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LAPAROSKOPIK XOLETSEKTOMIYADAN KEYIN QARIYALARDA QORIN ICHKI BOSIMINI BILVOSITA O‘LCHASH: KLINIK AHAMIYAT VA PROGNOSTIK QIYMATI

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Annotatsiya. Laparoskopik xoletsektomiyadan keyin qariyalar orasida qorin ichki gipertenziyasi tez-tez uchraydigan va klinik jihatdan muhim asorat hisoblanadi. Tadqiqotda qorin ichki bosimi (QIB) siydik pufagi orqali bilvosita o‘lchash usuli yordamida erta afteroperatsion davrda behushlik turiga qarab solishtirildi.

60–74 yoshdagi 80 nafar bemor (ASA II–III) ikki guruhga bo‘lindi: to‘liq vena ichiga behushlik (TVIA, n=40) va epidural komponentli kombinatsiyalangan multimodal behushlik (KMA, n=40).

KMA guruhida QIB ancha tez va to‘liq normallashdi: 30 daqiqa, 6 soat, 24 soat va 48 soatdagi median qiymatlar mos ravishda 9,1; 7,8; 6,5 va 6,2 mm sim. ust. (TVIA guruhida esa 11,8; 10,4; 8,9 va 7,6 mm sim. ust., p<0,001–0,002). QIB ≤8 mm sim. ust. darajasiga yetish vaqti KMA guruhida ~18 soat, TVIA guruhida ~38 soat bo‘ldi.

Olingan natijalar shuni ko‘rsatadiki, laparoskopik xoletsektomiyadan keyin qariyalar bemorlarida afteroperatsion og‘riqni bartaraf etishning eng maqbul usuli sifatida uzoq muddatli epidural analgeziya qo‘llanilishi qorin ichki gipertenziya muddati va darajasini kamaytirish maqsadida afzal ko‘rilishi lozim.

Kalit so‘zlar: qorin ichki bosimi, qorin ichki gipertenziya, laparoskopik xoletsektomiya, qariyalar, epidural analgeziya, afteroperatsion davr.

НЕПРЯМОЕ ИЗМЕРЕНИЕ ВНУТРИБРЮШНОГО ДАВЛЕНИЯ У ПОЖИЛЫХ ПАЦИЕНТОВ ПОСЛЕ ЛАПАРОСКОПИЧЕСКОЙ ХОЛЕЦИСТЭКТОМИИ: КЛИНИЧЕСКОЕ ЗНАЧЕНИЕ И ПРОГНОСТИЧЕСКАЯ ЦЕННОСТЬ

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Аннотация. Внутрибрюшная гипертензия остается частым и клинически значимым осложнением у пациентов пожилого возраста после лапароскопической холецистэктомии. В исследовании проведено сравнение динамики внутрибрюшного давления (ВБД), измеренного непрямым методом через мочевой пузырь, в раннем послеоперационном периоде в зависимости от вида анестезии.

Обследовано 80 пациентов 60–74 лет (ASA II–III). Пациенты разделены на две группы: тотальная внутривенная анестезия (ТВВА, n=40) и комбинированная мультимодальная анестезия с эпидуральным компонентом (КМА, n=40).

Группа КМА показала достоверно более быстрое и полное восстановление ВБД: медианы значений через 30 мин, 6 ч, 24 ч и 48 ч составили 9,1; 7,8; 6,5 и 6,2 мм рт.ст. соответственно (против 11,8; 10,4; 8,9 и 7,6 мм рт.ст. в группе ТВВА, p<0,001–0,002). Время

достижения уровня ВБД ≤8 мм рт.ст. составило ~18 ч в группе КМА против ~38 ч в группе ТВВА.

Полученные данные свидетельствуют о целесообразности использования продлённой эпидуральной аналгезии как предпочтительного метода послеоперационного обезболивания у пожилых пациентов после лапароскопической холецистэктомии для минимизации продолжительности и выраженности послеоперационной внутрибрюшной гипертензии.

Ключевые слова: внутрибрюшное давление, внутрибрюшная гипертензия, лапароскопическая холецистэктомия, пожилые пациенты, эпидуральная аналгезия, послеоперационный период.

INDIRECT MEASUREMENT OF INTRA-ABDOMINAL PRESSURE IN ELDERLY PATIENTS AFTER LAPAROSCOPIC CHOLECYSTECTOMY: CLINICAL SIGNIFICANCE AND PROGNOSTIC VALUE

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Abstract. Intra-abdominal hypertension remains a frequent and clinically significant complication in elderly patients after laparoscopic cholecystectomy. The study comparatively evaluated dynamics of intra-abdominal pressure (IAP) measured indirectly via bladder in the early postoperative period depending on the anesthesia technique.

