

stopping if pain or dysesthesia occurs, and 3) injecting only if the dysesthesia disappears.

These indications implicitly include avoiding performing a neuroaxial procedure on a sedated patient.

Chemical damage Chemical injuries to the neuroaxis can cause Cauda equina syndrome or arachnoiditis. Spinal nerves in the epidural space tolerate the injection of potentially neurotoxic substances quite well, while nerves in the subarachnoid space are much more susceptible to toxic injury. Many substances are neurotoxic, including preservatives and high doses or concentrations of anesthetics.

Vascular damage Ischemic injury to the spinal cord is very rare after neuroaxial anesthesia in obstetric patients. Clinical features include paraplegia or quadriplegia, loss of pain sensation (analgesia) and temperature discrimination in the lower extremities, fecal and urinary incontinence, but intact proprioception, light touch, and vibration senses, as the posterior spinal tracts are spared. In obstetric patients, cases of anterior spinal artery syndrome have been reported in patients with spinal vascular malformation, a patient with diabetes and scleroderma, three cases of vasospasm secondary to epidural catheter use, and some others secondary to the use of epinephrine in the anesthetic mixture.

Prognosis In the case series reporting spinal cord ischemia or vertebral canal hematoma had a notably poor prognosis, while patients with meningitis, nerve injury and abscesses fully recovered. Signs that should alert the anesthesiologist for immediate attention include: reduced Glasgow Coma Scale score; pupillary changes or eyelid ptosis; any neurological sign or symptom in the presence of fever; long lasting unilateral or bilateral paresis or hypoesthesia of the lower extremities; radicular pain; sudden onset of lower back pain; headache and/or neck stiffness; bladder or bowel dysfunction; persistent saddle anesthesia; and neurological signs or symptoms that evolve after resolution of the block.

Conclusions Neurological injuries are rare clinical conditions, although potentially very serious. In many cases, complications are inherent to the pregnancy and childbirth process, while in others, they are secondary to anesthetic procedures, which motivates this review and emphasizes the importance of maintaining constant alertness for timely detection and treatment. Equally important is lowering the threshold of tolerance for an unusual clinical course, allowing for quick and effective reactions before a tragic outcome occurs.

#36889 CLOSING THE GAPS IN POSTOPERATIVE PAIN MANAGEMENT: CHALLENGES AND FUTURE PERSPECTIVES

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Background and Aims The management of postoperative pain is a crucial component of perioperative patient care.

Promoting patient comfort, easing recovery, and optimizing outcomes all depend on effective and well addressed pain management. Despite the improved pain management techniques, the problem persists, making it difficult to provide the optimal postoperative pain control. A frequent problem that still undermines perioperative management, e.g., following joint arthroplasty, is the presence of insufficient pain control. Adopting well-designed, balanced multimodal analgesic regimens that include a variety of medications targeting different pain pathways in the peripheral and central nervous systems is essential to preventing such gaps. It is well known that systemic analgesics, combined with local anesthetic methods such as periarticular injections, can help prevent pain control gaps.

Although there are evidence-based recommendations for postoperative pain treatment, standardizing practices is still difficult to apply. Underwhelming pain management is a result of inconsistent pain evaluation and poor patient-provider communication. To achieve accurate assessment and appropriate action, healthcare providers must routinely evaluate pain using proven tools. Healthcare professionals can follow standardized quality metrics and recommendations to implement best practices, optimize pain management, and enhance patient outcomes.

Additionally, patient involvement and education are vital in bridging the gaps in perioperative management. Patients can take an active role in managing their pain when they are informed about pain expectations, accessible analgesic alternatives, and self-management approaches. Comprehensive pain management must address patient worries and misconceptions about opioids while encouraging non-pharmacological treatments like physical therapy and relaxation methods, both pre- and postoperatively.

Looking ahead, investigation on complementary therapies and cutting-edge therapy choices will be important for postoperative pain management. Non-opioid drugs, procedures for regional anesthesia, and neuromodulatory methods have the potential to enhance pain treatment outcomes and lessen reliance on opioids. Clinical professionals may receive additional tools and approaches to maximize pain relief and reduce gaps in postoperative pain management because of ongoing research and innovation in these fields.

