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Practice Guidelines in Anesthesia



Indian College of Anaesthesiologists
Whole Constituent of
Indian Society of Anaesthesiologists
(Member of the World Federation of
Societies of Anaesthesiologists)

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CHAPTER 4

Acute Pain Management Guidelines and Protocols: Evidencebased

Ashok Kumar Saxena

Work over the past thirty years has rejected the model of a pain mechanism as caused by a fixed rigid modality dedicated mechanism. The process, which produces pain, is plastic and changes sequentially with time. That essential mobility of mechanism exists in damaged tissue, in the peripheral nerves and spinal cord. This movement of pathology from periphery to center proceeds with the triggering of reactive processes in the brain. It presents the therapist with a migrating distributed target.

— Professor Patrick Wall

Underassessment and undertreatment of pain appears to be common in the developing nations and even in the developed world.

DEFINITION

ASA Task Force defines acute pain as pain that is present in a surgical patient after a procedure.[1]

In the opinion of ASA Task Force, acute pain management in the perioperative setting is referred to as actions done before, during, and after a procedure to reduce or eliminate postoperative pain before discharge.[1]

Acute pain management guidelines are being developed as a measure of providing optimum pain relief. They need to be reviewed at regular intervals and can be adopted, modified or rejected with the changing and upcoming evidence which emerges from time to time.[1] They may or may not be adopted completely in a particular set-up, and can be modified in a specific set-up depending on the availability of resources and clinical requirements. It is for sure that these guidelines being developed are based on the available evidence in the literature. We have to accept that even their application cannot guarantee any specific outcome.[1]

Acute pain is the most frequently encountered variety of pain all over the world. It is an important and significant aspect of childbirth, surgeries, trauma and acute medical illness.[2] Acute pain is also responsible for being the reason in more than two-thirds of consultations in emergency department.[3]

Whereas pain is considered to be an experience with sensory, cognitive, and emotional components, nociception refers to neural process by which stimuli that can elicit pain are detected by the nervous system.

Despite recent advances in the development of newer opioids and non-opioids molecules, and despite the use of minimally invasive surgery, millions and millions of people not only in developing nations, but also in developed

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world continue to suffer because of inadequate assessment and undertreatment.

It is very well established that uncontrolled and unrelieved acute pain not only results in high degree of suffering and discomfort, but also results in terrible consequences like delayed wound healing, loss of body weight, increased hospital stay, and the ultimate risk of development of chronic persistent postsurgical pain.[4-7]

AIMS OF THE GUIDELINES

1. To facilitate the safety and effectiveness of acute pain management in the perioperative setting.
2. To reduce the risk of adverse outcomes.
3. To maintain the patient's functional abilities, as well as physical and psychologic well-being.
4. To enhance the quality of life for patients with acute pain during the perioperative period.[1]

Scientific Evidence

All these guidelines are based on scientific evidence which have been defined as follows:

Category A

Supportive literature—based on randomized controlled trials (RCT)[1]

a. *Level 1*: The literature contains multiple RCTs and findings are supported by meta-analysis.
b. *Level 2*: The literature contains multiple RCTs, but the number of studies is insufficient to conduct a viable meta-analysis
c. *Level 3*: The literature contains a single randomized controlled trial.

Category B

Suggestive literature— information obtained from observational studies.[1]

a. *Level 1*: The literature contains observational comparisons (e.g., cohort, case-control research designs) of clinical interventions or conditions and indicates statistically significant differences between clinical interventions for a specified clinical outcome.
b. *Level 2*: The literature contains noncomparative observational studies with associative (e.g., relative risk, correlation) or descriptive statistics.
c. *Level 3*: The literature contains case reports.

Category C

Equivocal literature—indeterminate information in the literature which can be beneficial and harmful in various interventions.[1]

a. *Level 1*: Meta-analysis did not find significant differences among groups or conditions.
b. *Level 2*: The number of studies is insufficient to conduct meta-analysis, and (1) RCTs have not found significant differences among groups or conditions or (2) RCTs report inconsistent findings.
c. *Level 3*: Observational studies report inconsistent findings or do not permit inference of beneficial or harmful relationships.

Category D

Insufficient evidence from literature.[1]

The lack of scientific evidence described as inadequate or silent.

Opinion-based Evidence

Obtained from survey data, open-forum testimony, internet-based comments, letters, editorials.[1]

Category A

Expert opinion[1]

In this category, survey responses can be obtained from the "Task force" appointed expert consultants.