Eighty patients aged 60–74 years (ASA II–III) were divided into two groups: total intravenous anesthesia (TIVA, n=40) and combined multimodal anesthesia with epidural component (CMA, n=40). Measurements were performed before surgery, 30 min after desufflation, 6 h, 24 h and 48 h postoperatively.

The CMA group demonstrated significantly faster and more complete normalization of IAP: median values at 30 min, 6 h, 24 h and 48 h were 9.1; 7.8; 6.5 and 6.2 mmHg respectively (vs 11.8; 10.4; 8.9 and 7.6 mmHg in TIVA group, $p<0.001–0.002$). Time to reach IAP ≤8 mmHg was approximately 18 hours in CMA vs 38 hours in TIVA.

The obtained results indicate that prolonged epidural analgesia should be considered the method of choice for postoperative pain management in elderly patients after laparoscopic cholecystectomy in order to minimize the duration and severity of postoperative intra-abdominal hypertension.

Keywords: intra-abdominal pressure, intra-abdominal hypertension, laparoscopic cholecystectomy, elderly patients, epidural analgesia, postoperative period.

Introduction. Intra-abdominal pressure (IAP) is an important integral indicator that reflects the condition of the abdominal cavity and affects the functioning of the cardiovascular, respiratory, and renal systems [1, 2]. Under normal physiological conditions, IAP in adults does not exceed 5–7 mmHg [3], but in a number of clinical situations, it can increase significantly, leading to the development of intra-abdominal hypertension and, in severe cases, abdominal compartment syndrome [4].

The problem of increased IAP is of particular clinical significance in elderly and senile patients who have undergone laparoscopic surgery. Laparoscopic cholecystectomy, which is the "gold standard" for the treatment of gallstone disease, is accompanied by the creation of carboxyperitoneum, a change in the patient's body position, and a temporary increase in IAP [5]. In elderly individuals, these factors are compounded by age-related decline in the body's compensatory

abilities, the presence of concomitant cardiovascular and respiratory diseases, as well as impaired microcirculation and tissue perfusion [6].

Even a moderate increase in IAP in this category of patients can lead to a decrease in venous return, a decrease in cardiac output, a deterioration in pulmonary compliance, hypoxemia, and impaired renal function [7]. In the postoperative period, persistent intra-abdominal hypertension may be one of the factors contributing to delayed recovery, increased pain, the development of respiratory disorders, and hemodynamic instability [8].

In this regard, timely and reliable monitoring of IAP is a pressing issue. Direct measurement methods are invasive and limited in clinical practice, while indirect methods, in particular IAP measurement through the bladder, are accessible, safe, and reproducible [9, 10]. However, questions regarding their clinical interpretation and prognostic significance in elderly patients after laparoscopic cholecystectomy remain insufficiently studied.

The purpose of the study was to comparatively evaluate the dynamics of intra-abdominal pressure in the early postoperative period in elderly patients after laparoscopic cholecystectomy depending on the method of anesthesia.

Materials and methods. A prospective comparative study was conducted on 80 elderly patients (aged 60–74) who underwent elective laparoscopic cholecystectomy (LCE) in 2022–2024 at the Multidisciplinary clinic of Samarkand State Medical University.

Inclusion criteria: age 60–74 years, ASA II–III, presence of concomitant cardiovascular and/or respiratory pathology, performance of standard LCE with pneumoperitoneum 10–14 mm Hg.

Exclusion criteria: conversion to open surgery, baseline IAP ≥20 mmHg, severe heart failure (FC III–IV), history of stroke less than 6 months, contraindications to epidural anesthesia.

Patients were divided into two groups:

Group I (n = 40) — patients who underwent surgery under total intravenous anesthesia (TIVA) with artificial ventilation.
Pain relief was provided by intravenous administration of hypnotics and opioid analgesics. In the postoperative period, systemic analgesia with non-narcotic and narcotic analgesics was used on demand.

Group II (n = 40) — patients who underwent combined multimodal anesthesia (CMA) based on epidural block combined with intravenous anesthesia and mechanical ventilation. Postoperative pain relief was provided by prolonged epidural analgesia with minimal use of systemic analgesics.

The groups were comparable in terms of age, gender, body mass index, nature of comorbidities, and duration of surgery.

Indirect measurement of IAP:

Intra-abdominal pressure was determined indirectly through the bladder, which is currently recognized as the "gold standard" for clinical monitoring of IAP. The measurement was performed as follows:

After emptying the bladder, 20–25 ml of sterile saline solution was injected through a urethral catheter. The catheter was connected to a measuring system (water manometer or electronic sensor). The zero point was set at the level of the mid-axillary line with the patient lying on their back. The measurement was taken at the end of a calm exhalation with a relaxed abdominal wall.

