Features of pain assessment scales use in pediatrics

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Resume. The International Association for the Study of Pain, IASP, has long proven that pain and its effects on the child can lead to pathological reactions that lead to behavioral changes in the form of functional and vegetative disorders, emotional responses such as loss of skills, sleep disturbance, or child's irritability, enuresis and others.

There are currently a number of pain assessment scales for children of all ages that include many different parameters (cardiovascular and respiratory systems, changes in behavior, autonomic reactions in the form of changes in the function of the eyes, skin color, etc.) using a quantitative estimate to evaluate those signs.

In the practice of a pediatrician and a family doctor, it is important to choose from a range of pain scales that are simple and accessible to all healthcare providers and other caregivers.

We compared scales that are used most often and are recommended by the medical community. As well as investigating their use in practice, FLACC conducted a study of children with organic lesions of the central nervous system that had episodes of acute pain. Because this scale, in combination with the definition of autonomous regulation parameters, allows you to objectively assess the degree of pain experienced by the patient.

Introduction. International Association for the Study of Pain, IASP defines pain as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage"[1]. Additional note concerns the pain experienced by children: "The inability to verbal communication

does not deny the possibility that the individual feels pain and require analgesic treatment[1]".

It is known that the pain and its impact on the child can lead to pathological reactions that lead to behavior changes in the appearance of functional and vegetative disorders, emotional responses such as loss of earlier obtained skills, sleep disturbance or irritability of the child, enuresis and others.

It has been known for a long period of time that the inability to localize pain in children of early age in the clinic may have a system response in the form of compensatory systems disorders that are rapidly depleted. In the clinic on the first place are the cardiovascular and respiratory systems disorders, in the form of protective physiological adaptations to stress (increase heart rate, respiratory rate, pulse, muscle tonus, oxygen demand). These physiological responses to the pain were a base for a number of evaluation scales of pain in children. In addition, changings in the child's behavior that has the appearance of emotional reactions such as crying, grimacing on face, and others are also a basis for a number of scales.

The child expresses vegetative reactions in the form of the functional changes of the eyes, skin color, thermoregulation, accompanied by the activation of endocrine system (thyroid gland, adrenaline, insulin and pituitary hormones).

Also the reaction to the pain changes mobility of the child in the emergence of muscle hypertonia of hands, legs and torso. The number of pain scales also includes all these parameters using a quantitative scoring for assessment of certain characteristics.

Apgar scale, which is using worldwide after the birth of a child, also includes assessment of vegetative (heart rate, respiratory rate, skin color), movement (muscle tonus) and emotional (grimace or cry) components.

Thus, in the practice of pediatrician and family doctor it is important that the existing scales for pain assessment should be simple and accessible for all healthcare workers and people caring for the child.

Today, the modern literature data indicate that there is no uniform assessment tool pain depending on the age of the child and taking into account all types of pain.

At the moment there is a number of scales for pain assessment in children of different ages. Thus, there are scales for children under one year, such as the Neonatal Infant Pain Scale. It is behavioral pain assessment in the parameters: facial expression, crying, character of respiration, motor activity and tonus of the legs, state of irritation[2].

For children under 3 years there are FLACC scale and TVP Scale. Behavioral FLACC scale scores from 0 to 2 parameters such as facial expression, motor activity and tonus of the legs, common activity, crying, possibility to calm the child[3].

Scale FLACC and the scale of The Pain Indicator for Communicatively Impared Children can be used in children with intellectual disabilities[4].

In accordance with the WHO guidelines regarding to the pharmacological treatment of resistant pain in children with medical diseases, most common are tools for pain measurement based on the idea of counting and recommended by the Ped-IMMPACT and SPP-ATF:

1. Faces Pain Scale-Revised
2. Poker Chip Tool
3. Visual analogue scale (VAS)
4. Oucher photographic scale
5. Numeric rating scale [5]

Faces Pain Scale-Revised. This scale represents the schematic drawing without the ethnic features that range from a neutral expression to an expression of severe pain. The majority of children 3 years old are able to use this scale. Besides, according to the opinion of the children and their parents this scale is most convenient to use[6].

Poker Chip Tool. To assess the level of pain are used 4 red poker chips, the child is asked to choose chips to describe the pain. One piece - mild pain, when all

4-very severe pain. This scale can be used in children from 3 years. It is important that the chips are needed to be disinfected before use, and available are only 4 gradation of pain. This scale is easy to use, but, according to the assessment of children and their parents, less convenient than the FPS-R [4].

The visual analogue scale (VAS). Using a horizontal segment of length 10 cm, at one end marked "no pain" and the other "very severe pain". At equal intervals on the scale there are also marks "mild pain", "average pain" and "severe pain". The child is asked to draw a vertical line on the scale that indicate the level of pain. Requires a high level of abstraction, suitable for children older than 8 years [7].

