

PREVENTIVE ANALGESIA IN PEDIATRIC NEUROSURGERY

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ABSTRACT: Postoperative pain remains a pressing issue in modern surgery. Safe and effective pain treatment in children requires, first of all, the availability of informative and reliable methods for its assessment. One of the main features of pain intensity and analgesia effectiveness assessment in pediatrics is the impossibility of active cooperation of pediatric patients during research. In pediatric practice, it is often necessary to work with newborns and young children who have not yet learned to speak, and in neurosurgery, clinicians encounter children with delayed psychomotor development, focal neurological symptoms (for example, in the form of damage to sensory and motor conductors, aphasia), which complicates or even makes it impossible to contact the patient and objectively control analgesia (Oberlander T. F. , Gilbert C. A. , Chamber S. T. et al ., 1999). At the same time, it is in pediatric patients, due to the immaturity of the nervous system developing in the postnatal period, that uncontrolled pain leads to the development of inadequate stress responses with changes in protein metabolism, weakening of the immune response and the formation of pathological reactions to pain in the distant future (Wolf A., 2003).

Since the end of the 20th century, new systems for assessing pain in young children have appeared almost every year. However, there is still no single, generally accepted biological marker of pain. A reliable assessment of pain intensity and analgesia effectiveness is possible only with the use of a combination of behavioral scales, physiological and laboratory indicators (Oates JDL, Snowdon S. L. , Jayson D . W . H , 1994).

Objective physiological parameters, such as hemodynamics and neuroendocrine reactions, are of particular practical importance. At the same time, conducting a large number of laboratory and physiological studies in the perioperative period for each patient in everyday practice is extremely difficult. The lack of an ideal pain assessment system for pediatric patients that would allow the effectiveness of analgesia to be quickly determined at the patient's bedside makes it relevant to develop specific schemes and algorithms

postoperative analgesia for children based on knowledge of the general patterns of the postoperative period. Justification and implementation of safe methods for the treatment and prevention of occurrence

postoperative pain in neurosurgical patients through the use of multicomponent combined anesthesia will prevent secondary reactions to pain, which complicate the course of the postoperative period, slowing down wound healing and increasing the number of purulent-septic complications.

Objective of the study. To improve the treatment results of pediatric patients with neurosurgical pathology (hydrocephalus, brain tumors, pathological formations of the spinal cord and spine) by developing an effective method of balanced multicomponent analgesic therapy in the perioperative period.

Research objectives 1. Based on the results of the clinical studies, to develop a method of multimodal analgesic therapy for pediatric neurosurgical patients, which will ensure

adequate level of neurovegetative stabilization at the stage of surgery and

sufficient analgesia in the postoperative period, based on the inhibition of COX 1-3 and targeted pharmacological action on co-piate receptors, α_2 -adrenergic receptors, NMDA receptors.

2. To prove the effectiveness of the method of preemptive analgesia using

paracetamol and NSAIDs in the structure of TVVA based on opioid analgesic

fentanyl and the central α_2 -adrenergic agonist clonidine in children with hydrocephalus during cerebrospinal fluid shunting operations and surgical interventions to remove brain tumors, pathological formations of the spinal cord and spine.

3. To study the features of the reaction of some hemodynamic parameters (HR, systolic > diastolic blood pressure, mean), oxygen saturation of blood hemoglobin, plasma levels of stress hormones cortisol, prolactin, ACTH at the most traumatic stages of surgery and in the first postoperative days in children with neurosurgical pathology under the conditions of the developed method of preemptive analgesia and TVA based on the opioid analgesic fentanyl without a pain prevention component.

4. To conduct a comparative analysis of the assessment of the intensity of acute postoperative pain using physiological scales for young neurosurgical patients and visual analogue scales for school-age patients and adolescents operated on using the developed method of preemptive analgesia and TVVA based on the opioid analgesic fentanyl without a pain prevention component.

Scientific novelty of the study For the first time, a scheme for perioperative management of pediatric patients with neurosurgical pathology has been developed, which allows preventing the development and effectively relieving postoperative pain and thereby improving the results of treatment of children with hydrocephalus, brain tumors, pathological formations of the spinal cord and spine.

For the first time, it has been shown that inclusion of paracetamol and NSAIDs in the analgesic regimen effectively provides postoperative analgesia in pediatric neurosurgical patients only when administered before skin incision. For the first time, based on studies of plasma levels of stress hormones (prolactin, cortisol, ACTH) in response to surgical trauma in neurosurgical patients aged 2 weeks to 17 years with intracranial hypertension and normal intracranial pressure (according to neurosurgical diagnostic complex data), the effectiveness of antinociceptive protection using the preemptive analgesia method has been proven. For

the first time, based on an assessment of the intensity of acute postoperative pain in children with neurosurgical pathology, the feasibility of simultaneous use of physiological and behavioral scales in younger patients and visual analogue scales and pain self-assessment methods in school-age children and adolescents has been proven.

Practical significance. A method for perioperative management of pediatric neurosurgical patients has been developed, based on the principle of preemptive analgesia, which can be used to provide anesthesia to this category of patients. The method combines ease of implementation and a reliable analgesic effect.

Provisions submitted for defense.

1. Directed pharmacological action on c-opiate receptors,

a2- adrenoreceptors , NMDA receptors, inhibition of COX1-3 creates a reliable level of neurovegetative stabilization at the stage of neurosurgical operation and effective prolonged analgesia in the postoperative period in pediatric patients with neurosurgical pathology.

2. Plasma levels of “stress” hormones in the first postoperative day are significantly lower both in neurosurgical pediatric patients with initial intracranial hypertension and normal intracranial pressure (according to the neurosurgical diagnostic complex) under the conditions of the developed method of preemptive analgesia with NSAIDs and paracetamol than in the absence of a pain prevention component in the structure of TVVA based on opioid

analgesic fentanyl .

3. Reliable assessment of the intensity of postoperative pain in pediatric patients with neurosurgical pathology is possible only with the combined use of monitoring physiological parameters, behavioral scales and self-assessment methods.

Personal contribution of the author to the conducted research. The author formulated the aim and objectives of the research, provided anesthetic support for operations in 68 pediatric neurosurgical patients, collected, statistically processed and analyzed the obtained results.

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