In conclusion, low-dose ketamine given subcutaneously provided effective analgesia in most of the cancer patients (13/18). The dose of ketamine which relieved pain in regions of the spinal nerves also exerted an analgesic effect on regions of trigeminal and glossopharyngeal nerves. This supports the laboratory findings of Tomemori *et al.*[10] which suggested that ketamine does not act on the spinal cord directly.

Eiji Oshima MD PhD,
Kanchu Tei DDS
Hiroshi Kayazawa MD
Nobukata Urabe MD PhD
Department of Anesthesiology
Kitano Hospital
Tazuke Kofukai Foundation Medical Research Institute
13-3 Kamiyama-cho, Kita-ku, Osaka 530
Japan

REFERENCES

1 *Ito Y, Ichiyanagi K.* Post-operative pain relief with ketamine infusion. Anaesthesia 1974; 29: 222–9.
2 *Sadove MS, Shulman M, Hatano S, Fevold N.* Analgesic effects of ketamine administered in subdissociative doses. Anesth Analg 1971; 50: 452–7.
3 *Mankowitz E, Brock-Utne JG, Cosnett JE, Green-Thompson R.* Epidural ketamine. A preliminary report. S Afr Med J 1982; 61: 441–3.
4 *Bion JF.* Intrathecal ketamine for war surgery. A preliminary study under field conditions. Anaesthesia 1984; 39: 1023–8.
5 *Hutchinson HT, Leedham GD, Knight AM.* Continuous subcutaneous analgesics and antiemetics in domiciliary terminal care. Lancet 1981; 2: 1279.
6 *Campbell CF, Mason JB, Weiler JM.* Continuous subcutaneous infusion of morphine for the pain of terminal malignancy. Ann Intern Med 1983; 98: 51–2.
7 *Idvall J, Ahlgren I, Aronsen KF, Stenberg P.* Ketamine infusions: pharmacokinetics and clinical effects. Br J Anaesth 1979; 51: 1167–3.
8 *Nimmo WS, Clements JA.* Ketamine on demand for postoperative analgesia. Anaesthesia 1981; 36: 826.
9 *Slogoff S, Allen GW, Wessels JV, Cheney DH.* Clinical experience with subanesthetic ketamine. Anesth Analg 1974; 53: 354–8.
10 *Tomemori N, Komatsu T, Shingu K, Urabe N, Seo N, Mori K.* Activation of the supraspinal pain inhibition system by ketamine hydrochloride. Acta Anaesthesiol Scand 1981; 25: 355–9.

Anaesthetic data logging using a Psion pocket computer

To the Editor:

The acquisition of data from anaesthetic monitoring equipment is useful as a trend monitor, for teaching, and research purposes. Many monitors have built-in trending with analogue (waveform) or digital display (printer). Output of data from these machines is most often achieved by the use of industry standard interfaces, e.g., serial RS232.

Infra-red analysers are routinely used for the monitoring of anaesthetic gases including oxygen, carbon dioxide, nitrous oxide and volatile agents, e.g., Datex® 254 airway gas monitor, which has a serial RS 232 output interface for data streaming. Chart recorders (analogue) require to be calibrated (zero and peak) and errors may occur due to pen movement and, later, transcribing data from them. A previous program used an analogue to digital converter to obtain data suitable for computer processing.[1] However, this required a two-stage calibration to be performed each time it was used. Digital data is transmitted "as is" and, provided that the monitoring equipment is correctly calibrated, then the recorder will be accurate. Thus, calibration is a one-step procedure, and due to the good zero-stability of infra-red analysers, this is only required on a weekly basis. We have recorded data from the analyser during calibration and have shown that the recorded data corresponds to zero and peak levels of CO_2 and anaesthetic agent. Furthermore, to obviate the need to take a IBM computer (or similar) into the operating-room with problems of expense, electrical isolation and size we used a commercially available pocket computer (Psion Organiser XP). The communications link supplied, as an option, with the Psion XP pocket computer has a D-25 female connection, as does the Datex 254, therefore a gender-changer has to be constructed. "Pin-outs" were found for the two pieces of equipment and a cable with D-25 male connectors was appropriately fashioned. A further connection was used to permit the analogue display of the capnograph on the Datex 251.

