

INHALATION ANESTHESIA AT CHILDREN: MODERN POSSIBILITIES.

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Abstract. One of the prior directions in inhalation anesthesia is low flow anesthesia (LFA 1,0 1/min), which has several advantages over the traditional anesthesia with high gas- flow. The work is based on the following, obtained in implementation of the combined general anesthesia with low flow on the basis of enflurana on 147 children aged from 3 to 18 years (average age 7.5+2.2 years). The studied reading of hemodynamic in anesthesia with sevoflurana was characterized with minor changes in the stages of the research: HRR in period of induction increased to 8,2%, in comparison with the amount before the surgery

Key words. Hemodynamic, blood plasma, intubation, fentanyl, sevoflurane

Introduction. The development of pharmacological aspects of inhalation anesthesia, appearance of the new vaporescent anesthetics (isophluran, enphluran, sevophluran) in the pharmacological market, and also the invention of the modern narcosical-breathing equipment with intraoperational monitoring pushed the development of new methods of the inhalation anesthesia in our anesthesiology [1]. The main advantages of the new anesthetics include: fast absorption of the breathing surface of the lungs, significant speed of the distribution in blood plasma and cerebral tissue at small capacities of inhalation and outflow in nearly unchanged condition [2].

Implementation of the total intravenous anesthesia with the installation of catheter or field block anesthesia - additional psychological trauma for the child, therefore inhalation anesthesia in its simple view of implementation, physiologies and manageability are more preferred methods in pediatrics [3].

For more than 20 years, the different aspects of the low flow inhalation anesthesia are discussed in the modern anesthesiology. Interest in closed reversible system increased along with the development of the new technologies. Physiology, efficiency and ecological compatibility of the low flow^r method of anesthesia are considered main factors, attracting the interest of clinicians towards this issue [4]. Anesthesia with the lowered gas-flow (less than 3 1/min) has particular advantages: increase of temperature and moisture of the diving gas, reducing of the negative effects of the anesthetics on medical staff of the operation, expenditure of the medical gas and earlier awakening of the patient [5].

The chance of the introduction of this low cost, high effective technology, as low flow inhalational anesthesia into the practice of the public health of Uzbekistan was given by purchasing, and providing widely to the Tashkent Pediatric Medical Institute (TasPMI) and its branches with the new narcosis-breathing equipments with the block of gas analysis and flow meter. The aim of our research revealed the rate efficiency and safety of the inhalation anesthesia with low flow of gas on the basis of sevoflurans on children.

Materials and methods. The work is based on the following, obtained in implementation of the combined general anesthesia with low flow on the basis of enflurana on 147 children aged from 3 to 18 years (average age 7.5+2.2 years), patients after surgery concerning abdominal, urological and neurosurgical pathologies. Combined general anesthesia was conducted with low flow gas. Induction in narcosis was done with inhalational way (O₂ 100% + sevofluran). The flow of the oxygen-air mixture in anesthesia with enfluran was 11/min. The duration of the operation on average was 90+15 min. Induction was accomplished with inhalation of enflurana with 0.1, then increasing the concentration till 1.5 o6%, which correspond 0.15-0.2 minimum alveolar concentration (MAC). Before intubation, fentanil (2,5 mkg/kg) was injected. Intubation

of trachea was carried out after miorelaxation with ditilin (2 mg/kg) with further injection of arkuron in age-specific dose. Maintenance of anesthesia was achieved by inhalant O₂+ sevofluran 1,5-2,0 o6%. Intra operational anesthesia, fentanil in age-specific dose. 5 minutes to the end of the operation, all the inhalational anesthetics were stopped and the child was transferred into hand AVL on semi-open contour with high gas-flow (100% oxygen), blew out gland tube and carried out extubation of trachea.

