Solving the problems with patient controlled analgesia

SIR,—Miranda Farmer and N J N Harper describe a situation in which patients do not understand the function of the activating button on the patient controlled analgesia system and house officers and junior nursing staff are allowed to programme the pumps.¹ We sympathise with the problems they have encountered, but in such circumstances problems are not unexpected; they are inevitable.

In our hospital we have followed the advice of the *Report of the Working Party on Pain After Surgery*² and established an acute pain team. One of our first tasks has been to introduce the use of patient controlled analgesia. We have written protocols, guidelines, and quality standards and introduced training programmes for anaesthetists and ward nursing staff. Only trained staff are allowed to change syringes or alter the pump settings. Patients are given a full explanation of the pump before operation and are also supplied with an information leaflet. We believe this approach will result in a high quality, safe service and so far we have not had problems such as those described by Farmer and Harper.

Our acute pain team is multidisciplinary and comprises a consultant anaesthetist, four part time acute pain nurses, a pharmacist, and a clinical psychologist. We see the team's remit as being far wider than simply the introduction of patient controlled analgesia. We aim to supervise the effective use of established methods of pain relief, to evaluate and introduce new methods, to provide education and training, and to audit the effects of our activities.

Farmer and Harper conclude "The introduction of a patient controlled analgesia service demands more than simply buying the equipment." We agree—but, more importantly, the provision of effective postoperative analgesia requires far more than a patient controlled analgesia service; it requires a multidisciplinary team approach using a range of techniques.

MICHAEL O'CONNOR
SHEILA CHADWICK
CAROL BLACK
CAROLE CURTIS
PIPPA WARWICK

Princess Margaret Hospital,
Swindon SN1 4JU

- 1 Farmer M, Harper NJN. Unexpected problems with patient controlled analgesia. *BMJ* 1992;304:574. (29 February.)
- 2 Royal College of Surgeons of England, College of Anaesthetists. *Report of the working party on pain after surgery*. London: RCS, 1990.

SIR,—This department has experienced similar errors in the programming of patient controlled analgesia pumps to those reported by Miranda Farmer and N J N Harper.¹

I recently audited use of patient controlled analgesia in 23 adults after general surgery. This showed that the drug and dose used, the lockout interval during which the patient may not receive a further dose, and whether a four hour maximum dose was preset varied among anaesthetists. This caused confusion among the ward staff. The

surgical house officers often altered the settings on the machine postoperatively (to remove a four hour dose limit that was resulting in inadequate analgesia), sometimes making a mistake when doing so.

A policy of using a standard drug (morphine), dose (1 mg), and lockout interval (five minutes) was introduced and the audit repeated. The regimen proved satisfactory in almost all patients after general surgery. We now use the same settings on the pumps for all patients, but repeat audit has shown that pumps are still programmed incorrectly.

Patient controlled analgesia should be an inherently safe method of delivering opioid drugs because the patient must be alert enough to press the demand button to receive each dose. We have found that the same dose and lockout settings may be used for almost all adult patients after general surgery. Errors in programming the pump may, however, lead to the patient either receiving an overdose of opioid or being denied adequate analgesia.

Currently available pumps can be programmed to give a wide range of doses and lockout intervals, most of which are unlikely ever to be used intentionally. A four hour or similar maximum dose can be set, although this probably adds little to the safety of the technique while resulting in inadequate analgesia in patients with high opioid requirements. A simultaneous continuous infusion of opioid may be added, although this increases the amount of opioid administered without improving pain relief.²

A patient controlled analgesia pump designed with one preset dose and lockout interval and no additional features would require no programming. Programming errors by the operator would be eliminated, increasing patients' safety, and setting up the device would be quicker and easier. Such a simplified device would be less expensive than the present increasingly complex machines, but I believe it could provide equally effective analgesia.

ALASTAIR NIMMO

Department of Anaesthetics,
Royal Infirmary of Edinburgh,
Edinburgh EH3 9YW

- 1 Farmer M, Harper NJN. Unexpected problems with patient controlled analgesia. *BMJ* 1992;304:574. (29 February.)
- 2 Owen H, Szekely SM, Plummer JL, Cushnie JM, Mather LE. Variables of patient-controlled analgesia. 2. Concurrent infusion. *Anaesthesia* 1989;44:11-3.

