Attachment 1: Tables and schemes

Tables

General Recommendations

References for specific patient groups

General schemes

Tables

General Recommendations

1. Recommendations for monitoring

1.1. Recommendations for monitoring analgesia

	LOE Oxford	GoR
• In intensive care patient-orientated treatment approaches to analgesia, sedation and delirium with individual patient-specific treatment goals are needed as well as the establishment of adequate monitoring of the effects of treatment application - both in terms of desired effects and side effects [3] [68] [69].	**1b** **2b** **2b**	**A**
• The goal of treatment and the current degree of analgesia, sedation and delirium should be documented at least every 8 hours. This should be standard on all ICUs [10] [70] [71].	**4**	**A**
• Validated scoring systems should be used to guide therapy and monitoring of analgesia, sedation and delirium [5].	**1b**	**A**
• Depending on the level of sedation, the following should be available for the monitoring of pain: ➔ in awake patients: Numerical rating scale (NRS), the Verbal rating scale (VRS) or visual analogue scale (VAS) [72] [73] [74] [75] ➔ in ventilated patients: Behavioural Pain Scale (BPS) and subjective criteria such as movement and facial expressions and physiological parameters such as blood pressure, heart and respiratory rate, lacrimation and sweating, and the changes in these parameters after analgesic therapy [75] [76] ➔ in dementia patients: PAINAD (Pain Assessment in Advanced Dementia) [77] [78]	**2b** **2b** **1b** **2b** **1b** **2b**	**A**

1.2. Recommendations for monitoring sedation

	LOE Oxford	GoR
• The sedation goal should be clearly defined for the individual patient and requires regular adaptation to the changing clinical situation [1].	**1b**	**A**
• In critically ill patients sedation and ventilation algorithms with specific safety checks and failure criteria should be used [25].	**1b**	**A**
• Sedation goal and level of sedation should be recorded at least 8-hourly [26].	**5**	**A**
• Valid and reliable scores to be used, such as the Richmond Agitation and Sedation Scale (RASS) [79] [3].	**1b** **1b**	**A**

• The importance of apparative measuring methods can not currently be fully evaluated. Their complementary use should, however, for very deep sedation (RASS -4/-5) or patients receiving neuromuscular relaxants be strived for in order to ensure early detection of over-and under-sedation [80] (2b), [81] (3b), [82] (2a).	**2b** **3b** **2a**	**B**

1.3. Recommendations for monitoring delirium

	LoE **Oxford**	**GoR**
• A regular targeted screening for symptoms of delirium with a valid and reliable score should be performed. [83] [84] [85] [86] (e.g, the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) [15] or Intensive Care Delirium Screening Checklist (ICDSC) [16] [86].	**1b** **2b** **2b** **2b**	**A**
• The result of the assessment for delirium should be documented at least 8 hourly.	**5**	**A**
• Attention should be paid to the following risk factors for delirium: anticholinergic medication [87] [88], patient factors (age, comorbidities, surgery, pain), severity of illness (including use of sedatives, mechanical ventilation and intubation), psychological and social factors, environmental and iatrogenic factors [89].	**2b** **2b** **2b**	**B**

2. Recommendations for the treatment

2.1. Recommendations for analgesia

	LoE **Oxford**	**GoR**
• ICU patients should receive individually customized pain therapy [17].	**1b**	**A**
• If a longer-term analgesia (> 72 hours) is needed, opioid therapy may be appropriate [90] [91].	**4**	**0**
• For shorter-term analgesia (≤ 72 hours) bolus application of piritramide and / or continuous administration of opioids such as remifentanil or sufentanil is appropriate [92] [93].	**4** **2b**	**0**
• In critically ill patients sufentanil or fentanyl can be used for therapy > 72 hours [92] [94] [95]. Downgrading: open-label	**2b** **2b** **2b**	**0**
• If the patients' condition allows (eg RASS 0/-1 or during weaning), the therapy can be converted to a patient-controlled technique [18] [19]. Downgrading: only cardiac surgery, small group of patients	**1a**	**0**

• Depending on the pain and potential side effects of medications, non-opioids as well as clonidine or ketamine can be used as an alternative or adjunctive drug [20]. Downgrading: Approval	**1a**	**0**
• The possibility of a combination with regional analgesia (particularly epidural analgesia) should be considered [95]. The placement of regional catheters and the initiation of therapy should be pre-operative, if possible [97] [21]. Downgrading: No studies in an isolated facility in the ICU, and potentially greater injury, infection and bleeding risk in critically ill patients	**1a**	**B**
• Potentially painful wound care should be performed only with adequate analgesic shielding (local anaesthesia, regional anaesthesia, conscious sedation or general anaesthesia). Upgrading: Ethical Commitment	**5**	**A**
• If the patient is awake and cooperative, patient-controlled analgesia (PCA) should be preferred over conventional methods, as better pain control and patient satisfaction are achieved [19].	**1a**	**B**

2.1.1. Recommendations for regional analgesia

	LoE **Oxford**	**GoR** **S3-LL**
• A critical and individual risk-benefit assessment should be performed before use of regional analgesia and this assessment should be repeated daily.	**5**	**B**
• Once indicated and after appropriate risk-benefit analysis, epidural catheter techniques are preferable, because (as compared to intravenous opioid-treatment) they result in improved peri-operative analgesia, [21] [22] a reduction of pulmonary complications, an improvement of intestinal motility and mobilization and reduced ICU length of stay LOS [98].	**1a**	**A**
• Epidural analgesia can be achieved either with local anaesthetic alone or in combination with an opioid. Both these are superior to sole epidural opioids regarding pain therapy [99].	**1a**	**B**
• The technique of neuraxial regional analgesia should be atraumatic. If not possible, the procedure should be aborted and the patient should be monitored closely for possible complications [70].	**5**	**B**
• To avoid or for early detection of neurological complications, it is particularly important to ensure that 8-hourly within the first 24 hours and then at least 1 x per day, a sedation level corresponding to RASS of 0/-1 is achieved, so that neurological examinations can be performed [70].	**5**	**A**
• When using neuraxial regional analgesia during anticoagulative therapy, the recommendations of the DGAI regarding time intervals for administration of antithrombotic agents should be followed [100] [101].	**5**	**A**

• For optimized pain therapy and the early detection of complications, a daily clinical examination should be carried out (monitoring of the catheter for dislocations, haemorrhage, signs of infection and need for dressing change). Daily quality control and as appropriate dose adjustment should also be performed [102] [103]. Upgrading:clinical Relevance	**2a**	**A**
• In case of suspected complications immediate diagnostic and therapeutic measures should be initiated. If this will not be possible - for patient-specific or organizational reasons - neuroaxial techniques should not be performed. Upgrading:clinical Relevance	**5**	**A**
• In order to improve safety and to facilitate decision making, local standards for the use of regional analgesic techniques in the ICU should be developed [104].	**4**	**B**

