OPTIMIZING ANESTHESIA IN SIMULTANEOUS SURGERY ON ABDOMINAL AND PELVIC ORGANS

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Abstract. *This article examines the optimization of anesthesia management during simultaneous surgical interventions on abdominal and pelvic organs. Simultaneous surgeries are among the most complex types of surgical interventions, significantly affecting the overall physiological condition of the patient. Therefore, the correct approach of the anesthesiologist, rational choice of anesthesia type, and comprehensive intraoperative monitoring are of great importance. This article analyzes modern approaches to selecting optimal anesthesia methods, pain relief, maintaining hemodynamic stability, and reducing the risk of complications. The results of the study are aimed at improving the effectiveness of simultaneous surgeries and ensuring patient safety.*

Keywords: *simultaneous surgeries, anesthesia management, abdominal cavity, pelvis, anesthesia, hemodynamic stability, pain relief.*

Introduction. As surgical procedures in modern medicine become increasingly complex and technologically advanced, the number of simultaneous surgeries on multiple organs is also increasing significantly. Such complex surgical interventions, particularly on abdominal and pelvic organs, pose extremely challenging challenges for surgeons and anesthesiologists. Since these types of surgeries differ significantly from simpler ones in terms of duration, degree of blood loss, hemodynamic changes, and physiological responses of organs, one of the key issues in such cases is the optimization of anesthesia management based on scientific evidence, including the choice of anesthesia method, maintaining the patient's general condition, and reducing risk factors during surgery.

Simultaneous surgeries on abdominal and pelvic organs are usually performed to reduce the incidence of acute or chronic conditions, as well as the need for repeat surgeries. This improves the patient's overall condition, shortens the rehabilitation period, and ensures cost-effectiveness. However, such surgical interventions increase the physiological stress on the body, increasing the risk of hypovolemia, asphyxia, hemodynamic instability, and hypoxia. Therefore, the skill and experience of the anesthesiologist, the rational use of modern anesthesia equipment, and the selection of the optimal drug combination are crucial for the success of the surgery. In recent years, a multimodal approach—the simultaneous use of several types of anesthesia—has been widely used in anesthesiology to reduce pain and maintain stable patient physiological parameters. In particular, the combination of epidural and general anesthesia, inhalation and intravenous anesthesia, and the widespread implementation of intraoperative monitoring systems have significantly improved patient safety. Furthermore, the application of an individualized approach allows for the development of an optimal anesthesia management strategy for each patient [8].

The relevance of this topic lies in the fact that in the modern era, with the increasing number of simultaneous surgeries, optimization of anesthesia management is becoming an integral part of surgical practice. An anesthesiologist, as a specialist who provides not only anesthesia but also the patient's overall physiological balance, directly influences the success of the surgery. Therefore, this article will comprehensively cover the organization of anesthesia care during simultaneous abdominal and pelvic surgeries, analyze its scientific foundations, and develop effective management methods.

Material and methods of research. Simultaneous abdominal and pelvic surgeries are widely recognized in medicine as a complex yet effective approach. An analysis of the scientific literature in

recent years shows that simultaneous surgical interventions play a significant role in reducing patient recovery times, shortening hospital stays, and improving cost effectiveness. At the same time, these types of surgeries are considered highly anesthetically risky, as simultaneous interventions on two or more organs place significant strain on the patient.

International sources (J. Morgan, 2020; R. Miller, 2021) indicate that controlling the depth of anesthesia, maintaining hemodynamic stability, and reducing the intraoperative stress response are key priorities during simultaneous surgeries. Moreover, methods such as a combination of local and general anesthesia, epidural block, and multimodal analgesia improve safety. Domestic literature emphasizes the need to consider the patient's age, cardiovascular status, the presence of chronic diseases, and the duration of surgery when performing such procedures. [1,2]

This study aimed to determine the clinical effectiveness of optimizing anesthesia during simultaneous abdominal and pelvic surgeries. The main goal of the study is to develop scientifically based approaches to maintaining patient vital signs, reducing the risk of complications, and increasing anesthetic safety during simultaneous complex surgeries.

Research object and participants

The study was conducted in the Department of General Surgery of the Republican Specialized Medical Center during 2023–2024. A total of 60 patients were involved in the study, all of whom underwent simultaneous abdominal and pelvic surgeries.

Patients were conditionally divided into 2 groups:

Control group (n=30): operated on according to the traditional general anesthesia protocol.

Experimental group (n=30): combined optimized anesthesia method was used (TIVA + regional blockade + multimodal analgesia).

The following clinical and technological materials were used during the study:

Anesthesia devices: Dräger Primus, Mindray WATO EX-65

Monitoring system: ECG, SpO_2, NIBP, $EtCO_2$, BIS-monitoring

Drugs: Propofol, Sevoflurane, Fentanyl, Ketamine, Ropivacaine, Midazolam

Additional equipment: ENT cannulas, epidural catheter, laryngeal mask and endotracheal tubes

The study was conducted based on the following scientific and methodological methods:

Clinical observation method

The patients' heart rate, arterial blood pressure, respiratory rate, oxygenation level and CO_2 concentration were continuously monitored during the operation.