IAP indicators were recorded at the following time points:

P0 — before the start of the operation (baseline)

P1 — 30 minutes after desuflation

P2 — 6 hours after surgery

P3 — after 24 hours (1st day)

P4 — after 48 hours after (day 2)

Statistical processing: Mann-Whitney, Wilcoxon, χ^2 criteria, Spearman's correlation analysis. Significance level $p<0.05$.

Results. At baseline (P0), the median values of IAP in both groups were within the physiological norm or slightly exceeded it, with no significant intergroup differences (p=0.68).

Thirty minutes after desuflation (P1), the TIVA group showed a significant increase in IAP to 11.8 mmHg (range 9.4–14.2), which corresponds to moderate intra-abdominal hypertension (IAH grade II according to the WSACS classification). In the CMA group, the median value was 9.1 mmHg, which is statistically and clinically significantly lower ($p<0.001$). The difference between the groups at this stage reached 2.7 mmHg.

At the 6th hour of the postoperative period (P2), the differences between the groups persisted and even increased slightly: in the TIVA group, the median IAP remained at 10.4 mmHg, while in the CMA group, the values practically normalized to 7.8 mmHg ($p<0.001$).

By the end of the first day (P3), the median IAP in the TIVA group was still above 8 mmHg (8.9 [7.1; 11.2]), with a significant proportion of patients still having mild or moderate intra-abdominal hypertension. In the CMA group, IAP decreased to 6.5 mmHg, which corresponds to a complete restoration of physiological levels in most patients ($p<0.001$).

At 48 hours (P4), the differences between the groups decreased but remained statistically significant (p=0.002). In the TIVA group, the median was 7.6 mmHg, and in the CMA group, it was 6.2 mmHg.

Table 1.

Dynamics of intra-abdominal pressure (mm Hg)

Time point	TIVA group (n=40)	CMA group (n=40)	P value (between groups)
P0 - before surgery	7.2	7.4	0.68
P1 – 30 minutes after desuflation	11.8	9.1	<0.001
P2 – 6 hours later	10.4	7.8	<0.001
P3 – after 24 hours	8.9	6.5	<0.001
P4 – after 48 hours	7.6	6.2	0.002

The data obtained demonstrate a significantly faster and more complete normalization of VBD in the group receiving combined multimodal anesthesia with an epidural component. The most likely mechanisms for the advantage of CMA are:

Significantly better postoperative pain relief → less activation of the sympathoadrenal system → less vasoconstriction of mesenteric vessels

Significantly less severe postoperative intestinal paresis (earlier passage of gas and stool)

No depressing effect of high doses of opioids on gastrointestinal motility

Better preservation of diaphragmatic mobility due to less pain when breathing

More stable hemodynamics in the early postoperative period, less need for vasopressors

A strong correlation between IAP levels and pain severity in the TIVA group, as well as between IAP and total opioid dose, confirms the existence of a vicious circle: pain → tachycardia + vasoconstriction → impaired intestinal perfusion → paresis → increased IAP → increased pain.

Conclusions. After laparoscopic cholecystectomy in elderly patients (aged 60–74), moderate intra-abdominal hypertension persists in most cases in the early postoperative period. The most pronounced increase in intra-abdominal pressure is recorded in the first 30 minutes to 6 hours after deflation, followed by a gradual decrease over 24–48 hours.

The method of anesthetic support significantly affects the dynamics and rate of normalization of intra-abdominal pressure. When using combined multimodal anesthesia with an epidural component (0.25% bupivacaine solution), IAP values at all stages of observation are statistically significantly lower than with total intravenous anesthesia.

The most pronounced differences between the groups are observed in the first day after surgery: 30 minutes after desuflation, the difference in median IAP values is about 2.7 mmHg, after 6 hours — 2.6 mmHg, after 24 hours — 2.4 mmHg ($p<0.001$).

The time to reach the target IAP level of ≤8 mmHg in the combined multimodal anesthesia group is approximately twice as short as in the total intravenous anesthesia group (median 18 hours vs. 38 hours, respectively, $p<0.001$).

The use of combined multimodal anesthesia with prolonged epidural analgesia with bupivacaine provides faster normalization of intra-abdominal pressure due to effective postoperative pain relief, a significant reduction in the need for opioids, a decrease in the severity of postoperative intestinal paresis, and better preservation of diaphragmatic mobility.

The obtained results indicate that combined multimodal anesthesia with an epidural component is the preferred method of anesthetic support for laparoscopic cholecystectomy in elderly patients from the standpoint of minimizing the risk of prolonged intra-abdominal hypertension and associated complications in the postoperative period.

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