

clinical need. For example, the lowest carbon footprint would be achieved with an uncomplicated vaginal delivery not requiring pharmacological analgesia. Unfortunately, this is seldom the case, and a large carbon footprint is to be expected in prolonged labor necessitating N₂O-mediated analgesia, followed by an emergency cesarean delivery.

As anesthesiologists, we have a supreme responsibility to take care of safety and well-being of our patients undergoing surgery. However, we equally have an ethical obligation toward environmental sustainability and protection, as this directly affects the health of the general population. By assuring environmentally conscious practices, we are safeguarding humanity's viability for healthy coexistence. Raising awareness is the first step to lessening our daily carbon footprint.

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#36852 SPINAL ANAESTHESIA FOR AWAKE LUMBAR SPINE SURGERY: A NICHE BUT EMERGING INDICATION?

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Spinal anesthesia for lumbar spine surgery is a technique that provides excellent operating conditions and patient satisfaction. The ability to avoid a general anesthetic and the requisite management of the airway is attractive to many patients. In contrast to the frequently-challenging period after emergence with spine surgery under general anesthesia, spinal anesthesia provides a 'soft landing' in the early postoperative period as the block of the lumbar area recedes slowly. In this lecture, I will discuss our experience with awake lumbar spine surgery under spinal anesthesia and provide perspective on several important considerations including:

- What does 'awake spine surgery' really mean? Are all patients wide awake? Is some sedation ok? What sedative agents/plans are appropriate and safe in this setting?
- Patient selection: Who CAN get awake spine surgery? Who should NOT be considered for awake spine surgery?
- Communication with patient and surgeon: How to set expectations ahead of time with the patient, the surgeon, and the perioperative team?
- Technique: The how, where, when and what of our intraoperative regimen with a recipe for success
- Pitfalls: What can go wrong in awake spine surgery? How to predict and prepare for these
- Outcomes: Why do we do this? Are we really making a difference? Here we discuss some of the important data that support the use of awake spine surgery in selected patients.

Expert opinion

#36755 ANAESTHESIA CONSIDERATION IN SCOLIOSIS SURGERY

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Scoliosis Is an abnormal lateral curvature of the spinal column. Cobb angle of 10 degrees regarded as a minimum angulation to define it. The most common form of scoliosis is idiopathic.

Preoperative evaluation include assessment for the presence and severity of pulmonary dysfunction from restrictive lung disease. It's unlikely will improve during scoliosis surgery and may make intraoperative and postoperative ventilation challenging. Significant postoperative atelectasis should be anticipated, and in severe cases of scoliosis, prolong postoperative ventilation may be required. Cardiac function is one more important side that we have to consider. Regional hypoventilation caused by abnormal diaphragm movement and chronic hypercarbia and hypoxemia from advanced pulmonary disease can lead to pulmonary hypertension and of the right ventricle failure.

A large incision may lead to loss of up to one half of a patient's blood volume. To prevent haemorrhage complication next steps are require: preoperative iron supplementation or erythropoietin, Cell Saver mashing, Deliberate hypotension, arterial access for PPV, SVV and CO, goal directed fluid therapy, Thromboelastography, proper prone positioning, neuromonitoring.

Due to the large wound area and traumatic spinal correction, patients suffer from severe pain immediately after scoliosis surgery. The treatment of this postoperative pain remains one of the major challenges in scoliosis surgery, and insufficient treatment can increase postoperative morbidity, complication rates, and length of hospitalization.

We have following options – epidural anaesthesia, intrathecal morphine, Lidocaine iv and ketamine, ESP block.

Epidural founds its place in pain management after spinal surgery. Epidural catheter can be used as an effective means of postoperative pain management for children with scoliosis, it is more effective than intravenous patient-controlled analgesia in postoperative pain management after posterior spinal fusion. It accelerates postoperative mobilization, independent

ambulation, and decreases duration of hospital stay. Epidural anaesthesia without opioids is a safe and sufficient method to regulate postoperative pain in patients even with neuromuscular scoliosis and respiratory impairment. There are some limitations that we should consider. Catheters might be an additional source of infection by channelling the way for bacteria during their application. It may get stuck in surrounding tissues or even rupture. Catheter is installed after the surgery, and it does not reduce pain intraoperatively, therefore, amount of opioids during surgery remains to be substantial.

Intrathecal morphine injection A lot of studies carry out conclusion that intrathecal morphine reduces postoperative pain and opioid consumption in the 24 hours following spine surgery. There are some evidences that intrathecal opioids may decrease intraoperative blood loss, though the mechanism of the blood-sparing effect remains unclear. Some hypothesize that the diminished blood loss may be due to lower mean arterial pressures. Nevertheless, other studies have demonstrated no difference in blood pressures. In spite of all benefits, we should keep in mind several possible complications associated with intrathecal morphine.

