

PEDIATRICS

Gonchar M. O., Urivaeva M. K., Kuznetsova D.O., Tkachuk L.M.

APPLICATION OF PAIN ASSESSMENT SCALES IN PEDIATRICS (pilote study)

Kharkiv National Medical University, Ukraine

Abstract: 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 resulting in behavioral changes in the form of functional and vegetative disorders, emotional responses such as loss of skills, sleep disorders, 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 pediatric and family practice, 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 to provide non-biased assessment of the degree of pain experienced by the patient.

KeyWords: Pain, pain assessment, pain relief, pain scales, palliative medicine, pediatrics



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 resulting in behavioral changes in the form of functional and vegetative disorders, emotional responses such as loss of earlier obtained skills, sleep disorders or irritability of the child, enuresis and others.

It has long been known that the inability to localize pain in young children in hospital may have a systemic response such as compensatory systems disorders that are rapidly depleted. In-patients are most commonly found to have cardiovascular and respiratory disorders, in the form of protective physiological adaptations to stress (increased cardiac and respiratory rate, pulse, muscular tone, oxygen demand). These physiological responses to pain as well as changings in the child's behavior with the appearance of emotional reactions such as crying, grimacing on face, and others were used as a base for a number of evaluation scales of pain in children.

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

Apgar scale used worldwide after the birth of a child includes assessment of vegetative (cardiac and respiratory rate, skin color), movement (muscular tone) and emotional (grimace or cry) components.

Thus, in pediatric and family practice it is important to use simple scales for pain assessment, accessible for all healthcare providers and child-caregivers.

Corresponding Author:

Maryna Uryvaeva, MD, PhD, Associate Professor of Department of Pediatrics 1 and Neonatology, Kharkiv National Medical University, Ukraine. E-mail: marina310366@gmail.com

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 involving the following parameters: facial expression, crying, character of respiration, motor activity and tone 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 such parameters as facial expression, motor activity and tone of the legs, common activity, crying, possibility to calm the child [3].

FLACC scale and The Pain Indicator for Communicatively Impaired Children can be used in children with mental disabilities [4].

In accordance with the WHO guidelines regarding 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 [4]:

- Faces Pain Scale-Revised
- Poker Chip Tool
- Visual analogue scale (VAS)
- Oucher photographic scale
- Numeric rating scale

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 three-year-old children are able to use this scale. Besides, according to the opinion of children and their parents this scale is the most convenient [5].

Poker Chip Tool. Four red poker chips are used to assess the level of pain, the child is asked to choose chips to describe the pain. One piece corresponds to mild pain, while all four mean very severe pain. This scale can be used in children over the age of three years. It is important to disinfect the chips before use, and there are only four gradations of pain. This scale is easy to use but, according to the assessment of children and their parents, less convenient than the FPS-R [6].

The visual analogue scale (VAS). Using a horizontal segment with the length of 10 cm, marked “no pain” at one end and “very severe pain” at the other. There are also “mild pain”, “average pain” and “severe pain” marks at equal intervals on the scale. The child is asked to draw a vertical line on the scale indicating the level of pain. This scale requires a high level of abstraction, suitable for children over the age of eight years [4].

Oucher photographic scale. This scale consists of two vertical scales: numeric marks from 0 to 100 and six photos of children's faces, expressing a growing level of pain. There are four versions: African-American, Asian, European and Spanish children populations. It can be used in children over the age of three years and it requires color printing [4].

Numeric rating scale. A horizontal segment with the length of 10 cm, one end means “no pain” and “very severe pain”, with marks from 0 to 10. It is used in children over the age of 7-8 years. Besides, it may be used verbally [4].

A special group of patients are children with persistent pain. Persistent pain is a long-term pain associated with somatic diseases lasting more than three months. New WHO guidelines recommend two-stage analgesia. At the first stage patients with mild pain are mostly administered ibuprofen and paracetamol. At the second stage moderate and severe pain is managed by morphine. The use of opioids has a number of features. First, opioids should be administered in equal intervals of time, not “on demand”. Second, opioids are administered orally to patients who can swallow. Morphine dose should increase gradually, and the maximum dose should correspond to individual needs of the child. In case of the so-called “breakthrough pain” the selected doses of morphine are accompanied by additional small doses [7].