2.2. Recommendations for sedation

	LoE **Oxford**	**GoR**
• Deep sedation should be reserved for only a few specific indications [1] [9].	**1b**	**A**
• The choice of sedatives should be based, inter alia, on the anticipated duration of sedation and taking into account the context-sensitive drug half time [1].	**1b**	**B**
• Propofol should be preferably used for an expected sedation time up to 7 days [105] [106] [107].	**1b** **1a** **5**	**B**
• For sedation longer than 7 days, midazolam may be used. Propofol has no advantage in long time sedation, regarding the duration of weaning [106] [107]. Downgrading: Data on long term sedation (> 54h) were not conclusive.	**1a**	**B**
• For patients ≥ 16 years the propofol dosage should not exceed 4 mg / kg / h and a duration of 7 days. Close monitoring of acid-base balance and rhabdomyolysis parameters should be performed [107]. Upgrading: patient safety, no further study for ethical reasons.	**5**	**A**
• Etomidate should not be used for long term sedation [108] [109] [110].	**5**	**A**
• Etomidate should be used only as inductive hypnotic for intubation, and only in patients with severe cardiovascular failure [111] [112].	**2b**	**B**
• The adjuvant use of clonidine is acceptable at any time sedation and reduces the dose of other sedatives and analgesics [113] [114].	**1b**	**0**

• A normal day-night rhythm should be maintained in all not deeply sedated patients, primarily with non-pharmacological measures such as reduction of light, noise and night-time restriction of interventions [115] [116] [117]. Upgrading: clinical relevance	**4** **4** **3b**	**B**

2.2.1. Recommendations for inhalative sedation

	LoE **Oxford**	**GoR**
• In patients who are ventilated via tracheal tube or tracheostomy, inhalative sedation can be used as an alternative to intravenous sedation [27] [118] [119] [28] [120] [121] [122].	**1b**	**0**
• Inhalative sedation may be used if rapid waking up, rapid recovery of cognitive functions or a rapid mobilization is needed [27] [118] [119] [28] [120] [121] [122]. Downgrading: methods, small patient group	**2b**	**0**

2.3. Recommendations for weaning

	LoE **Oxford**	**GoR**
• Weaning should begin at the earliest possible date in order to avoid the complications of mechanical ventilation, improve outcome and to shorten ITS treatment [123] [9].	**1a**	**A**
• During weaning, sedatives with a short context-sensitive halftime should be used [124].	**1b**	**B**
• During weaning, analgesics with a short context-sensitive halftime should be used [125] [126].	**2b**	• **B**
• A weaning protocol should be used in combination with a sedation protocol [9] [123].	**1b**	**A**

2.4. Recommendations for delirium treatment

	LoE **Oxford**	**GoR**
• Low-dose haloperidol may be used prophylactically in geriatric delirious patients [88] [30]. Downgrading: risk patients small patient group	**1b**	**0**
• Either haloperidol, risperidone or olanzapine can be used in the treatment of delirium [30]. Downgrading: not only ICU patients	**1a**	**0**

• Symptom-orientated treatment of delirium should be started promptly [34].	**1b**	**A**
• The possibility of withdrawal syndrome as a cause of the delirium should always be considered [32] [127] [88].	**1b**	**A**
• Discontinuation of long-term sedation should be performed gradually in order to avoid withdrawal, and possibly in conjunction with adjuvant agents (e.g. clonidine) [127]. Downgrading: insufficient data to duration of sedation	**1b**	**B**
• In younger adults who were sedated longer than 72 hours and who are starting to show withdrawal symptoms, long lasting benzodiazepines can be given [128].	**2b**	**0**

3. Recommendations for economy, quality assurance and implementation

	LoE **Oxford**	**GoR**
• Analgesia and sedation in the ICU should be guidelines compliant and subject to quality assurance. Upgrading: improving patient safety	**5**	**A**
• Assuming that the nursing staff are critical care nursing specialists and possess experience and specialist skills, analgesia and sedation can be provided by nursing staff (using a syringe pump) according to predefined protocols and medical prescription [129] [130] [45]. Downgrading: feasibility	**1b** **1b** **3b**	**0**
• With the aim of increasing safety and to facilitate decision-making, local standards for analgesia, sedation (including the use of sedation protocols) and delirium therapy should be developed [9] [131].	**2b**	**A**
• For successful implementation of guidelines or standards, staff should be educated in their use [46]. Upgrading: Exclusion from application errors	**2b**	**A**

References for specific patient groups

4. Recommendations for patients with severe burn injuries

	LoE Oxford	GoR
Basic analgesia		
• Continuous intravenous administration of lidocaine for analgesia in burn patients should not occur [132].	**1a**	**A**
• Co-analgesics such as gabapentin can be used adjunctively to opioids in adult burn victims [133].	**3b**	**0**
• Ketamine should be used to reduce secondary hyperalgesia [134] [135] and to reduce opioid requirement [135] in burn victims.	**1b** **1b** **4**	**B**
Procedure pain in children with burn injuries		
• Ketamine should be preferred to opioids [137].	**2b**	**B**
• Adjunctive use of non-pharmacological methods (massage of non-burned areas, hypnosis) reduce opioid requirements and should be used in children [138] [139] [140].	**1b**	**B**

5. Recommendations for patients with multiple traumatic injuries

	LoE Oxford	GoR S3-LL
• In multiple trauma patients attention should be paid to the individual level of pain, especially since this is often underestimated by intensivists and nurses [10].	**4**	**A**
• Validated scoring systems will be used to guide therapy and monitoring of analgesia, sedation and delirium [5]. The Behavioral Pain Scale is validated to monitor the pain level in mechanically ventilated, trauma patients receiving analgosedation [76].	**1b** **2b**	**A**
• A daily sedation goal should be set and should be reviewed regularly using an appropriate sedation scale (e.g., RASS) [141] [142] [143].	**1b** **1b** **2b**	**A**
• Propofol should be preferred when rapid awakening (neurological assessment / extubation) is intended [144] [106].	**1a**	**B**
• Ketamine can be used for short interventions in combination with midazolam and / or propofol [145].	**5**	**0**

• For trauma patients, delirium screening with a valid scoring instrument should be performed several times a day due to their high risk of developing delirium [141] [142] [143].	**1b** **2b** **1b**	**A**
• A combined of sedation and weaning protocol should be used to reduce the ventilation period [143] [146].	**1b** **2b**	**B**