Challenges in Post-operative pain management:

In clinical practice, postoperative pain treatment presents several difficulties. To prevent the development of chronic postsurgical pain, which can affect a large percentage of patients, adequate treatment of acute pain after surgery is essential. To enhance patient outcomes and reduce opioid overuse and related harm, these issues must be resolved.

Below, some of the major difficulties in postoperative pain management are listed:

1. **Optimization of patients' physical condition.** Preparation to surgery, both physical and mental, has resulted as an important aspect also for the optimization of postoperative pain management.
2. **Poor Pain Assessment:** In order to effectively manage pain, it is important to accurately gauge the severity of pain and how it affects the patients' wellbeing. Due to the subjective nature of pain and variability in patients' capacities to convey their discomfort, pain assessment can be difficult. While for assessing pain, it is advised to constantly use proven tools.
3. **Variability in Physician Practices:** Physicians' prescribing practices for postoperative pain management can vary. This diversity may be influenced by elements like prior experience,

education, and attitudes towards opioids. Improving outcomes requires standardizing and implementing evidence-based perioperative management practices among healthcare professionals.

4. **Excessive Opioid Prescribing:** It has been established that prescribing opioid excessively for pain relief following surgery is a key contributor to opioid abuse and associated harm. Opioid dependence can occasionally begin with a prescription following a minor injury or surgery. Therefore, it's important to strike a balance between providing sufficient pain treatment and limiting unneeded opioid exposure.
5. **Transition to Outpatient Settings:** Postoperative pain management has moved from hospital to home care, as more surgeries are carried out in outpatient settings. In terms of ensuring proper pain control, keeping an eye out for problems, and giving patients prompt care and follow-up, this shift provides special challenges.

Future Perspective A crucial component of patient care is postoperative pain management, which aims to deliver the best pain relief while reducing the risks of complications and opioid-related harm. However, there are various obstacles to closing the postoperative pain treatment gaps. Healthcare practitioners can improve outcomes and improve patient experiences by tackling these issues and embracing future perspectives.

1. **Pre-habilitation of the patient to surgery**
2. **Multimodal Analgesia:** Multimodal analgesia, which employs several analgesic drugs acting on different pain pathways, has demonstrated promise in enhancing postoperative pain management. Future research and development are required to determine the most potent analgesic combinations and to optimize their dosing regimens in order to provide better pain relief with fewer adverse effects.
3. **Telemedicine and remote monitoring:** Especially for patients in remote locations or those with limited access to healthcare services, the development of telemedicine and remote monitoring technologies gives a chance to close the gaps in postoperative pain management. With the use of these technologies, healthcare professionals may remotely assess pain, provide instructions, and track patient improvement, resulting in quicker interventions and better pain management.
4. **Incorporating Non-Pharmacological Approaches:** Non-pharmacological interventions, such as physical therapy, have demonstrated to be a potential supplementary approach to conventional pain management. In order to maximize pain relief and raise patient satisfaction, these approaches will likely be incorporated into postoperative pain management regimens, either as solo treatments or as components of multimodal approaches.
5. **Collaborative Care Models:** Implementing collaborative care models with multidisciplinary teams can improve postoperative pain management. In order to effectively treat the complicated nature of postoperative pain, these models bring together healthcare professionals from multiple professions, including surgeons, anesthesiologists, pain experts, nurses, and psychologists. Coordinated pain management techniques, interdisciplinary communication, and all-encompassing patient care are encouraged by collaborative care.

