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Investigation Of The Frequency Of Arousal Syndrome Upon Awakening In Children After General Anesthesia In The Department Of Pediatric Surgery

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Abstract

One of the directions of preoperative preparation in children is psychological support as part of the prevention of emotional experiences. Any surgical intervention causes anxiety and fear in both adults and children. At the same time, 50-70% of children undergoing surgical manipulation experience fear and anxiety. The negative consequences of increased preoperative anxiety include an increased risk of developing arousal syndrome after awakening or agitation syndrome. to determine the frequency of development of arousal syndrome in children of different ages after general anesthesia in the department of pediatric surgery. To determine the frequency of development of arousal syndrome after awakening in children, 126 medical records were analyzed, including an anesthesiological manual. In the experimental group, arousal syndrome after awakening was found in 2 patients. In children of the control group, the syndrome of arousal after awakening was not recorded. Patients aged 2-6 years are more at risk of developing arousal syndrome after waking up than older children.

Keywords: arousal syndrome, agitation syndrome, sevoflurane, anesthesia

1. Introduction

One of the directions of preoperative preparation in children is psychological support as part of the prevention of emotional experiences. Any surgical intervention causes anxiety and fear in both adults and children. At the same time, 50-70% of children undergoing surgical manipulation experience fear and anxiety. The negative consequences of increased preoperative anxiety include an increased risk of developing arousal syndrome after awakening or agitation syndrome. It is manifested by motor hyperactivity, disorientation in space, emotional lability (feelings of anxiety, fear, incessant crying with the transition to irritability and aggressive behavior), sensory perception disorder. Such psychomotor agitation can lead to physical damage in the area of surgical intervention.

The main focus of the anesthesiological manual for children in surgical practice is the optimal level of anesthesia safety, as well as the prevention of postoperative pain syndrome. One of the complications in children upon awakening after surgery is post–acute motor arousal - pronounced emotional and uncontrollable anxiety, confusion, feelings of anxiety and fear, inappropriate behavior, inability to cooperate, irritability, inconsolable crying, aggressive and negative attitude towards parents and medical staff. These signs characterize the so-called agitation syndrome. This condition, as a rule, can last 15-30 minutes after waking up and passes either spontaneously or after the use of benzodiazepine-type drugs. Agitation syndrome often manifests itself after waking up in children aged 2-6 years. There are hereditary, prenatal and natal factors that contribute to the development of this phenomenon. During inhalation anesthesia with sevoflurane, which is the most optimal for children, the frequency of agitation in children varies widely from 6 to 80% of cases and a number of authors associate this with rapid awakening after anesthesia in an unfamiliar environment. The use of the method of slowly reducing the inhaled concentration of sevoflurane to prolong awakening does not always help to reduce the frequency of agitation. The agitation that occurs after general anesthesia with sevoflurane may be associated with an insufficient level of analgesia. At the same time, there are studies showing that postoperative pain may not be the only cause of agitation. During sevoflurane anesthesia during magnetic resonance imaging (MRI), cases of agitation occur, although there is no pain factor in this study.

It is believed that agitation develops in preschool children due to their psychological immaturity. It should also be noted the difficulties of differential diagnosis of this syndrome from the usual pain or anxiety reaction of children of this age. In addition to sevoflurane, the intravenous anesthetic propofol is also used in pediatric anesthesiology – a cerebral vasoconstrictor with the ability to reduce intracranial pressure by 10-12%. Among the prognostic and predisposing factors for agitation are anxiety and hyperactive behavior of a child during an anesthesiological examination on the eve

of surgery, a previously suffered traumatic brain injury, the presence of epilepsy, and infectious diseases. Risk factors for the occurrence of agitation: the age of the child from 1 to 7 years, rapid awakening after anesthesia, sevoflurane or isoflurane used for anesthesia, performing ophthalmological and otolaryngological interventions. There is isolated evidence that agitation may be due to the immaturity of the development of the central nervous system (CNS) at an early age, which manifests itself in the form of disorders of the autonomic autonomic nervous system (ANS), psychological immaturity and imperfection of adaptation to the environment.