6. Recommendations for patients with severe traumatic brain injury and / or intracranial hypertension

	LoE **Oxford**	**GoR**
• Based on the current data no clear recommendations regarding particular instruments for the monitoring of analgesia or sedation in ICU patients with severe TBI and intracranial hypertension can be made. Neurological examination should be performed on these patients regularly [147].	**5**	**A**
• Racemic ketamine can be used during controlled ventilation (PCO_2 constant) and additive sedation with GABA receptor agonists (to suppress the excitatory component) can be used even in traumatic brain-injury patients with intracranial hypertension [145] [146] [149] [150] [151].	**2a** **2a** **2b** **2b** **4**	**0**
• Through the use of racemic ketamine (with its sympathomimetic and benign haemodynamic effects) a clinically relevant reduction of MAP and CPP can be avoided [148] [149].	**2a** **2b**	**0**
• Both racemic ketamine / midazolam-based or an opioid / midazolam-based sedation regimes can be used in mechanically ventilated traumatic brain injury patients with intracranial hypertension (no significant difference in effect on ICP, CPP) [149] [150].	**2a** **2b** **2b**	**0**
• An S (+) –ketamine / methohexital-based and a fentanyl / methohexital-based sedation regime can be used equally safely (with respect to ICP and CPP) and effectively (regarding sedation achieved) in mechanically ventilated traumatic brain injury patients with intracranial hypertension [152].	**2b**	**0**
• Bolus doses of opioids (sufentanil, fentanyl, alfentanil) should be administered in traumatic brain injury patients with intracranial hypertension only if the MAP is constantly monitored and maintained, because a significant drop in MAP and associated autoregulatory increase of CBV and ICP can otherwise occur [151] [153].	**4** **4**	**B**
• A continuous intravenous administration of opioids (remifentanil, sufentanil, fentanyl, morphine) in patients with intracranial hypertension should only be performed under continuous blood pressure monitoring [150] [154] [149].	**2b** **2b** **2b** **2b** **2b**	**B**

• Due to the favorable pharmacokinetics and thus possibility for rapid neurological evaluation, remifentanil should be preferred to other opioids for analgesia and sedation in neuro-trauma patients, provided conscious sedation will not be necessary for more than 72 hours [92] [147] [53] [155] [156].	**2b** **2a** **2a** **2a** **2b**	**B**
• Remifentanil can be safely administered (regarding effects on ICP, CPP) in craniocerebral trauma patients with intracranial hypertension, if PCO_2 and MAP are going to be monitored and kept constant [92] [147] [53] [155] [157].	**2b** **2a** **2a** **2a** **4** **4**	**0**

7. Recommendations for pregnant and lactating patients

	LoE **Oxford**	**GoR**
• The pharmacotherapy of acute pain in pregnant women should take into account effects on the unborn child. Upgrading: clinical relevance	**5**	**A**
• The indication for pharmacotherapy should always be critically considered. Upgrading: clinical relevance	**5**	**A**
• Adequate pain therapy after cesarean section is imperative [158]. Upgrading: clinical relevance	**5**	**A**
• NSAID's can be given during lactation [159] [70].	**5**	**0**
• Paracetemol is the non-opioid of choice during pregnancy [160] [161] [162] [163] [164] [160].	**4**	**0**
• Metamizole is contraindicated in the 1st and 3rd trimester, but can be given in the 2nd trimester [159] [165].	**2b**	**0**
• In the 1st and 2 Trimester of pregnancy ibuprofen, diclofenac and indomethacin can be given, in the 3rd Trimester, there is a relative contraindication to NSAIDs [166] [167] [57].	**2b** **3b**	**0**
• COX-2 inhibitors should not be given during pregnancy and while breastfeeding [168].	**5**	**B**
• Fentanyl, piritramide, sufentanil may be used during pregnancy for analgesia [169] [170].	**1b** **4**	**0**
• Buprenorphine can be used if long-term opioid therapy is indicated in pregnancy [171].	**4**	**0**
• Breastfeeding should be restarted no earlier than 24 h after the last Piritramide dose. *Information of manufacturers*	**5**	**B**

• During breastfeeding epidural, parenteral and oral opioids should be administered with caution [172] [173] [174] [175].	**2b** **3b**	**B**
• Sedatives should be used only when strictly indicated in pregnant women. *Information of manufacturers*	**5**	**B**

8. Recommendations for elderly patients

	LoE **Oxford**	**GoR**
• There should be regular, active screening for delirium because advanced age is a strong predictor for hypoactive delirium in ICU patients [176] [84] [85].	**2b**	**A**
• In patients with advanced dementia the "PAINAD Scale" (pain assessment in advanced dementia) can be used for pain assessment [77] [78].	**4**	**0**
• The Faces Pain Scale (FPS) and the verbal rating scale (VRS) are reliable and valid and should be used [177] in elderly patients to measure pain intensity.	**1b**	**A**
• Anticholinergic drugs should be avoided in elderly patients [87] because of the high delirium risk.	**1a**	**A**

9. Recommendations for moribund and dying patients

	LoE **Oxford**	**GoR** **S3-LL**
• Dying patients are equally entitled to patient-oriented medical and nursing care. Through regular monitoring of dying patients and in accordance with the general guidelines, freedom from all symptoms are should be secured. Upgrade: clinical relevance	**5**	**A**
• Dying patients should receive anxiolytic and analgesic therapy as required, even if this leads to an acceleration of the dying process [178-180]. Upgrade: clinical relevance	**5**	**A**
• Neuromuscular blocking drugs should not be used in dying patients because it will not be possible to adequately assess the clinical condition of the patient.. Upgrade: clinical relevance	**5**	**A**

10. Recommendations for newborns and in children ages

10.1. Recommendations for monitoring

10.1.1. Recommendations for analgesia monitoring

	LoE Oxford	GoR
• Age-validated scoring systems are to be used in children to guide therapy and monitor for pain, over- or under-sedation, and delirium [181].	**1a**	**A**
• In the pediatric intensive care a patient-orientated concept for analgesia, sedation and delirium with individually tailored treatment goals should be used.	**5**	**A**
• If possible, children should rate their pain level themselves [182].	**2b**	**A**
• In children, behavioral traits such as facial expression, crying, movement, posture, activity, restlessness, apathy, and the external manifestation of pain should be considered to be valid indicators of the presence of pain [183] [184].	**1b**	**A**
• For children from about the 4th year of life, the revised Faces Pain Scale is best for self-assessment [185]. From school age the numerical rating scales or visual analogue scales possible are acceptable alternatives.	**1b**	**A**
• The childrens discomfort and pain scale (KISS) is a validated and feasible scale to assess acute postoperative pain in non-ventilated infants and children up to about 4 years of age [186].	**1b**	**A**
• The Comfort Scale B is for external evaluation of acute postoperative pain in ventilated infants [187].	**1b**	**A**
• An additional assessment of the scale's output will be made in the clinical context, the stress level should be documented regularly as a control using an analgesic therapy [188].	**1a**	**A**
• An evidence-based recommendation for a particular neonatal "pain" scale can currently not be expressed [189].	**1a**	**0**

