

# **Italian Intersociety Recommendations (SIAARTI, SIMEU, SIS 118, AISD, SIARED, SICUT, IRC) on Pain Management in the Emergency Setting**

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## **ABSTRACT**

Pain is the primary reason for admission to the Emergency Department (ED). However, the management of pain in this setting is often inadequate because of opiophobia, fear of excessive sedation, and fear of compromising an adequate clinical assessment.

### **Methods**

An intersociety consensus conference was held in 2010 on the assessment and treatment of pain in the emergency setting. This report is the Italian Intersociety recommendations on pain management in the emergency department setting.

### **Results**

The list of level A recommendations includes: a) use of IV Acetaminophen for opioid sparing properties and reduction of opioid related adverse events; b) ketamine-midazolam combination preferred over fentanyl-midazolam or fentanyl-propofol in pediatric patients; c) boluses of ketamine IV (particularly in the population under the age of 2 years and over the age of 13) can lead to impairment of the upper airways, including the onset of laryngospasm, requiring specific expertise and skills for administration; d) the use of ketamine increases the potential risk of psychomotor agitation, which can happen in up to 30% of adult patients (this peculiar side effect can be significantly reduced by concomitant systemic use of benzodiazepines); e) for shoulder dislocations and fractures of the upper limbs, the performance of brachial plexus block reduces the times spent in ED compared to sedation; f) pain relief and the use of opioids in patients with acute abdominal pain do not increase the risk of error in the diagnostic and therapeutic pathway in adults; g) in newborns, the administration of sucrose reduces behavioural responses to blood sampling from a heel puncture; h) in newborn, breastfeeding or formula feeding during the procedure reduces the measures of distress; i) in paediatric patients, non-pharmacological techniques such as distraction, hypnosis and cognitive-behavioural interventions reduce procedural pain caused by the use of needles; j) in paediatric patients, preventive application of eutectic mixtures of prilocaine and lidocaine allows arterial and venous samples to be taken in optimum conditions; k) in paediatric patients, the combination of hypnotics (midazolam) and N<sub>2</sub>O is effective for procedural pain, but may be accompanied by loss of consciousness.

### **Conclusion**

The diagnostic-therapeutic pathway of pain management in emergency should be implemented, through further interdisciplinary trials, in order to improve the EBM level of specific guidelines.

### **KEY WORDS**

analgesia  
pain  
emergency care, prehospital  
trauma  
children

## INTRODUCTION

Pain is the primary reason for admission to the Departments of Emergency and Urgent care (DEA-Dipartimento di Emergenza e Accettazione) [1] and adequate analgesia is one of the cornerstones of effective emergency management. However, numerous studies have documented inadequate pain control in the prehospital setting and in the Emergency Department (ED) [2-4].

### 1-AIM OF THE RECOMMENDATIONS

The aim of the recommendations is to provide all emergency operators with an interdisciplinary review on diagnosis and treatment of pain in the different emergency contexts. Scientific literature highlighted the trend towards systematic oligoanalgesia and opiophobia in the context of an emergency department practice [5-9].

In light of the recent introduction of the Italian Law 38/2010 [10], containing the implementation of the project “Ospedale-territorio senza dolore” (Pain-Free Hospital and Territory) (Art. 6) and the obligation to report the assessment of pain in the medical record (Art. 7), the interdisciplinary working group underlay the need for a document that could be an useful tool for healthcare professionals in diagnosing and treating pain in the emergency setting.

### 2-MATERIALS and METHODS

The project emerged from the collaboration between two SIAARTI Study Groups: “Emergency” and “Acute and Chronic Pain”. It was then extended to other interdisciplinary and inter-professional societies: Società Italiana di Medicina di Emergenza Urgenza (SIMEU), Italian Resuscitation Council (IRC), Società Italiana di Anestesia Rianimazione Emergenza e Dolore (SIARED), Società Italiana Sistema 118 (SIS 118), Associazione Italiana per lo Studio del Dolore (AISD), Società Italiana di Chirurgia d’Urgenza e del Trauma (SICUT).

During the annual convention of the Pain Cultural Area SIAARTI in 2010, an intersociety *consensus conference* was held (SIAARTI, SIMEU, IRC, SIARED, SIS 118, AISD, SICUT) on the assessment and treatment of pain in the emergency setting. Following identification of clinical needs, a careful review of the literature was performed according to Evidence Based Medicine (EBM) methodology.

Bibliographical research was carried out using PubMed ([www.pubmed.gov](http://www.pubmed.gov)) and including human studies from January 1991 to June 2013.

An advanced draft, drawn up in 2012, was brought to the attention of the respective Executive Councils of all the scientific societies involved, which produced their comments by 30 October 2012. The final version was released in June 2013 and the involved Scientific Societies expressed their approval.

The literature review has been validated according to the levels of evidence proposed by the SIGN guidelines [11].