Sevoflurane is the "gold standard" in pediatric anesthesiology. This is due to the fact that it does not irritate the upper respiratory tract, has a cardioprotective effect, is easily controlled due to the dose-dependent effect, is low toxic, provides rapid induction and awakening after anesthesia. Along with this, sevoflurane has side effects. The greatest interest from the point of view of assessing the negative effect of sevoflurane on children is caused by postnarctic arousal syndrome (PTSD), characterized by severe anxiety, motor arousal, pronounced negativism, lack of contact. To date, there is no definitive opinion on the etiology and pathogenesis of CNV. Among other causes of its occurrence, there is a rapid restoration of consciousness against the background of insufficient analgesia, restless behavior of the child before anesthesia, his age, the nature of surgery, lack of premedication with benzodiazepines, pathology of the central nervous system (CNS). Currently, there is a significant amount of work devoted to the prevention of PCOS during sevoflurane anesthesia. For this purpose, it is recommended to use opioid analgesics, ketamine, nitrous oxide, clonidine, benzodiazepines, propofol, dexmedetomidine. However, for a number of reasons, many of these drugs (drugs) cannot be used in pediatric oncology during short-term mask anesthesia with sevoflurane with preserved spontaneous breathing. Currently, propofol is used for the prevention and relief of PCOS. Being a cerebral vasoconstrictor, propofol reduces cerebral blood flow and helps to reduce intracranial pressure, however, it lowers blood pressure and briefly inhibits breathing. It should also be noted that the premedication of most of the above drugs involves an exclusively parenteral route of administration. This in itself causes negative reactions and does not lead to the development of a proper sedative effect in babies. It should also be noted that a selective α2-adrenergic receptor agonist, dexmedetomidine, can be used for the prevention of SPNV. In a number of foreign works, there are indications of the drug's ability to prevent arousal upon awakening after anesthesia with sevoflurane. It has a sympatholytic, sedative and analgesic effect, practically has no ability to inhibit breathing, has cardioprotective and neuroprotective properties, helps prevent delirium and tremor. Quite a lot of work concerns the effectiveness of the use of buccal and intranasal administration of dexmedetomidine for premedication and short sedation in children. In particular, the advantage of intranasal administration is the possibility of a central action of drugs, their high bioavailability, the absence of the effect of the first passage through the liver, convenience and ease of use, and the rapid development of a systemic effect. However, dexmedetomidine is currently not allowed for use in pediatric practice in our country. Thus, there is still an unresolved issue of both the choice of optimal means of preventing STDS and the method of their administration, which indicates the need for further development of the problem under consideration.

2. Objectives

To determine the frequency of development of arousal syndrome in children of different ages after general anesthesia in the department of pediatric surgery.

3. **Methods**

The study was conducted between September 2023 and March 2024. To determine the frequency of development of arousal syndrome after awakening in children, 126 case histories of the Department of pediatric surgery, including an anesthesiological manual, were analyzed. The patients were divided into 2 groups. The experimental group consisted of 67 patients aged 2-6 years, with an average age of 3.4 ± 0.8 years. Of this group, 5 patients were registered with the neurologist. The control group included 59 children aged 14-18 years, with an average age of 15.1 ± 1.2 years. The method of anesthesia is inhalation anesthesia with sevoflurane. Benzodiazepine-type drugs were not used. The statistical analysis of the obtained data was carried out using the MS Office Excel program, with the calculation of extensive indicators. The value of $P<0.05$ was taken as the level of statistical significance of the differences.

4. **Results**

The structure of surgical interventions included operations for acute appendicitis, Meckel's diverticula, acute adhesive intestinal obstruction, pinched inguinal hernias, ovarian cysts. In the experimental group, arousal syndrome after awakening was found in 2 (4.3 ±1.1%) patients. Both patients were registered with a neurologist for more than six months. They had a restless condition before the operation. In children of the control group, the syndrome of arousal after awakening was not recorded. Patients aged 2-6 years are more at risk of developing arousal syndrome after waking up than older children.

4. Discussion

Based on the data obtained, it can be concluded that the immaturity of the psycho-emotional sphere and the imperfection of emotional volitional qualities, the presence of hyperexcitability, increased reactivity of the sympathetic department of the ANS are prognostically unfavorable conditions for the development of agitation syndrome in the postoperative period in children 2-6 years old in the postoperative period.
The use of comprehensive measures for the prediction and prevention of agitation syndrome will improve the quality of anesthesiological care, ensure early full-fledged and comfortable rehabilitation of children during surgical interventions.

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