10.1.2. Recommendations for monitoring sedation

	LoE Oxford	GoR
• The Neonatal Pain, Agitation and Sedation Scale (N-PASS) allows for the assessment of sedation in cases of premature newborns and newborns [58].	**2b**	**0**
• The Comfort Scale B is to be used for external evaluation of the sedation of infants and children [187].	**1b**	**A**

10.1.3. Recommendations for delirium monitoring

	LoE Oxford	GoR
• A regular targeted screening for delirious delirium symptoms with an appropriate score is to be performed [12] [83] [84].	**1b** **1b** **2b**	**A**
• The possibility of an opioid and benzodiazepine withdrawal syndrome should be kept in mind in particular after continuous therapy. These medications should be tapered if possible [190].	**2b**	**B**

10.2. Recommendations for treatment

10.2.1. Recommendations for analgesia

	LoE Oxford	GoR
• Critically ill children in intensive care units should be provided with analgesia as required regardless of the requirement for sedation [191].	**2a**	**A**
• Continuous intravenous infusion of opioids should be used on neonatal and pediatric intensive care unit to treat severe pain [192] [193].	**2b**	**B**
• Severe pain in older children should be treated using an opioid in combination with a non-opioid [194] [195] [196] [197].	**1b**	**A**
• Local, regional and neuraxial analgesia should be considered [198].	**4**	**B**
• Patient-controlled analgesia (PCA) can be useful in children from 5 years of age [199]. In children < 6 years of age, a parent and / or nurse-controlled analgesia can be used [200].	**4**	**0**
• Additional measures to reduce acute, procedural pain in newborns should be considered (e.g. sucrose po or the use of non-pharmacological measures (eg non-nutritive sucking) [201] [202] [203].	**1a** **1b**	**A**

10.2.2. Recommendations for sedation

	LoE Oxford	GoR
• Midazolam can be used for sedation in older, critically ill children who require intravenous sedation. This may be continuously administered [204].	**4**	**0**
• Longer-term sedation of neonates should be undertaken only in very exceptional cases, such as life-threatening, otherwise uncontrollable agitation, and only after critical risk-benefit analysis [205].	**1a**	**A**

• Using midazolam as a sedative should be avoided if possible due to its very adverse side effect profile.	**1a**	**A**
• In the rare cases where sedation is required in neonates, morphine should be used in preference to midazolam [206]. *Downgrading: insufficient evidence at this point of the review*	**1a**	**B**
• The dosage of sedative drugs should be carefully titrated to the desired level of sedation.	**5**	**B**
• In children the continuous intravenous administration of clonidine, as an adjuvant to or instead of midazolam, is possible provided that the hemodynamics effects are taken into account.	**2b**	**0**
• In older, critically ill children, enteral sedatives should be used as early as possible [207].	**1b**	**B**
• For premature and fullterm neonates, both chloral hydrate (orally or rectally) and phenobarbital should be used only after careful risk-benefit-analysis (particular consideration should be paid to the effects on cerebral development and duration of ventilation) [208] [209].	**1b**	**B**

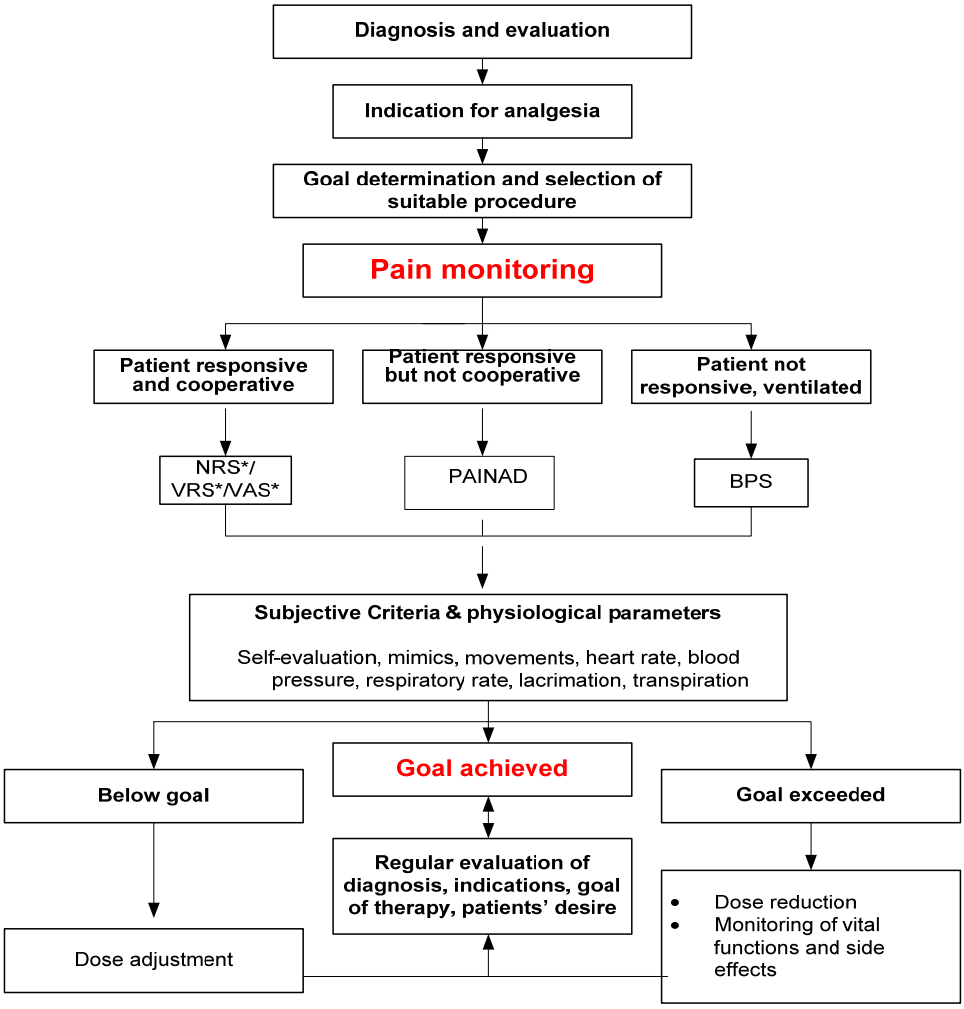
10.2.3. Recommendation for delirium treatment

	LoE **Oxford**	**GoR**
• The treatment of delirium in children should be a combined psychosocial and pharmacological approach [64] [65] [210].	**4**	**B**