The Datex 254 transmits a data-stream every ten seconds consisting of time (hours and minutes), end–tidal and inspired fractions of CO_2, O_2, N_2O, anaesthetic agent, agent name (ISO, ENF, HAL), and respiratory rate. The communications procedure on the Psion was set up with a Baud rate of 1200 and the other default values supplied. Data can be directly down-loaded from the Psion to an IBM spreadsheet (Microsoft Works® in this case), and then displayed graphically and/or printed.

This particular pocket computer has several other facilities; diary, calculator, database and is programmable. Commercial programs which perform other functions, e.g., spreadsheet and finance packs may be bought. A bar-code reader may also be attached to the communications link and provides portable database of coded items. The programmable feature allows useful and varied procedures to be writen, e.g., drug dosages for different age groups, infusion doses and statistical tests (Student's t test and chi-squared test). We have also written a procedure which will allow the user to vary the timing of data input, and length of the data strings. Another modification to the Psion communication setup enables the data to be directly down-loaded to an Apple Macintosh computer (as <Tab> separated values). We plan to make these programs available to other Psion users.

At present the main interest in this system of data collection is for research into uptake of volatile agents, with special reference to the new agent, desflurane (formerly I-653). The rapid rise of alveolar concentration of this drug, conferred by the low blood–gas solubility (0.42), makes this system ideal for such measurement.

R.H. Taylor FFARCS
B. Bissonnette FRCPC
G.R. Atkinson
The Department of Anaesthesia and the Research Institute
Hospital for Sick Children
University of Toronto
Ontario, Canada M5G 1X8

REFERENCE

1 *Dwyer R, Atkinson R, Taylor R, Fee JPH.* Program for BBC B microcomputer to record data from anesthetic monitoring equipment. Anaesthesia 1988; 44: 812.

Intranasal sufentanil

To the Editor:

Recently, Helmers *et al.*[1] demonstrated that sufentanil is well absorbed from the nasal mucosa, the plasma concentration 20 min after administration being similar to that following IV administration. Because onset of sedation was rapid, the authors suggested that intranasally administered sufentanil may be a useful premedication. Their recommendations must be interpreted cautiously: because the authors did not assess the effects beyond the preoperative period, they did not evaluate possible interactions with drugs administered during anaesthesia. When we preinduced anaesthesia in paediatric patients using nasally administered sufentanil,[2] ventilatory compliance was mildly or markedly decreased in many children. Of note, one patient who received sufentanil, 4.5 $\mu g \cdot kg^{-1}$ intranasally, required succinylcholine, oxygen, and positive pressure ventilation when a marked decrease in compliance during induction of anaesthesia compromised arterial oxygen saturation. This interaction between sufentanil and inhaled anaesthetics may markedly limit the utility of nasally administered sufentanil.

Jane M. Henderson MD FRCPC
Department of Anaesthesia
Montreal Children's Hospital and McGill University
Dennis M. Fisher MD
Department of Anesthesia
University of California, San Francisco

REFERENCES

1 *Helmers JH, Noorduin H, Van Peer A, Van Leeuwen L, Zuurmond WWA.* Comparison of intravenous and intranasal sufentanil absorption and sedation. Can J Anaesth 1989; 36: 494–7.

2 *Henderson JM, Brodsky DA, Fisher DM, Brett CM, Hertzka RE.* Preinduction of anesthesia in pediatric patients with nasally administered sufentanil. Anesthesiology 1988; 68: 671–5.

REPLY

We wholeheartedly agree with Henderson et al. *that high dose opiates may cause rigidity. However, in our study we used so small a dose that rigidity was not noticed during the observation period, nor thereafter. Our induction was at least 60 min after the intranasal administration of a small dose of sufentanil (0.21 $\mu g \cdot kg^{-1}$ vs 1.5–4.5 $\mu g \cdot kg^{-1}$ in their study), so the peak-effect and maximal concentration were already "passed," whereas they continued their administration induction within ten minutes of intranasal sufentanil, when the plasma concentration of sufentanil reaches its peak. Preinduction with an anaesthetic dose of intranasally administered sufentanil is very different from premedication with a very small dose of intranasal sufentanil. We firmly stay with our conclusion that intranasal sufentanil in a low dose may be an attractive alternative as a preoperative premedicant.*

J.H.J.H. Helmers MD
Hospital "De Lichtenberg"
Department of Anaesthesia
Utrechtseweg 160
3818 ES Amersfoort
The Netherlands