Methods To fill in any gaps in postoperative pain management and to examine the difficulties and potential future directions in this area, this presentation will offer an assessment of the

literature on the subject. The presenter will review the most recent postoperative pain management recommendations made by several organizations, including the American Society for Enhanced Recovery (ASER), the Procedure-Specific Postoperative Pain Management (PROSPECT) group, and the Enhanced Recovery After Surgery (ERAS) Society, including its Perioperative Quality Initiative (POQI). Additionally, for the presentation he carried out searches in the PubMed database and Google Scholar using specific phrases associated with multimodal analgesia, opioid-sparing analgesia, and increased recovery analgesia. English-language papers with a focus on postoperative treatment methods that were published between a defined start and end date met the inclusion criteria for the presentation. The analysis omitted the use of preemptive analgesia and intraoperative management strategies. Following the screening of study titles and abstracts, several publications were chosen for additional examination. Then additional searches on the PubMed, Cochrane Library, and Google Scholar databases using the terms 'postoperative pain' and the names of each therapy method (e.g., acetaminophen, epidural, etc.) was conducted.

The aim of this presentation will be to give relevant information from the selected publications and conduct a comprehensive analysis to address the difficulties in postoperative pain management. He also will provide insights into the current state of postoperative pain management, highlight knowledge or practice gaps, and suggest potential solutions for improvement by synthesizing the data from the literature.

Results After surgery, effective pain management involves evaluation and prompt action. For patients who can self-report subjective pain scales including the visual analogue scale, verbal rating scale, and numerical rating scale to assess pain intensity. Unfortunately, one-dimensional scales might not adequately represent the patients' experience, including their capacity for pain tolerance or its effects on functional recovery. It is crucial to assess all aspects of pain, considering not only the surgical site but also potential pain sources in other areas. Patients who are unable to self-report may use standardized, established objective assessment techniques instead. Tools like Pain in Advanced Dementia (PAINAD) are advised for people with severe cognitive impairment. Patients who are unable to express their pain verbally in critical care settings can utilize the Critical Care Pain Observation Tool (CPOT) or Behavioral Pain Scale (BPS).

It is crucial to understand that managing acute pain following surgery plays a crucial role in both the immediate postoperative period and in preventing its transition to chronic postsurgical pain. Multimodal strategies should be used in addition to pharmacological treatments for postoperative pain control. When compared to pain management techniques used within an enhanced recovery after surgery (ERAS) pathway, conventional methods like epidural analgesia or opioid-based intravenous patient-controlled analgesia (IVPCA) may provide superior pain control, but they do not always result in an improved recovery or a decrease in morbidity. Whenever possible, ERAS routes promote the use of multimodal analgesia and opiate-sparing methods, such as local analgesia. It is important to not ignore the fact that managing acute pain following surgery plays a crucial role in both the immediate postoperative period and in preventing chronic postsurgical pain. Multimodal strategies should be used in addition to pharmacological treatments for

postoperative pain control. Traditional methods, such as opioid-based IVPCA or epidural analgesia, may offer greater pain management, but do not target various pain pathways with medications with various modes of action. Multimodal analgesia creates synergistic effects and enables the use of lower doses, minimizing side effects. Each patient should receive a customized regimen of analgesic drugs, considering things like previous analgesic use, co-morbidities, drug interactions, and tolerance. The problem of opioid abuse and associated harm must be addressed. One of the main causes of opioid misuse is the over-prescription of opioids for pain relief following surgery. To effectively prevent the opioid epidemic, actions like enhancing perioperative prescribing procedures and lowering opioid use during and after discharge are required. The restrictions on daily opioid prescriptions, the need for continuing medical education for doctors who write restricted substance prescriptions, and the facilitation of pharmacist-prescriber communication regarding high morphine doses are some of the measures that have been put into place. It is essential to understand that evaluation, customized pain management plans, and a focus on multimodal analgesia are necessary for efficient pain management following surgery. It is of utmost importance that effective pain management following surgery requires careful assessment, individualized plans, and a focus on multimodal analgesia. It is essential to consider the patient's particular experience of pain and use tested assessment techniques when self-reporting is not an option. To improve patient outcomes and reduce harm, it is also crucial to halt chronic postoperative pain and deal with the potential opioid misuse.