General schemes

1. Schemes for monitoring

1.1. Scheme for monitoring analgesia



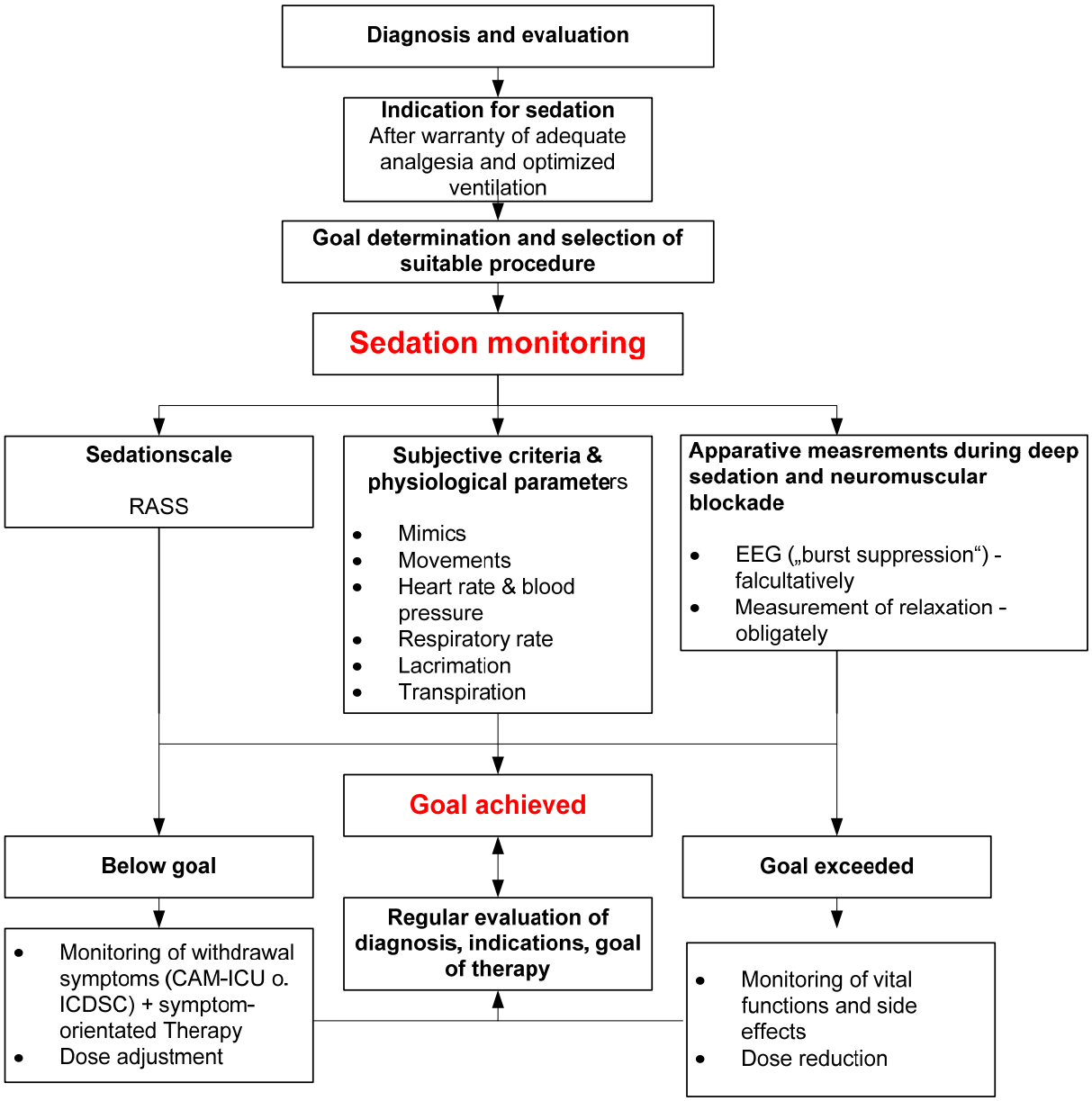
* dependent on the individual pain acceptance of th patient,

Legend:

VAS: Visual Analogue Scala, VRS: Verbale Rating Scala, NRS: Numeric Rating Scale (0-10)

BPS: Behavioral Pain Scale (3-12), PAINAD: Pain Assessment in Advanced Dementia (0-10)

1.2. Scheme for monitoring sedation



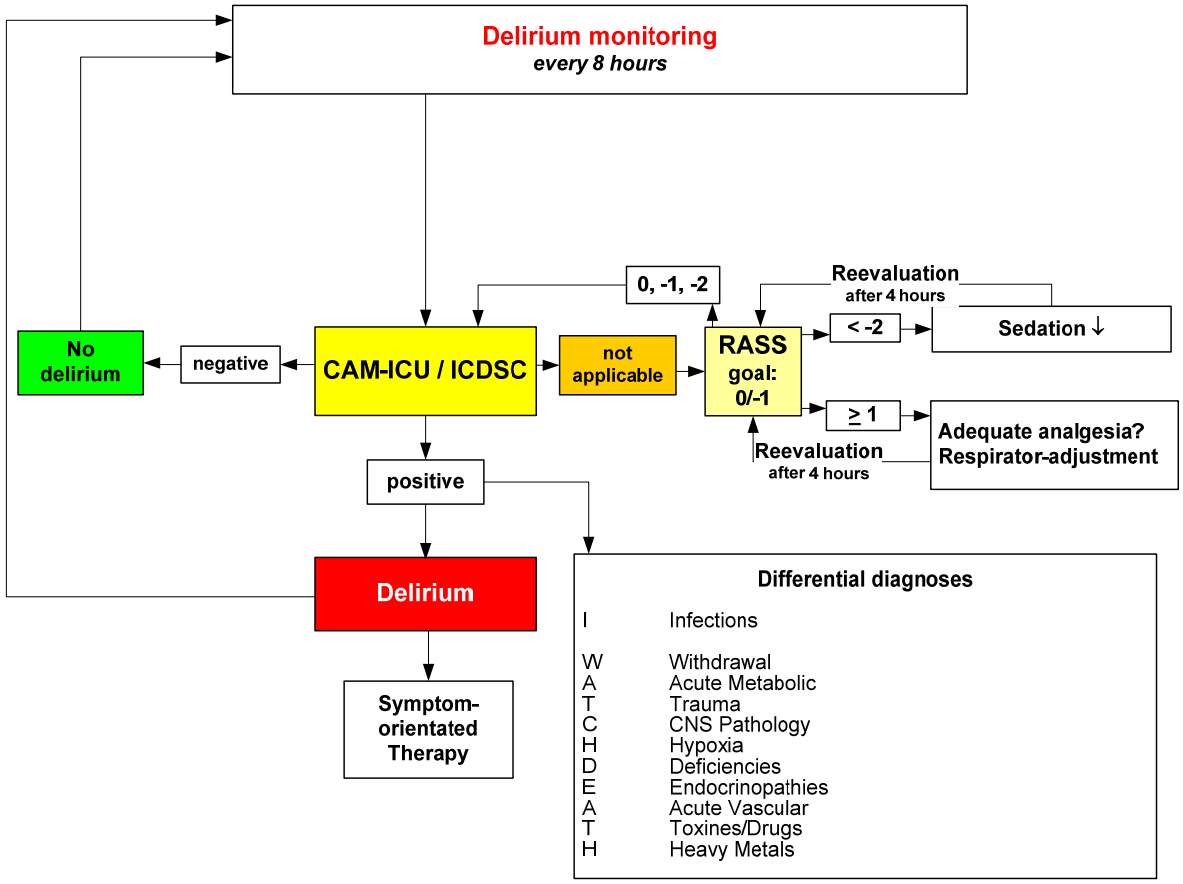
Legend:

