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Reasons to Avoid Pain Scales in Newborns, and Reasons to Use Them

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Abstract

Aim of this paper is a critical examination of the use of neonatal pain assessment tools. It emerged that neonatal pain scales for acute pain are complex to use, give a score when the maneuver is over, and they are not validated for levels of pain higher than those due to a heel-prick. Nonetheless, they are useful for research, and those for prolonged pain, in particular for post-surgery or intubated babies, can help to modulate the use of analgesics. In conclusion, pain scales have several weak points that make their use flawed for everyday practice; however they can still be useful for research purposes, though new tools are now available, such as EEG pain assessment or the analysis of autonomous nervous system reaction to stimuli. However, caregivers should be easily aware if they are provoking pain, and this, rather than through scales, can be attained using a pain-detection strategy illustrated in the text.

Keywords

Pain, Newborn, Pain scale

More than 30 neonatal pain scales exist [1], but they are scarcely used in clinical settings [2,3]. Many of them are multifactorial, i.e. they simultaneously take in account the fluctuations in oxygen saturation, blood pressure and facial expression but they also score gestational age, behavior states and so on [4-16]. They are used for babies, preverbal patients who cannot assess the level of their pain on a visual scale, as it happens for competent adults. These scales were obtained assembling several items, in order to get a final score from their sum. Here are some of them: PIPP [17] is a 6-item scale that uses the variations in Heart rate, O_2 saturation and face grimace. NIPS [18] is a 6-item scale, that uses facial expression, cry, breathing patterns, arms and legs movements, state of arousal. DAN [19] items include facial expression, limb movement and crying. ABC scale [20] is based on the scores given by three features of crying. CRIES is based on: amount of crying, amount of O_2 required increased vital signs, expression and sleep [21]. EDIN scale includes facial activity, body movements, quality of sleep, and quality of contact with nurses, consolability [22].

These scales have usually been validated measuring their specificity, sensitivity, concordance with previously validated scales, and concordance among the scorers. Nonetheless, they are still scarcely used [1,2], and in many trials non validated measures are used, for instance the duration of crying or the visual analogue scale.

The main reasons why pain scales for newborns have scarce interest for clinical practice are the following:

1. Lack of assessment of levels of pain exceeding those of a heel prick: All scales have been validated during heel-pricks with no analgesia. This means that the maximum level of pain is referred to the pain due to a heel-prick, though other maneuvers can provoke a higher pain. Thus, these scales do not register the highest level of pain in an infant. However, is it usually not necessary to assess the different levels of pain, but it is enough to detect the presence or absence of pain [23,24] as we will discuss later.

2. "Too late": All acute pain scales measure pain during a heel-prick, but what can we do when, after the start of the procedure we see that the baby is experiencing pain? In reality, we cannot do much, because the common analgesic procedures (oral sucrose, senso-

rial saturation, breastfeeding, skin-to-skin treatment) should start before the beginning of a painful procedure to be effective. Thus, 30 seconds after the start of the procedure, when we assess the level of pain [18,19], it is too late to intervene.

3. Complexity: Many scales use several indicators to give a final score. In many cases, most of these indicators should be carefully measured with a chronometer, or calculated performing the rate of increase/decrease from the baseline. For a single nurse who is performing a painful procedure, it is almost impossible to do these calculations or measures during the maneuver she is performing to the baby. This has been outlined in several papers [25,26] where the differences of assessment done by different scorers is disclosed, in particular when a scorer is performing the painful procedure and another has the possibility of scoring the procedure watching in calm the video clip of the event.

4. Value of the tools: Current scales have several weak points in their validation or in their reproducibility. For instance EDIN reports among its items 'quality of contact with the nurse' and 'quality of sleep' that are not easy to assess, and this was reflected by the weighted k coefficients in the scale validation [22]. Some acute pain scales have been developed only on healthy babies and not on brain damaged infants. The most widely used acute pain scale [17] gives additional scores if newborns are sleeping, because babies are supposed to feel pain during sleep but they are not able to express it: it also gives a supplementary score according to babies' immaturity as another scale [27]; however, most scales ignore the possibility of these additional scores. A further question is raised recently: do these scales register actual pain or just a reflex to an external stimulus? Recent studies performed via EEG seem to confirm this hypothesis [28].

5. Intermittent assessment: Scales cannot give a continuous assessment of pain, while it, especially in disease states, may be constantly present, with ups and downs; the scales that assess long-term pain resume what happened in the previous 3-4 hours, but they do not give a moment-by-moment assessment. Maybe the use of those tools that give the state of the autonomous nervous system evaluating plant sweating or heart rate variability [29,30] can be more informative in this sense.

6. Agitation and sedation: in the extremely preterm babies any handling is perceived as painful [31] but the frequent habit of touching them for several reasons makes them so agitated that it is difficult to obtain a rest state, needed to start the pain assessment process. On the converse, babies can be so ill or so sedated (with sedatives but not with analgesics) that they can hardly disclose the overall pain they are feeling.

Nonetheless, there are also three reasons why we should use pain assessment tools.

1. Modulating the analgesics: Many newborns need analgesic drugs, namely intubated babies, those after surgery, and those who have some long-term source of pain. Several analgesic drugs like opioids or acetaminophen are available for these babies, but we need an objective criterion to decide whether or not using them, or how modulating their dose. We have few scales to this aim, like the EDIN or CRIES scale [21,22]. These scales give an overall pain score of the last several hours and give a reliable indication in order to decide the use of analgesics.

2. Research aims: In clinical trials aimed to assess the effectiveness of a new analgesic treatment, we give a mean pain score both to the control group and to the intervention group. In this case, pain scales are useful, because a thorough score is necessary. Pain scales are often complex and complicated, and this can be overcome by recording video clips of each intervention and giving later a score using the video that can be used to measure the requested parameters. Nonetheless, an objective pain assessment with the evaluation of the autonomous nervous system activity [28,29] or with an EEG [32], was recently proposed as more reliable than the common scales.

3. Detection: Pain evaluation is mandatory during any maneuver: it is possible to use a Pain-Detection Strategy (PDS) instead than a scale, when we just need to acknowledge if we have provoked pain, and in many cases this is enough, because giving a score can be redundant. To this aim, we can use single indicators of pain like the onset of crying or the sudden increase in heart rate. This has been criticized because crying or heart rate are sensible indicators, but they are not specific for pain [33]. To overcome this objection we should contextualize the event: are we potentially performing an actually painful maneuver? If the answer is yes and if the baby responds with heart rate increase or with crying, we have provoked pain. But what is an "actually painful maneuver?" It is an event with two main features: it is applied on an innervated region of the body, and it is appropriate for provoking pain. We should remind in using the PDS, that some parts of the body can become more sensible to pain for several reasons such as inflammation, itch, burns, scratches; and that some tools apparently unfit to provoke pain (e.g. a swab) if used improperly or on a itched region can hurt and provoke suffering.

Conclusion

Scoring pain with scales in neonates has shown its limits and flaws, and we should wonder if it is still appropriate to spend

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time and energies in doing it, while insufficient efforts and time are still devoted to pain-preventing strategies and to the correct use of analgesics [3]. Scales can be useful for research purposes, though new tools are now available, such as EEG pain assessment or the analysis of autonomous nervous system reaction to stimuli. However, caregivers should be easily aware if they are provoking pain, and this, rather than through scales, can be attained using the PDS illustrated in the text.

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