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GOOD CLINICAL PRACTICES

Pain assessment in adult intensive care patients

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ABSTRACT

Introduction: Pain is an important public health problem worldwide and has a great clinical, social and economic impact, for these reasons its identification and treatment must have high priority from healthcare professionals. Critical care patients feel pain not only for their diseases but also for the long immobility and various invasive procedures they may undergo. The negative physiological and phycological consequences due to the ineffectual pain management can be important and remain for long.

Objective: To provide some recommendations on professional good practices in the assessment of pain in patients hospitalized in intensive care unit (ICU).

Material and Methods: After a carefully literature review, using an evidence based method, the best practice document was carried out by the Aniarti Scientific Committee and revised by some experts. Ten recommendations were created whose evidence level was evaluated by an instrument adapted from the one of American Association of Critical Care Nurses.

Results: (1) Critical care nurses acknowledge that attention to pain is one of the priorities the patient should be guaranteed. (2) Each intensive care patient must be ensured routine pain monitoring, with the most suitable instruments. (3) Pain should be monitored and recorded at least every four hours. (4) When it is possible, the nurse should do his or her best to help the patient communicate the presence and intensity of pain, using verbal or visual numerical scales (0-10), through alphanumerical charts or compensative or alternative communication tools. (5) In patients who are unable to independently report their pain, the nurse should use validated scales such as: the Italian version of the Critical Care Pain Observation Tool (CPOT), or the Behavioral Pain Scale (BPS), also in the version for non-intubated patients (BPS-NI). (6) The pain detection scales in people who are unable to communicate verbally should be used by suitably trained health care workers. (7) Where feasible, in people who are unable to independently report their pain, the nurse should avail of people who are close to the patient to assess the presence of pain indicators. (8) The vital signs alone are not enough to detect pain. (9) Generally, pain during diagnostic, therapeutic and care procedures on critical care patients who are unable to speak should always be suspected and prevented. This is worth especially for the patients treated with muscle relaxants, high sedation levels, or in clinical conditions characterized by such neuromuscular deficits, as to make even the CPOT and BPS or BPS-NI scales useless. (10) After the preventive or treatment analgesic therapy, the intensive care nurse reassesses the patient to evaluate the effectiveness of the treatment through the more suitable pain scales for the clinical conditions.

Conclusions: The document, approved by Aniarti Executive Committee, despite the evidence low level of recommendations should be known and applied by all the healthcare professionals who take care of intensive care patients.

Key words: Pain, assessment, intensive care unit, critical care, nurses.

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OBJECTIVE OF THE DOCUMENT

The aim of this document is to provide some recommendations on professional good practices in the assessment of pain in patients hospitalized in intensive care unit (ICU).

APPLICATION FIELDS

These recommendations can be useful for all nurses and healthcare professionals trained in the pain assessment in critical care departments.

DEFINITION AND IMPORTANCE OF THE PROBLEM

Pain "is an unpleasant, sensitive and emotional experience, associated with an effective or potential tissue damage or described as such"[1]. This definition recognizes the multidimensional nature (both physical and emotive) of the experience of pain. The International Association for the Study of Pain specifies that "the inability to communicate verbally does not exclude the possibility that an individual is experiencing pain and does not need suitable treatment to relieve the symptom"[2].

Being an important public health problem worldwide, pain has a clinical, social and economic impact and should be given top priority in the assessment of healthcare workers[3].

In their documents and position statements, many international government and professional health organizations acknowledge the possibility to prevent pain whenever predictable and the uselessness of reaching a diagnosis, and thus recommend its prevention, identification and treatment[4-6].

Intensive care patients feel pain caused not only by the pathologies and complications they undergo, but also by the prolonged immobility and numerous invasive procedures they are subjected to[7]. International guidelines[8] recommend the early treatment of all invasive procedures that may provoke pain in intensive care, and prevention of the onset of pain especially during "light sedation" when removing the chest and surgical drainage tubes and inserting arterial catheters[9]. Nursing procedures such as endotracheal aspiration[10] or mobilization and postural changes may be important sources of pain[11].