Respiratory depression and sedation It can be sufficiently severe and require escalation of care and readmission to ICU.

Other complications – post dural puncture headache, cerebrospinal fluid leaks and surgical site infections. Morphine has the side effect – nausea, vomiting

We should be aware of the risk-to-benefit ratio when deciding whether to administer ITM for postoperative pain management.

Lidocaine and ketamine have no relation to regional methods of anaesthesia, nevertheless both this method achieves the same goals – they reduce postoperative pain and opioid consumption.

Lidocaine iv improved pain scores and reduced 48-h opioid requirements in patients undergoing spine surgery. Patients given lidocaine had slightly fewer 30-day complications than patients given placebo. IV lidocaine improved the postoperative gastrointestinal function. Lidocaine reduces postoperative nausea, vomiting and the supply of antiemetics. Functional walking capacity distance increased significantly in lidocaine-treated children.

The analgesic effect of lidocaine is diversified. This drug has peripheral and central actions, which reduces neural responses to pain. Lidocaine suppresses spontaneous impulses generated from injured nerve fibres and the proximal dorsal root ganglion.

Lidocaine does not adversely affect the monitoring of motor evoke and somatosensory-evoked potentials in individual patients during surgery and can be used as an adjunctive medication with TIVA regimens to reduce the required dose of other MEP suppressing medications.

Ketamine at sub-anaesthetic doses, has been shown to modulate nociceptive hypersensitization through its antagonist effects on NMDA receptors by blocking pain signalling input. Several studies have demonstrated that the addition of intraoperative and postoperative intravenous ketamine infusion can reduce the amount of morphine equivalents consumed in the 48-h postoperative time period, founding the effects of ketamine on the pain control regimen. Additionally, significant reduction in the incidence of nausea and vomiting provides an additional benefit of ketamine. Yet, other studies conclude that ketamine reduces the amplitude and increases the latency of transcranial electrical MEP.

ESP block, due to the peculiarity of the innervation of the spinal column, shows the best results in reduction of pain after spine surgery. Recent MRI studies on cadavers and healthy volunteers confirm the spread of anaesthetic to the dorsal ramus of the spinal nerve, which innervates the muscles, soft tissues around spine column, and transverse processes of the spine.

Further studies demonstrate a significant reduction in the opiate use with lower rates of pain intensity after lumbar spine surgeries. Moreover, we have first clinical cases that describes successful performing ESP block in scoliosis surgery.

ESP is volume dependent block. To reach paravertebral and epidural spaces and effect ventral ramus of the spinal nerve at several levels high volume of anaesthetic is required. But, for spine surgery we need to effect only dorsal ramus, so we can reduce the volume of anaesthetic, and inject it bilaterally on two levels in order to block more spine levels as much as possible to place of screws implementation.

Apparently, we will not affect motor evoked potentials, considering that we block only the dorsal branch of the spinal nerve, but further researches are required.

Spine surgeries belongs to the most traumatic intervention and may conduct pronounce postoperative pain. If it treated not appropriately, it can lead to hyperalgesia and chronic pain. The incidence of moderate to severe chronic postsurgical pain at 12 months after spine surgeries can reach up to 39.1%

All methods of anaesthesia discussed today has impact on pain perceiving from various sides. Some of them, affects transduction, transmission, and modulation by interrupting the conduction of the pain impulse, another affects perception by reducing sensitization and tolerance to pain by reducing the quantity of narcotic analgesics. Due to this mechanism, the essential balance between nociception and antinociception is sustained.

#37207 IMPROVING OUTCOMES IN POSTPARTUM HAEMORRHAGE: RECOGNITION AND RESUSCITATION

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Introduction When this topic of PPH recognition is afforded, the first problem that arises is the correct definition of what a PPH is. Lack of consensus is the first concern, as many definitions have been used.

This is the classical definition of postpartum haemorrhage (PPH): genital tract blood loss of more than 500 ml within 24 h after giving birth.¹

PPH is nowadays the leading cause of maternal deaths worldwide.² Most of these deaths occur in low-income countries (LMIC).² It is estimated that 34% of 275000 maternal deaths in 2015 were caused by PPH.^{2 3}

Despite of these data, we must acknowledge that even in high income countries (HIC), women still die because of PPH.⁴⁻⁶

Data from Europe seem that 13% of obstetric patients have a PPH (> 500 mL) or severe PPH (>1000mL).⁷