Remifentanil PCA has become an indispensable part of the obstetric analgesic repertoire. After the approval of remifentanil in 1996, the remifentanil patient-controlled analgesia (PCA) was first used for labour analgesia in 1999 to circumvent epidural puncture in thrombocytopenic patients. In 2005, remifentanil PCA was established as a routine labour analgesic at the Ulster Hospital in Northern Ireland.

The results of two large audits were published in 2019 by the Ulster Hospital and the RemiPCA SAFE Network with together over 13,000 remifentanil PCA applications from 32 different hospitals. By 2022, these two institutions alone count for over 25,000 documented cases. Seldom has a new medical method been monitored in clinical practice across hospitals in such a systematic way. Today, the remifentanil PCA is an integral part of labour analgesia in numerous hospitals worldwide.

The question is not, if remifentanil PCA has a place in labour analgesia, but how to keep the method at the high level of safety attained in an unparalleled network effort. The quint essence is that remifentanil PCA can be used safely for labour analgesia if standard protocols are followed, professionals are trained regularly, and outcome data are evaluated on a regular basis.

How did remifentanil PCA find its place in labour analgesia?

A first reason is the unique pharmacokinetic of remifentanil. Remifentanil is fundamentally different from long-acting opioids such as pethidine, tramadol, morphine and others. With its quick onset, high potency, and ultra-short duration of action it somewhat mimics the profile of a labour contraction. It is metabolised to inactive metabolites independently of renal and liver function. With its context-sensitive half-time of around 3 minutes, it does not accumulate even when administered as prolonged infusion. Although crossing the placenta, remifentanil is quickly redistributed and metabolised by the neonate. Therefore, potential side effects for mother and child are very short-lived, which make the remifentanil PCA extremely well steerable.

A second reason is that remifentanil PCA is an efficient way to alleviate labour pain without long-lasting complications.

It is more efficient than the greenhouse gas nitrous oxide and the long-acting opioids. The Respite Trial published in 2018 in the Lancet showed that because of insufficient analgesia under Pethidine 41% of women switched to regional anaesthesia during the further course of labour. When remifentanil PCA was chosen, only 19% converted to an epidural for pain control. In the same study, Wilson et al further discovered a beneficial effect of remifentanil PCA on the mode of delivery. An instrumental delivery was necessary in only 15% with remifentanil vs 26% with pethidine. In view of the potential long-lasting side effects, the use of long-acting opioids during active labour should be fundamentally reconsidered.

Compared to regional anaesthesia, remifentanil PCA is less effective. However, if epidural anaesthesia is not necessary because the pain is well tolerated, or if it is not feasible due to contraindications or technical problems, remifentanil PCA is the most effective alternative, even avoiding specific complications of the epidural such as post-puncture headache, neurological deficits, etc. Compared to nitrous oxide and long-acting opioids remifentanil PCA has a stronger analgesic effect.

A third reason why remifentanil PCA has gained broad acceptance is that it can be safely used in clinical practice, provided the potential risks are considered.

Most institutions engaged in introducing this new method into clinical practice were aware of the potential risks. In a cautious and supervised process, they established save operating standards and gained extensive experience in routine use. The standards for the remifentanil PCA have been established and are constantly reviewed and adjusted.

Besides that, some serious maternal adverse events were published in 2013. On closer analysis of these cases, it became clear, that the causes of these incidents were not owed to remifentanil PCA as such, but rather to a lack of experience with the new method on one hand and mismanagement on the other, such as accidentally administering 10 times the usual concentration, administering multiple long-acting opioids prior to remifentanil PCA, neglecting continuous monitoring or 1:1 care. This shows how important it is to establish a comprehensive safety concept, especially when introducing a new method with a highly potent drug in an environment that is not constantly in the hands of the anaesthesia staff.

Analysis of serious neonatal events, such as cardiopulmonary resuscitation, shows that when these events were due to remifentanil PCA, which was rare (0.3%), they were transient, short-lived and responded immediately to professional care.

No permanent harm has been described for either the mother or the child in connection with remifentanil PCA.