A series of questions were identified regarding issues for which it is not possible to give validated EBM recommendations, due to the lack of adequate scientific literature available. This document includes the answers that obtained a sharing of >75% of participants, in accordance with the Delphi method [12].

By applying GRADE methodology to level A findings, a list of evidence, which can be labelled “strong recommendations”, are extrapolated at the end of the conclusions [11,13].

The authors have disclosed that they have no significant relationships with or financial interests in any commercial companies related to these recommendations. They also declared that no public or private sponsorship/funding supported this study. Finally, the authors undertake to revise these recommendations by 2018.

### 3-PAIN ASSESSMENT IN THE EMERGENCY SETTING

An accurate assessment of the patient and the pain symptoms is essential for the choice both of analgesic and route of administration. It is equally important to reassess the patients after the individual analgesic interventions (Level B) [14].

The diagnosis of acute pain and its treatment should be performed consistently for all patients treated in emergency, both in a prehospital context and in ED. From their arrival in ED, all patients should be assessed for any allergies and intolerances, their level of pain should be measured and the intensity reported in the clinical chart (medical records, triage card and 118-national emergency system-card) [15, 16].

The introduction of pain assessment among the parameters to be recorded during triage leads to a major clinical improvement, as it reduces the time required for patients to receive appropriate analgesic treatment [17]. As a first choice, it is appropriate to use the NRS (Numeric Rating Scale) from 0, no pain, to 10, maximum pain imaginable [18]. A reasonable alternative is the semantic assessment of pain using the VRS (Verbal Rating Scale) [19, 20]. In paediatric patients it is possible to use the FACES pain rating scale for children who are able to speak [21] and the FLACC (face, legs, activity, cry, consolability) scale for those who are unable to speak [22, 23] Tab. 1

In adults with mild-moderate cognitive impairment, it is possible to use descriptive scales enabling verbal assessment [24, 25], while in adults who are unable to speak, it is necessary to adopt the PAINAD (Pain Assessment in Advanced Dementia) [26] (Tab 2).

#### 3.1-Identification of Red Flags

When first approaching a patient with pain symptoms, it is strongly recommended to obtain a quick medical history and an initial physical examination, in order to exclude diagnostic red flags [27] (Appendix 1) and to identify patients who require further in-depth investigations [28] (Level B).

### 4-PREHOSPITAL and EMERGENCY DEPARTMENT CARE

In the prehospital assistance and on arrival at ED, the interdisciplinary group proposed the following recommendations (Level D):

- a. Perform systematic assessment and documentation of pain in appropriate forms. Proceed to reassessment after each analgesic intervention.
- b. Define clinical protocols of outpatient pain treatment in accordance with the local 118 operative center and the hospital EDs.
- c. Provide emergency vehicles with an adequate supply of analgesics and specific protocols for their use.

d. Provide special training sessions for healthcare professionals involved in territorial health emergency activities.

#### 4.1-Prehospital Analgesia

Moderate to severe pain is common in both adult and paediatric patients in a prehospital environment [29] (Level D); it is therefore required to carefully plan the analgesic regimen (drug, dose and route of administration) for optimal efficacy.

The ideal prehospital analgesic should be easy to use, safe, effective, and have a predictable dose-response relationship with rapid onset and a short duration of action.

The first-line medications for prehospital analgesia, in the case of severe pain (NRS 7-10), are opiates; intravenous (IV) morphine, fentanyl and tramadol are equally effective in a prehospital environment [30-32] (Level B).

There is no proven difference between fentanyl and IV morphine in ensuring effective analgesia for up to 30 minutes during prehospital care [33] (Level B).

The proposed adult dosages are reported in Appendix 2.

Preventive use of IV paracetamol provides good analgesia and reduces morphine consumption and the relative adverse events, as shown in post-operative pain trials [36] (Level A).

In a prehospital environment it is possible to ensure effective analgesia by using ketamine [37-40] (Level D).

The use of opioids in patients with traumatic brain injury should be based on an individual assessment of the risk-benefit ratio on the basis of potential side effects, such as the possibility of interfering with the neurological assessment and the possibility of causing respiratory depression with hypercapnia and increased intracranial pressure [41, 42].

#### 4.2-Analgesia in the Emergency Department

In ED systemic analgesia and regional techniques should be considered [43, 44].

##### a) Systemic Analgesics:

##### Paracetamol

For mild pain (NRS 1-3), paracetamol is the first choice, in its oral formulation at the dosage of 1 g, repeatable every 8 hours [45]. It can also be used in its orodispersible formulation, in a protocol based on pain assessment by nurses, enabling satisfactory analgesia to be achieved in ED [46].