The inability of intensive care patients to report the pain they feel due to mechanical ventilation, the simultaneous use of sedation dosages and muscle relaxants or loss of consciousness, should not preclude pain assessment and treatment. Acute pain is the main source of stress for intensive care patients and almost 50% of this population showed a moderate to severe symptom intensity[12].

The negative physiological and psychological effects determined by the lack of pain treatment may be important and long-term[13]. The stress responses caused by pain is associated to arteriolar vasoconstriction, altered tissue perfusion, reduced partial pressure of tissue oxygen, catabolism and increased insulin resistance, increased risk of wound infection, immunity alterations and development of chronic and neuropathic pain[13].

Besides the self-assessment of the patient which remains as the referral standard for the measurement and intensity of the symptom also in the intensive care, the pain behavioral scales are a valid alternative when patients are unable to independently report the pain[8].

In this type of patients, the use of the validated behavioral scale can be associated with better pain management and improved clinical outcomes[13].

Training is needed to be able to correctly use the pain assessment tools, particularly the behavioral scales, since behaviors are complex and difficult to decode[14].

Pain assessment by healthcare professionals is not only an ethical duty but also a legal one. In fact, the current law refers to the policy of ethical and also legal duty to guarantee a "Painless Hospital"[15], in the clinical records of medical and nursing sections, where pain assessment, its treatment and effects have to be reported[15].

RECOMMENDATIONS

Legend of the evidence levels

Level A* - Metanalysis of quantitative or metasynthesis of qualitative studies with results that consistently support a specific action, intervention or treatment (including systematic revisions of experimental randomized clinical studies).
Level B* - Well-designed, controlled clinical studies with results that consistently support a specific action, intervention or treatment.
Level C* - Qualitative, descriptive studies of correlation, integrative reviews, systematic reviews or randomized, experimental clinical studies with inconsistent results.
Level D* - Professional and organizational standards based on peer reviews with recommendations supported by clinical studies.
Level E* - Multiple case reports, evidences based on theories of experts' opinions, or professional and organizational standards based on peer reviews with clinical studies to support the recommendations.
Level M* - Only recommendations from the manufacturing companies.
Deontological standard /normative≠ – Not classifiable recommendations based on levels of scientific evidence but also ethically advised.

* Levels of evidences adopted by American Association of Critical Care Nurses
≠ Modified evidence level compared to that used by the American Association of Critical Care Nurses

1. Critical care nurses acknowledge that attention to pain is one of the priorities the patient should be guaranteed *(Deontological standard/normative)*

Rationale

Pain assessment and management in patients should be a priority for every member of the health staff regardless of the department or ward[14,15,16]. Intensive care patients are a particular population since, besides the presence of the symptom they are burdened by the stress of facing the risk of non-survival[16].

Regardless of the progress made in the knowledge of pain assessment and management in the intensive care unit, nurses have found it difficult to give the problem top priority despite the fact that pain has been defined as the fifth vital sign[17].

A Canadian survey highlighted that 94% of nurses attribute the same importance in the assessment and documentation of pain in patients who are able to report their pain levels and to those who are unable to do so[18]. While data from Italy highlight the low aptitudes and knowledge levels of pain management in the nurses working in ordinary hospital wards and sub intensive and intensive care wards[19].

2. Each intensive care patient must be ensured routine pain monitoring, with the most suitable instruments. *(Deontological standard/normative)*

Rationale

The Montreal Declaration written during the International Pain Summit (IPS) of the International Association for the Study of Pain (IASP)[6], states that access to Pain Manage-

ment is a Fundamental Human Right and in particular Article 3 textually establishes: "the right of all people with pain to have proper assessment and treatment of the pain by adequately trained health care professionals"[6]. Specifically in the Italian professional scenario, the current Deontological Code, precisely article 18, textually says "the nurse prevents, measures and records the patient's pain during the treatment plan. He or she works using the good practices for the management of pain and the related symptoms, in respect of the patient's rights"[20].

