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LONGOCAIN SOLUTION FOR INFILTRATION ANESTHESIA IN MORBID OBESITY SURGERY

The objective of the paper is to study the efficacy of the infiltrative anesthesia combined with general anesthesia in patients with morbid obesity.

Materials and methods. Sixty patients (36 females and 24 males) aged 21 to 56 (mean age – 41.2 ± 1.2 years) with morbid obesity were enrolled in the study and underwent different types of gastro-restrictive and malabsorptive surgical interventions. The patients were divided into two groups. In Group 1 (n = 30), the multicomponent balanced anesthesia was used (sevoflurane, fentanyl); for muscle relaxation, *Esmerone* solution (rocuronium bromide) was used; in Group 2 (n = 30), additional infiltration anesthesia of the surgical incision site was applied onto the anterior abdominal wall using *Longocain* solution. The solution was administered subcutaneously to the entire length of the planned incision. To monitor the anesthetic management adequacy of surgical interventions, the indices of hemodynamics, gas exchange and acid-base status were studied. Postoperatively, the duration of prolonged artificial lung ventilation was registered; pain at rest and on movement was assessed using the visual analog scale.

Results and discussion. In the postoperative period, the indices of hemodynamics, external respiration, gas exchange and acid-base status were not fundamentally different in the groups. The administration of local anesthetic solutions was not accompanied by a significant decrease in blood pressure and heart rate. No significant difference in analgesic effect between the local anesthetics was observed, but the *Longocain*'s advantage is a long-term effect. Infiltrative anesthesia combined with general anesthesia decreases drowsiness, respiratory depression, pain intensity, especially when moving, which prevents respiratory and thromboembolic complications.

Conclusions. Infiltrative anesthesia use in case of general anesthesia for surgical stage management provides reducing hemodynamic disorders and earlier beginning of the surgery. *Longocain* solution application allows to reduce the amounts of narcotic analgesics and muscle relaxants for an adequate anesthetic management and thereby to reduce pharmacological loading on the liver.

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Key words: infiltrative anesthesia, morbid obesity, the efficacy of general anesthesia and analgesia supplemented with infiltration anesthesia, *Longocain*.

The WHO h as acknowledged obesity as a non-infectious epidemic of the 21st century. About 250 million people or 7 % of the adult population suffer from obesity. Obesity induces all types of metabolic disorders, early atherosclerosis, arterial hypertension, coronary artery disease, respiratory failure, type 2 diabetes mellitus, and dystrophic processes in parenchymal organs.

Morbid obesity (MO) and concomitant diseases increase the incidence of perioperative complications and mortality rate [1, 5].

It is known that the hemodynamic response to surgical procedures of the upper abdomen (lifting the mesentery and stomach, esophageal manipulations) cannot be prevented even by the deepest anesthesia. In patients with MO, the choice of an effective method of anesthesia during a surgical intervention is a challenge [3, 4].

The aim of the paper is to study the efficacy of the infiltrative anesthesia combined with general anesthesia in patients with morbid obesity.

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Objectives of the study:

· to compare the efficacy of general anesthesia and analgesia supplemented with infiltration anesthesia (IA);

· to compare the amount of administered anesthetics during both types of analgesia;

· to compare the efficacy of Longocain solution IA and other local anesthetics;

· to compare the pain syndrome intensity in the postoperative period in patients undergoing general anesthesia and analgesia by means of IA.

MATERIALS AND METHODS

Sixty patients (36 females and 24 males) aged 21 to 56 (mean age – 41.2 ± 1.2 years) with MO were enrolled in the study and underwent different types of gastro-restrictive and malabsorptive surgical interventions. The body weight of the patients was 123 to 240 kg, mean weight was (147.0 ± 5.6) kg. The body mass index (BMI) was 40 to 73 kg/m^2; averagely, (51.2 ± 1.4) kg/m^2.

In Group 1 (n = 30), the multicomponent balanced anesthesia was used (sevoflurane, fentanyl); for muscle relaxation, *Esmerone* solution (rocuronium bromide) was used; in Group 2 i (n = 30), additionally to IA, surgical incision sites on the anterior abdominal wall were treated by *Longocain* solution. The solution was administered subcutaneously to the entire length of the planned incision [5]. During a surgical intervention, IA of the parietal peritoneum was performed, as well as of the abdominal nerve plexuses. We used such an anesthesia in patients who had pronounced changes in the cardiovascular and respiratory systems, often, under subcompensation, and in patients with a BMI over 50 kg/m^2 with sleep apnea syndrome accompanied by frequent apnea/dyspnea episodes during sleep.

To monitor the anesthetic management adequacy of surgical interventions, the indices of hemodynamics, gas exchange and acid-base status were studied. Postoperatively, the duration of prolonged artificial lung ventilation was registered; pain at rest and on movement was assessed using the visual analog scale (VAS), as well as during the first need for analgesia after surgery [2, 4].

