

COMPARISON BETWEEN REMIFENTANIL AND EPIDURAL ANALGESIA FOR PAINLESS BIRTH

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ABSTRACT

Many women, particularly primiparas, grade the postpartum pain as severe and unbearable. Providing an effective and safe analgesia during delivery is a constant challenge for the obstetric anesthesiologist.

In many countries nowadays the possibility for pain free delivery is considered a reflection of the development of obstetric care. The pharmacological approach to pain management during delivery is divided into two main directions: regional and systemic analgesia.

Neuraxial analgesia is the most effective method of anesthesia during delivery and the only method that provides complete analgesia without maternal and fetal sedation.

The **epidural analgesia** is the most commonly used method of neuraxial anesthesia. It is considered the gold standard in obstetric anesthesia. The placement of the epidural catheter allows to maintain analgesia both until delivery and after delivery, as well as a conversion of epidural analgesia to epidural anesthesia for an emergency cesarean section.

It is a blind method and there may be problems when performing spinal puncture in patients with previous spinal problems or, in a recent trend, parturients with obesity.

The exact incidence of unsuccessful blocks is unknown, the causes are usually inadequate dosing of drugs, technical causes or causes related to the patient.

Itching is a common side effect of the use of opioids in epidural techniques. The exact etiology is unknown, but it is known that this is not the result of the release of histamine, so antihistamine therapy is unnecessary.

Nausea and vomiting. Even though nausea is known to occur as a result of visceral pain in women during delivery, in neuraxial analgesia, even though there is no pain or the pain is only slight, nausea and vomiting occur as a result of a drop in the blood pressure and hyperperfusion of area postrema in the medulla.

The **increased body temperature** during delivery is one of the side effects that has been widely discussed in recent years. The etiology of increased body temperature during delivery is an intraamniotic infection and the use of epidural analgesia. Many studies consistently show a significant correlation between the epidural and the increased temperature. When the use of the epidural increased from 1 to 83% and the incidence of maternal temperature above 38 degrees C increased from 0.6% to 11%. In primiparas due to the prolonged time of delivery, the risk of epidural temperature ranges from 13 to 33%. What is worrying, in fact, is the correlation between the maternal body temperature and the neonatal sequelae, predominantly neonatal sepsis and neonatal encephalopathy. However, many studies have shown that the epidural temperature is not associated with proven neonatal sepsis or neonatal encephalopathy.

Pneumocephalus is a rare side effect. It is a result of an intrusion of air into the cerebrospinal fluid when setting the epidural catheter when air is used instead of a physiological solution to identify the epidural space. It manifests itself with severe headaches and other neurological symptoms.

The **epidural hematoma** is a rare complication that may occur after an epidural puncture more often in patients with a coagulation disorder or those who receive anticoagulation therapy. It manifests with radicular pain and loss of sensory and motor functions as well as bladder and bowel functions. Early surgical decompression is essential for therapy. The incidence is lower in the obstetric population rather than in the non-obstetric one.

Irregularities in the cardiotocograph (CTG) traces and fetal bradycardia occur as a result of maternal hypotension or uterine hyperactivity.

Post Dural Puncture Headache (PDPH) occurs as a result of leakage of cerebrovascular fluid from the dural puncture and traction of the brain structures. Fortunately, the incidence of this side-effect with experienced anesthetists is very low (ranging from 1 to 2%).

Urinary retention may occur, but is short-lived.

Infections (epidural abscess and meningitis) are very rare complications, especially if the asepsis techniques are observed.

Breastfeeding effects have caused a lot of controversy in recent years. However, there is no definite evidence that neuraxial analgesia affects the success in breastfeeding.

The alternative methods for pain relief in obstetric anesthesia are more and more directing towards the systemic opioids and discovering the ideal opioid for intravenous analgesia. The emergence of remifentanyl on the pharmacological stage in the 90's opens up some new opportunities for intravenous analgesia.

Remifentanil is a short-acting μ -1 agonist opioid receptor agonist that is metabolized in an inactive metabolite via tissue and plasma esterases. All its inactive metabolites are eliminated through urine. The rapid analgesia (30-60sec) onset with a maximum effect of 2.5 minutes and a total half-life of 3.5-6 minutes makes the remifentanil ideal for obstetric anesthesia. It quickly passes the placenta, quickly metabolizes and redistributes into the fetus. This pharmacokinetic profile gives remifentanil an advantage over other opioids.

Remifentanil is most often administered via a PCA (patient-controlled administration) pump on a locked interval of 2 to 3 minutes. Dosage is probably the most important in achieving adequate analgesia and is the subject of many studies. Various studies use bolus doses ranging from 0.15 to $1\mu\text{g} / \text{kg}$, very often with a fixed dose of $0.5\mu\text{g}/\text{kg}$. To avoid sub-dosing of the patient and insufficient analgesia or overdosing and the onset of side effects (respiratory depression/desaturation), it is best to titrate the doses of remifentanil according to the needs of the patient.

Another important aspect in achieving adequate analgesia is the moment of administering the bolus dose. In almost all studies comparing intravenous analgesia with remifentanil and epidural analgesia, remifentanil is associated with significantly higher pain scores. But it is interesting that despite the significantly lesser pain in epidural analgesia, the two groups did not show significant differences in patient satisfaction.

Side effects associated with intravenous analgesia:

The **desaturation of the mother** raises the greatest concern when using intravenous opioids. All intravenous opioids are powerful respiratory depressants, which implicate a mandatory continuous monitoring of the oxygen saturation in patients receiving intravenous opioids, as well as the availability of oxygen if necessary. Most studies show that respiratory depression caused by intravenous opioids is short-lived and easily and quickly corrected with nasal oxygen and without side-effects. There are reports in the literature of several isolated cases of obstetric patients who had apnea during analgesia with remifentanil and during a continuous remifentanil infusion, as well as during the simultaneous use of multiple methods of analgesia. They were all short-lived and with a positive outcome, however, the cases cite caution and readiness at all times. Compared with epidural analgesia, intravenous analgesia with remifentanil is associated with significantly lower levels of oxygen saturation requiring substitution (from 10 to 65%).

The **sedation of the mother** is also a significant adverse effect that varies from 0 to 65%, in some studies even 100%. Occasional monitoring and assessing the degree of sedation are mandatory.

Itching may occur as a side-effect, with a mild to moderate intensity, and there is usually no need for therapy.

Nausea and vomiting are a known effect of opioid analgesia, and their incidence with remifentanil varies from 0 to 60%.

Irregularities in the cardiocograph traces. As with any opioid use, systematically or in central blocks, there may occur abnormalities of the fetal cardiac action that are manifested by irregularities in the cardiocograph trace and neonatal depression. In all studies, the incidence of irregularities in the CTG trace is low and is rapidly recovering. But this implies the mandatory use of a cardiocograph in any patient receiving a systemic opioid for anesthesia.

There are few reported side effects of remifentanil. The fact that there is insufficient information related to the side effects on the mother and the newborn does not mean that they do not exist. Further research is needed for gathering more information and establishing reasonable recommendations for monitoring.

Epidural analgesia is considered a golden standard in obstetric anesthesia. The side effects associated with neuraxial anesthesia may be very serious, but are rare. Remifentanil is an alternative to neuraxial analgesia in cases where it is contraindicated, inaccessible, or simply unwanted by patients. The use of remifentanil should always be followed by an appropriate monitoring. Further research is needed to determine its reliability for the mother and the newborn.

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