RASS: Richmond Agitation Sedation Scale (-5 to +4)

CAM-ICU: Confusion Assessment Method for the ICU (positive/negative)

ICDSC: Intensive Care Delirium Screening Checklist (0-8)

1.3. *Scheme for monitoring delirium*



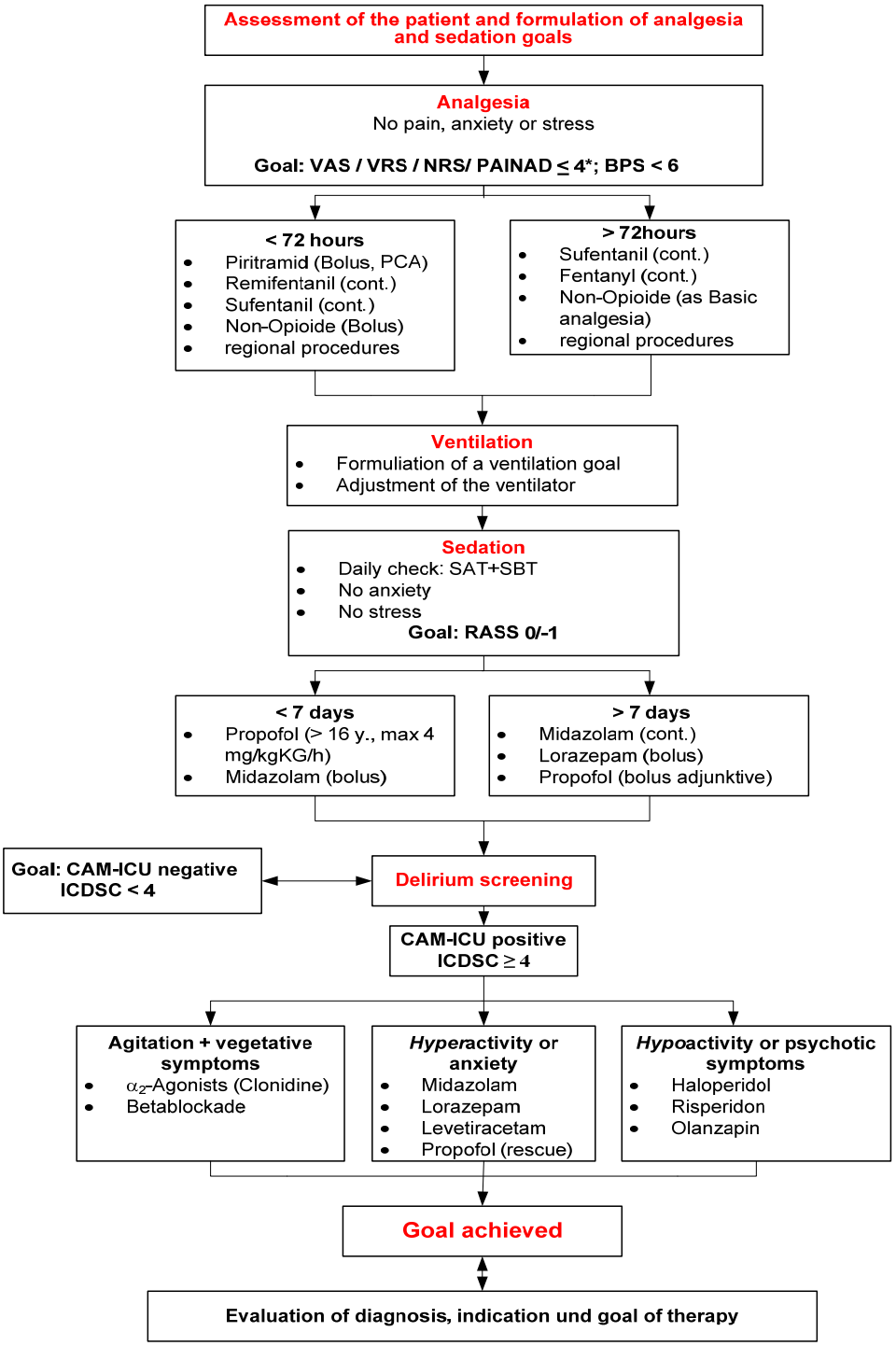
Legend:

RASS: Richmond Agitation Sedation Scale (-5 to +4)

CAM-ICU: Confusion Assessment Method for the ICU (positive/negative)

ICDSC: Intensive Care Delirium Screening Checklist (0-8)

2. Overall-scheme for analgesia, sedation and delirium treatment in adults



* dependent on the individual pain acceptance of th patient,

RASS: Richmond Agitation Sedation Scale (-5 to +4)

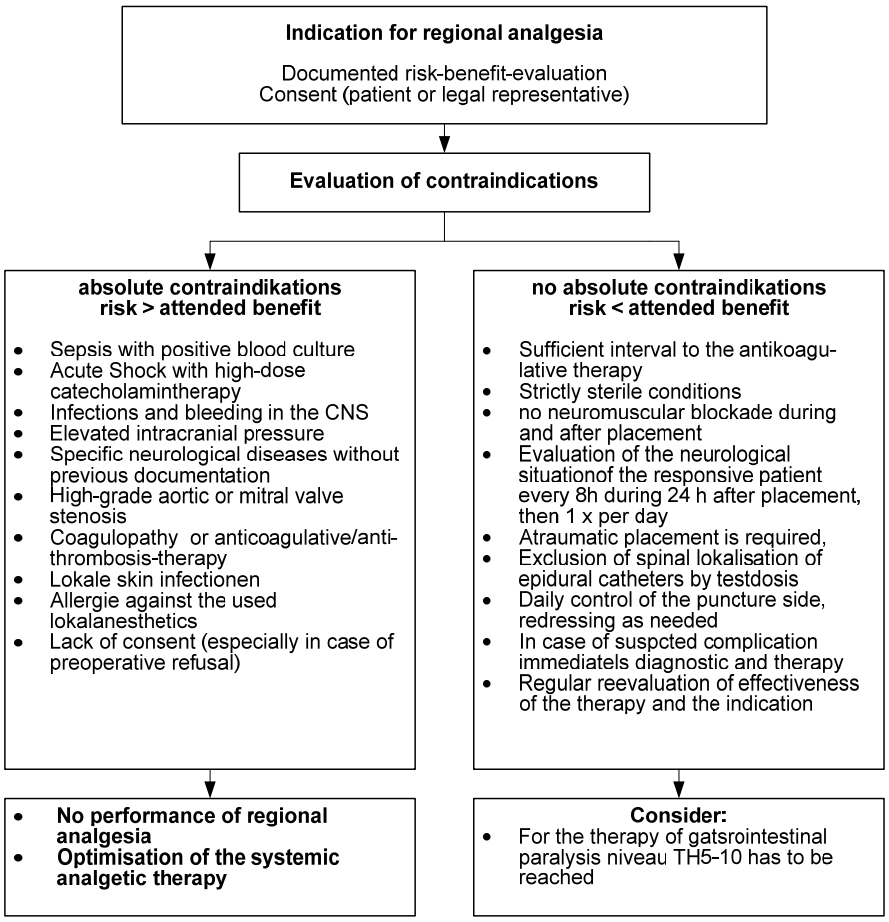
VAS: Visual Analogue Scala, VRS: Verbale Rating Scala, NRS: Numeric Rating Scale (0-10)

