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REVIEW ARTICLE

Remifentanil and dexmedetomidine as an alternative to regional analgesia in obstetrics

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Abstract Epidural analgesia for controlling pain in labour has been the gold standard over the past 2 decades as it is considered the least harmful technique for the newborn. In reality, however, it is not without risk. That said, there are few options for pain management in labour when epidural analgesia is contraindicated. A recent survey to investigate the use of alternatives showed remifentanil to be the first choice when using systemic analgesia intravenously, as short-acting opioids administered systemically relieve pain adequately without the need for epidural analgesia.

Another safe option for providing obstetric analgesia is dexmedetomidine, a selective alpha-2 agonist that improves the quality of analgesia and reduces opioid requirements. Dexmedetomidine promotes stability and maintains uterine/placental homeostasis.

PALABRAS CLAVE
Remifentanil;
Dexmedetomidina;
Analgesia obstétrica

Remifentanil y dexmedetomidina como alternativa a la analgesia regional para analgesia obstétrica

Resumen La analgesia epidural ha sido el estándar de oro en las últimas 2 décadas para controlar el dolor en labor ya que es considerada la técnica menos nociva para el recién nacido, pero en realidad no está exenta de riesgos. Sin embargo hay pocas opciones para manejar el dolor en labor cuando la analgesia epidural está contraindicada. Una reciente encuesta para investigar el uso de alternativas demostró que se sugiere al remifentanil como la primera opción cuando se utiliza analgesia sistémica por vía intravenosa, ya que los opioides de corta acción administrados sistémicamente alivian el dolor adecuadamente sin usar analgesia epidural.

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Otra opción segura para brindar analgesia obstétrica es la dexmedetomidina; un alfa 2 agonista selectivo que mejora la calidad de la analgesia y disminuye el requerimiento de opioides. La dexmedetomidina promueve la estabilidad y mantiene la homeostasis útero placentaria.

Introduction

It is well known that the gold standard for obstetric analgesia is neuraxial block (epidural or subarachnoid block). However, when this is contraindicated, labour should not be left to progress without adequate pain relief.

Labour is considered to be one of the most painful experiences in the life of a woman. Different studies have assessed the perception of pain during this experience, with about 20% of women reporting ''unbearable pain'' and another 60% describing it as ''severe pain''.[1]

This makes pain management and comfort for the mother and neonate one of the most challenging tasks for the anaesthetist. Various techniques have been used, from ''natural'' techniques, for example water immersion and acupuncture, to pharmacological, such as regional analgesia, considered the gold standard (either spinal or epidural), and systemic analgesia with opioids.[2–4] The aim of this study was to review the available literature on the use and the effects on the mother and child of two drugs that reduce pain in labour, remifentanil and dexmedetomidine.

Remifentanil

Although opioid anaesthetics are usually avoided in the induction of general anaesthesia in obstetrics as they cross the placental barrier and can cause respiratory depression in the neonate, in view of their properties, they have often been resorted to when the mother has a coexisting condition that can increase blood pressure and heart rate, as in the case of cardiac, neurological or liver disease, and disorders related to the pregnancy itself, such as preeclampsia.[5] In fact, these drugs, mainly fentanyl, have been commonly used in regional epidural analgesia during the first stage of labour.[2,6]

Remifentanil, a 4-anilidopiperidine derivative of fentanyl, is a potent, ultra-short-acting, synthetic μ-opioid receptor agonist. It contains a propionic acid ester linkage, so it is easily inactivated by non-specific plasma and tissue esterases.[4,7] The chemical structure is shown in Fig. 1.

Onset of action is 90 s and it has a half-life of 3 min. In terms of metabolism, 16–18% of remifentanil is metabolised in the muscle tissue, brain, lungs and intestine, and less than 3% in the liver and kidneys, so it is not contraindicated by impairment of these organs.[7,8]

Reported side effects are similar to those of the other substances in its class, such as nausea, vomiting, muscle stiffness, itching, bradycardia and respiratory depression.

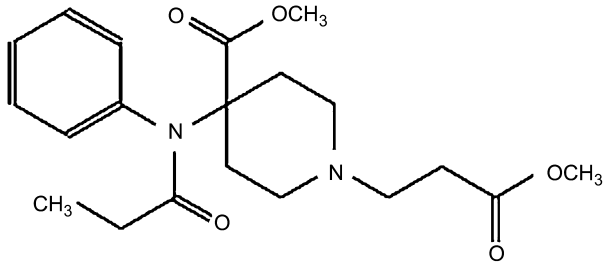

Figure 1 Chemical structure of remifentanil.

It is contraindicated in epidural or spinal analgesia due to the glycine used as preservative being neurotoxic.[7,8]

The use of remifentanil and its safety in obstetrics patients has already been established. The initial studies were conducted on patients undergoing caesarean section under epidural anaesthesia combined with continuous infusion of remifentanil (0.1 μg/kg/min), in which the concentrations of remifentanil were measured in maternal arterial blood, the umbilical artery and the umbilical vein.

High placental transfer of remifentanil has been demonstrated, with umbilical cord/maternal ratios of greater than 0.88 ng/ml, but with rapid metabolism and elimination (umbilical artery/umbilical vein ratio of 0.29 ng/ml), and without causing effects in the neonate according to APGAR scores (greater than 7 at 5 min) and neonatal neurological adaptive capacity scores.[9]

As mentioned above, remifentanil crosses the placental barrier (up to 80%) and it has been found that the foetus is able to metabolise about 50% of this, with reports of some cases of neonatal respiratory depression, although reversed after administration of naloxone.[7,8]

Dexmedetomidine

Another of the drugs used in obstetrics for its sedative and analgesic properties is dexmedetomidine. This substance is a D-enantiomer of medetomidine, α2-adrenergic receptor agonist imidazole derivative. The chemical structure is shown in Fig. 2.

Its peak concentration is reached at 6 min and it has a half-life of 2 h.[3,10] It undergoes cytochrome P450-dependent metabolism in the liver and 95% of the drug is excreted by the kidneys. Reported adverse effects include hypotension, hypertension, bradycardia, nausea, dry mouth and arrhythmias.[11–13]

The main benefits observed in obstetrics are as an anxiolytic, an adjunct in the haemodynamic management of the