REPLY

We thank you for the letter and we are most interested in your findings. As you discovered for yourselves, the chemical properties of the constituents have an interesting pharmacological relationship. It is clear that the use of hyaluronidase outside its optimal pH range is inappropriate. In our study we demonstrated that alkalinization improved the efficacy of the blocks; however, most institutions do not use bicarbonate, including your own. Scientifically, we feel its addition is necessary for the maximal efficacy of this mixture, but in practice can be laborious. Measuring the small volumes of bicarbonate required to prepare these solutions can be time-consuming, and if added in excess, can precipitate local anaesthetic. With this in mind, it seems reasonable to encourage the use of a more acidic mixture without hyaluronidase which is both safe and reasonably efficacious. However, in our study we demonstrated that the use of an alkalinized hyaluronidase solution reduced the need for supplemental injection by 35% over the next best solution – saving time for the anaesthetist and sparing the patients the risk of further injections.

Your question about the use of adrenaline could present an interesting study. We found similar pH differences between a solution of plain lidocaine and bupivacaine, and one with adrenaline. One would have to weigh the risks of adrenaline toxicity, with those of increased systemic absorption of the anaesthetic and local bleeding in the absence of adrenaline.

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Filling Tec 5 vaporizers

To the Editor:

In the Ohmeda manual,[1] there is a warning "do not fill the vaporizer unless the control dial is in the off position" and also "warning do not turn the dial on during filling or attempt to fill beyond the full mark." Presumably, the warning is in relation to the possibility that there may be a surge of anaesthetic vapour during the filling process. The Tec 5 Vaporiser has a new filler system in use whereby the bottle adaptor is placed into the filler orifice and clamped and then another lever opens the filler orifice to the fluid sump to allow filling to commence.

In clinical practice quite often filling is necessary during an anaesthetic. It is therefore necessary to turn off the vaporiser, fill the vaporiser and more importantly turn it on again afterwards. Unfortunately, this does not always occur and may lead to cases of awareness. In this hospital the recent purchase of the new anaesthetic machine with Tec 5 Vaporizers has allowed some experimentation. It has been noted that even on filling with the vaporiser turned on with fresh gas flow both at low flows and at high flows, there is no surge of vapour concentration, at either fresh gas outlet or at the patient end of the close circuit.

We should like to pose a question – Is it really necessary to turn off Tec 5 Vaporizers when filling?

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REFERENCE

1 Tec 5 Continuous Flow Vaporizer, Operation and Maintenance Manual, Ohmeda Part No. 1105-0100-000.

REPLY

Thank you for the opportunity to reply to Dr. Dunphy's question regarding the filling of an Ohmeda Tec 5 Vaporiser. With the dial at the OFF position the vaporiser sump is closed to atmosphere. When filling, using the keyed filling system, the agent bottle and adapter become part of that closed system. The volume of drug entering the vaporiser sump is approximately equal to the volume of air leaving the sump. Under these conditions it is not possible to overfill the vaporiser.

The Operation and Maintenance Manual for the Tec 5 Vaporiser states that the dial should be at the OFF position during filling as a precautionary measure to prevent overfilling in the event that a leak has developed between the bottle and adapter. If the vaporiser dial is turned to the ON position during filling and there is a leak, for example around the bottle adapter cap, the sump and bottle cease to be a closed system and overfilling potentially can occur in this double-fault condition.

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Fibreoptic intubation

To the Editor:

In Dr. Morris' recent CME article "Fibreoptic Intubation", it was stated that fibreoptic intubation under general anaesthesia "can be difficult," and "is rarely required," and he concludes that "Where possible, fibreoptic intubation should be performed with the patient awake."[1] As clinicians who routinely perform and teach fibreoptic intubation to residents on patients under general anaesthesia and muscle relaxation, we strongly take issue with this view, and offer the following observations to encourage and assist others to acquire and practice this useful skill.

Fibreoptic intubation in the anaesthetized, apnoeic patient is useful in at least two situations. First, teaching

fibreoptic intubation is very well (and arguable best) managed in anaesthetized, apnoeic patients, without any patient discomfort or added risk, and without the delay inherent in the awake fibreoptic intubation.[2,3] The number of available patients in whom the technique may be used to learn and maintain fibreoptic intubation skills (i.e., all patients for elective tracheal intubation) is much greater than the number requiring awake fibreoptic intubation. Secondly, asleep fibreoptic intubation is an accepted tool or "strategy" in the management of the unsuspected difficult laryngoscopic intubation.[4] No classification based on physical examination in current use has proved to be effective in prospectively identifying more than 50% of difficult intubations. Given the increasing trend to intubate the trachea after non-depolarizing relaxants rather than after succinylcholine, it seems logical to expect that anaesthetists will increasingly encounter unexpectedly difficult intubations, where skill with asleep fibreoptic intubation would prove valuable, if not life-saving.

Morris noted "fibreoptic intubation under general anaesthetic requires two skilled individuals".[1] We agree, but training of the assistant can be brief. We routinely utilize respiratory therapists or nurses who appreciate the importance and effect of three manoeuvres: (1) neck extension,[5] (2) jaw thrust ,[5] and (3) lingual traction.[6,7]

Studies comparing intubation times between rigid and fibreoptic techniques (during anaesthetic induction) consistently find that fibreoptic intubation, while taking 20–40 sec longer, does not result in clinically important oxygen desaturation, provided patients are adequately pre-oxygenated.[8-11,2,3] Oxygen insufflation by catheter into the mouth and pharynx at 4–6 $L \cdot min^{-1}$ prevents oxygen desaturation during fibreoptic intubation.[2,12] The one article which showed oxygen desaturation during fibreoptic intubation under general anaesthesia[13] was performed with patients breathing spontaneously. We suggest that intubation under general anaesthesia without muscle relaxants by any technique is liable to result in breath-holding, coughing, and/or laryngospasm with resultant hypoxemia.

Schaefer and Marsch said of fibreoptic intubation that "it may become the method of choice for many anaesthetists rather than reserved for patients in whom rigid techniques have proven to be unsuccessful."[11] We completely agree.

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REPLY

Fibreoptic intubation can be performed in the unconscious apnoeic individual, but is most useful in the patient who is predicted to be a difficult intubation, and in this setting the margin of safety is maximizing by performing the procedure with patient awake. Fibreoptic intubation under general anaesthesia can be difficult. Cole et al. reported two fibreoptic intubation failures in 33 patients under general anaesthesia.[1] Schaefer et al.[2] reported one patient who required two fibreoptic attempts before successful intubation in a series of 50 patients and Smith et al.[3] reported two failed fibreoptic intubations in 50 patients. Furthermore these studies excluded patients who were predicted to be a difficult intubation[1,3] or had abnormal airway anatomy.[2] Smith et al.[4] reported a series of 60 patients predicted to be a difficult intubation who underwent fibreoptic intubation