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Category B

Membership based opinion.[1]

In this category, survey responses can be obtained from the active ASA members using a 5 point score:

1. Strongly agree
2. Agree
3. Equivocal
4. Disagree
5. Strongly disagree

Category C

Consensus based opinion.[1]

In this category, information can be obtained through open forum testimony from previous updates, internet based comments, letters, and editorials informally evaluated and discussed.

ASA TASK FORCE'S RECOMMENDATIONS FOR PROVIDING POST OPERATIVE PAIN MANAGEMENT

Institutional Policies and Procedures Providing Perioperative Pain Management.[1]

It includes:

1. Education and training for healthcare providers
2. Monitoring of patient outcomes
3. Documentation of monitoring activities
4. Monitoring of outcomes at an institutional level
5. 24-hours availability of anesthesiologists providing perioperative pain management
6. Use of a dedicated acute pain service.
   - In the opinion of Gleman et al, Harmer et al, Rose et al and White anesthesiologists offering perioperative analgesia services as a perioperative physician should be knowledgeable and skilled with regard to the effective and safe use of the available treatment options (Category B2 evidence).[8-11]
   - Briggs et al, Camp et al, Clarke et al, Davis et al, Enhfors et al and Bardiau et al, suggest that educational content should range from basic bedside pain assessment to pharmacological as well as nonpharmacological techniques.[12-18]
   - The above authors also recommends that anesthesiologists and healthcare personnel should use standardized and validated instruments for evaluation and documentation of pain intensity.[12-18] At every cost, pain should be implemented as a 5th vital sign in each hospital.
   - In the opinion of Bardiau et al, Gould et al, Mackintosh et al, Miaskowski et al , Pesut et al, Sartain et al, Stacey et al and Stedler et al, anesthesiologists should be available all the time (24 hours availability) to consult with ward nurses, surgeons or other physicians involved in providing perioperative pain services (Category D evidence). Adverse effects associated with the analgesic therapy should be documented and promptly dealt with.[19-27]
   - The above authors also recommends that anesthesiologists providing perioperative analgesia services should do with in the frame work of the acute pain services. Observational studies indicate that acute pain services are associated with reduction in perioperative pain (Category B2 evidence). They should participate in developing standardized institutional policies and procedures.[19-27]

Preoperative Evaluation of the Patient

It includes:

1. Directed history and preoperative pain mapping.
2. Directed physical examination and relevant investigations.
3. Acute pain control plan
   - Furdon et al suggest a directed pain history and preoperative pain

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mapping (e.g. medical record review, current medications, adverse effects, pre-existing pain conditions, medical conditions that would influence a pain therapy, nonpharmacologic pain therapies, alternative and complementary therapies.[28] (Category D evidence).
- Furdon et al emphasise on a directed physical examination and relevant investigations.[28]
- In the opinion of Anderson and Daltroy et al, acute pain control plan should be included in the anesthetic preoperative evaluation.[29,30] Implementation of pain management protocol is associated with reduced analgesic use, shorter time to extubation, and shorter time to discharge (Category B2 evidence).

Preoperative Preparation of the Patient

It includes:
1. Adjustment or continuation of medications whose sudden cessation may provoke a withdrawal syndrome
2. Treatments to reduce pre-existing pain and anxiety
3. Premedications before surgery as part of a multimodal analgesic pain management program
4. Patient and family education, including behavioral pain control techniques.[30-36]
   - Appropriate titration, adjustment or continuation of medications in order to avert withdrawal syndrome should be included in patient preparation (Category D evidence).
   - Daltroy et al and Egbert et al emphasize on the treatment of pre-existent pain, preoperative education by encouragement and instructions of postoperative pain management therapy.[30,31]
   - Anesthesiologists offering perioperative analgesia services should impart, in collaboration with other healthcare personnel, patient and family education regarding their important roles in achieving comfort, reporting pain, and in proper use of the recommended analgesic methods (Category C2 evidence).
   - Overestimation of the risk of adverse events and addiction are the common misconceptions that should be dispelled.
   - Optimal use of PCA and other sophisticated methods, such as patient —controlled epidural analgesia (PCEA) depending on the infrastructure available.
   - And other analgesic methods should be discussed at the time of the preanesthetic evaluation through brochures and videotapes to educate patients about therapeutic options.
   - In the opinion of Elsass et al, Griffin et al, Knoerl et al, Lam et al, and Lilja et al such structured preoperative education may also include instruction in behavioural modalities for control of pain and anxiety.[32-36]

Perioperative Techniques for Pain Management

Perioperative techniques for postoperative pain management include, but are not limited to the following single modalities:
1. Central regional (*i.e.* neuraxial) opioid analgesia.[37,38]
2. PCA with systemic opioids.[40,41] RCTs report equivocal findings regarding the analgesic efficacy of IV PCA techniques when compared with nurse or intravenous analgesia (Category 2 evidence). Meta-analyses of RCTs report improved pain scores when IV PCA morphine is compared with intramuscular morphine (Category A1 evidence). Meta-analyses of RCTs indicate more analgesic use when IV PCA with a background infusion of morphine is compared with IV PCA without background infusion (Category A1 evidence).

