

Analgesia and Sedation in the Paediatric Intensive Care Unit: Evidence based or Extrapolation?

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ABSTRACT

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In the field of paediatric critical care, there is considerable uncertainty and variation in the area of analgesia and sedation in critically ill children. Consensus guidelines on sedation and analgesia in critically ill children are available since 2006, although clinical practice reveals variations both in pharmacological agents and regimens used. A patient at comfort, free of pain and able to communicate when required, constitutes the current, widely accepted clinical endpoint of analgosedation. Newer agents like remifentanyl, which is now widely used in paediatric practice, allowing for the application of newer algorithms of proven efficacy. The introduction of newer analgosedation algorithms definitely presupposes the extended use of pain and comfort assessment, using several, more or less validated tools. The difficulty with children is that with the progress of age and developmental stage, different scales are proposed with varied degrees of difficulty in application. Directing treatment to specific and individualized goals through analgosedation algorithms will assure that the patient's needs are met.

INTRODUCTION

Just like every treatment, analgesia, sedation and more recently analgosedation in ICU patients, should follow the simple rules of admi-

nistration. It should have its indications and contraindications, a specific method of delivery and a refined dosage regimen that would allow easy titration and individualization with the possibility of escalation and de-escalation when this is necessary.

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Although relevant consensus guidelines for adult patients date back in 2002, a huge amount of recently published literature is available to guide clinical practice. On the contrary, in the field of paediatric critical care, there is considerable uncertainty and variation in practice. The paucity of prospective randomized trials in the area of analgesia and sedation in critically ill children is one of the reasons. When attempting to create clinical practice guidelines in areas where the published evidence is weak, extrapolations from experience with adult patients seem inevitable. Consensus guidelines on sedation and analgesia in critically ill children are available since 2006, although clinical practice reveals deviations and variations both in pharmacological agents and regimens used.^{1,2}

On the other hand, recent evidence mostly from adult studies again, challenges common beliefs and poses new standards for a more targeted provision of analgesia and sedation along with completely new approaches on what is desired for a patient sustaining the burden of ICU interventions and treatments, either adult or child.

The importance of sleep pattern is now well documented, as its deprivation may have detrimental effects on a patient's outcome. It is now accepted that there is an important sleep fragmentation in sedated ICU patients with less than 6% of REM sleep during the 24hrs

of a day. Surprisingly, the addition of sedative agents may further aggravate this situation. Since arousals rather than awakenings, contribute most to total sleep fragmentation in these patients, sleep disruption during sedation may be undetected. It follows that the bedside assessment of sedation using various sedation scales may not correlate with objective scoring of sleep.³ The Same effect has been noticed in children, upsetting the concept that a "sleeping" patient of a Ramsay score of 2-3 is necessarily "asleep".

Benzodiazepines are widely used both in adult and paediatric ICUs, although there is increasing evidence of their unpredicted way of action, concerning metabolism and clearance in the critically ill. The occurrence of delirium is now directly correlated to their use, while their widely-known amnesic effect on unpleasant ICU memories is also challenged.⁴ There is convincing evidence, at least from adults, that it is the delusions and not the memories from the ICU environment that predispose to an increased level of anxiety disorders during or after ICU stay.⁵ Whatever the reason for delirium occurrence, it is also a well documented situation in paediatric ICU patients and specific assessment tools and diagnostic instruments are available.⁶

Thus, new targets are being sought; even complete disuse of sedation is now supported.⁷ A patient at comfort, free of pain and

able to communicate when required, constitutes the current, widely accepted clinical endpoint of analgosedation. Although this approach is well supported in adults, it has to be proven in children. On the other hand, inadequate sedation in children, may have very unpleasant and even harmful results as is self-extubation.

Under the aforementioned considerations, analgosedation, that is the provision of analgesia as the main constituent, followed by sedation only when necessary, is now introduced to children as in adults. This is feasible with the introduction of newer agents like remifentanyl, which is now widely used in paediatric practice, allowing for the application of newer algorithms of proven efficacy. Remifentanyl has a unique elimination profile with inactive metabolites. It has been successfully used even in preterm newborns under mechanical ventilation with an excellent analgesic-sedative profile, as validated by NIPS (Neonatal Infant Pain Scale) and COMFORT scale, with a mean duration of therapy of 6 days and no side effects on the respiratory or cardiovascular system.⁸

In this issue of the *Greek E-Journal of Perioperative Medicine*, Volakli E and Sdouga M, present an extensive review of recently published literature along with practical recommendations for analgesia and sedation in the paediatric intensive care unit (PICU).⁹ The

authors are focusing on the published Guidelines, while challenging every area and adding recent evidence and practical approaches.

Volakli and Sdouga present quite extensively, useful algorithms in theory and practice, offering a tutorial for analgosedation for paediatric intensive care medicine specialists, in every PICU that who would be interested in implementing it. These algorithms incorporate the concept of daily interruption of sedation, alias a “drug holiday”, or in the case of children, allowance for “spontaneous awakening periods” where assessments are possible. This is in accordance to the well established knowledge that daily sedative interruption has an important impact on patient outcome and even in mortality.^{10,11}

The introduction of newer analgosedation algorithms definitely presupposes the extended use of pain and comfort assessment, using several, more or less validated tools. The difficulty with children is that with the progress of age and developmental stage, different scales are proposed with varied degrees of difficulty in application. This proves the well-known view that “children are not like little adults” and turns into vanity the aspect as suggested by L.Gattinoni in the ESICM Congress in 2002, that “the best way to titrate analgesia is to ask the patient himself”. Nevertheless, as stated by the authors of their review, although there is no ideal method that will evaluate a-

nalgesia and sedation, pain scales according to child age should be used routinely, whereas the COMFORT scale is considered to be the most suitable clinical sedation scale for use in critically ill children under mechanical ventilation. Directing treatment to specific and individualized goals through analgosedation algorithms will assure that the patient's needs are met.

The frustration of PICU practice extrapolation from the adults' one, is far from being resolved in the near future. This does not mean that there are insufficient data, which might impede paediatric intensivists from establishing specific strategies of expected benefit. The concept of protocol-driven strategies penetrates all the fields of standard ICU care whether this is addressed to critically ill adults or children. Although numerically fewer, paediatric ICU population needs our focused concern. Further investigation is absolutely needed and while awaiting for newer evidence, we should concentrate on the best application of the already available, always for the best interest of this vulnerable patient population.

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Keywords: analgesia, sedation, critically ill children, pediatric intensive care

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