Patient-controlled analgesia in labour using remifentanil in two parturients with platelet abnormalities

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Two term parturients with documented platelet abnormalities presented to the delivery suite in labour. Because regional analgesic techniques were contraindicated, we elected to use patient-controlled i.v. remifentanil for pain relief. The patient-controlled analgesia (PCA) device was programmed to give a bolus dose of remifentanil 20 µg over 20 s with a lockout time of 3 min, and no background infusion. Analgesia was reported as very good by the mothers and by the attending midwives. There were no adverse neonatal sequela. If there are facilities to monitor the neonate and mother, this method of analgesia may prove useful in those patients where regional techniques are not possible, but further research is needed to ascertain its safety and appropriateness in such circumstances.

Keywords: analgesia, obstetrics; analgesia, patient-controlled; analgesics opioid, remifentanil; blood, platelets

Accepted for publication: October 4, 1999

Obstetric anaesthetists are not infrequently confronted by patients with known coagulopathies requesting pain relief in labour, but for whom epidural is contraindicated. In the following two patients, patient-controlled analgesia (PCA) using remifentanil provided adequate pain relief.

Case reports

Patient No. 1
A 26-yr-old, 66-kg primigravida was admitted to the antenatal ward for investigation of falling platelets and hypertension. During the first trimester, the patient had a platelet count of $173 \times 10^3$ ml$^{-1}$ and arterial pressure of 110/60 mm Hg. At 32 weeks’ gestation, her platelet count was $118 \times 10^3$ ml$^{-1}$ and arterial pressure remained unchanged. At 37 weeks’ gestation, a full blood count showed a platelet count of $113 \times 10^3$ ml$^{-1}$ and arterial pressure was 130/90 mm Hg. Platelet count was monitored weekly and decreased progressively, reaching $73 \times 10^3$ ml$^{-1}$ at 39 weeks’ gestation, when arterial pressure was 140/85 mm Hg. She was admitted for closer monitoring and investigation.

Urea and electrolyte concentrations, urate concentrations, liver function tests and measures of blood clotting were normal. Arterial pressure became Persistently increased, reaching 160/100 mm Hg, and the decision was made to induce labour. Her daily platelet count had decreased to $59 \times 10^3$ ml$^{-1}$, but increased a little to $96 \times 10^3$ ml$^{-1}$ at the time of induction.

Labour was induced using a prostaglandin E$_2$ pessary and then continued with an infusion of Syntocinon i.v. Before infusion was started, analgesia for labour was discussed fully with the patient by a senior anaesthetist. Although platelet count had increased to $96 \times 10^3$ ml$^{-1}$ by the time of induction, epidural analgesia was not performed because of the previous low fluctuating platelet count and consequent risk of epidural haematoma. She was offered remifentanil i.v. using a PCA device. Full instructions were given to the patient and attending midwife, and an anaesthetist was available at all times. Remifentanil 1 mg was diluted to a volume of 50 ml with normal saline, resulting in a concentration of 20 µg ml$^{-1}$ of solution. The PCA pump (Graseby 2400) was set to deliver a bolus dose of remifentanil 20 µg with a lockout time of 3 min. A cannula was sited in a forearm vein, and a dedicated line was used. There was continuous monitoring of the fetus and mother. The first stage of labour proceeded for 6.5 h, augmented by Syntocinon i.v. The second stage lasted 13 min. The fetal heart showed good variability throughout labour and maternal oxygen saturation was normal with an $F_{O_2}$ of 21%. A live baby girl weighing 3240 g was delivered, with Apgar scores of 9 at 1 min and 10 at 5 min. No neonatal resuscitation was required.

The PCA was used for the last 2 h of labour. During this time she made 49 demands of which 37 were good, and received a total dose of remifentanil 740 µg. The patient was assessed continually throughout labour to ensure she had adequate pain relief, and questioned shortly after...
delivery about the analgesia she had received. She experienced no pruritus, no nausea or vomiting, but was drowsy between contractions. She commented that this was not unpleasant as it wore off very quickly. She was very pleased with her analgesia, commenting that although it did not take away all of the pain of labour, it made it manageable and that she had felt more in control.

