A Potential Cause (and Cure) of a Major Gas Leak

To The Editor—A Fraser Harlak Boyle System\textsuperscript{a} anesthesia machine (now Ohmeda\textsuperscript{a} model 8000) equipped with Cyprane Isotec 4\textsuperscript{b}, Fluotec 4\textsuperscript{b}, and Enflurane 4\textsuperscript{b} vaporizers was received for prepurchase clinical evaluation. The vaporizers on this machine are easily removed (and remounted) by rotating a locking lever 90° and lifting them off. Prior to use, a Boyle representative demonstrated this feature using the Isotec\textsuperscript{b} vaporizer. The machine was pressure tested prior to clinical use, revealing no apparent gas leaks. During use, gas flow from the machine appeared normal until the Isotec\textsuperscript{b} vaporizer was activated, at which time all noticeable flow from the machine ceased. As the source of the problem was not immediately obvious, the machine was exchanged.

Subsequent investigation revealed that when the Isotec\textsuperscript{b} vaporizer was replaced, it was improperly seated, being cocked at a very slight angle. This angled position was not obvious upon cursory visual inspection. The vaporizer locking mechanism rotated normally, and the calibrated dial could be rotated. With the vaporizer off, no gas flow is directed to the vaporizer. The mechanical action of turning the vaporizer on moves two metal plungers, which open the vaporizer inlet and outlet and direct gas flow through the vaporizer. Leak-free connection of the vaporizer is dependent on proper seating. Since the vaporizer was cocked, the majority of fresh gas flow was lost into the room at the vaporizer inlet.

This same vaporizer and vaporizer mounting system is used on the Ohmeda Modulus II\textsuperscript{c} machine, and this same problem is easily reproducible on that machine. This problem has been brought to the attention of the manufacturer and hopefully will be addressed. Until then, it is important when remounting these vaporizers on this mounting system to assure correct positioning. Presence of fresh gas flow at the common gas outlet with the vaporizer turned on will verify proper seating.

James Jablonski, P.E., C.C.E.
Director of Clinical Engineering
Milwaukee County Medical Complex
Alam C. Reynolds, M.D.
Associate Professor of Anesthesiology
Medical College of Wisconsin
Milwaukee, Wisconsin 53226

In reply.—Ohmeda would like to take the opportunity to respond to the article by Mr. Jablonski and Dr. Reynolds. In this article the authors state that a Cyprane TEC 4\textsuperscript{a} vaporizer was improperly seated on a Fraser Harlak Boyle System\textsuperscript{a} anesthesia gas machine, resulting in a significant leak of fresh gas.

The Ohmeda (Cyprane) TEC 4\textsuperscript{a} vaporizers have been on the market for approximately 1 year. As with most relatively new products, user education may be required to become familiar and comfortable with the TEC 4\textsuperscript{a} system.

The Ohmeda TEC 4\textsuperscript{a} vaporizer is similar to many other vaporizers in one major aspect. It must be correctly positioned to function properly. Therefore, it is always important when mounting the Ohmeda TEC 4\textsuperscript{a} or any other vaporizer to ensure correct positioning.

Several things should be done prior to use to help ensure proper positioning of an Ohmeda TEC 4\textsuperscript{a} vaporizer on any Ohmeda anesthesia gas machine. They include sighting across the tops of the mounted and locked vaporizers to ensure that they are level and at the same height. If they are not, check each vaporizer for proper positioning. Another is to gently attempt to lift each mounted and locked vaporizer off the manifold without unlocking it. If the vaporizer can be removed, it is improperly positioned. Finally, and most importantly,
A separate anesthesia gas machine leak test should be performed with each vaporizer individually dialed to a concentration setting of 0%. A dialed setting of 0% is required because the self-sealing valve ports on the manifold are not open unless the vaporizer is dialed to a concentration (ON). If a significant leak is discovered, the vaporizer should be checked for proper positioning.

Procedures for anesthesia gas machine leak tests that help ensure Ohmeda TEC 4\textsuperscript{®} vaporizer mounting integrity appear in both the Ohmeda 8000\textsuperscript{®} and Modulus II\textsuperscript{™} Operation and Maintenance manuals. They do not, however, appear in the earlier Fraser Harlake Boyle System\textsuperscript{®} instruction manuals.

In summary, it is always important, when mounting an Ohmeda TEC 4\textsuperscript{®} vaporizer to ensure correct positioning. Proper positioning is essential for a properly functioning vaporizer. For additional information, contact Ohmeda at (608)221-1551.

RAYMOND T. RIDDLE
Product Compliance Administrator
Ohmeda
P.O. Box 7550
Madison, Wisconsin 53707

(Accepted for publication January 16, 1985)

Beta-adrenergic Blocking Drugs and Apnea

To the Editor:—With interest I read the report on “Timolol and Postoperative Apnea in Neonates and Young Infants” by Bailey,\textsuperscript{1}

Recent research concerning overdoses of beta-adrenergic blocking drugs (propranolol, timolol, and sotalol) in experimental animals was performed in the National Institute of Public Health and Environmental Hygiene, Bilthoven, The Netherlands. These experiments showed the primary cause of death to be respiratory arrest. When death from respiratory arrest was prevented by artificial ventilation the survival time, using the same doses of the drugs, was significantly prolonged.\textsuperscript{*} When much larger doses of the drugs were used in ventilated animals, death occurred from hemodynamic and cardiac failure.

Some beta-adrenergic blocking drugs are rapidly absorbed when applied topically to the eye, which might easily lead to overdosage, especially in children. In addition, there may be an increased susceptibility in the neonate to this type of drug or immaturity of the blood brain barrier. Any or all of these factors may have been responsible for the apnea reported by Dr. Baily, which would seem to confirm our finding that overdosage of certain beta blockers produces respiratory arrest. It would be interesting to know whether there were other observed signs that can be ascribed to beta-adrenergic blockade such as a decrease in heart rate and blood pressure.

J. J. M. LANGEMEIJER, M.D.
Department of Anesthesiology
University Hospital
Catharijnesingel 101
Utrecht
The Netherlands

REFERENCE


(Accepted for publication January 16, 1985)

Cortisol Following Etomidate Administration: Should We Give It the Time of Day?

To the Editor:—The excellent studies by Wagner and White\textsuperscript{1} and by Frangen et al.\textsuperscript{2} document that etomidate decreases adrenocortical response to surgery. However, neither group of investigators considered the possible effect of the circadian rhythm in plasma concentration of cortisol. During a normal circadian rhythm, plasma concentrations of cortisol may vary by a factor of five or more (e.g., typically from a nadir of 3 \textmu g/dl at midnight to a peak of 15 \textmu g/dl at 6:00 A.M.).\textsuperscript{3} These circadian-related alterations in cortisol levels are similar

---

\textsuperscript{*} Langemeyer JJM, De Wildt DJ, De Groot G, Sangster B: Respiratory failure as main determinant of toxicity due to overdose with different beta-blocking drugs in rats, unpublished data.