RESULTS AND DISCUSSION

After surgery, all patients were transferred to the intensive care unit in a satisfactory condition. The indices of hemodynamics, external respiration, gas exchange, and acid-base status were not fundamentally different in the groups. The administration of local anesthetic solutions was not accompanied by a significant decrease in blood pressure and heart rate. The advantage of IA use is the absence of the increase in blood pressure and heart rate during the traumatic moments of a surgery; therefore, there was no need for administering narcotic analgesics. In the postoperative period, no toxic effect of local anesthetics was observed, even in patients in whom *Lidocaine* solution was used for IA and, during surgical intervention over 4 hours, the daily dose was administered. Taking this into account as well as the need for a repeated administration of *Lidocaine* solution into the abdominal nerve plexuses that diverts the surgical team, we began using *Longocain* solution. No significant difference in analgesic effect between these local anesthetics was observed, but the *Longocain*'s advantage is a long-term effect which makes it irreplaceable in surgeries lasting for more than 2 hours.

Another advantage of the IA use in the anesthetic management of surgeries is the fact that surgeons can start the intervention without waiting for the stage of surgical anesthesia. This allows to bring the patient into the stage of surgical anesthesia more gradually, reduces the sharp pharmacological load on the liver, the cardiovascular system which is important in patients with MO, and also slightly reduces the surgery duration.

The analysis of the amount of administered narcotic analgesics for an adequate analgesia during surgeries (Table) demonstrated that in Group 2, the need in them was lower by 11.73 %. Given the fact that MO is always accompanied with fatty infiltration of the liver, which impairs the elimination of narcotic analgesic and, thereby, respiratory depression occurs in the early postoperative period with prolonged artificial lung ventilation, the IA use is an important method of preventing pulmonary and thromboembolic complications. The amount of administered muscle relaxants in the patients of Group 2 was less by 13.1%.

Consequently, the combined use of multicomponent balanced anesthesia and IA provides a sufficient blockade of nociceptive sensations, which reduces the need for narcotic analgesics and muscle relaxants.

Our institute has been practicing surgical treatment of MO using different methods of anesthetic management. The best results were obtained in case of general and epidural anesthesia combination, but an excessive fat deposition in the spinal area, in some cases, makes an epidural puncture technically impossible. In patients with MO, a low coagulation potential is often observed, which is related to the administration of nonsteroidal anti-inflammatory drugs, anticoagulants for concomitant pathology treatment and also makes it impossible to perform epidural anesthesia because of a high risk of an epidural hematoma. Therefore, we use the combination of general anesthesia with infiltration anesthesia by *Longocain* solution, which reduces the need for narcotic analgesics and muscle relaxants for an adequate anesthetic management of surgical interventions. The long-lasting analgesic effect of *Longocain* allows to reduce the amount of inhalation anesthetics in the inhaled anesthetic gas without waiting for the completion of the surgery and, in such a way, to speed up the awakening of patients from anesthesia. All patients in Group 2 were allowed to breath independently simultaneously with the completion of the surgery. In case of satisfactory hemodynamics, external respiration, gas exchange and acid-base status, the patients were extubated and transferred to the intensive care unit for further treatment.

Table

Amounts of drugs administered during surgery

Index	Group 1	Group 2
Number of patients	30	30
Surgery duration, min	265.0 ± 17.5	251.0 ± 12.7
Fentanyl, ml	14.5 ± 2.1	12.8 ± 1.8
Longocain, mg	–	148.0 ± 2.0
Esmerone	84.0 ± 7.0	73.0 ± 4.0

The postoperative pain intensity assessment using the VAS demonstrated that the first demand for analgesia arose in the patients of Group 2 averagely (285 ± 12) min after surgery, while in the patients of group 1, it arose after (124 ± 19) min. At that, the patients of Group 2 were still somnolent, which required a constant surveillance by a duty resuscitation team. In the early postoperative period, in the patients of Group 1, the pain at rest was assessed as an average of 52 mm using the VAS; in the patients of Group 2, it was assessed as 28 mm; on movements, it was assessed as 74 and 46 mm, respectively. The less pain response in the patients of group 2 allowed them to do physical exercises, respiratory gymnastics and not to divert the duty resuscitation team from treatment of seriously ill patients.

CONCLUSIONS

Infiltrative anesthesia use in case of general anesthesia provides reducing hemodynamic disorders for surgical stage management, as well as earlier beginning of the surgery.

Longocain solution application allows to reduce the amounts of narcotic analgesics and muscle relaxants for an adequate anesthetic management and thereby to reduce pharmacological loading on the liver.

Infiltrative anesthesia combined with general anesthesia decreases drowsiness, respiratory depression, pain intensity, especially when moving, which prevents respiratory and thromboembolic complications.

The absence of drowsiness and of a significant postoperative pain allows patients with morbid obesity to do respiratory gymnastics, special physical exercises, and makes it easier to take care of them.

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