SIR,—We endorse Miranda Farmer and N J N Harper's concern about the problems of introducing a patient controlled analgesia service without adequate in service training and provision for educating patients.¹

Although we now have experience of over 1000 patients at Derbyshire Royal Infirmary, our early attempts with patient controlled analgesia were beset by similar difficulties. The medical and nursing staff's lack of understanding of the operation of the pumps used (Lifecare, Abbott Laboratories) was exacerbated by the absence of any education for patients. The resulting inadequate treatment, manifest as poor control of pain, served only to reinforce further deeply held misgivings about the wisdom of allowing patients to administer opioids themselves. The disillusionment among the staff was so great that even those who had

supported introducing this technique in the hospital questioned its continued use.

Consequently, an extensive programme of regular in service training was undertaken. It covered the practical operation of the equipment and the theory behind patient controlled analgesia and defined the roles and responsibilities of medical, nursing, and pharmacy staff in a successful patient controlled analgesia service. Structured education for patients was introduced, and use of patient controlled analgesia is discouraged unless the patient has received adequate preoperative counselling. The development of an acute pain team in the hospital, as recommended in the joint colleges' report on pain after surgery,² has further enhanced the monitoring and evaluation of patient controlled analgesia.

Such measures have proved effective in improving the quality of pain relief obtained by patients using patient controlled analgesia. Currently, over 96% of our patients complete their treatment with patient controlled analgesia uneventfully and are satisfied with the overall pain relief obtained. Less than 0.5% stop because of poor pain relief. The remaining 3.5% stop because of predictable side effects—for example, sickness or dysphoria.

Patient controlled analgesia is valuable and effective but, in the current financial climate, is unlikely to be available to all those who might benefit from it. Therefore, it seems inappropriate to introduce or operate such a service without careful prior consideration of the potential pitfalls.

DERMOT BALL
KAY HOLMES
STAN RALPH

Acute Pain Service,
Derbyshire Royal Infirmary,
Derby DE1 2QY

- 1 Farmer M, Harper NJN. Unexpected problems with patient controlled analgesia. *BMJ* 1992;304:574. (29 February.)

- 2 Royal College of Surgeons of England and College of Anaesthetists. Commission on the Provision of Surgical Services. *Report of the working party on pain after surgery*. London: RCS, College of Anaesthetists, 1990.

Intussusception in infants

SIR,—Mark D Stringer and colleagues find that death from intussusception in infancy occurs in about one in 130 patients,¹ and in a previous review Pledger *et al* found that the mortality for children aged under 4 with acute appendicitis was about one in 320.² These are low figures, but in the earlier analysis the authors remarked that "although death is now rare it is still a tragedy for the individual family, and for every death there are likely to be several 'near misses'."

Both these papers identify aspects in which practice could be improved, but one obstacle is the limited opportunity to build up experience. A children's hospital serving a population of 450 000 admits each year about 110 children with acute appendicitis (of whom only 5% will be aged under 3) and six or seven infants with intussusception.³ This population is served by some 250 doctors, so their experience of abdominal emergencies in infants is bound to be thinly spread. Even in children's hospitals recognition of intussusception is delayed: in half of 630 patients treated in Melbourne⁴ and 30% of 336 children seen in Toronto⁵ the diagnosis was not made at the first

examination. Infants cannot describe their complaints and often resent abdominal palpation. Stringer and colleagues confirm that among children with intussusception only a minority have the traditional triad of symptoms.

It is natural for trainees in general practice to try to reach an accurate diagnosis, but in these difficult circumstances it is probably wiser to observe the rule that a patient who has evidence of continuing acute abdominal disease for more than six hours must be considered to have a surgical condition. If this is uppermost in the practitioner's mind he or she is less likely to delay in seeking a surgical opinion.

To improve the management of intussusception in hospital Stringer and colleagues advise "expedient treatment in a centre with combined paediatric radiological, anaesthetic, and surgical expertise." The first line of treatment in most cases, after correction of dehydration, is now generally agreed to be hydrostatic reduction under an image intensifier, with the surgeon ready to proceed if necessary. In most series about a fifth of patients who are operated on require a resection. This is a regimen that requires radiologists, anaesthetists, and surgeons with paediatric expertise. Some district hospitals can call on these skills, but the few infants admitted with an acute abdomen mean that other hospitals cannot easily acquire them. Attention has been drawn to these problems,⁶ and the British Association of Paediatric Surgeons has considered them, but Stringer and colleagues' report shows that some infants still receive less than expert care.