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3. Peripheral regional analgesic techniques, including but not limited to intercostal blocks, plexus blocks, and local anesthetic infiltration of incisions.[41,42] Meta-analyses of RCTs report improved pain scores when preincisional infiltration of bupivacaine is compared with saline (Category A1 evidence).

   Meta-analyses of RCTs are equivocal for pain scores and analgesic use when post-incisional infiltration of bupivacaine is compared with saline (Category C1 evidence). Meta-analyses of RCTs report improved pain scores when preincisional infiltration of ropivacaine is compared with saline (Category A1 evidence). Meta-analyses of RCTs report less analgesic use when preincisional plexus blocks with bupivacaine are compared with saline (Category A1 evidence).
4. TAP block—Carney et al have recently shown that transversus abdominis plane block (TAP) provides effective postoperative analgesia with reduced pain scores at rest and with movements in patients undergoing total abdominal hysterectomy. Perhaps the block of the abdominal wall (musculature and skin) is a more strategic and effective approach than simple skin infiltration.[43]
   - Boldt et al and Murphy et al suggest that anesthesiologists who manage perioperative pain should use therapeutic options such as epidural or intrathecal opioids, systemic opioid PCA, and regional techniques after considering the risks and benefits for the individual patient.[39,40]
   - RCTs comparing preoperative or preincisional intrathecal morphine or epidural sufentanil with saline placebo report inconsistent finding regarding pain relief (Category C2 evidence). RCTs comparing preoperative or preincisional epidural morphine or fentanyl with postoperative epidural morphine or fentanyl are equivocal regarding postoperative pain scores (Category C2 evidence).
   - These modalities should be used in preference to intramuscular opioids ordered as needed.
   - Therapy should be selected according to individual anesthesiologist's skills and the safe application of the modality.
   - Special caution should be applied when continuous infusion modalities are used because drug accumulation may contribute to adverse events.[40,42]

Multimodal Approach for Pain Management

- Multimodal techniques for pain management include the administration of two or more drugs that act by different mechanisms and at different sites in the nervous system, resulting in additive and synergistic analgesia with lowered adverse effects of sole administration of individual analgesics. These drugs may be administered *via* the same route or by different routes.[44-46]
- Schmid et al[47] and Subramaniam et al[48] have shown that low dose Ketamine play a significant role in providing postoperative pain relief when used as an adjuvant analgesic to local anesthestic, opioids and other analgesics. In the opinion of Aubrun et al, and Engelhardt et al, sometimes lack of effect of Ketamine may be due to too low dose of Ketamine or not planning to continue the dose in the postoperative period.[49,50]
- Regional blockade with local anesthetics should be considered.[51,52]
- Tramer et al[53] and Koinig et al[54] observed that at very high doses, perioperative intravenous Magnesium sulfate reduces postoperative morphine consumption but not the pain scores.
- Latest ASA Task Force Practice guidelines for acute pain management in the perioperative setting state that unless contraindicated, patients should receive an around the clock regimen of NSAIDs, Cyclooxygenase-2-selective inhibitors, or acetaminophen.[55-58]

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Improved pain scores reported when intravenous morphine is combined with ketorolac (Category A1 evidence). Findings for acetaminophen are equivocal (Category C2 evidence).

- Andrieu et al[59] and Lavand et al[60] have shown efficacy of intrathecal Clonidine for postoperative analgesia following radical prostatectomy[58] and elective cesarean.[59] Also Famery et al observed lower pain scores following epidural Clonidine infusion for spine surgery.[61]
- Dexmedetomidine may be given during the postoperative period to reduce PCA morphine requirements. Lin et al[62] and Tufanogullari et al[63] observed that patients on dexmedetomidine required less morphine.
- Dosing regimens should be administered to optimize efficacy while minimizing the risk of adverse events.[55-58]
- Alpha 2 δ ligands like gabapentin or pregabalin alone or in combination with dexamethasone can also be used perioperatively in adequate doses for their opioid sparing effects. Clinical trials with gabapentin or pregabalin for postsurgical pain have been conducted by Mathiesen et al,[64,65] Jokela et al,[66] Agarwal et al[67] and Gilron.[68] IV opioids combined with alpha 2 δ ligands like gabapentin or pregabalin, report lower pain scores (Category A1 evidence).
- Huang et al noticed lower pain scores following perioperative Celecoxib administration for pain management in patients undergoing total knee arthroplasty.[55]
- The choice of medication, dose, route, and duration of therapy should be individualized.
- Moodie et al observed lower mean morphine consumption in the intranasal Ketorolac group patients undergoing major abdominal or orthopedic surgery.[69]
- In patients undergoing total hip arthroplasty under spinal anesthesia, perioperative intravenous Dexamethasone can be considered as Kardash et al have shown that it reduces pain upon standing at 24 hours.[70]