Policy-regulatory support is found in art. 7 (obligation to report the pain observations in the clinical records) of Law no. 38/2010 and particularly in paragraphs 1 and 2 that state: "1. The characteristics of the identified pain and its development during hospitalization, together with the antalgic technique and drugs used, the related dosages and the achieved antalgic outcomes must be reported in the medical and nursing sections of clinical records"; "2. In compliance with the guidelines of the «Painless Hospital» project, provided by the agreement between the Ministry of Health and the regions and autonomous provinces of Trento and Bolzano, on 24 May 2001, the Gazzetta Ufficiale n. 149 dated 29 June 2001, published that "health care facilities have the faculty to choose the most suitable instrument, among the validated once, for the assessment and measurement of pain to be reported in the clinical records in accordance with paragraph 1"[21].

3. Pain should be monitored and recorded at least every four hours. *(Level E)*

Level of supporting evidence- rationale

The more recent guidelines on pain management in intensive care refer to the need to perform routine measurements of pain, but without specifying the intervals (minimal) at which measurements should be made[12,13]. Also documents on pain management for patients who are unable to verbally communicate their feelings, underline the need for each operating unit to equip itself with the suitable pain measurement and response to treatment procedures and to perform re-valuations "after the regular interventions on the pain," but are vague with regard to the precise schedules or time frames[22]. A rather old document written by the National Pharmaceutical Council provided some indications regarding the revaluation of pain, with respect to acute pain in clinical acute pain contexts (e.g. after 1 hour from the oral administration of drugs and after 30 minutes from the parenteral administration of analgesics). The article pointed out the usefulness of measuring the pain simultaneously with the other vital signs (since pain is the fifth vital sign) in some clinical contexts, but it also specified the variability of the measurement with respect to the more or less frequent measurement intervals of the other vital signs[23]. A recent article about the improvement quality process indicated the minimum interval of 4 hours for the administration of the Critical Care Pain Observation Tool (CPOT) in ICUs[24].

4. When it is possible, the nurse should do his or her best to help the patient communicate the presence and intensity of pain, using verbal or visual numerical scales (0-10), through alphanumerical charts or compensative or alternative communication tools *(Level C)*

Level of supporting evidence – rationale

The American Society for Pain Management Nursing's Position Statement on pain assessment in the people who are unable to communicate the symptom verbally, recommends the use of the pain measurement hierarchy also for this type of population: 1 – try to obtain the patient's self-evaluation and report the reason why it cannot be used; 2 – seek the potential cause of pain identifying the sources (pathological process, procedures, immobility, previous surgery …); 3 – observe the behavior of the patient, listing down those that may indicate the presence of pain; a behavioral pain scale should be used; 4 – use the assessments of the *proxy* (relatives, caregivers, health workers), identifying the behavior which may be a sign of pain in their opinion (even though there are still no studies that have demonstrated their importance with effective proof[13]); 5 – if appropriate, perform an assessment on the efficacy of an analgesic[22].

The *gold standard* is the patient's self-assessment also through a simple YES/NO or other words, or movement, like pressing one's hand or winking[22], in situations of limited verbal and cognitive capacities. In particular, regarding patients in critical condition, the obstacles to self-reports may be caused by sedatives, muscle relaxants, tracheal tubes and delirium. Delirium is also characterized by fluctuations; it would therefore be necessary to turn to repeated attempts to stimulate self-reporting of these patients[22].

The self-reporting of patients who are able to reliably communicate would be the ideal standard for pain measurement; also for critical patients the use of a visual (or verbal) numerical scale from 0-10 is the best tool[13,22,25]. If the patient is unable to use a numerical scale a verbal pain descriptor could also be used (e.g. no pain, slight pain, moderate, strong or unbearable pain)[13].

Under critical conditions and clinical instability, the patient may have difficulty in focusing on the intensity of the symptom and may easily indicate only the presence or absence of pain[26].

5. In patients who are unable to independently report their pain, the nurse should use validated scales such as: the Italian version of the Critical Care Pain Observation Tool (CPOT), or the Behavioral Pain Scale (BPS), also in the version for non-intubated patients (BPS-NI) *(Level C)*

Level of supporting evidence- rationale

The current PADIS guidelines (*Clinical Practice Guidelines for the Prevention and Management of Pain, Agitation/Sedation, Delirium, Immobility, and Sleep Disruption in Adult Patients in the ICU*)[8], in line with the previous PAD guidelines (*Clinical practice guidelines for the management of Pain, Agitation, and Delirium in adult patients in the ICU.*), recommend for critical patients that are not able to self-assess their pain, to use the two behavioral assessment scales: Critical-Care Pain Observation Tool (CPOT) (scoring range of 0-8), and the Behavioral Pain Scale in intubated (BPS) and non-intubated (BPS-NI) patients (scoring range 3-12)[12,13]. The psychometric assessment of this scale is satisfactory[27]: CPOT 16.7; BPS 15.1; BPS-NI 14.8[13].

