I.V. ALFENTANIL ANALGESIA FOR PHYSIOTHERAPY FOLLOWING RIB FRACTURES

A. RAVALIA AND D. SURESH

SUMMARY

A case is presented in which intermittent i.v. alfentanil was titrated to meet the analgesic requirements in a patient with extensive rib fractures, during each session of intensive chest physiotherapy. This method of analgesia is discussed and compared with other analgesic techniques.

KEY WORDS

Analgesics: alfentanil. Lung: physiotherapy, rib fractures.

Various methods have been used to facilitate the provision of analgesia for physiotherapy following rib fractures [1—3]. A case is described in which alfentanil was used successfully during each session of intensive chest physiotherapy, to provide excellent, brief and safe analgesia in a patient with extensive rib fractures.

CASE REPORT

A 70-yr-old male (weight 65 kg) was admitted to hospital after a fall during which he sustained fractures of 12 ribs on the anterolateral aspect of the left chest and the clavicle on the same side. His previous medical history was unremarkable apart from heavy cigarette smoking with chronic obstructive airways disease.

On examination, he was breathless, with reduced air entry over the entire left lung field. There was no evidence of a flail segment. His arterial blood-gas data breathing air were: pH 7.40, Pco₂ 6.88 kPa, Po₂ 5.89 kPa. Chest x-ray was consistent with early bronchopneumonic changes affecting the left side to a greater extent than the right. He was transferred to the Intensive Care Unit (ICU) and given 35% humidified oxygen via a face mask, and an infusion of pethidine 20 mg h⁻¹ for analgesia.

It was possible neither to perform chest physiotherapy nor to obtain a sputum sample, as objection to a face mask and severe pain made the use of Entonox (50% nitrous oxide in oxygen, B.O.C.) difficult. However, a 100-µg bolus of alfentanil permitted production of a sputum sample; amoxycillin 1 g i.v. was given subsequently every 8 h. Gram staining and culture of the greenish sputum failed to isolate any organism.

Alfentanil provided such excellent analgesia and co-operation that it prompted us to defer a thoracic extradural in order to evaluate the continued use of alfentanil for physiotherapy.

Alfentanil was diluted to 100 µg ml⁻¹ with water for injection. The pethidine infusion was interrupted and alfentanil 200 µg i.v. given over a period of 2 min. The patient was then turned onto his right side and physiotherapy commenced following further alfentanil 100 µg. Additional doses of alfentanil 50—100 µg were given at 2—3 min intervals to a total dose of 800 µg. There was no apnoea, bradycardia, hypotension or loss of consciousness and the patient remained co-operative and pain free throughout this period.

Vigorous chest physiotherapy was carried out

Correspondence to D.S.
in this manner four times daily for the next 5 days. An average of 750 μg of alfentanil was required per session. Each of these sessions, lasting approximately 15 min, produced copious quantities of thick greenish sputum and a marked improvement in arterial blood-gases. Pethidine i.m. was substituted for the infusion on the 5th day, when the patient was able to tolerate physiotherapy without alfentanil. He was transferred to the general ward the following day when his chest x-ray was clear and arterial blood-gas data breathing air had improved to pH 7.43, $P_{\text{CO}_2}$ 5.80 kPa, $P_{\text{O}_2}$ 9.80 kPa. He was discharged home 1 week later.

**DISCUSSION**

The key factor in the successful management of rib fractures in elderly patients with bronchitis is effective analgesia. Inadequate analgesia leads to sputum retention, atelectasis and infection culminating in respiratory failure. Our patient's admission to the ICU is a typical example of this sequence of events. Administration of alfentanil i.v. averted the need for mechanical ventilation and allowed discharge from the ICU without resort to minitracheotomy or a thoracic extradural.

Alfentanil was chosen for its potent analgesic properties and its rapid and short lived action [4, 5]. The earlier sessions were used to determine the average dose requirement, which in this patient possibly reflects the sensitivity of the elderly to alfentanil [6]. Apnoea and respiratory depression were avoided by using small bolus doses titrated slowly to the patient's analgesic requirements and ventilatory frequency [7].

Alternative methods of analgesia include paravertebral and intercostal block [8–10]. The need for multiple injections, inadvertent i.v. injections, total spinal block [11], pneumothorax and possible toxicity, are obvious disadvantages. Intercostal techniques were considered inappropriate in our patient because of the extensive nature of his injury. Performance of thoracic extradural block requires greater technical expertise than lumbar extradural. The use of local anaesthetic agents in the extradural space causes hypotension, especially in the elderly [12, 13]. Extradural opioids overcome the problem of sympathetic block with the additional advantage of the absence of motor block. Delayed respiratory depression [14, 15] should restrict their use to a high dependency area or ICU.

Entonox, the method of analgesia used most commonly for physiotherapy in rib fractures, requires instruction, patient co-operation and acceptance of a face mask or mouth-piece. Atmospheric pollution [16], a compulsory $F_{\text{I}_{\text{o}}}$ of 0.5 in a chronic bronchitic, its relative contra-indication where pneumothorax is a possibility, and other side effects [17], render it less suited for this purpose compared with alfentanil.

Alfentanil was an effective analgesic for physiotherapy in this patient, but the risk of respiratory depression should restrict its use to situations in which resuscitative skills and equipment are readily available.

**REFERENCES**


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