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NEW DAY IN MEDICINE**

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## OPTIMIZATION OF ANESTHESIA IN OPTIMIZATION OF ANESTHESIA IN SIMULTANEOUS SURGERIES: MODERN APPROACHES AND CLINICAL EFFECTIVENESS

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### ✓ *Resume*

*This article presents an evaluation of modern anesthetic strategies used in simultaneous surgical interventions involving abdominal and pelvic organs. Particular attention was given to hemodynamic stability, perioperative stress reduction, epidural analgesia, low-flow inhalational anesthesia, and multimodal postoperative pain control. The study included 64 patients who underwent combined surgical procedures between 2023 and 2025. The results demonstrated that an optimized anesthetic protocol based on combined anesthesia and multimodal analgesia provided better cardiovascular stability, lower postoperative pain scores, reduced opioid requirements, faster recovery of intestinal motility, and shorter stay in the intensive care unit compared with conventional general anesthesia.*

*Keywords: simultaneous surgery, combined anesthesia, epidural analgesia, multimodal analgesia, hemodynamic stability, postoperative recovery, intensive care.*

## SIMULTAN OPERATSIYALARDA ANESTEZIYANI TAKOMILLASHTIRISH: ZAMONAVIY YONDOSHUVLAR VA KLINIK SAMARADORLIK

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### ✓ *Rezyume*

*Maqolada qorin va kichik chanoq bo'shlig'i a'zolarida bajariladigan simultan jarrohlik amaliyotlarida qo'llaniladigan zamonaviy anesteziologik yondashuvlar samaradorligi baholandi. Tadqiqotda gemodinamik barqarorlikni ta'minlash, perioperatsion stressni kamaytirish, epidural analgeziya, past oqimli inhalyatsion anesteziya hamda multimodal postoperatsion og'riqsizlantirish usullariga alohida e'tibor qaratildi. Tadqiqotga 2023–2025-yillar davomida kombinatsiyalangan jarrohlik amaliyotlarini boshdan kechirgan 64 nafar bemor kiritildi. Olingan natijalar kombinatsiyalangan anesteziya va multimodal analgeziyaga asoslangan optimallashtirilgan anesteziologik protokol yurak-qon tomir tizimi barqarorligini yaxshilashi, postoperatsion og'riq darajasini kamaytirishi, opioid preparatlarga ehtiyojni qisqartirishi, ichak motorikasining tezroq tiklanishini ta'minlashi hamda intensiv terapiya bo'limida qolish muddatini kamaytirishini ko'rsatdi.*

*Kalit so'zlar: simultan operatsiyalar, kombinatsiyalangan anesteziya, epidural analgeziya, multimodal analgeziya, gemodinamik barqarorlik, postoperatsion tiklanish, intensiv terapiya.*

## ОПТИМИЗАЦИЯ АНЕСТЕЗИИ ПРИ СИМУЛЬТАННЫХ ОПЕРАЦИЯХ: СОВРЕМЕННЫЕ ПОДХОДЫ И КЛИНИЧЕСКАЯ ЭФФЕКТИВНОСТЬ

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✓ **Резюме**

*В статье представлена оценка современных анестезиологических подходов, применяемых при симультанных хирургических вмешательствах на органах брюшной полости и малого таза. Особое внимание уделено обеспечению гемодинамической стабильности, снижению периоперационного стресс-ответа, использованию эпидуральной анальгезии, низкотоковой ингаляционной анестезии и мультимодального послеоперационного обезболивания. В исследование были включены 64 пациента, перенесших комбинированные хирургические вмешательства в период 2023–2025 годов. Полученные результаты показали, что оптимизированный протокол анестезиологического обеспечения, основанный на комбинированной анестезии и мультимодальной анальгезии, способствует улучшению сердечно-сосудистой стабильности, снижению интенсивности послеоперационной боли, уменьшению потребности в опиоидных препаратах, более быстрому восстановлению моторики кишечника и сокращению продолжительности пребывания в отделении интенсивной терапии.*

*Ключевые слова: симультанные операции, комбинированная анестезия, эпидуральная анальгезия, мультимодальная анальгезия, гемодинамическая стабильность, послеоперационное восстановление, интенсивная терапия.*

### **Introduction**

In modern surgical practice, simultaneous operations are becoming increasingly important as they allow two or more independent pathological conditions to be corrected during a single anesthetic session. This approach reduces the need for repeated hospitalization, prevents additional surgical stress, and improves the economic efficiency of medical care.

Simultaneous procedures are especially relevant in patients with combined abdominal and pelvic pathology, such as cholelithiasis with abdominal wall hernia, gynecological disorders with intestinal disease, or metabolic disorders associated with obesity. However, from the anesthesiologist's point of view, these operations are more complex than isolated surgical interventions. Longer operative time, manipulation in several anatomical regions, increased blood loss, fluid shifts, and pronounced neuroendocrine stress response may negatively affect cardiovascular, respiratory, and metabolic functions.

The main perioperative risks in such patients include hemodynamic instability, hypoxia, hypercapnia, increased intraoperative blood loss, severe postoperative pain, thromboembolic complications, delayed intestinal motility, and prolonged rehabilitation. Therefore, anesthetic management in simultaneous surgery should not be limited to unconsciousness and analgesia alone. It must also provide effective control of stress response, tissue oxygenation, cardiovascular stability, and early postoperative recovery.

**The aim of this** study was to assess the clinical effectiveness of an optimized anesthetic approach in patients undergoing simultaneous operations on abdominal and pelvic organs.