As more consultants are appointed and it becomes usual for each general surgeon to have a special interest we can reasonably expect that each district general hospital will have at least one surgeon with paediatric skill. Until then there is no dishonour in recognising that some sick infants require speedy transfer to the regional paediatric surgical unit.

PETER F JONES

Cults,
Aberdeen AB1 9HR

- 1 Stringer MD, Pledger G, Drake DP. Childhood deaths from intussusception in England and Wales, 1984-89. *BMJ* 1992;304:737-9. (21 March.)
- 2 Pledger HG, Fahy LT, van Mourik GA, Bush GH. Deaths in children with a diagnosis of acute appendicitis in England and Wales 1980-4. *BMJ* 1987;295:1233-5.
- 3 Winsey HS, Jones PF. Acute abdominal pain in childhood: analysis of a year's admissions. *BMJ* 1967;1:653-5.
- 4 Beasley SW, Auldred AW, Stokes KB. The diagnostically difficult intussusception: its characteristics and consequences. *Pediatric Surgery International* 1988;3:135-8.
- 5 Ein SH, Stephens CA. Intussusception: 354 cases in 10 years. *J Pediatr Surg* 1971;6:16-27.
- 6 Jones PF. The general surgeon who cares for children. *BMJ* 1986;293:1156-8.

SIR,—We think that in their attempt to produce practice guidelines from their audit of childhood deaths from intussusception Mark D Stringer and colleagues have overlooked a particular problem in the diagnosis and management of this condition in children, possibly because of the small sample they studied.¹

We and others have become increasingly aware of the difficulty of diagnosing intussusception in neonates and premature infants (M P Lewis *et al*, unpublished findings).² Although fairly unusual in this age group, intussusception causes considerable diagnostic problems when it occurs. Because of the similarity of the presentation of neonatal intussusception and the common condition of necrotising enterocolitis an ultraconservative non-operative policy may be adopted with disastrous consequences.^{3,4} Early consideration of the diagnosis and a low threshold for operation are to be recommended in view of the appreciable incidence of jejunal atresia in these infants, which is thought to result from the ischaemic necrosis during the intrauterine pathogenesis of the condition.³

Recommendations attempting to reduce serious

complications in children presenting with intussusception should not overlook the problems in neonates and premature infants.

MARK EMBERTON

Royal College of Surgeons of England,
London WC2A 3PN

M P SINGH

Department of Surgery,
Royal Postgraduate Medical School,
Hammersmith Hospital,
London W12 0NN

- 1 Stringer MD, Pledger G, Drake DP. Childhood deaths from intussusception in England and Wales, 1984-9. *BMJ* 1992;304:737-9. (21 March.)
- 2 Pavri DR, Marshall DG, Armstrong RF, Gorodinsky FP. Intrauterine intussusception: case report and literature review. *Can J Surg* 1983;26:376-8.
- 3 Kelly SB, Singh MP. Intrauterine intussusception and ileal atresia presenting as acute perforation. *Acta Paediatr Scand* 1991;80:172-3.
- 4 Stine MJ, Harris H. Intussusception in a premature infant simulating neonatal necrotising enterocolitis. *Am J Dis Child* 1982;136:76-7.

The fast of Ramadan

SIR,—Awad H Rashed's editorial on the fast of Ramadan is a reminder of the need to monitor the medical effects of this religious observance.¹ Unfortunately, his contention that breast feeding mothers are exempt from fasting is not universally accepted, and some authorities allow exemptions only for the sick or travellers, who should subsequently make up missed days.^{2,3}

Last week we admitted a 1 month old child whose mother had been successfully breast feeding. After the start of the fast her milk supply dried up and the child was given the local alternative of goats' milk diluted with heavily polluted canal water. The child became extremely ill with diarrhoea and vomiting and required intravenous rehydration. On medical advice the mother was allowed to break her fast with the proviso that the missed days should be made up afterwards. Her milk supply returned and the child was discharged well; obviously, though, if the mother fasts again the child may again be at risk.

During Ramadan some local Muslims allow people who have a good reason to avoid fasting to give morning and evening meals instead to a poor person who can fast in their place. Muslim doctors whose conscience will allow them to do so will be doing a great service to Muslim infants by encouraging the idea of a special dispensation for breast feeding mothers.