For moderate pain (NRS >3), paracetamol can be used at the dosage of 1 g IV for up to 4 daily doses, to reduce opioids consumption (Appendix 2). Paracetamol 1 g IV has proven effective compared with a dose of 0.1 mg/kg of morphine, in the reduction of pain associated with renal colic [47] and in the treatment of moderate/severe isolated injury to the limbs [48].

A cross-sensitivity between NSAIDs and paracetamol allergy has been described. If the patient is combative and uncooperative, pain and drug/alcohol overdose should be considered, when prescribing paracetamol.

##### Non-Steroidal Anti-Inflammatory Drugs (NSAIDs)

NSAIDs are indicated for the treatment of mild-moderate musculoskeletal pain, trauma, renal or biliary colic and for certain forms of acute headache [49-51]. Prior to administration of NSAIDs, it is recommended to take a quick medical history for the purposes of exclusion of any allergies or side effects (gastropathies, coagulopathies, renal failure).

##### Tramadol

Tramadol can be used for moderate-severe pain as a single IV treatment or orally in the available combinations with paracetamol [52]. In the management of pain due to trauma IV tramadol is an acceptable alternative to morphine [53] (Level B).



## Opioids

In ED, opioids are frequently prescribed for severe pain and they should preferably be administered intravenously. Doses should be adjusted according to age and titrated until the desired effect is reached (halving the initial level of pain or otherwise NRS <4), using the lowest effective dose. Patients treated with opioids require close observation in a protected environment, where continuous monitoring with pulse oximetry/capnometry, oxygen therapy and naloxone are available, due to the possible side effects (sedation, hypotension, and respiratory depression) [54, 55] (Level D).

The best method of ensuring rapid and effective analgesia is to titrate the opioids to clinical effect, by stratifying the patients according to pathology, age, comorbidities, concomitant use of psychotropic medications.

Most patients report effective analgesia 10 minutes after IV morphine 0.1 mg/Kg followed by 0.05 mg/Kg every 5 minutes [34] (Level B). In haemodynamically unstable or potentially critical patients, individual titration with IV morphine is carried out with relatively low doses, equivalent to 1-2 mg, repeated every 5-10 minutes until the desired effects are reached; or alternatively, particularly in unstable patients, fentanyl can be used at the dose of 0.5-1 mcg/Kg IV, or intranasally (IN).

The combination of benzodiazepines and opioids may increase the risk of respiratory depression and desaturation, necessitating careful monitoring of the neurological state of the patient and the arterial saturation [56].

In children, 1.5 mcg/kg IN fentanyl ensures effective analgesia in ED and procedural pain [57-60] and it is the first choice for the treatment for severe pain (Level B).

In the case of "intractable" pain, non-responsive to a proper approach with titration of major opiates, it is necessary to activate a referral to the Pain Unit, if present in the hospital, or to the anaesthetist of the Acute Pain Service (APS) or the Medical Emergency Team (MET) (Level D) [61].

Although supported by recent scientific literature, immediate release (IR) opioids or rapid onset opioids (ROO), approved only for the treatment of breakthrough pain in the setting of chronic pain, can be used off-label for the treatment of acute pain only if included in the guidelines of the 118 centres and the ED, after approval of the local ethics committees. In order to manage any complications related to the use of opioids by such routes, rapid venous or intraosseous access must be provided in an emergency.

## Analgesics by inhalation

The use of analgesics by inhalation is not common in Italy. In English literature, however, a mixture of nitrous oxide (N<sub>2</sub>O) and 50% oxygen has been proposed for minor procedures in adults and children [62] (Level B).

## Ketamine

The ketamine-midazolam combination is more effective and has fewer side effects than fentanyl-midazolam or fentanyl-propofol in reducing paediatric fractures in ED [63] (Level A). Boluses of IV ketamine result in significant morphine-sparing effect, ensuring adequate levels of analgesia if used in the treatment of severe pain due to trauma in ED [7] (Level B).

However, particularly under the age of 2 years and over 13, IV Ketamine can lead to impairment of the upper airways and laryngospasm [64], requiring specific expertise and skills for administration [65] (Level A).

Ketamine increases the potential risk of psychomotor agitation in up to 30% of adult patients, but side effects can be significantly reduced by concomitant use of benzodiazepines [66] (Level A)

## 4.2 Regional Techniques

Topical local anaesthetics (including liposomal formulations) (Level A), with (Level B) or without epinephrine, ensure effective analgesia in the treatment of wounds in ED [67].

Regional anaesthesia provides high-quality site-specific analgesia, avoids the potential risks of respiratory depression, sedation or bleeding, which are typical of opioids and NSAIDs [68], and it is particularly indicated for the management of post-traumatic pain in ED.

For fractures of the femoral neck, the three-in-one femoral block, in combination with IV morphine, ensures analgesia that is superior to IV morphine alone, reducing the use of rescue doses [69] (Level B). For rib fractures, continuous intercostal blocks improve lung function and pain control, and reduce the lengths of hospital stays [70] (Level B). For shoulder dislocations and fractures of the upper limbs, brachial plexus block reduced the times spent in ED compared to sedation [71, 72] (Level A).