Oucher photographic scale. This scale consists of 2 vertical scales: numeric marks from 0 to 100 and 6 photos of children's faces, which expresses a growing level of pain. There are 4 versions: African-American, Asian, European and Spanish children population. Can be used in children from 3 years, requires color printing [4].

Numeric rating scale. A horizontal segment of length 10 cm, one end of which means "no pain" and "very severe pain", on a segment are given marks from 0 to 10. Used in children older than 7-8 years. May be used verbally [8].

A special group of patients are children with persistent pain. Persistent pain is a long - term pain associated with somatic disease lasting more than three months. New WHO guidelines recommend a two-stage analgesia. At the first stage, in the condition of mild pain, mostly are used ibuprofen and paracetamol. At the second stage, in the case of moderate and severe pain morphine should be used. The use of opioids has a number of features. First, opioids should be introduced to the body in equal intervals of time, not "on demand". Second, method of administration of opioids to patients who can swallow, is an oral form. Morphine dose should increase gradually, and the maximum dose due to the individual needs of the child. In the case of the so-called "breakthrough pain" the selected doses of morphine are accompanied by additional small doses. The dependency syndrome in patients with pain is rare, and the risk of developing of this syndrome should not be a reason for the refusal of

adequate analgesia with morphine. At the moment it is impossible to give recommendations for use of additional drugs such as tricyclic antidepressants, anticonvulsants, ketamine, benzodiazepine and baclofen [9].

It is important to pay attention to the fact that all of the tools to assess the pain were developed for acute pain, which was associated with diagnostic medical procedures[10].

It is clear that the measurement of pain in conditions of persistent pain and in children of early age and children with cognitive impairment requires further study and continuous dynamic monitoring of a particular child [8].

Purpose. The aim is to present experience of pain assessment scales use in pediatrics.

Subjects and methods. We examined 10 patients of the Kharkov regional children clinical hospital, children aged from 3 to 8 years with organic lesions of the central nervous system, which had episodes of acute pain.

FLACC scale was used in patients with organic lesions of the central nervous system that are experiencing acute pain, in the complex with parameters of autonomic regulation including heart rate, respiratory rate and skin color (table 1).

Conflict of interests. There is no conflict of interests.

Results and discussion. It is obvious that scales like Faces Pain Scale-Revised and the Oucher photographic scale may not be used in this patient population because of the peculiarities of facial expressions and reaction to acute pain. The visual analogue scale, numeric rating scale and Poker chips tool require high levels of abstract thinking in the child that sometimes does not achieve the validity and reliability of the results. However, the parameters of the scale FLACC does not require verbal skills or the development of abstract thinking in the child. Parameters such as facial expression (options: calm face, the expression of concern and an expression of extreme suffering), motor activity and tonus of the legs, common activity, crying, possibility to calm the child, are relevant for patients of various age

groups and possible for use in patients with different severity of neurological lesion. But not only the indicators of the emotional sphere and motor component must be evaluated. A comprehensive assessment of the level of acute pain is impossible without taking into account the main indicators of the condition of the organism, such as heart rate, respiratory rate, and skin color, which can signal the stress, and, eventually, exhaustion of the homeostasis and the vegetative component. These parameters for best accuracy should be measured quite often as the child's condition is edited and assessed individually.

According to the results of the study revealed the following data: 80% of patients had 8-10 points(severe pain) on a scale FLACC. However, despite the severity of the organic lesion of the central nervous system and severity of general condition, pain assessment may not be accurate. We propose to focus also on the parameters of heart rate and respiratory rate in the absence of somatic pathology of the cardiovascular and respiratory systems in this group of patients, since our study showed high variability of these indicators (growth more than 30%).

Conclusions. It is necessary to provide correction of pain in patients with somatic diseases that have a high rating on a FLACC scale and variability of autonomic indices.

Table 1. FLACC scale

Criteria	Score
Face	
No particular expression or smile	0
Occasional grimace or frown, withdrawn, uninterested	1
Frequent to constant quivering chin, clenched jaw	2
Legs	
Normal position or relaxed	0
Uneasy, restless, tense	1
Kicking, or legs drawn up	2
Activity	
Lying quietly, normal position, moves easily	0
Squirming, shifting, back and forth, tense	1
Arched, rigid	2
Cry	
No cry (awake or asleep)	0
Moans or whimpers; occasional complaint	1
Crying steadily, screams or sobs, frequent complaints	2
Consolability	
Content, relaxed	0
Reassured by occasional touching, hugging or being talked to, distractible	1
Difficult to console or comfort	2

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