed:

• mean physical well-being score of 34.35 (31.82-36.88)

• during the first postoperative day had mean physical well-being score of 35.71 (31.83-39.59), lower compared to preoperative score regards of reduction of the pain score

• before discharging from hospital had mean physical well-being score of 44.65 (42.83-46.47) and shown increase of the score dye to mainly higher pain score.

Preoperatively we see the following pattern:

• mean mental well-being score of 67.59 (62.59-72.59)

• during the first postoperative day, a decreased mean mental well-being score of 49.88 (45.55-54.21)

• Before discharge from the hospital, mean mental well-being score was slightly increased to 72.65 (69.09-76.21)

The mean total QoR-15 score for the preoperative period had a value of 101.94 (103), showing a decrease in the value in the first postoperative day to 85.59 (89), and this continued with higher mean total score of 117.30 (119). Thus the data show that regional anesthesia techniques, in this case RSB, provide excellent postoperative analgesia and improve the quality of postoperative recovery. Abougabal A at al. (2024) also confirmed the positive postoperative analgesic effect of RSB [19].

Intraoperative data for patients of Group C shows an anesthesia time of overall 123.53 minutes (107.14-139.92) and a mean operation time of 103.82 minutes (88.8-118.84). Intraoperative mean propofol consumption was 585.29 milligrams (547.56-623.03), and mean fentanyl consumption was 191.18 micrograms (163.08-

219.28). These were used for induction into general anesthesia. Intraoperative remifentanil consumption of 1229.41 micrograms (1136.56-1322.27) for the endurance of analgesia, as a part of general anesthesia. The overall consumption of pain suppressant drugs used in the period up to 48 hours after the operation shows a median and high use of these medications in the first 24 hours after operation, similar to the findings of Gupta A at al. (2019) [20].

The values of intraoperative data for patient Group S shows a mean anesthesia time in minutes, giving an overall time of 109.41 minutes (101.07-117.75) as well as a mean operation time of 95.29 minutes (87.96-102.63). Intraoperative propofol, fentanyl, and remifentanil consumption were excluded. The overall consumption of pain suppressant drugs in patient Group S used in the period up to 48 hours after the operation shows a higher use of these medications compared to the other groups during the first 24 hours after operation. Similar findings were documented by Eoh KJ et al., who compared spinal anesthesia versus general anesthesia in single-port access laparoscopic adnexal surgery (2025) [21].

The values of intraoperative data for patient Group R show a mean anesthesia time in minutes at of 130.59 minutes (121.71-139.46) overall and a mean operation time of 110.59 minutes (101.89-119.28). Intraoperative mean propofol consumption was 588.24 milligrams (543-633.47), and the mean fentanyl consumption was 170.59 micrograms (157.84-183.33), both used for induction into general anesthesia. Intraoperative remifentanil was excluded. The overall consumption of pain suppressant drugs used in the period up to 48 hours after the operation shows a reduced use of these medications in the first 24 hours after the operation, as similar to the findings of Manici M et al. (2024) [22].

In group C, PONV showed a mean value of 5.82 (4.26-7.39), due to high perioperative opioid application as an important risk factor of PONV and tremors [23]. In addition, there is a prolonged stay in the PACU of 183.82 minutes (160.28-207.37). There was a also a longer duration of mean time to first flatus of 1421.18 minutes (1353.92-1488.43) and mean time to first discharge from bed at 1326.47 minutes (1303.64-1349.3). This was similar to the findings of Hamid HKS at al. (2021) [24]. There was a low patient satisfaction of 7.29 (6.63-7.95).

The overall consumption of pain suppressant drugs in patient Group S in the period up to 48 hours after operation shows a high use of these medications in the first 24 hours afterwards. A short stay in the PACU was at 136.47 minutes (114.69-158.25), compared to the findings from other authors [25]. There was also a shorter duration of mean time to first flatus of 1024 minutes (972-1076.24) and mean time to first discharging from bed of 1179 minutes (1151.94-1206.3). PONV with a mean value of 7.94 (6.83-9.05) as similar to the findings of Peano E at al.(2025) [26]. There was a moderate patient satisfaction score of 8.24 (7.87-8.6).

Group R is characterized by a shorter stay in the PACU, at 133.24 minutes (112.67-153.8), and a short duration of mean time to first flatus of 1200.59 minutes (1165.98-1235.2) as well as a mean time to first discharge from bed of 1206.18 minutes (1174.35-1238). PONV had a mean value of 7.35 (5.82-8.89), and similar observations were described from other authors [27]. There was also a high patient satisfaction score of 8.65 (8.25-9.05).