Peripheral nerve blocks, however, requires specific training, currently pertaining to anaesthetists and resuscitators. Therefore, emergency operators should improve their knowledge and systematic use of "elementary" regional techniques (subcutaneous, subfascial, truncular, plexus infiltrations with local anaesthetics), in order to reduce and/or eliminate post-traumatic and procedural pain [73]. Blockade of the iliac fascia, which is considered a safe technique because it is carried out far from vascular structures, ensures better analgesia than IV opioids alone in the treatment of femoral neck fracture [74] (Level B). However, even "elementary" regional techniques require specific experience and expertise.

Ultrasound-guided techniques can facilitate and improve the safety of regional techniques [75]. Therefore, educational courses aimed at improving knowledge of ultrasound-guided techniques should be implemented [43, 44] (Level B).

## 4.3 Non-Pharmacological Approaches

While analgesics are essential for pain control in ED, the importance of non-pharmacological treatments should not be overlooked: application of ice, immobilisation of fractures, management of the psychological aspects of the patient, and patient information on the causes and the prognosis of his pain in order to reduce anxiety [76].

## 4.4 Analgosedation for Procedural Pain

The management of procedural pain in the ED normally requires a process of close multidisciplinary collaboration.

Current analgosedation usually include midazolam, propofol, ketamine and opiates, resulting in a *continuum* of effects on consciousness, from anxiolysis to light sedation (or conscious, without loss of verbal contact with the patient) and even to deep sedation (with loss of verbal contact) and actual general anaesthesia [77, 78].

As a rule, non-anaesthetists should limit their practice to conscious sedation techniques.

The mixtures of N<sub>2</sub>O and 50% oxygen, self-administered by patients with one-way valves, are only partially effective and should be administered in environments with high laminar flows [79].

During analgosedation for procedural pain in ED, the same levels of safety currently required in the operating theatre must be ensured, even for minor procedures [80-82]. The exact type of monitoring of the vital functions and extent of such monitoring remains controversial. The measurement of blood pressure, peripheral saturation and continuous ECG are considered unavoidable controls [80]. The use of continuous capnography remains controversial, for the limited availability of instruments, costs and the risk of false positives. However, capnography may have a decisive role in detecting respiratory depression caused and/or masked by supplementary oxygen administration [83-86].

Regional analgesia techniques and non-pharmacological methods should also be promoted.

No studies have determined that a fasting period is necessary before undergoing an analgosedation procedure in emergency [87]. Literature data are lacking to pronounce an absolute recommendation (Level D). In emergency conditions, for patients who cannot wait, recent intake of food is not an

absolute contraindication for analgo-sedation; however, physicians must consider the risk of aspiration, balancing it with the potential benefit of pain control [88].

For patients who can wait, a fasting period of at least 2 hours should be observed for clear liquids, at least 4 hours for breast milk, and at least 6 hours for solids and non-breast milk [89].

## 5-SPECIAL CONDITIONS

### 5.1 Trauma

General recommendations for the treatment of pain in trauma patients (Level B):

- 1) To insert pain assessment on the triage charts of the trauma centre [90];
- 2) To include elements of differential diagnostics of pain in the secondary assessment;
- 3) To develop methods of treatment such as:
  - appropriate use of paracetamol
  - use of opiate titration [91]
  - use of regional anaesthesia for the transport and invasive procedures.
- 4) After the stabilisation phase, to identify the patients who may develop chronic neuropathic pain due to inadequate analgesic treatment [92] and to make a "pro-active" plan for the prevention of chronic pain, including:
  - Continuous regional blocks [93]
  - Treatment of neuropathic pain
  - Use of opioids even for prolonged periods
  - In intensive care units, to use guidelines for analgo-sedation, for the management of pain and the prevention of delirium [94, 95]
  - Physio-kinesio-therapy and early rehabilitation
  - Early psycho-behavioural approach aimed at preventing and treating post-traumatic stress syndrome [96].

### 5.2 Abdominal Pain

A common belief is that analgesia masks the signs and symptoms of acute abdominal pathologies [97]. Pain relief and the use of opioids in patients with acute abdominal pain do not actually increase the risk of error in the diagnostic and therapeutic pathway, neither in adults (Level A) [98] nor in children [99] (Level B). In the case of severe pain, it may be necessary to administer opioids. Although in the past it was recommended to use pethidine (meperidine) as a substitute for morphine, particularly for renal colic [100] and biliary colic because of the theoretical risk of spasm of smooth muscle, there is no current evidence to support this position.

### 5.3 Headache

After excluding causes of headache that pose an immediate risk to the life and health of the patient (Appendix 1), it is recommended to ensure rapid and effective control of pain symptoms [101].