CPOT and BPS seem to be completely suitable for use in patients with concussions since the basic pathology may limit the behavioral manifestations of pain, like the absence of muscle stiffness and grimaces. For the same reasons, also the use of these two instruments in patients with serious burns may probably be limited given the influence on the facial expressions and movements of wounded limbs[14].

CPOT and BPS-NI seem to be valid also in patients with delirium, but further studies would be needed to confirm these results. Moreover, there is a lack of studies on the validation of behavioral scales of people with cognitive disorders[14].

The cut-off that identifies the presence of pain in the CPOT was set at a score of > 2 and in the BPS > 5 that stand for over 2 points with respect to the minimum points[14]. The scores for self-reporting of pain and behavioral scales go in the same direction but, while the former generally enables to discern the intensity of the pain, the latter only identifies the absence or presence of pain, not distinguishing whether they are slight, moderate or severe[14].

In 2012, an observational monocentric prospective study in an Italian ICU, highlighted a strong correlation between the CPOT and BPS scores in 1,083 measurements on 36

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hospitalized patients (ρ=0.784; p<0.001)[28].

In 2016, the BPS and the CPOT were compared in 2 ICUs of an Italian university hospital[29], to assess their congruity: 528 measurements were taken on 33 patients. Both scales were able to discern the painful procedures (mobilization on the right and left side and endotracheal aspiration) from the painless procedures (hygiene without mobilization, changing of medications of the central vein catheter and/or arterial catheter) (p<0.001). The correlation between the two scales were optimal and important (with rs greater than 0.9 and p=<0.001)[29].

Severgnini et al. tested the validity of the Italian version of the CPOT and the BPS in an Italian ICU on 101 patients hospitalized (60 unconscious 41 conscious). The validity of the BPS and CPOT criteria showed a moderate correlation with the VAS (Visual Analogue Scale), including all the measurements (BPS rs = 0.56; p < 0.0001 CPOT rs = 0.48; p < 0.0001)[28]. During nursing procedures BPS sensitivity was low (sensitivity 62.8 % and specificity 91.7 %, accuracy 72.04 %), and CPOT specificity was also low (sensitivity 76.5 % and specificity 70.8 %, accuracy 74.68 %)[30].

At international level, a new behavioral pain assessment scale called Behavior Pain Assessment Tool (BPAT)[28] was validated. Six Italian ICUs took part in this validation study. The weighted psychometric score obtained by the scale was 10,6[30] and therefore the PADIS still continues to recommend the use of the CPOT and BPS at first hand[13].

A Canadian survey showed that nurses are more attentive to detect pain in conscious patients rather than in sedated ones (respectively 89% against 33%), and this indicates the need for a further awareness in healthcare staff[18].

6. The pain detection scales in people who are unable to communicate verbally should be used by suitably trained health care workers *(Level C)*

Level of supporting evidence – rationale

The patient's self-assessment of pain depends on elevated mental processes, while behaviors depend on automatisms and are subject to minor voluntary control. Behaviors which indicate pain are more complex to be decode by external observers, which explains the importance of adequate training in the use of the scales for patients who are unable to verbalize independently[14]. Standardized training experiences in the use of the CPOT and BPS scales have shown to be prevalently used and complied with in the assessment of operators[31-36]. The same CPOT validation survey in Italian ICUs showed moderate levels of congruity associated to the perception of scarce clarity of the instructions for the use of the scale, scarce comprehension simplicity and not having much user-friendliness in the compilation of more than half of the interviewees[37].