During this study, there were no complications associated with applied spinal anesthesia and RSB, such as puncture site infection and bleeding, or local anesthetic toxicity. Patients were treated with an appropriate multimodal anesthesia protocol and provided adequate analgesia.

## CONCLUSION

According to the obtained results, the postoperative global QoR-15 scores in patient Group R (with RSB) were in the range of 101.94-117.30 (103-119), and in patient Group S they were in the range of 98.71-107.58 (102-109). The patients from Group R, with applied preoperative RSB, had reduced intraoperative opioid consumption, moderate time to first flatus and time to first discharge from bed, low postoperative analgesic consumption, and shorter post-anesthesia care unit discharge time ($p<0.05$). Patients from Group S, with applied spinal anesthesia, had less or absent initial postoperative pain, abbreviated time to first flatus and time to first discharge from bed, a lower incidence of postoperative nausea and vomiting (PONV), and an early ability to ambulate.

When we observe patient satisfaction, we see that for patient group C there was average patient satisfaction, group S showed moderate patient satisfaction and group R showed high patient satisfaction. It can thus be concluded that the use of regional techniques (RSB or spinal anesthesia) are recommended for open gynecological surgery.

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**Резиме**

## КВАЛИТЕТОТ НА ЗАКРЕПНУВАЊЕТО ПО ОТВОРЕНА ГИНЕКОЛОШКА ОПЕРАЦИЈА

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**Вовед**: Хистеректомијата е една од најчестите големи отворени гинеколошки операции. Отворената гинеколошка операција резултира со голема рана и силна постоперативна болка, и потребна е соодветна постоперативна аналгезија. Како дел од мултимодалните стратегии за аналгезија, техниките на регионална анестезија се широко користени во ваквите операции за да се намали потрошувачката на опиоиди и да се зголеми ефикасноста на аналгетикот. Спиналната анестезија како техника на регионална анестезија и блокот на обвивката на мускулот rectus abdominis (RSB) можат да обезбедат соодветна анестезија и се истражуваат во оваа проспективна рандомизирана студија.

**Цел**: Целта на оваа студија е да се процени и да се спореди ефектот на стандардната општа ендотрахеална анестезија, регионалната блок-спинална анестезија и билатералниот RSB воден со ултразвук (US) врз квалитетот на закрепнување по отворена гинеколошка операција.

**Пациенти и методи**: Оваа проспективна рандомизирана студија беше спроведена на 51 пациентка, ASA I или II, пријавени за елективна гинеколошка операција, класифицирани по случаен избор во 3 еднакви групи (секоја од 17 пациенти): Група C (n = 17) е контролна група, каде што пациентките примаат стандардна општа ендотрахеална анестезија; пациентките во Групата S (n = 17) примаат регионален спинален блок со аплициран интратекален 20 mg (4.0 ml) 0,5 % хипербаричен бупивакаин и 20 μg фентанил; пациентките во Групата R (n = 17) примаат RSB со 40 ml ропивакаин 0,375 % (20 ml од секоја страна) пред операцијата и стандардна ендотрахеална анестезија. Примарниот исход беше квалитетот на закрепнувањето на првиот постоперативен ден, оценет со прашалник за квалитет на закпренувањето од 15 прашања (QoR-15). Секундарните исходи вклучуваат интраоперативна потрошувачка на опиоиди, време до првото испуштање на гасовите, време до првото станување од кревет, постоперативно гадење и повраќање (PONV), постоперативна потрошувачка на аналгетици и задоволство на пациентите.

**Резултати и заклучок**: Постоперативните глобални QoR-15 резултати кај групата пациенти R беа во опсег од 101,94– до 117,30 (103–119), а во групата S, пациентите беа во опсег од 98,71 до 107,58 (102–109). Пациентите од групата R, со применет предоперативен RSB, имаа намалена интраоперативна потрошувачка на опиоиди, умерено време до првите гасови и време до првото станување од кревет, ниска постоперативна потрошувачка на аналгетици и пократко време за отпуштање од единицата за постанестезиолошка нега ($p < 0,05$). Пациентите од групата S со применета спинална анестезија имаа помала или отсутна почетна постоперативна болка, скратено време до првите гасови и време до првото станување од кревет, помала инциденца на постоперативно гадење и повраќање (PONV) и рана способност за одење. Во однос на задоволството на пациентитете, за групата C се покажа дека е со просечно, групата S со умерено задоволството на пациентите, а групата R е со високо задоволството на пациентите. Според добиените резултати, за отворена гинеколошка хирургија се препорачува употреба на регионални техники (RSB или спинална анестезија).

**Клучни зборови**: квалитет на закпренување, QoR-15, блок на обвивката на мускулот rectus abdominis, спинална анестезија, отворена гинеколошка операција