For emergency treatment of migraine, prochlorperazine is superior to all the other classes of medications; triptans and dihydroergotamine are as effective as dopamine antagonists, but must be avoided in patients at vascular risk; NSAIDs and opioids can be used, but not as a first choice; magnesium may be a useful adjuvant, especially in pregnant patients (Level B) [102-104].

### 5.4 Elderly patients

In emergency departments and prehospital settings, elderly patients who complain about pain are less likely to receive analgesics compared with younger patients [105, 106].

For mild-moderate pain, the first choice is paracetamol 1000 mg orally 3 times daily or IV paracetamol 500-1000 mg every 6 hours. Valid alternatives include combinations of paracetamol with weak opioids (codeine or tramadol) [54] or with low-dose oxycodone by oral route [107].

NSAIDs should not be considered first-line agents and should be used with extreme caution in elderly patients, because they are associated with renal failure and an increased risk of bleeding of

the upper gastrointestinal tract [108]. Among NSAIDs, ibuprofen is the most reasonable choice (there is evidence to suggest avoiding indomethacin). It is recommended to use the lowest effective dose for a short period of time (e.g. 200-400 mg orally 3-4 times a day) [109, 110]. For elderly patients, NSAIDs and COX-2 inhibitors should always be prescribed in combination with a proton pump inhibitor [111].

Elderly patients tend to need lower doses of opioids compared with younger patients.

### 5.5 Terminally ill patients

In order to reduce the persistently high number of inappropriate admissions to the ED areas and the Intensive Care Departments for terminally ill patients, protocols should be adopted and shared between the 118 operating centres and the continuity of care network for terminally ill patients [112]. The protocols should contain the rules to be adopted in emergencies that occur in the course of palliative care, identifying in advance those that require hospital admission or temporary placement in the Short-Term Intensive Observation Unit (Level D).

### 5.6 Children

The main focus of paediatric scientific studies on pain control in emergency is the management of procedural pain.

In newborns, the administration of sucrose reduces behavioural responses to blood sampling from a heel puncture [113] (level A); likewise, breastfeeding or formula feeding during the procedure reduces the measures of distress [114] (Level A).

In paediatric patients, non-pharmacological techniques such as distraction, hypnosis and cognitive-behavioural interventions reduce procedural pain caused by the use of needles [115, 116] (level A); preventive application of eutectic mixtures of prilocaine and lidocaine allows arterial and venous samples to be taken in optimum conditions [117]. "Needle-free" lidocaine/tetracaine patch can be used for needle injections and for surgical procedures in children from the age of 3 years upwards [118]. Minor surgical procedures (cutaneous sutures, reduction of fractures) can easily be carried out, by combining topical anaesthesia and 50% inhalation of N<sub>2</sub>O without the onset of major side effects [119, 120]. The combination of midazolam and N<sub>2</sub>O is effective but may be accompanied by loss of consciousness [121, 79] (level A). Administration of N<sub>2</sub>O must be carried out in environments with an adequate number of air changes per hour. In experienced hands, a combination of hypnotics and analgesics is effective in reducing procedural pain of moderate intensity [122] (level B). Adverse events in paediatric patients are frequent in the absence of adequate monitoring, advanced training in cardiopulmonary resuscitation (Paediatric Advanced Life Support - PALS) and in the case of multiple medication use.

Recent reports reassess the use of ketamine in combination or not with propofol [123, 124] and propose the use of dexmedetomidine, particularly for advanced medication for burn patients [125].

There are numerous reports of intranasal administration of opiates (fentanyl 1-2 mcg/kg), as an alternative to IV morphine, in a prehospital setting or in ED [126, 127], also in the treatment of severe pain due to sickle-cell disease [128].

A partial response to the use of off-label analgo-sedation medications, which is the norm for paediatric patients, was recently given in the Determination of 27 July 2012 by the Italian Medicines Agency – AIFA, which authorised the commercial use of analgesic and sedative-hypnotic medications also for paediatric patients [129].

### 5.7 Pregnant patients

Pregnant women are at risk of not receiving adequate treatment of pain or not receiving any, because of widespread fear associated with the use of medications during pregnancy. The analgesics most commonly used in pregnancy are paracetamol, NSAIDs and opioids [130].

In accordance with the Food and Drug Administration (FDA) (Table 3), paracetamol in therapeutic doses is safe in all stages of pregnancy and is classified in Risk Category B [131]. Most NSAIDs are also classified in Risk Category B; however several trials have shown that prenatal exposure to

NSAIDs may increase the risk of structural abnormalities (ventricular septal defect, diaphragmatic hernia, intrauterine growth retardation) [132, 133]. Few data are available on COX-2 inhibitors; therefore they are classified in Risk Category C. Opioids have mainly been studied in the third trimester (labour analgesia) and, therefore, little information is available on their possible teratogenicity. Tramadol and codeine are in Risk Category C; fentanyl, morphine and oxycodone (Risk Category B) are all equally effective, but must be used with caution, especially if the pregnancy is at term, due to the risk of neonatal respiratory depression and/or neonatal abstinence syndrome [134]. In the last stage of pregnancy, opioids are in Risk Category D. There are no analgesics in Risk Category A.