7. Where feasible, in people who are unable to independently report their pain, the nurse should avail of people who are close to the patient to assess the presence of pain indicators *(Level C)*

Level of supporting evidence – rationale

There are a few studies that have examined the accuracy of the detection of pain and its intensity by *proxy* or representatives like relatives; the degree of closeness with the patients seemed to be modest[13]. Further studies are therefore needed to evaluate the real usefulness of the use of *proxies* for patients who are unable to express themselves autonomously. Some qualitative studies seem to point out the interesting potentials of the contribution of relatives in identifying indicative behavior of their relative in pain, thanks to their level of familiarity with the patient[38,39]. The relatives themselves recognize the same behavior examined by the pain detection scale, such as facial expressions, bodily movements and muscle rigidity[13].

Also the most recent pain management guidelines for intensive care patients and the clinical recommendations suggest the involvement of relatives in the assessment of pain whenever possible and appropriate. However, the assessment of relatives do not replace the one of the health care workers[13,22,26]. Some authors in fact point out the risk of over treatment potentially generated by the tendency to overestimate the evaluation of relatives[22,40].

8. The vital signs alone are not enough to detect pain *(Level C)*

Level of supporting evidence – rationale

The physiological parameters (respiratory frequency, heart rate and arterial pressure) are commonly monitored and recorded but cannot be interpreted as simple indicators of discomfort and/or pain of the patient when the patient is unable to relay his feelings[41]. A Canadian 2012 survey evidenced that 92% of the nurses interviewed considered the vital signs as moderately to extremely important in pain assessment in the ICU[18]. A recent literature review confirmed the results of many surveys regarding the scarce capacity to discern the alterations of respiratory rate, cardiac frequencies, arterial pressure, oxygen peripherical saturation and end-expiratory CO_2 concentrations, in representing the exclusive presence of pain compared to other clinical conditions or induced by the administration of drugs [14] and, in particular, the absence of changes in the vital signs does not mean the "absence of pain"[22].

The current PADIS guidelines recommend the use of the alterations in vital signs exclusively as a first clue on the possible presence of pain but to associate to validated methods, such as the self-reporting of the patient (where possible) or, in its absence, to the behavioral scales[10]. The guidelines themselves point out the need for deeper studies on the heart rate variations (Analgesia Nociception Index) and the simultaneous integration of several physiological parameters (Nociception Level Index) to detect the presence of pain in critical patients[13].

9. Generally, pain during diagnostic, therapeutic and care procedures on critical care patients who are unable to speak should always be suspected and prevented. This is worth especially for the patients treated with muscle relaxants, high sedation levels, or in clinical conditions characterized by such neuromuscular deficits, as to make even the CPOT and BPS or BPS-NI scales useless *(Level E)*.

Level of supporting evidence– rationale

The recent PADIS guidelines reconfirm the limits of the pain detection behavioral scales that are not useful in determining categories of people (e.g., the unresponsive ones, with a Richmond Agitation-Sedation Scale score that is ≤ –4)[13]. These scales in fact cannot be used in patients with myoresolution and sedation levels[14]. Furthermore, the same guidelines encourage further studies in order to overcome these limits[13]. Some promising results were seen in the use of the bispectral index (BIS), pupillometry and skin conduction to measure pain in intensive care patients, but they would need further confirmations[41].

Therefore, the only instrument usable in the ICUs is the analgesic efficacy test every time one suspects that the patient may be in pain. The choice of the type of analgesics to use and their titration should be done on the basis of the presumed intensity of the pain[22].

10. After the preventive or treatment analgesic therapy, the intensive care nurse reassesses the patient to evaluate the effectiveness of the treatment through the more suitable pain scales for the clinical conditions. *(Level E)*

Level of supporting evidence – rationale

In a document dedicated to the im-

provement of the quality of acute and oncological pain management, the American Pain Society recommends "frequent" pain reassessments[42]. It recommends the production of protocols and pain management procedures at local level (hospital, wards) that also provide for revaluations "after interventions on pain, and in a regular manner"[22]. Already in 2001 the National Pharmaceutical Council indicated the need to reevaluate acute pain 1 hour after the oral administration and after 30 minutes after analgesics are parenterally administered[23]. In every case pain should be revaluated to control the efficacy of the therapy according to the pharmacokinetic characteristics of the analgesics administered.

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