BPS: Behavioral Pain Scale (3-12), PAINAD: Pain Assessment in Advanced Dementia (0-10)

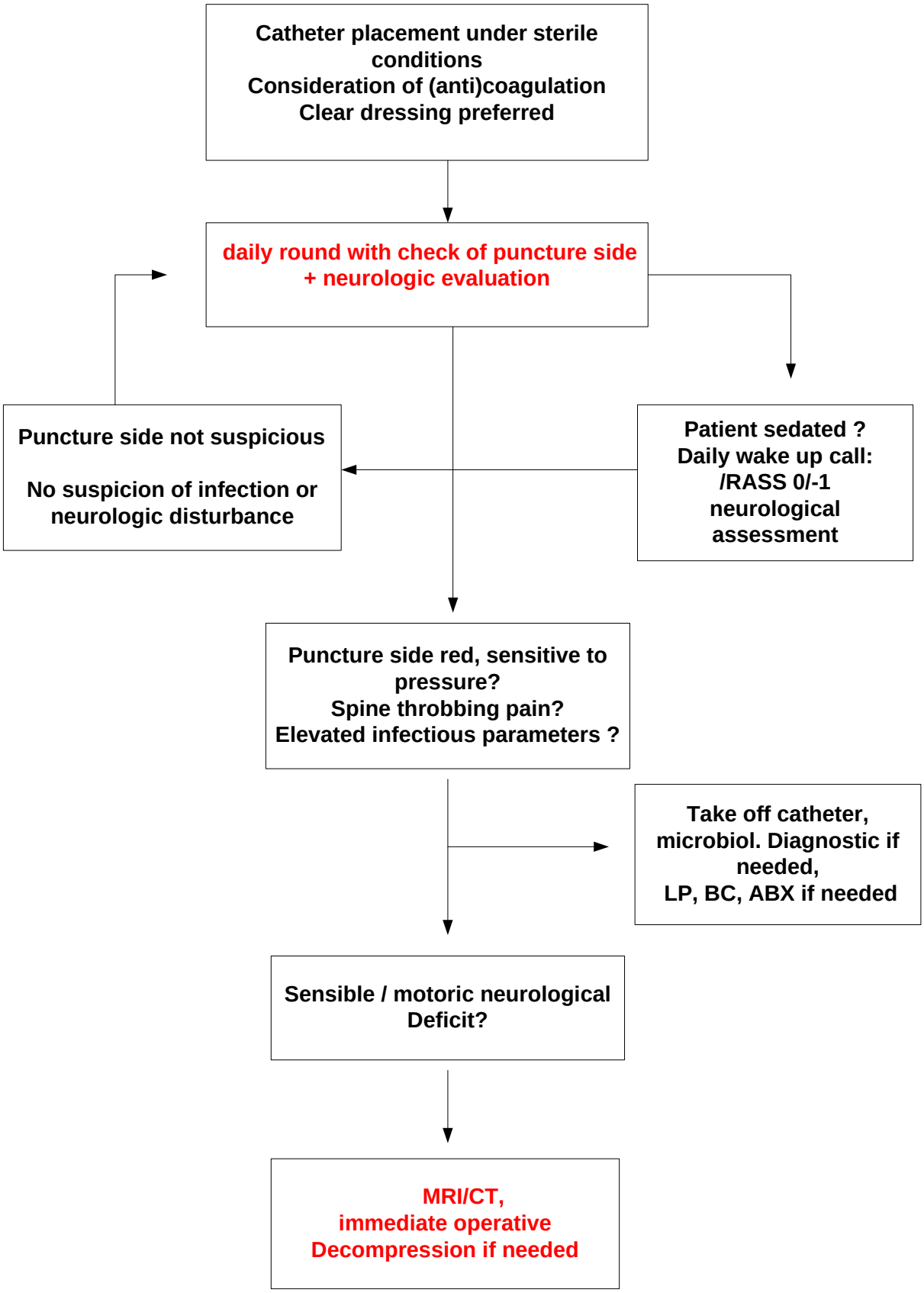
CAM-ICU: Confusion Assessment Method for the ICU (positive/negative)

ICDSC: Intensive Care Delirium Screening Checklist (0-8)