#### 5.8 Differences in gender and race

In the treatment of pain in emergency departments, inequalities may occur with respect to gender and race.

Women who come to ED with abdominal pain are less likely to receive analgesics compared with men [135]. Similarly, patients of a low socio-economic level [136] and the population of non-Caucasian race (blacks and Hispanics) who come to ED with abdominal pain or lower back pain receive fewer analgesics and experience longer waiting times compared with whites [137].

The use of standardised protocols for analgesia in emergency may help to reduce these disparities. Gender differences in pain perception must also be taken into consideration. Although the majority of studies have demonstrated no difference between the two genders with respect to pain intensity, cognitive and social factors, rather than hormonal or psychological factors, seem to explain the gender differences (allodynia and secondary hyperalgesia may be more pronounced in females) [138-139].

### 6-IN-HOSPITAL EMERGENCIES

#### 6.1 Calls from surgical, medical and oncology departments

In line with the objectives of the Pain-Free Hospital and Territory project, a shared organisational model should be created for the assessment of postoperative pain and its proper treatment, with particular attention to the complications and adverse events linked to it and their solutions [140, 141].

Identification of hospital emergency codes used to alert the Medical Emergency Team / Acute Pain Service (MET/APS) may reduce preventable adverse events [142] (Level C).

Medical and oncology departments should be closely integrated with the Pain Medicine Operative Unit (OU), for proper identification of requests for pain therapy consultations in an emergency [142].

The complete clinical documentation must always be available. Standardised protocol should be adopted for reassessment of pain symptoms and for review of the therapeutic plan (Level C).

#### 6.2 End of life choices and palliative care pathways

For terminally ill patients and the management of end of life care, specific SIAARTI guidelines are available on the subject [112].

Palliative care must be guaranteed not only to cancer patients, but also in the advanced stages of other chronic pathologies, such as chronic obstructive pulmonary disease (COPD) [143, 144].

### 7-CONCLUSIONS

For educational purpose, the working group has chosen to adopt an algorithm on the diagnosis and treatment of acute pain prepared by the ICSI (*Institute for Clinical Systems Improvement*) in 2008 [145, 146], modified and adapted to the Italian context (Appendix 3).

According with the guidelines approved by the Section and Board of Anaesthesiology of the European Union of Medical Specialists (EUMS) [147-148], the working group proposes a basic course on pain in emergency, called BASIC PAIN SUPPORT (Table 4).

**KEY MESSAGES:**

Diagnostic-therapeutic pathways on pain in emergency require an interdisciplinary approach.

These recommendations highlighted the need for an improved knowledge, and promoted the use of opioids titration and regional techniques.

Level A evidence is limited to paediatric procedural pain control (Table 5).

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**Table 1: FLACC scale (Face, Legs, Activity, Cry, Consolability)**

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

The FLACC scale is indicated for newborns and children under the age of 7.

Each of the categories can be assigned a score from 0 to 2, for a total of between 0 and 10.

Modified by Merkel SI et al. [22]

**Table 2: PAINAD (Pain Assessment in Advanced Dementia)**

CATEGORY	SCORE		
	0	1	2
Breathing	Normal	Occasional laboured breathing, short period of hyperventilation	Laboured breathing, hyperventilation, Cheyne-Stokes respiration
Vocalisation	None	Occasional moans, occasional negative expressions	Repeated calls, moans, crying
Facial expression	Smiling or inexpressive	Sad, frightened, frown	Grimaces
Body language	Relaxed	Tense, nervous movements, restlessness	Rigid, fidgety, knees bent, striking out
Consolability	No need for consolation	Distracted or reassured by voice or touch	Inconsolable, cannot be distracted nor reassured

The PAINAD scale is indicated for adult patients who are unable to communicate. Each of the categories can be assigned a score from 0 to 2, for a total of between 0 and 10.