Conclusion For the sake of improving patient outcomes and lowering the likelihood that chronic pain may develop, closing the gaps in postoperative pain treatment presents considerable obstacles and calls for careful attention. After surgery, inadequate pain management can result in patient misery, opiate abuse, and other problems. These gaps are largely caused by several important variables, such as the misuse of opioid analgesics, the underutilization of multimodal analgesic regimens, and variances in pain evaluation and management techniques.

Future views should concentrate on applying evidence-based recommendations for postoperative pain management to address these issues. This involves using carefully crafted multimodal analgesic regimens, which combine medications that can act on both the peripheral and central nervous systems. Medications including acetaminophen, cyclo-oxygenase 2 (COX-2) inhibitors, gabapentin, and glucocorticoids may be used in such regimens. Long-acting local anesthetics injections can help people manage their pain more successfully.

To ensure consistency and top-notch care, standardized postoperative pain management quality measures should be created and put into practice. These metrics can serve as a guide for best practices and assist medical professionals in evaluating and enhancing their pain management techniques. For efficient pain management, it is essential to emphasize the regular use of approved pain assessment tools. A multidisciplinary strategy involving medical staff, decision-makers, and patients is needed to address gaps in postoperative pain management. Programs for education and training should be put in place to improve the expertise of healthcare providers in pain management. Additionally, patient involvement and education in pain management decisions can enhance results and guarantee individualized care.

#36946 KETAMINE IN ACUTE AND CHRONIC PAIN

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Acute and chronic pain remains a significant health problem worldwide. The aging of the population has led to an increased number of individuals experiencing both acute injuries and chronic diseases that cause pain. Ketamine was originally developed by Craig Newlands and later synthesized by Calvin Stevens in 1962. It is a derivative of phenylcyclidine in order to produce a safer and more manageable drug. Recently there has been an increased interest about it especially in emergency medicine, acute and chronic pain and psychiatry. It is an analgesic imperative to maintain a balance between the adequate treatment of pain and preventing opiate dependence in the population.

It is a 'dissociative anesthetic,' which refers to the fact that simultaneously different areas of the brain are either activated, such as the hippocampus and frontal cortex, or suppressed, such as the thalamus, and therefore the various areas of the brain are 'dissociated' from each other. It rapidly induces general anesthesia while preserving the patient's protective reflexes and vital functions besides its sympathomimetic effect. However, its psychomimetic effects have limited its use. Research in 1965 demonstrated its analgesic effect in subdissociative doses during painful procedures in children. In 1971, the analgesic effect of ketamine was further confirmed when it was observed that patients who underwent anesthesia with ketamine required less opioid medication and experienced better pain management.

It is highly lipophilic with a distribution half-life of 10 min, onset time of 30 s, short duration of action after a bolus dose, large volume of distribution (160-550 litres) and it is least protein bound (10-50%). The liver metabolizes ketamine via the cytochromes CYP 2B6 and CYP3A4, producing (R, S)-norketamine, which is converted to 6-hydroxynorketamine and 5,6-dehydronorketamine. These metabolites have an extended half-life of up to 3 days and, according to various authors, provide prolonged analgesic and antidepressant effects. Bioavailability and duration of action vary depending on the route of administration: with intravenous administration, bioavailability is 100%. It is eliminated mainly in the urine (elimination half-life of 1,5-3 h) Women generally metabolize ketamine more rapidly (up to 20%) than men, whereas older people tend to metabolize it more slowly. It is contraindicated during pregnancy and lactation. Due to its short half-life, no dosage adjustment is required in patients with impaired renal function.

It has the ability to produce different effects depending on the dosage and this property is unique among drugs. Low-dose ketamine has been shown to have an opioid-sparing effect and has been shown to reduce opioid tolerance. In addition to its role as an analgesic in acute pain, it can reduce hyperalgesia and allodynia in chronic pain.

The main mechanism of action of ketamine is to block glutamatergic neurons via its antagonistic effect on NMDA receptors. It does this by non-competitively blocking the opening of glutamatergic channels, mainly in the prefrontal cortex and hippocampus. Ketamine also activates the prefrontal cortex via blockade of inhibitory interneurons, which is one of the