### **Materials and methods**

The study was conducted at the multidisciplinary clinic of Samarkand State Medical University during 2023–2025. A total of 64 patients who underwent simultaneous abdominal and pelvic surgical procedures were included. The age of patients ranged from 32 to 74 years. Among them, 41 were women and 23 were men.

Patients were divided into two groups: Group I — Control group: 32 patients received standard general inhalational anesthesia.

Group II — Main group: 32 patients received optimized combined anesthesia, including epidural analgesia, low-flow inhalational anesthesia, and multimodal analgesic support.

During surgery, the following parameters were monitored: systolic and diastolic blood pressure, heart rate, SpO<sub>2</sub>, ETCO<sub>2</sub>, arterial blood gases, intraoperative need for vasopressors, postoperative pain intensity according to the VAS scale, duration of ICU stay, opioid requirement, postoperative nausea and vomiting, recovery of bowel motility, and early mobilization. Statistical analysis was performed using Student's t-test. Differences were considered statistically significant at  $p < 0.05$ .

## Result and discussions

The results showed that patients in the main group had more stable intraoperative hemodynamic parameters compared with the control group. During the most traumatic stages of surgery, fluctuations in blood pressure and heart rate were less pronounced in patients who received combined anesthesia with epidural analgesia.

In the control group, episodes of tachycardia, arterial hypertension, and transient hypotension were more frequent. These patients required additional opioid analgesics and vasopressor support more often.

Postoperative pain intensity was significantly lower in the main group. According to the VAS scale, the mean pain score was  $2.7 \pm 0.7$  points in the main group, whereas in the control group it was  $6.2 \pm 1.1$  points. This confirms the effectiveness of epidural and multimodal analgesia in reducing postoperative pain.

The need for opioid analgesics was also lower in the main group. As a result, opioid-related adverse effects such as respiratory depression, nausea, vomiting, and delayed bowel function were observed less frequently. Postoperative nausea and vomiting occurred in 28.1% of patients in the control group and in 9.4% of patients in the main group.

Recovery of intestinal motility was faster in the main group. Early enteral nutrition was possible earlier, and patients were mobilized sooner. The duration of ICU stay decreased from  $3.2 \pm 0.5$  days in the control group to  $1.6 \pm 0.3$  days in the main group.

Hemodynamic instability was observed in 34.4% of patients in the control group and only in 12.5% of patients in the main group.

**Table 1. Clinical effectiveness of anesthetic approaches in simultaneous surgeries**

Parameter	Control group	Main group
Duration of surgery	$220 \pm 26$ min	$214 \pm 19$ min
VAS pain score	$6.2 \pm 1.1$	$2.7 \pm 0.7$
ICU stay	$3.2 \pm 0.5$ days	$1.6 \pm 0.3$ days
Hemodynamic instability	34.4%	12.5%
Postoperative nausea and vomiting	28.1%	9.4%
Opioid requirement	High	Significantly reduced
Recovery of bowel motility	Delayed	Early
Early mobilization	Limited	Active

**Discussion:** Simultaneous surgical interventions are associated with a greater anesthetic risk than single-stage isolated operations. This is mainly due to prolonged surgical trauma, greater stimulation of the neuroendocrine system, increased inflammatory response, and higher probability of intraoperative fluid and hemodynamic disturbances.

The findings of this study indicate that conventional general anesthesia alone may be insufficient for adequate perioperative protection in patients undergoing combined abdominal and pelvic operations. In the control group, cardiovascular instability and stronger postoperative pain were more common, which increased the need for opioids and additional hemodynamic correction.

The use of epidural analgesia in the main group provided several important advantages. By reducing sympathetic nervous system activity, epidural blockade contributed to more stable blood pressure and heart rate. It also improved peripheral circulation and tissue perfusion. In abdominal surgery, epidural analgesia has an additional benefit because it promotes earlier recovery of intestinal motility and reduces the risk of postoperative ileus.

Multimodal analgesia also played an important role. The combined use of analgesics with different mechanisms of action allowed effective blockade of pain impulses at different levels of the nervous system. This approach reduced opioid consumption and minimized opioid-related complications. Lower opioid use contributed to better respiratory function, fewer gastrointestinal adverse effects, and faster patient mobilization.

Low-flow inhalational anesthesia was another important component of the optimized protocol. This method allows adequate depth of anesthesia with reduced consumption of inhalational agents. It also helps preserve humidity and temperature in the respiratory circuit, which may have a protective effect on the airway mucosa. In addition, low-flow anesthesia is economically beneficial and environmentally safer because it decreases the release of anesthetic gases into the atmosphere.

Modern monitoring technologies are essential in simultaneous operations. Continuous control of blood pressure, oxygen saturation, capnography, blood gas analysis, and depth of anesthesia makes it possible to detect complications at an early stage and correct them promptly. Individualized anesthetic planning based on patient age, ASA status, comorbidities, expected duration of surgery, and operative trauma is a key factor in improving clinical outcomes.

Thus, the study confirms that combined anesthesia with epidural analgesia, multimodal pain control, low-flow inhalational anesthesia, and advanced monitoring provides better perioperative safety and improves postoperative recovery in simultaneous abdominal and pelvic operations.

### Conclusion

Optimized combined anesthesia is more effective than standard general anesthesia in patients undergoing simultaneous abdominal and pelvic surgery. Epidural analgesia improves hemodynamic stability and decreases perioperative stress response. Multimodal analgesia significantly reduces postoperative pain and opioid requirements. Low-flow inhalational anesthesia increases safety, reduces anesthetic consumption, and supports respiratory protection. Individualized anesthetic management and modern monitoring contribute to fewer complications, shorter ICU stay, and faster rehabilitation.

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