The dependency syndrome in patients with pain is rare, and the risk of its development should not be a reason for the refusal from adequate analgesia with morphine. It is currently impossible to give recommendations for use of additional drugs such as tricyclic antidepressants, anticonvulsants, ketamine, benzodiazepine and baclofen [6].

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 [8].

It is clear that the measurement of pain in conditions of persistent pain in young children and children with cognitive impairment requires further study and continuous dynamic monitoring of a particular child [10].

2 PURPOSES, SUBJECTS and METHODS:

2.1 Purpose was to present experience of using pain assessment scales in pediatrics.

2.2 Subjects & Methods

The study involved 10 patients with episodes of acute pain aged from 3 to 8 years with organic lesions of the central nervous system, treated in Kharkiv Regional Children Clinical Hospital.

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

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

Conflict of interests

There is no conflict of interests.

3 RESULTS AND DISCUSSION

It is obvious that such scales as 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, FLACC scale parameters do not require verbal skills or the development of abstract thinking in the child. Such parameters as facial expression (options: calm face, the expression of concern or extreme suffering), motor activity and tone 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 it is necessary to evaluate not only the indices of the emotional sphere and motor component. A comprehensive assessment of the level of acute pain is impossible without taking into account vital signs, such as cardiac and respiratory rate and skin color, which can signal the stress, and, eventually, exhaustion of homeostasis and vegetative component. These parameters should be measured quite often for adjustment to the child's condition.

The study showed that FLACC score in 80% of patients was 8-10 points (severe pain). 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 cardiac 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 indices (growth more than 30%).

CONCLUSIONS

FLACC is a valid scale for the assessment of pain in pediatric patients with somatic diseases. High FLACC score and variability of autonomic indices are effective for the pain control.

REFERENCES

1. Merskey H., Bogduk N. (1994). Classification of Chronic Pain. Second Edition. IASP Task Force on Taxonomy, IASP Press, Seattle, 209-214.

2. Witt N., Coynor S., Edwards Ch., Bradshaw H. (2016). A Guide to Pain Assessment and Management in the Neonate. *Current Emergency and Hospital Medicine Report*, 4, 1-10. doi: 10.1007/s40138-016-0089-y.
3. Merkel, S. I., Voepel-Lewis, T., Shayevitz, J. R., & Malviya, S. (1997). The FLACC: A behavioral scale for scoring postoperative pain in young children. *Pediatric Nursing*, 23(3), 293-297.
4. Andriyshyn L., Bracun N. (2016) Nastanovi VOOZ shodo farmakologichnogo likuvannja stijkogo bolju v ditej iz medichnimi zahvorjuvannjami [WHO guidelines for pharmacological treatment of persistent pain in children with medical conditions]. *Vidavnichiy dim "Kalita", Kiiv*, pp 24-78.
5. Merskey H., Bogduk N. (1994). *Faces Pain Scale-Revised*. IASP Task Force on Taxonomy, IASP Press, Seattle, 13-27.
6. Guziy O. (2016). Viktoristannja narkotichnih, psihotropnih rechovin ta ih prekursoriv v praktici simejnoi medicine [Using of narcotic, psychotropic substances and their precursors in the practice of family medicine]. *Ukrai'ns'kyj medychnyj chasopys №4(108)*, 289-319.
7. Chou R., Fanciullo G.J., Fine P.G. (2009). Guidyline for ehe use of chronic opioid therapy in noncancer pain. *The American Pain Society in Conjunction with The American Academy of Pain Medicine. Pain*, Feb;10(2):113-30. doi: 10.1016/j.jpain.2008.10.008.
8. Bellieni C.V. (2012). Pain assessment in human fetus and infants. *AAPS J.*14. 456, 61.
9. Voepel-Lewis T, Zanutti J, Dammeyer JA, Merkel S. (2010). Reliability and validity of the face, legs, activity, cry, consolability behavioral tool in assessing acute pain in critically ill patients. *Am. J. Crit. Care.*19 (1), 55-61.
10. Roenn J., Michael E., Judith A. (Eds.). (2008). *Current Diagnosis & Treatment of Pain*. McGraw-Hill Companies.

Received: 08-Jul. - 2017

Accepted: 12-Dec. - 2017

