Intraoperative Anesthesia Management

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Core Messages

✔ Communicate with your anesthetist. Talk to him before surgery if you have particular concerns about the patient or the procedure you are planning. Let him know constantly about how things are going during the surgery. Share your thoughts and team up.

✔ Patients having major spine procedures must be properly assessed by the anesthesia team beforehand to increase safety and success in the perioperative period.

✔ Special airway management and positioning could be challenging for the anesthesia team, sometimes involving longer preparation.

✔ The anesthesia technique must allow for reliable neuromonitoring; SSEP recordings and wake-up test, short-acting drugs, TIVA and low-dose gases are indicated.

✔ Blood preservation is a must. Careful surgical technique and positioning, antifibrinolytics, blood predeposit, cell recovery and controlled hypotension (CH) are the way to go. CH is contraindicated in the presence of spinal cord compression (tumor, trauma, etc.).

✔ Some cervical spine surgeries, long cases or those with massive transfusions might require postoperative ventilation.

✔ Good pain control after surgery is associated with lower rates of postoperative chronic pain conditions and faster recovery. Multimodal analgesia is the cornerstone. NSAIDs could be controversial, but in low doses they are 17 times less likely than smoking to be linked to malunion.

✔ Anesthesia should be tailored to fast-track minimally invasive spine surgery, emphasizing prevention of nausea, vomiting and pain control.

Historical Background

Precise information is not available about the first anesthesia for spine surgery. Definitive improvements began in the 1950s with the use of muscle relaxants, orotracheal intubation, introduction of halothane and more generous use of intravenous crystalloids. In the 1970s the wake-up test was described to assess the integrity of the spinal function. At the same time larger doses of opiates became popular to help maintain stable hemodynamic conditions and better pain control intra- and postsurgery. In the 1980s and 1990s new short-acting drugs contributed to the enhancement of the perioperative experience in patients having day surgery procedures, as well as permitting better neurophysiologic monitoring.

Goals of Anesthesia in Spinal Surgery

The role of anesthesia care in spinal surgery must be appreciated within the context of comprehensive perioperative care where a dedicated team takes care of a patient from preoperative planning and perioperative care to rehabilitation and discharge. In many places this is accomplished through the design of “Clinical Pathways,” a
road map for a particular surgical procedure with standardization of each step to reduce variability, cost and errors. The anesthesia contribution is a key component in this continuum. In a successful Clinical Pathway all players have agreed upon a road map, they have contributed the best evidence from their fields and everybody understands his or her own role and each other’s inputs. In this chapter the most relevant features of anesthesia for spinal surgical procedures are discussed. Particular emphasis on trauma, scoliosis, and degenerative and cancer surgery is given.

**Preoperative Patient Assessment**

Recommendations for preoperative assessment, diagnostic work-up and condition dependent patient optimization have been provided in Chapter 14. Safe and efficient anesthesia for spinal interventions depends crucially on the quality of the preoperative assessment and patient optimization. A detailed preoperative assessment minimizes life-threatening risks and helps to avoid intra- and postoperative complications.

The surgeon and anesthesiologist must team up, discuss and plan the operative procedure in advance, particularly in nonroutine cases. Good preoperative communication and a clear bilateral understanding of the procedure and the overall condition of the patient are prerequisites to successful surgery. Although seemingly trivial, the consequences of these rules being ignored are often seen in daily clinical practice.

**Induction of Anesthesia**

Patients being admitted for surgery of the spine benefit from premedication with gabapentin. Our experience confirms recent publications [80] supporting the use of 300–600 mg before going to the operating room. It provides mild sedation and a powerful antihyperalgesic effect. If a wake-up test (WUT) is considered, benzodiazepines or other amnesic drugs are not recommended since the patient will not retain the information about the WUT provided before the induction of general anesthesia.

Prior to starting the anesthetic procedures, the identification of the patient, the type of procedure and the level to be operated at (which is key in spine surgery) must be checked and confirmed to avoid “wrong patient, wrong side and wrong site surgery” particularly if patients with identical surnames are on the operating list.

Before starting the anesthetics, the minimum standard monitoring for general anesthesia in an otherwise healthy patient undergoing low risk spine surgery encompasses:

- hemoglobin-O₂ saturation
- noninvasive blood pressure
- end-tidal CO₂
- continuous ECG

The patient’s preoperative condition and type of surgery will dictate the use of other monitoring before starting the operation.

At least one large bore i.v. cannula should be in place prior to the induction of anesthesia and for major cases. A second cannula is inserted after the patient is asleep unless a central venous catheter is considered.

The choice of induction agent (propofol, thiopental, opiates, etomidate or inhaled agents in children) will depend on the general condition of the patient and the presence of trauma associated hypovolemia, cardiac conditions and cord com-