The baby was transferred to the neonatal intensive care unit after delivery as the platelet count in cord blood was $52 \times 10^3$ ml$^{-1}$. The mother was discharged to the post-natal ward shortly afterwards and advised to remain in hospital for 72 h. Repeat platelet counts on both mother and neonate returned to normal levels and the mother’s arterial pressure returned to normal within a few days. Mother and baby were discharged home on the third day after delivery.

**Patient No. 2**

A 25-yr-old, 61-kg primagravida was referred to the obstetric anaesthetic service at 32 weeks’ gestation to discuss analgesia during labour. She was known to have chronic idiopathic thrombocytopenic purpura (platelet count 60–80 $\times 10^3$ ml$^{-1}$). During the pregnancy, her platelet count declined steadily to $46 \times 10^3$ ml$^{-1}$ at the 23rd week of pregnancy. She was also a known asthmatic, controlled with salbutamol and beclomethasone inhalers. When she was seen in the outpatient clinic by the senior obstetric anaesthetist, her platelet count was $48 \times 10^3$ ml$^{-1}$, and after full discussion with explanation of the risks and benefits, as outlined for patient No. 1, she was offered the use of patient-controlled remifentanil.

She presented to the labour ward at 34 weeks’ gestation with spontaneous rupture of membranes and in active labour. Platelet count had decreased further to $34 \times 10^3$ ml$^{-1}$. She used Entonox for the first 3 h before remifentanil PCA was set-up, with explanations and monitoring as in patient No. 1. The cannula was sited in a forearm vein, and a dedicated line was used. She used PCA for the next 3 h until full cervical dilation. During this time she made 74 demands of which 47 were good, and received a total dose of remifentanil 940 µg. She used Entonox for the 15-min second stage. A live baby girl, weighing 1720 g, was born by normal vaginal delivery, with Apgar scores at birth of 9 at 1 min and 10 at 5 min. No neonatal resuscitation was required.

When questioned the following day, she described analgesia as very good. She had no pruritus, nausea or vomiting. The baby was transferred to the neonatal intensive care unit for supplementary feeding and remained in hospital for 10 days, before being discharged home.

**Discussion**

Epidural analgesia for labour is not recommended if the platelet count is less than $100 \times 10^3$ ml$^{-1}$ (normal $>150 \times 10^3$ ml$^{-1}$) because of the risk of epidural haematoma and resulting neurological damage. Non-pharmacological forms of analgesia, such as breathing exercises and transcutaneous nerve stimulation (TENS), are inadequate for established and augmented labour. Entonox may also be inadequate. Pethidine is the most widely used opioid but causes marked sedation.

Patient-controlled analgesia techniques are not new to obstetrics: it is the standard delivery system for Entonox. Pethidine has been given by PCA and there are case reports of fentanyl PCA in labour. Remifentanil may have advantages over other opioids when used as PCA because of its rapid onset and offset times, allowing better matching of analgesia to the intermittent pains of labour without accumulative side effects.

Remifentanil has an effect-site half-life for analgesia of 1.3 min, which gives it a rapid onset time, and it is hydrolysed rapidly by red blood cell and tissue esterases. Its effects are reversed by naloxone. It has been used as an i.v. infusion during non-urgent Caesarean section as an adjunct to epidural anaesthesia. It crosses the placenta but appears to be rapidly metabolized, redistributed, or both, with no clinically adverse effects on the neonate. Remifentanil has similar potency to fentanyl, which is why we chose our scheme of a 20-µg bolus. Both patients remained comfortable using this scheme and they were both satisfied with their analgesia. Since we made our observations, we are aware of a case report of patient-controlled analgesia using remifentanil in the parturient with thrombocytopenia but much larger doses were used.

In summary, we used remifentanil i.v. by PCA as a method of managing pain during labour in two patients where epidural analgesia was contraindicated. I.v. PCA with a short-acting drug should be better than intermittent i.m. injections because it avoids the pain of injection and allows better matching of analgesic delivery to the pain. Further research needs to be carried out in this field to further ascertain its safety and appropriateness as it may prove to be a suitable method of pain management in labour.

**Acknowledgement**

We thank Dr N. Goodman for help with the preparation of the manuscript.

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