2.1. Scheme for general proceeding in regional analgesia

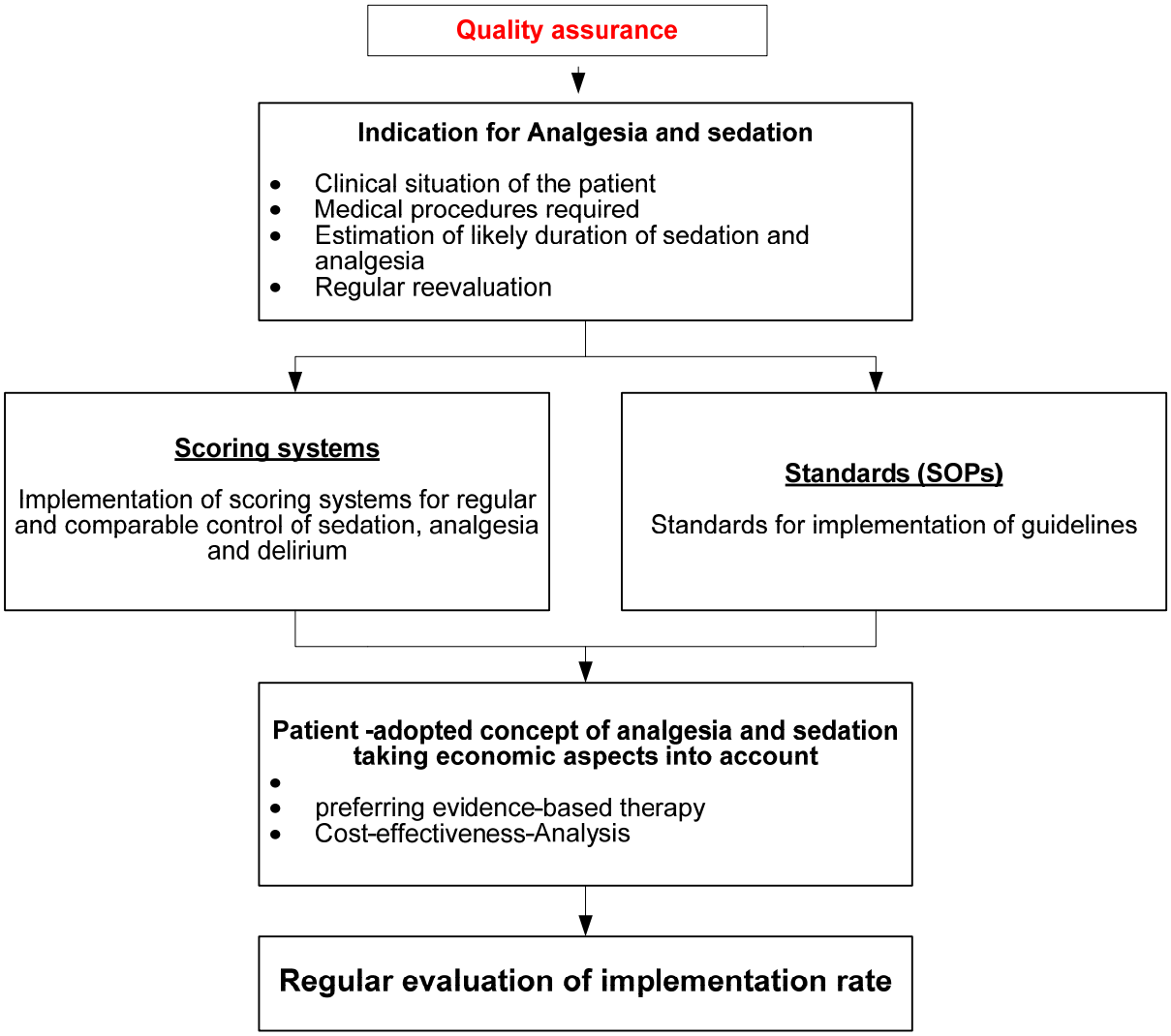


2.2. Scheme for management of complications of regional analgesia

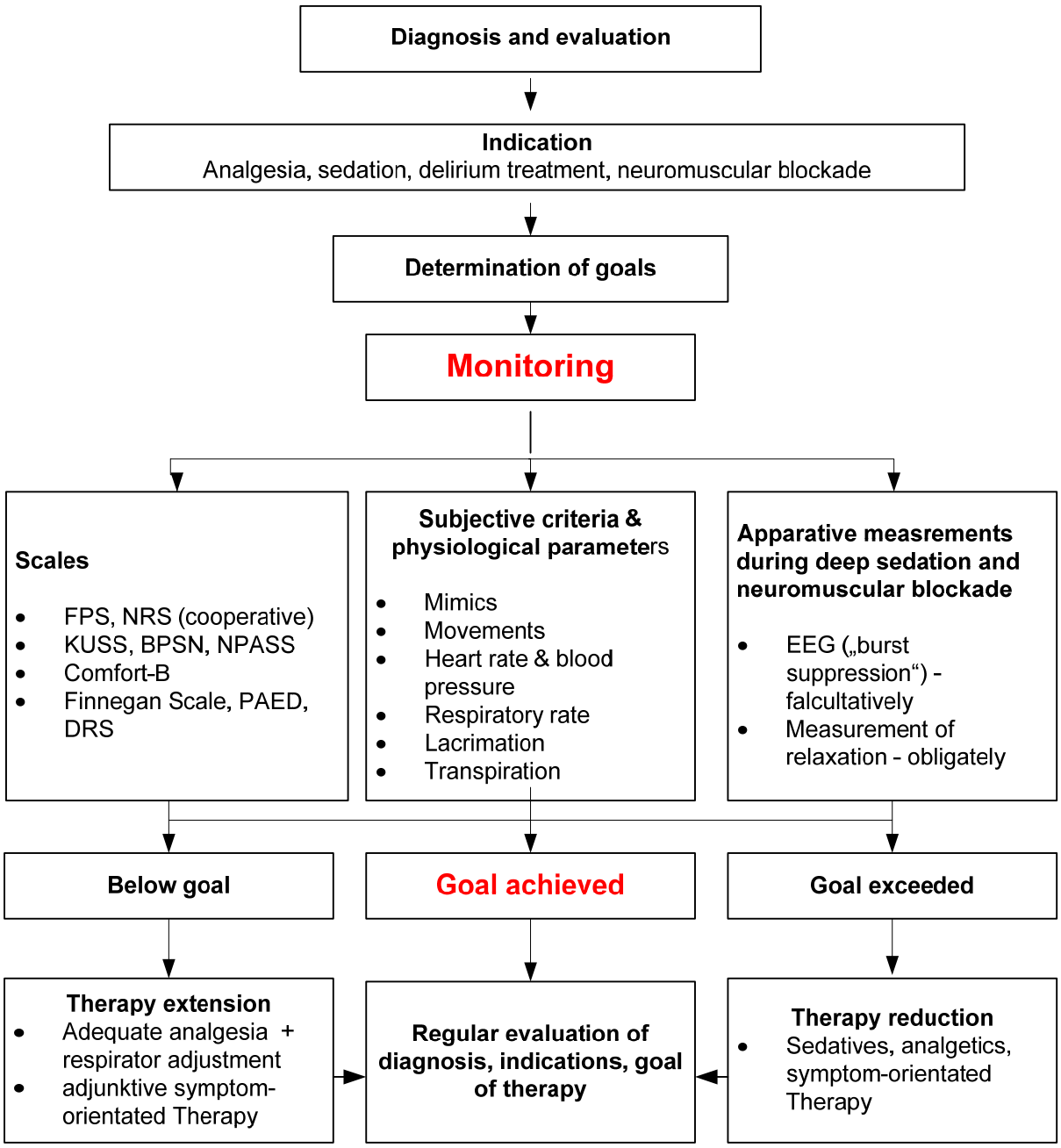


ABX: Antibiotics , BC: Blood Culture, CT: Computer tomography, Dx: Diagnostic, MRI: Magnetic resonance imaging

3. Scheme for ecomonics, quality assurance and implementation



4. Scheme for general monitoring in newborns and in children age



FPS: Faces Pain Scale, NRS: Numerice Rating Scale,

KUSS: Kindliche Unbehagen- u. Schmerz Skala

BPSN: Berner Schmerzscore für Neugeborene

NPASS: Neonatal Pain, Agitation and Sedation Scale

PAED: Pediatric Anesthesia Emergence Delirium Scale

DRS: Delirium Rating Scale

5. Overall scheme for treatment of neonates and in childhood