For the assessment of the efficiency and safety of the anesthesia, standard intraoperational monitoring -HRR, A/Psyst and A/Pdiast. Cardiocap (Datex), engorgement with oxygen (pulsometer), PinCO₂, PetCO₂, FiO₂, FexO₂, (capnography). In order to identify adequacy of ventilation, blood gas was evaluated: PaCO₂, PaO₂, pH in the following stages: before the start of anesthesia, induction, maintenance of anesthesia, exit from anesthesia. In order to test toxic effect sevoflurana, blood bilirubin, creatinine, A1AT, urea, albumin before operation and in 24 hours after the end of the anesthesia, were all evaluated.

Results. Induction in narcosis sevoflurana was fast (45-50s), and well taken by patients. In the condition of the 'low-flow anesthesia reading of interchange of gases, hemodynamics, and respiratory function of all the children was maintained stable in all stages of anesthesia and operation. During the induction, spontaneous motion was not observed. There were a little frequency of the unfavorable reactions, on 4 children (8.5%), irritation in respiratory tract along with minor cough was observed. The studied reading of hemodynamic in anesthesia with enflurana was characterized with minor changes in the stages of the research: HRR in period of induction increased to 8,2%, in comparison with the amount before the surgery, During the maintenance of anesthesia, HRR reduced in 3% compared with the previous stage, which shows the hemodynamic stability. On the stage of exit from the anesthesia HRR stayed high compared with the first stage, a little reducing compared with the second stage.

Table 1. Reading of the hemodynamic and outer respiration at low flow anesthesia with sevoflurana

Reading	Before operation	Induction	Maintenance of anesthesia	Exit from anesthesia
HRR, beat/min	82.5+7.7	88.4+7.3	86.0+5.6	85.2+6.6
AP, syst	92.3+6.8	82+5.4	86.9+5.8	88.2+7.3
AP, diast	62.4+2.5	56.5+3.8	58.1+3.7	60.1+3.3
PaO ₂ ,mm Hg	97.4+4.4	83.1+1.7	85.8+5.2	93.3+4.7
PaCO ₂ .mm Hg	35.8+2.2	40.1+3.3	39.8+1.7	36.6+2.5
pH	7.36+0.01	7.36+0.01	7.37+0.02	7.34+0.01

In the induction stage, little lowering of AP occurred, as systolic by 11,2%, and diastolic by 9,5%. In the next stages, APsyst and APdiast changed around 5-10%. These information also characterized sevofluran as hemodynamic stable anesthetic. Reading of the PinCO₂, and FexO₂ stayed almost the same in all stages of the study. SpO₂ changed about 97-99%. In order to assess the level of oxygenation, the evaluation of the blood gas of the patient was done, which showed the following: level PaO₂ in all stages of the research stayed the acceptable amount(more than 80 mm Hg), pH changed from 7, 36+0,01 to 7, 34+0,01, which confirmed adequacy of oxygenation during the whole anesthesia and operation.

Discussion. Taking into account that all the fluorine-containing inhalation of the anesthetics have feature of elimination in parenchymatous organs, we conducted several biochemical analysis in order to check the functional conditions of kidney and liver. The obtained results of the research of the biochemical reading of blood on patients showed that there was no disfunction of the liver and kidney. So, concentration of the creatinine and urea didn't differ from the initial amount in 24 hours. Ferment of necrosis of the liver cells- A1AT- reduced in 24 hours after the operation. The rate of the bilirubin and albumin of the blood had small

change, stayed in normal amounts, that was in statistical uncertain, and pointed that the function of the protein-production of the liver maintained.

Stable readings of interchange of gas and hemodynamic (in comparison with the initial values), the absence of the negative influence on the studying readings of the homeostasis tells about the safety of the methods of the low flow inhalational anesthesia on the basis of sevoflurana on children.

Inhalational anesthesia with low flow gas and application of the closed contour is the most perspective directions in anesthesiology with those ideologies and technologies, based on the modern achievements of the science and techniques. Low flow method of the inhalational anesthesia on the basis of the sevoflurana provide smooth flow of the induction, stability of the main readings of hemodynamics and interchange of the gas on children.

Referents.

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