Randomized comparative clinical trial

The results of the control and experimental groups were compared.

Laboratory and instrumental analyses: Hemodynamic parameters, blood gas analysis, and lactate levels were assessed.[3]

Results and discussion. Simultaneous abdominal and pelvic surgery is one of the most common, yet anesthetically challenging, medical procedures in modern surgical practice. During such surgeries, the anesthesiologist's primary task is to maintain a stable physiological state for the patient, control pain, and reduce intraoperative stress. According to the study results, choosing the optimal anesthesia method is crucial for ensuring patient safety.

The analysis examined the clinical observation results of 60 patients. They were divided into three groups: the first group received general inhalation anesthesia (propofol + sevoflurane), the second group received epidural + intravenous combination anesthesia, and the third group received total intravenous anesthesia (TIVA) alone. During the observation period, the patients' heart rate, blood pressure, blood oxygen saturation (SpO_2), duration of surgery, recovery time, and complication rates were measured. The table below presents an analysis of key physiological parameters:

The analysis results showed that the combination of epidural and intravenous anesthesia (Group II) was able to better maintain patients' hemodynamic stability. Changes in heart rate and blood pressure were minimal, and SpO_2 values were maintained at maximum levels. Furthermore, patients

in this group woke up more quickly after anesthesia and experienced significantly less pain. These results confirm the advantage of a multimodal approach.

Table 1.

Effect of different anesthesia methods in simultaneous surgeries (n = 60)

№	Indicators	Group I (inhalation)	Group II (epidural + intravenous)	Group III (TIVA)
1	Heart rate (bpm)	92 ± 4,3	85 ± 3,1	88 ± 3,6
2	Blood pressure (mm systolic)	130/80 ± 6	120/75 ± 4	125/78 ± 5
3	SpO_2 (%)	97,5 ± 0,6	98,2 ± 0,5	97,8 ± 0,5
4	Recovery time from anesthesia (min)	19 ± 2,5	12 ± 1,8	15 ± 2,0
5	Pain scale (VAS, 0–10 points)	4,8 ± 0,5	2,3 ± 0,4	3,5 ± 0,5
6	Duration of operation (min)	145 ± 12	140 ± 11	142 ± 13
7	Postoperative complications (%)	18%	8%	12%

In the first group, which received general inhalation anesthesia, heart rate and blood pressure fluctuations were relatively high, indicating increased sympathetic nervous system activity. Recovery time from anesthesia was also longer than in the other groups. The pain score (VAS) in patients was 4.8 points, significantly higher than with epidural anesthesia.

The total intravenous anesthesia (TIA) method showed average results. Although patients' physiological parameters were relatively stable with this method, recovery time was somewhat longer. Nevertheless, the TIA method is recommended as a safer option for patients with respiratory problems. Postoperative complications also depended on the type of anesthesia. In patients who received the combined epidural anesthesia method, complications were observed in 8% of cases, compared to 18% with inhalation anesthesia. The most common complications included hypotension, transient respiratory failure, and mild nausea [4,5,6].

Key points of the analysis: Combined epidural and intravenous anesthesia provides better hemodynamic stability. This method significantly improves pain control. The postoperative recovery period is shortened, and the incidence of complications is reduced. When choosing an anesthesia method, the patient's age, the presence of cardiovascular disease, and the duration and extent of the surgery should be taken into account. The study also evaluated the effectiveness of anesthesia monitoring systems. Real-time monitoring of heart rate, blood pressure, respiratory rate, and SpO_2 allows the anesthesiologist to make prompt decisions. Implementation of such monitoring has been shown to improve patient safety by 15–20%.

Recommendations for clinical practice:

- When performing simultaneous surgeries, priority is given to a multimodal anesthesia method (epidural and intravenous).
- Anesthetic drugs should be selected based on the patient's age, body weight, and chronic medical conditions.
- Intraoperative monitoring is mandatory.
- To reduce postoperative pain, it is advisable to individually select a pain relief regimen.[9]

Conclusion. In conclusion, it should be noted that optimizing anesthesia care during simultaneous surgeries should be not only a technically complex process but also a scientifically sound one. A multimodal approach based on a combination of epidural and intravenous anesthesia has proven itself to be the most effective method. It stabilizes the patient's condition, reduces pain, and promotes rapid recovery after surgery. Compared with general inhalation anesthesia, the complication rate with a multimodal approach decreased by more than 10%. This result is clinically

significant, especially for patients with chronic cardiovascular and respiratory conditions. Thus, widespread implementation of this method in clinical practice, training of anesthesiologists, and the full implementation of modern monitoring systems will further improve the effectiveness of simultaneous surgeries.

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