Modified by Costardi D et al. [26]

**TABLE 3- FDA medication categories in pregnancy**

Category	Interpretation
A	Controlled studies in pregnant women fail to demonstrate an increased risk of fetal abnormalities to the fetus in the first trimester (and there is no evidence of a risk in later trimesters), and the possibility of fetal harm appears remote.
B	Either animal-reproduction studies have not demonstrated a fetal risk but there are no controlled studies in pregnant women, or animal-reproduction studies have shown an adverse effect (other than a decrease in fertility) that was not confirmed in controlled studies in women in the first trimester (and there is no evidence of a risk in later trimesters).
C	Either studies in animals have revealed adverse effects on the fetus (teratogenic or embryocidal or other) and there are no controlled studies in women, or studies in women and animals are not available. Drugs should be given only if the potential benefit justifies the potential risk to the fetus.
D	There is positive evidence of human fetal risk, but the benefits from use in pregnant women may be acceptable despite the risk (e.g., if the drug is needed in a life-threatening situation or for a serious disease for which safer drugs cannot be used or are ineffective).
X	Studies in animals or human beings have demonstrated fetal abnormalities, or there is evidence of fetal risk based on human experience or both, and the risk of the use of the drug in pregnant women clearly outweighs any possible benefit. The drug is contraindicated in women who are or may become pregnant.

**Table 4: Basic Pain Support – core curriculum**

<b>BPS: Basic Pain Support</b>
Epidemiology of pain in an emergency
Pathophysiology of pain
Pain rating and measuring scales
Monitoring, and reassessment after an intervention
Pain therapy: analgesic medications and titration of opiates
Regional techniques
Prevention of chronic pain
In-hospital analgesic emergencies
Integration with pain therapy and palliative care networks (Italian Law 38/2010)
Credentialing, and regular monitoring of competency in non-anaesthetists / pain physicians / ED physicians

**Table 5: "strong recommendations" (Level A)**

Statement	Reference
<i>Preventive use of paracetamol IV provides good analgesia and helps to reduce morphine consumption and the relative adverse events, as shown in the clinical trials on post-operative pain</i>	[36]
<i>For procedural pain, the ketamine-midazolam combination is more effective and has fewer side effects than fentanyl-midazolam or fentanyl-propofol in reducing paediatric fractures in ED</i>	[63]
<i>Boluses of ketamine IV (particularly in the population under the age of 2 years and over the age of 13) can lead to impairment of the upper airways, including the onset of laryngospasm, requiring specific expertise and skills for administration</i>	[64, 65]
<i>The use of ketamine increases the potential risk of psychomotor agitation, which can happen in up to 30% of adult patients. This peculiar side effect can be significantly reduced by concomitant systemic use of benzodiazepines</i>	[66]
<i>For shoulder dislocations and fractures of the upper limbs, the performance of brachial plexus block reduces the times spent in ED compared to sedation</i>	[71, 72]
<i>Pain relief and the use of opioids in patients with acute abdominal pain do not increase the risk of error in the diagnostic and therapeutic pathway in adults</i>	[99]
<i>In newborns, the administration of sucrose reduces behavioural responses to blood sampling from a heel puncture</i>	[113]
<i>In newborns, breastfeeding or formula feeding during the procedure reduces the measures of distress</i>	[114]
<i>In paediatric patients, non-pharmacological techniques such as distraction, hypnosis and cognitive-behavioural interventions reduce procedural pain caused by the use of needles</i>	[115, 116]
<i>In paediatric patients, preventive application of eutectic mixtures of prilocaine and lidocaine allows arterial and venous samples to be taken in optimum conditions</i>	[117]
<i>In paediatric patients, the combination of hypnotics (midazolam) and N2O is effective for procedural pain, but may be accompanied by loss of consciousness</i>	[79, 121]

## Appendix 1: Red Flags in the assessment of pain in the emergency setting

### RED FLAGS in the case of HEADACHE

neurological deficits (severe or persistent reduction of vision, strength or speech)  
personality alterations or onset of epileptic seizures  
fever, confusion, stiff or sore neck  
very severe headache attacks or worsening of a previous pattern of headaches  
headache attacks after 35 years  
severe and known disease (cancer, hypertension, diabetes or trauma)  
headache that comes on after an injury to the head, especially if there has been a loss of consciousness

### RED FLAGS in the case of LOW BACK PAIN

patients aged <20 years or >55 who have pain for the first time  
pain after a violent trauma  
recurrent, continuous pain, which worsens despite treatment  
pain radiating to the upper part of the back  
history of cancer  
treatment with steroids  
medication abuse  
HIV infection  
fever  
significant weight loss  
sensory alterations, impotence, sphincter incontinence, etc.  
emergence of structural deformities  
debilitating pain that persists after 4-6 weeks of treatment

### RED FLAGS in the case of CAUDA EQUINA or QUICKLY PROGRESSIVE NEUROLOGICAL DEFICITS

#### MEDICAL HISTORY

saddle anaesthesia  
recent onset of bladder dysfunction (e.g. urinary retention, increased urination, incontinence)  
recent onset of faecal incontinence

#### PHYSICAL EXAMINATION

severe or progressive neurological deficit in the lower extremities  
unexpected laxity of the anal sphincter  
loss of perianal/perineal sensation  
greater motor weakness: knee extension, ankle plantar eversion, dorsiflexion of the foot

*In the case of one or more flags, send immediately for emergency investigations and definitive treatment*

