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UPDATED INFORMATION ON MULTIGAS MONITOR

To the Editor:
In Evaluation of Three Transportable Multigas Anesthetic Monitors: The Bruel & Kjaer Anesthetic Gas Monitor 1304, The Datex Capnomac Ultima, and the Nellcor N-2500, by Jacob Nielsen, MD, Torben Kann, MScEE, and Jakob Trier Moller, MD (1993;9:91–98), the authors compared three multigas monitors, Datex Capnomac Ultima being one of them. The *Journal of Clinical Monitoring* received the article on August 26, 1991, and we would like to update the information regarding the Capnomac Ultima multigas monitor.

Since the beginning of 1992, Capnomac Ultima has been able to automatically identify the inhaled anesthetic agents halothane, enflurane, and isoflurane. Presently, Capnomac Ultima not only identifies and measures the two new anesthetic agents sevoflurane and desflurane [identification pending 510(k)], but even identifies mixtures of two agents. Models identifying anesthetic agents are also capable of compensating for the presence of alcohol in a patient's breath. The technology is called *sweeping spectrum analysis*. This option can be installed onto any Capnomac Ultima monitor.

We changed the supplier of our calibration gases in June 1991. Gas mixtures before June 1991 had a tolerance of +0.2% (abs), whereas current calibration gas mixtures have a tolerance of ±0.1% (abs).

As relevant purchasing criteria, Nielsen et al list cost of purchase, maintenance, reliability, flexibility, interapparatus communication, and display control, and adaptability to future development. We agree with this list, and would like to see studies of the several factors not investigated in this comparison, such as long-term stability. Furthermore, we would like to emphasize the value of identifying, specifying, and evaluating those properties essential for a particular hospital or a particular application.

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CONVENIENT AND COST-EFFECTIVE MODIFICATION OF NEUROMUSCULAR BLOCKADE MONITORS

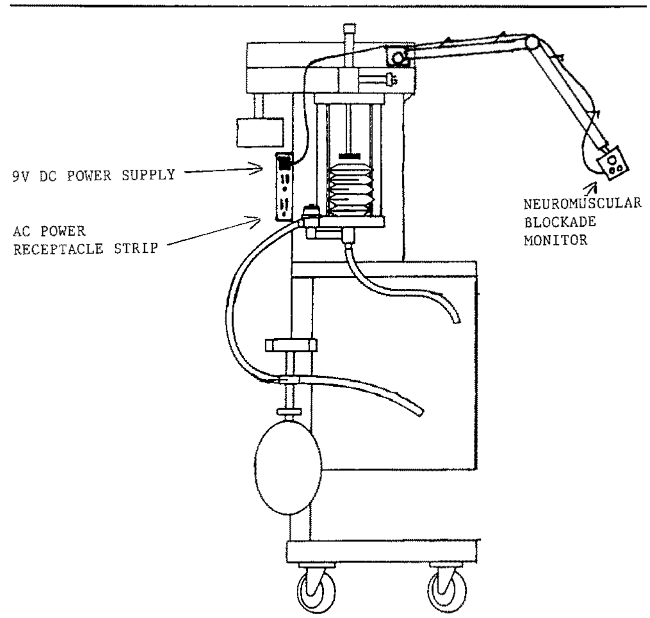
To the Editor:
In our University Hospital (adult) Anesthesia Department, we have used Professional Instrument Corp. NS2/NS3 battery-operated neuromuscular blockade monitors and in our Mott Children's Hospital Pediatric Anesthesiology Department we used the Bard 750 neuromuscular blockade monitors. They were kept in anesthesia machine drawers and were often found with expended batteries. Frequently, they were dropped while in use or while the batteries were being changed. Damage was often extensive, with replacement of switches and cases needed.

An anesthesia technician in our Pediatric Anesthesia Department suggested reducing the failures from dropping by attaching the neuromuscular blockade monitor to a rollabout floor stand. He fashioned a bracket using a standard Abbott disposable blood pressure transducer clamp and attached it with Velcro.

After some experience with the prototype, a biomedical engineering technician (WH) assigned to Anesthesiology permanently mounted the blockade monitors in the adult University Hospital. He attached them to the anesthesia machine's boom arm using existing holes on the arm and drilled matching holes in the case. However, changing batteries still required removal of the blockade monitor from the arm. To avoid that difficulty, and the expense and environmental impact of batteries, we acquired a small, inexpensive AC-powered 9-V DC power supply. We installed a jack in the case of the neuromuscular blockade monitor to bypass the battery, and added a matching plug on the output cord of the power supply. We modified 36 units.

There are several advantages to our setup. A significant human factors advantage is that the stimulator controls can now be operated with only one hand. Furthermore, they no longer disappear. We estimate our loss was 4 to 6 blockade monitors per year at an average cost of $500 each. Electrical safety has not been compromised because the devices exceed the specifications of the AAMI leakage current standard for intracardiac-connected lead wires.

To date, 9 months after the conversion, the repair rate for the 36 boom-mounted neuromuscular blockade monitors has been zero. In comparison, our remaining population of 32 portable blockade monitors has undergone an average of six



Anesthesia machine with neuromuscular blockade monitor attached.

Summary of Cost Impact (36 Stimulators)

	Yearly Repair Expense, Premodification	Yearly Battery Expense	One-Time Modification Expense	Yearly Repair Expense, Postmodification
Labor	$2,830		$2,376	$0
Material	216	$1,104	860	
	Total premodification annual expense = $4,150		Total one-time modification expense = $3,236	

repairs per month. Considering only the repair and supply expenses, the initial costs will be paid back in 9.4 months, after which the operating expense savings will be $4,150 annually (Table). We are now converting the remaining Bard units, which do not lend themselves to permanent mounting, to the Professional Instrument Corp. devices, which mount easily.

We have achieved a significant reduction in operating expenses. The majority of battery use has been eliminated in the Anesthesiology Department. And, most importantly, the anesthesiologists always have a conveniently accessible blockade monitor that is now trouble-free, instead of a frequent annoyance.

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EDITORIAL COMMENT

This is an excellent example of technical support personnel contributing to the efficient, economical utilization of monitoring equipment. Competitive, professional technical support is a requirement for the safe and cost-effective administration of anesthesia in our increasingly technical environment.

Mr Harrison should be commended for his simple yet eloquent solution to a common problem.

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