SVO₂ port of the PA catheter. After repositioning the PA catheter, following aortic valve replacement, the fiberoptic continuous monitoring of SVO₂ was still impossible. We tried to exchange the PA catheter, but we could not withdraw it. However, the PA catheter could be withdrawn finally after removal of the SVC cannula and the purse string suture in the RA wall. We detected a small perforating hole at 26 cm from the PA catheter tip (Figure 2). A communication with the extra-lumen of the catheter, located 19 cm from the tip, was also demonstrated. It is advisable to ascertain that the PA catheter is freely mobile and its functions are not impaired before terminating cardiopulmonary bypass, since this simple manoeuvre may allow an early detection of this rare complication.

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Key issues in vaporizer filling

To the Editor:

We were interested to read the editorial¹ and correspondence^{2,3} relating to the critical overfilling of a vaporizer equipped with a keyed filler and the serious outcome associated with this error. This specific hazard was relayed to anaesthetists practising in the United Kingdom by the Department of Health.⁴

We believe it is now time for a comprehensive reappraisal of the current keyed filler design concept which dates back some 20 yr. Some of the problems associated with keyed fillers were listed in the editorial. Furthermore, their use is not associated with pollution-free vaporizer filling and filler port leakage has been reported during and after filling. Keyed fillers are expensive and prone to fatigue, although newer designs appear more durable. A further cost associated with their use is that of the inevitable wastage of residual anaesthetic, typically 2-3% in the case of isoflurane, remaining in "emptied" bottles, which occurs when keyed fillers are employed.^{5,6}

We recently surveyed 14 hospitals in one Health Re-

gion in the UK and found that 51% of the operating department personnel responsible for vaporizer filling experienced difficulties with vaporizers equipped with keyed fillers,⁷ some commenting that they found the procedure time consuming and "frustrating." Air locks resulting in slow filling or inability to fill were cited most commonly and several respondents volunteered "remedies" such as brief unscrewing of the bottle/filler connection and turning the vaporizer to the "On" position to overcome the inherent limitations of the keyed filler systems on the vaporizers they employed. This is clearly unsatisfactory and suggests that, despite clear warnings, another tragedy resulting from overfilling may be nearer than we think, particularly because agent-specific keyed vaporizers produced by several manufacturers are capable of being overfilled (personal communication [letter] E. Palayiwa, Nuffield Department of Anaesthetics, February 1994).

We propose the keyed filler system be abandoned in favour of a system allowing direct location of the bottle, complete with its collar, in an appropriately designed agent-specific vaporizer fill port. This has been previously described for conventional vaporizers⁸ and is a welcome design feature for the Ohmeda Tec 6 desflurane vaporizer.⁹ The current keyed filler system is inefficient and obsolete and cannot be redeemed by repeated costly design modifications prompted by further case reports reminding us, again, of the deficiencies associated with its use.

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REPLY

As past Chairman of the Standards of Practice Committee of the Canadian Anaesthetists Society, I was invited to write an Editorial comment on the problem of vaporizer overfilling. In essence, I was not attempting to justify the use of a specific piece of equipment but, rather to promote the safe use of vaporizers and their keyed filler devices as we know them. I am happy to note that information on this specific health hazard has been circulated. I hope that heightened awareness of the risks associated with erroneous manipulation of these delicate and complex medical devices will decrease the incidence of anaesthetic accidents related to overfilling of existing vaporizers.

One can only agree that the keyed filler device is imperfect and that its use tends to be time consuming and frustrating. As mentioned in the Editorial, it must be improved upon or, as suggested by Drs. Uncles and Conway, it could be replaced by a system allowing the direct location of the bottle in an appropriately designed vaporizer. I am confident manufacturers will produce safer vaporizers in the near future, and avoiding the use of keyed filler devices altogether may be part of the solution.

However, since mechanical devices are prone to malfunction, either because of faulty design or secondary to improper use, the other two recommendations formulated earlier remain pertinent and merit being repeated. First, the use of agent-specific monitors is encouraged to detect abnormally high or low concentrations of anaesthetic vapours and alert the clinician to equipment malfunction. Second and foremost, users of these sophisticated pieces of medical equipment must read and follow instructions and must not delegate filling of vaporizers to a person without proper instruction and training. Contrary to the popular dictum, please follow instructions, before everything else fails.

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Preanaesthetic oral ranitidine, omeprazole and metoclopramide for modifying gastric fluid volume and pH

To the Editor:

The ideal method of prophylaxis against acid aspiration syndrome during induction of anaesthesia aims at maintaining a small intragastric volume (<25 ml) and high pH (>2.5).¹ We studied the efficacy of omeprazole alone

TABLE Mean $\pm$ SEM (Range)

	pH	Volume (ml)
Group I	1.87 $\pm$ 0.17 (1.16–4.84)	26 $\pm$ 4 (3–65)
Group II	6.06 $\pm$ 0.33* (2.27–7.75)	8 $\pm$ 2* (1–30)
Group III	6.23 $\pm$ 0.22* (3.69–7.61)	6 $\pm$ 1* (0–27)
Group IV	6.83 $\pm$ 0.12* (6.0–7.5)	1 $\pm$ 0.4† (0–7)

* $P < 0.001$ compared with placebo.

† $P < 0.01$ compared with Groups II and III.

and in combination with metoclopramide in modifying gastric volume and pH and compared it with ranitidine in 80 healthy adult patients. Patients were randomly allocated in a double-blind manner to four groups of 20 patients each. Group I patients received placebo, Group II ranitidine 150 mg, Groups III and IV omeprazole 40 mg, at 2200 hr the evening before and at 0600 hr in the morning of surgery. In addition Group IV patients received metoclopramide 10 mg at 0600 hr. After induction of general anaesthesia, gastric contents were aspirated as completely as possible. The pH was measured using Corning digital pH meter. Data were analysed by Kruskal Wallis rank test (one way ANOVA) and a P value of <0.05 was considered significant.

The groups were comparable with respect to age, weight, preoperative interval and duration of surgery. Mean pH was higher in all the treatment groups than in control ($P < 0.001$). However, there were no differences among Groups II, III and IV (P :NS). Mean gastric volume was lower in all the three treatment groups than in control ($P < 0.001$). Group IV had lower mean gastric volume than Groups II & III ($P < 0.01$), while Group III did not differ significantly from Group II ($P > 0.05$) (Table).

We conclude that preanaesthetic oral administration of omeprazole was as effective as ranitidine in reducing gastric acidity and volume. Even though, statistically, all treatment groups appear to be similar in modifying gastric pH, co-administration of omeprazole and metoclopramide results in lower gastric volume and hence appears to be a logical approach to prevent pulmonary damage, should the patient be at risk of aspiration.

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