Types of Multimodal Techniques

Two or more analgesic agents, one route *versus* a single agent, one route[1]

- Epidural or intrathecal analgesia with opioids combined with:
  - Local anesthetics *versus* epidural opioids
  - Local anesthetics *versus* epidural local anesthetics
  - Clonidine *versus* epidural opioids
- IV opioids combined with:
  - Clonidine *versus* IV opioids
  - Ketorolac *versus* IV opioids
  - Ketamine *versus* IV opioids
  - Oral opioids combined with NSAIDs, COXIBs, or acetaminophen *versus* oral opioids
- Dexamethasone.

Two or more drug delivery routes *versus* a single route[1]

- Epidural or intrathecal analgesia with opioids combined with IV.
- Intramuscular, oral, transdermal, or subcutaneous analgesics *versus* epidural opioids.
- IV opioids combined with oral NSAIDs, COXIBs, or acetaminophen *versus* IV opioids.
- Nonpharmacologic, alternative, or complementary pain management combined with pharmacologic pain management *versus* pharmacologic pain management.

Continuous Multimechanistic Post-operative Analgesia

- Pergolizzi et al suggest rationale for transitioning from intravenous Acetaminophen and opioids to oral formulations.[71]
- Pergolizzi et al emphasize that the use of IV. Acetamoniphen and opioids in the preoperative period could transition to oral formulations of the same agents in the same proportions for postsurgical pain management.[71]

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- Oral fixed dose combination (Tramadol + Acetamoniphen) or loose dose combinations could be used, as appropriate to meet the needs of individual patients.[72-78]

Special Populations

Pediatric patients

Children's pain matters–for the child, For the family, and for the society

Very low birth weight infants may be admitted in the neonatal ICU for months together, and obviously they are highly vulnerable to pain from recurring procedures due to immaturity of their CNS and rapid brain development occurring in the last trimester of fetal life.[79] Also Grunau et al[80] suggest that prolonged untreated pain suffered early in life, independent of morphine exposure, may have long lasting effects on the individual pattern of stress hormone responses in vulnerable infants.

- Optimal care for infants and children requires special attention to the biophysical nature of pain. Pediatric population presents developmental differences in their experience and expression of pain and sufferings, their response to analgesic pharmacotherapy.
- Caregivers may assume that pain is not present and defer treatment. Safe methods of providing analgesia are underutilized for fear of opioid-induced respiratory depression. However the emotional component of pain is particularly strong in infants and children.
- The task force (of American Pain Society) on pain in infants recommended that aggressive and proactive pain management is essential to streamline the undertreatment of pain in children.[81,82]
- The task force (of American Pain Society) on pain in infants recommended that perioperative care for children undergoing painful procedures or surgery requires detailed pain assessment and therapy.[82]
- Each analgesic administration should be based on body weight and comorbidity, and pharmacokinetics as applicable to children, should preferably involve a multimodal approach.[82]
- Behavioral techniques addressing the emotional component of pain should be adopted whenever feasible.[81,82]
- Kokki, Dalens and Kawaraguchi et al emphasize that in the multimodal approach, sedative, analgesic, and local anesthetics are all essential components of analgesic regimens for painful procedures.[83-85]
- There is substantial body of evidence that various analgesic medications are synergistic with sedative agents, it is important that appropriate monitoring be used during the procedure and recovery.[83-85]
- The emotional component of pain is essentially strong in infants and children and presence of parents in familiar surroundings makes all the more difference. Millions of children undergo surgery each year in developing nations and assessment of their pain has its own unique problems. Despite the limited resources, a successful pain management protocol was developed and tailored to the specific setting of the Medical Research Council pediatric ward in the Gambia, West Africa.[86] This protocol would serve as an example for other developing nations in similar settings. Also regional anesthetic techniques can be utilized to provide more effective multimodal postoperative pain management.[87]

Geriatric Patients

- Elderly patients are more likely to undergo surgery because of various underlying medical and surgical conditions.[1]
- Pain is often undertreated and elderly patients are more vulnerable to the detrimental effects of such undertreatment.[88]
- Bergh et al observed that the physical, social, emotional, and cognitive changes associated with aging have an impact on perioperative pain management.[88]