### **RED FLAGS for SUICIDAL ATTEMPT**

depression  
previous suicide attempts  
open declaration of the will to commit suicide  
development of a suicide plan  
self-harm (cuts, burns, etc...)  
risk behaviour (reckless driving, alcohol and drug abuse or unprotected sex)  
sudden mood swings for no apparent reason

### **YELLOW FLAGS for ADDICTION (Psychological Dependency )**

aggressive demand for higher doses of medication  
accumulation of the medication during periods when the symptoms are reduced  
demand for specific medication  
acquisition of similar medications from other doctors  
dose escalation without a prescription or other behaviour showing poor compliance with the treatment  
reference to psychic effects not seen by the doctor  
attitude of resistance to changes in therapy associated with tolerable side effects due to anxiety about the return of severe symptoms

### **RED FLAGS for ADDICTION (Psychological Dependency )**

prescription forgery  
stealing medications from others  
selling prescription medications  
obtaining the prescription for medications from non-medical personnel  
injection of oral formulations  
concomitant abuse of alcohol or illegal substances  
multiple-dose escalation or other attitudes showing poor compliance with therapy  
multiple episodes of "loss" of a prescription  
repeated request for prescriptions from other doctors without informing the doctor in charge of the treatment plan  
evident deterioration of their capabilities in the workplace, in the family or in society  
repeated resistance to changes in therapy despite evidence of physical or psychosocial side effects of the medication

## Appendix 2: Analgesia in the emergency setting

Level of pain	Analgesic treatment
<b>NRS 1-3</b>	<b>Adult patient</b> Oral/orodispersible paracetamol 1 g (max 3 g per day) NSAIDs <sup>1</sup>
	<b>Paediatric patient (1-10 yrs)</b> Paracetamol <ul style="list-style-type: none"> <li>- syrup (30 mg per 1 ml) 10-15 mg/kg (repeatable every 6 hours)</li> <li>- suppositories 10-15 mg/kg (repeatable every 6 hours)</li> </ul> Ibuprofen 4-10 mg/kg (repeatable every 6-8 hours)
<b>NRS 4-6</b>	<b>Adult patient</b> Paracetamol IV 1 g (max 4 g per day) Paracetamol in combination with weak opioids orally <ul style="list-style-type: none"> <li>- Paracetamol/Codeine 500/30 mg (repeatable every 6 hours)</li> <li>- Paracetamol/Tramadol 325/37.5 mg (repeatable every 6 hours)</li> </ul> NSAIDs <sup>1</sup>
	<b>Paediatric patient (1-10 yrs)</b> Paracetamol IV 15 mg/kg (repeatable every 6 hours). The maximum daily dose must not exceed 60 mg/kg (not to exceed 2 g per day) Paracetamol/Codeine: <ul style="list-style-type: none"> <li>- syrup (25/1.5 mg per 1 ml) 1 ml per 4 kg of body weight (repeatable every 6 hours)</li> <li>- suppositories 200/5 mg (repeatable every 8-12 hours)<sup>2</sup></li> </ul> Tramadol (choose the lowest effective analgesic dose) <ul style="list-style-type: none"> <li>- drops (2.5 mg per drop) 1-2 mg/kg. The maximum daily dose must not exceed 8 mg/kg (not to exceed 400 mg per day)</li> <li>- 1-2 mg/kg IV</li> </ul>
<b>NRS 7-10</b>	<b>Adult patient</b> Opioids <sup>3</sup> <ul style="list-style-type: none"> <li>- Morphine (initial dose 4-6 mg IV)<sup>4</sup></li> <li>- Fentanyl (initial dose 50-100 mcg IV)</li> </ul>
	<b>Paediatric patient (1-10 yrs)</b> Opioids <ul style="list-style-type: none"> <li>- Morphine IV 0.05-0.1 mg/kg (perform titration to the lowest effective dose)</li> <li>- Fentanyl IV 1-2 mcg/kg</li> </ul>

<sup>1</sup> Prior to administration of NSAIDs, it is recommended to take a quick medical history for the purposes of exclusion of any allergies or side effects (gastropathies, coagulopathies, renal failure). Consider possible cross-sensitivity between NSAIDs and paracetamol.

<sup>2</sup> In a recent warning (29<sup>th</sup> July 2013), AIFA denied the use of codeine in patients under 12 years, for the risk of opioid toxicity. This risk seems to be increased among rapid metabolizers children and in those where codeine is used for post-operative analgesia after tonsillectomy and adenoidectomy.

<sup>3</sup> Perform titration until the lowest effective dose is reached (halving the initial NRS)

<sup>4</sup> Only in stable patients aged <65 yrs. For patients aged >65 years and/or unstable patients, halve the initial dose.

### Appendix 3: Algorithm for diagnosis and treatment of pain in the emergency setting