While severe side effects are extremely rare, remifentanil PCA frequently causes mild side effects. With its high potency, remifentanil exhibits opioid-specific side effects, of which sedation and respiratory depression, accompanied by hypoxia and hypercapnia, are particularly important. Hypercapnia cannot be reliably measured in the delivery room so far. In contrast, hypoxia, which is usually defined as an oxygen saturation of less than 94%, can easily be measured continuously. Up to 70% of women on remifentanil PCA may experience at least one episode of hypoxia, depending on how it is defined, monitored, and documented. However, this does not appear to be significantly different from hypoxic episodes during labour with nitrous oxide or long-acting opioids. Hypoxic events also occur during labour with epidural analgesia or without any analgesic treatment. It can usually be adequately treated with nasal oxygen of 2L/minute.

Continuous care by the midwife, who intervenes immediately in the event of mild hypoxia or sedation, prevents the escalation of a benign, self-limiting situation and is one major aspect of safe administration. The short half-life of remifentanil contributes significantly to the fact that the regime settings can be adjusted quickly and efficiently in case of adverse reactions. Thorough and regular training of the personnel, clear standards for critical values and appropriate interventions are paramount for a high level of safety, while the parturient additionally benefits from continuous professional care.

A fourth reason for the establishment of the remifentanil PCA is the high satisfaction of parturients with this method. Though the pure analgesic effect of remifentanil PCA is somewhat lower than of an epidural, parturients were very
satisfied when using remifentanil PCA. This can be explained by the fact that a good birth experience is not solely dependent on complete anaesthesia. In a large-scale survey of over 14,000 parturients,18 women found complete analgesia less important. More important was that they were involved in decision making, that they felt well looked after by the midwife, that their expectations were met and that they could receive analgesia promptly once they decided for it. Remifentanil PCA meets these criteria well. It can be quickly installed; it guarantees close supervision by the midwife; and the labouring woman can decide herself how she wants to deal with pain. The parturient can use the PCA button as frequently as she wants and she can switch to other methods, like an epidural, at any time. The expectations of labouring women are also dependent on the cultural and personal environment and their personality. To meet these expectations, careful information about the benefits and the limitations of the remifentanil PCA and the other analgesic methods is of great importance and an integral part of the birth plan and the informed consent. Women should have the choice.

In summary, the question of whether remifentanil PCA should be used in obstetrics no longer arises today, as the advantages are visible and well documented in daily clinical practice. Remifentanil PCA can substitute long-acting opioids which are far from optimal for mother and child in active labour and it can efficiently replace an epidural if necessary. In addition, parturients benefit from continuous care by the midwife.

It is a matter of ensuring that quality standards are set and maintained correctly and that the method itself is constantly improved. This has been done for epidurals since the 1980s and for the remifentanil PCA since 2005. With both methods, there are still many questions to be answered. The basis for continuous improvement of every method is research on the one hand and transfer of new knowledge into the clinical environment on the other hand. The RemiPCA SAFE Network developed an Internet supported quality management system as early as 2009 with the aim to continuously improve the remifentanil PCA as a method itself and support very different international hospitals, from small regional to large teaching hospitals, in safety and quality management. As with every medical treatment, what matters for safety is the responsible application to our patients in daily clinical practice by trained personnel. This is where the remifentanil PCA has its place.

REFERENCES


SP44 LOCAL ANAESTHETIC SYSTEMIC TOXICITY AFTER AN EPIDURAL BOLUS FOR MANUAL PLACENTA REMOVAL. A CASE REPORT

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Epidurals placed during labour can be of use when manual removal of a retained placenta is necessary. We report a case of a scratching sensation in the ear and hypotension after a bolus of 4ml ropivacaine 7.5% in a previous sited epidural catheter. There was no loss of consciousness and the hypotension was treated with a bolus of ephedrine.

After induction using a rapid sequence induction with placement of endotracheal tube, the surgical procedure was performed without any major postoperative issues.

In conclusion, it is important to check position and effectiveness when using a previously sited epidural catheter. Preferably a standardised approach using clinical information, patient’s account and some sort of test dose.

Introduction Epidurals placed during labour can be of use when manual removal of a retained placenta is necessary or when conversion to C-section is necessary. Several strategies exist to detect intravascular intrathecal or subdural epidural catheter misplacement. However a functional epidural catheter can migrate into an epidural vessel.

Patient Information A 37-year old parturient with no medical history was admitted for PPROM at 36 weeks of gestation and a dilation of 3–4cm. An epidural catheter was placed by a colleague anaesthetist and a continuous rate of 4 ml


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