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- These geriatric patients may have all together different attitudes than younger adult patients in expressing pain and seeking appropriate therapy.
- Altered pharmacokinetics in geriatric patients as based on physiological changes in the drug distribution and metabolism of analgesic drugs and local anesthetics requires frequent dose alterations.
- Pain assessment and therapy should be integrated into the perioperative care of geriatric patients.
- Pain assessment tools and methods appropriate to a patient's cognitive abilities should be used. Extensive and proactive evaluation and questioning may be necessary to overcome barriers that hinder communication regarding unrelieved pain.[88,89]
- Anesthesiologists should recognize that geriatric patients may respond differently than younger patients to pain and analgesic medications, often because of comorbidity.
- Strict dose titration is essential for minimizing the adverse effects such as somnolence in this vulnerable group, because of concomitant medication with some complimentary agents.

Critically Ill and Cognitively Impaired Patients

Recently Sandra et al in a systematic review of behavioral pain assessement tools noted that patients who are critically ill, cognitively impaired (e.g. Alzheimer's disease/ dementia), or who otherwise have difficulty communicating (e.g. cultural or language barriers) present unique challenges to perioperative pain management.[89]

- Techniques that reduce drug dosages required to provide effective analgesia may be suitable for such patients (e.g. regional analgesia and multimodal analgesia).
- Behavioral modalities and techniques such as PCA that depend upon self-administration of analgesics are usually not suitable for the cognitively impaired.[89]
- The literature is insufficient to evaluate the application of pain assessment methods or pain management techniques specific to these populations.
- This special population may require additional interventions to ensure optimal perioperative pain management.
- Anesthesiologists should consider a therapeutic trial of an analgesic in such patients with increased blood pressure and heart rate or agitated behavior when causes other than pain have been excluded.

Pain in Childbirth

- Acute pain during childbirth is a well established cause of pain in a parturient. Obviously in developing world, analgesia during labor is a "luxury" that is not readily available due to shortage of drugs, equipment and medical personnel and poor infrastructure.
- Epidural block cannot be offered to the majority of mothers in developing nations as it is expensive (especially in hospital with poor infrastructure and in the absence of health insurance facilities). Hence Kuczkowsi and Chandra innovated a single shot spinal anesthetic during labor.[90] They achieved high degree of maternal satisfaction with minor side effects in majority of women. This technique could be adopted by other developing nations also.

Genetics and Gender

- ASA Task Force believes that patient's race, ethnicity, culture, gender and socioeconomic status have significant bearing on access to the treatment as well as pain assessment by the doctors and nurses.
- The genetic predisposition and single nucleotide polymorphism may influence

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the doses and pharmacokinetics of few analgesics.

CONCLUSION

With the background of barriers to optimal acute pain management in the developing countries, it is not surprising that acute pain in several settings is not well managed in the developing world. With the shortage of anesthesiologists around, the surgeons still play a major significant role in postoperative pain management and intramuscular injections are still the preferred route of analgesic administration by the surgeons. Acute pain services and dedicated "acute pain nurse" are available in majority of large hospitals in China, while they are only available in selected hospital in India (mainly corporate hospitals and premier medical institutions), Thailand, Philippines, Indonesia and Nigeria. Pain is monitored as the 5th vital sign in majority of hospitals in Thailand, and a few hospitals in China, Philippines, and Nigeria, but generally speaking there is no such policy in India (except for corporate hospitals) or Indonesia. The Indian Society for Study of Pain (ISSP) is trying its best to convince the health officials and administrators in Ministry of Health and Family Welfare, Government of India for implementation of pain as the 5th vital sign in each and every hospital in the country. We do hope that our good intentions shall manifest into equally good deeds of implementation of pain as the 5th vital sign. Putting into action what we hear is real adoption of the truth.

The "Declaration of Montreal"[91] holds that "access to pain management is a fundamental human right". It "recognizes the intrinsic dignity of all persons, and that withholding of pain treatment is profoundly wrong, leading to unnecessary suffering which is harmful". Various scientific bodies and government agencies must provide greater funding for research on pediatric pain, along with the funding for infrastructure and resources to translate research finding into practice. However in the developing nations there appears to be a ray of hope and a silver lining in the dark clouds, that many anesthesiologists and institutions are taking initiative to overcome some of these barriers and may be in a couple of years, we can look forward to optimal acute pain management in the developing world.

"All things are possible for those who believe, Believe and your belief will create the fact"

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ISBN 978-93-5152-988-0