DEREK A MCHARDY
MORRIS EPHRAIM

Rural Health Care Project,
Kunri Christian Hospital,
Kunri 69160,
Tharparkar,
Sindh,
Pakistan

- 1 Rashed AH. The fast of Ramadan. *BMJ* 1992;304:521-2. (29 February.)
- 2 Sarwar G. *Islam: beliefs and teachings*. 3rd ed. London: Muslim Educational Trust, 1987:76.
- 3 Yusuf Ali A. *The holy Quran: text, translation and commentary*. Leicester: Islamic Foundation, 1975:72.

Effect of overdose of trazodone

SIR,—We doubt G Balestrieri and colleagues' interpretation of hyponatraemia and seizure being due to an overdose of trazodone.¹

Firstly, no mention is made of the blood concentration of trazodone. The therapeutic concentration of the drug is 1.6 mg/l; 25.7 mg/l is associated with moderate toxicity. Serious symptoms of toxicity are well recognised with doses exceeding 750 mg and include dry mouth, dilated pupils, and urine retention. The authors also do not mention the sodium concentration on admission, and the

laboratory results quoted may well have been due to overhydration of the 72 year old patient.

Secondly, the sweating and anxiety that the patient experienced were probably due to the withdrawal of oxazepam and propranolol, which she had been taking for 10 years. The vasopressin concentration was not measured.

Trazodone is fairly safe in overdose compared with first generation tricyclic antidepressants. Animal studies suggest that it does not lower the seizure threshold and causes minimal cardiovascular disturbances.²

EMMA BAUGHAN

S S M JAWAD

Department of Psychological Medicine,
University of Wales College of Medicine,
Cardiff CF4 4XN

- 1 Balestrieri G, Cerudelli B, Ciacio S, Rizzoni D. Hyponatraemia and seizure due to overdose of trazodone. *BMJ* 1992;304:686. (14 March.)
- 2 Barnes T, Bridges P. New generation of antidepressants. In: Tyrer P, ed. *Drugs in psychiatric practice*. London: Butterworths, 1982:219-48.

AUTHOR'S REPLY,—We could not measure the blood concentration of trazodone, but the dose of trazodone (350 mg) may well be considered to be an overdose in a lean (35 kg) old woman. The serum sodium concentration (118 mmol/l) was measured immediately after the seizures and was the first measurement obtained. We do not think that the infusion prescribed (1000 ml of 5% glucose and 500 ml saline daily) could have caused overhydration in a patient without appreciable cardiac, renal, or hepatic impairment. On the contrary, the urine was hypertonic in relation to plasma, and this was consistent with inappropriate secretion of antidiuretic hormone. Measurement of vasopressin is not required to diagnose this syndrome.

The patient had taken oxazepam and propranolol irregularly for six months. We agree that some of the symptoms could be related to the withdrawal of these drugs. Seizures were observed in our patient during profound hyponatraemia; in our opinion seizures may more easily be correlated to ion imbalance than to a direct effect of trazodone. Seizures have, however, been described in patients receiving trazodone in therapeutic doses.¹

GIANPAOLO BALESTRIERI

Facoltà di Medicina e Chirurgia,
Università degli Studi di Brescia,
25124 Brescia,
Italy

- 1 Tasini M. Complex partial seizures in a patient receiving trazodone. *J Clin Psychiatry* 1986;47:318-9.

Advanced trauma life support courses

SIR,—As a successful candidate I can vouch for the effectiveness of the advanced trauma life support course as a method of learning for doctors caring for patients with trauma in hospital.¹ Unfortunately, the course, and Jerry P Nolan and colleagues' editorial, does not address the most important problem of trauma care in the United Kingdom.

The cost of trauma is unquestionable, whether it is measured in terms of fatal and non-fatal casualties, distress caused to patients and their relatives, distress suffered by the staff of the emergency services, or cost to the nation (assessed in 1989 at £6.36bn a year).²

A large proportion of deaths from trauma occur before the patients reach hospital,³ and early treatment improves mortality from accidents.⁴ In the United Kingdom there is still a substantial "therapeutic vacuum" between accident and hospital, which can be filled by immediate care doctors.⁵

A report by a working party of the Royal College