TITLE: STANDARDIZED DRUG TRAYS AND CARTS IN ANESTHESIOLOGY

AUTHOR: J.M. Christie, M.D.

AFFILIATION: Department of Anesthesiology, Veterans Administration Medical Center, Bay Pines, FL 33504 and University of South Florida College of Medicine, Tampa, FL 33612

Inappropriate drug management and medication wastage increase risks to patients and hospital costs. Common problems created by drug handling and control in the operating room complex, include excessive stock, drug expiration, improper labeling, multiple use of single dose vials, improper syringe storage, and re-use of syringes between patients.[1,2] Errors related to handling of drugs are the third most frequent cause of anesthetic mishap. Currently, no data is available on drug handling practices by anesthesia personnel. Therefore, we evaluated the drug handling behavior of anesthetists before and after the institution of exchangeable drug tray system.

We evaluated medication costs and drug handling practices before and following the institution of standardized drug trays. Prior to the investigation, each anesthetist maintained an individual drug drawer of an anesthesia cart.

Standardized drug trays were cost effective and improved the efficiency of stock maintenance (Table). This resulted from a transference of stock management to the pharmacy. Therefore, wastage, drug outdating, etc. largely were eliminated. In addition, misuse of single dose vials, improper drug storage, and unlabeled syringes, were eliminated.

TABLE: Inventory Value.

	BEFORE	AFTER
Carts	$ 25,991	$ 4,546
Drug Cabinet	$ 13,340	$ 2,188
Annual Drug Cost	$ 112,800	$ 66,171
Annual Drug Waste	$ 36,109	$ -0-
Annual Drug Outdates	$ 14,520	$ -0-

Exchangeable drug trays were determined to be cost effective and achieved several advantages previously attributed to an operating room satellite pharmacy. However, the benefits were obtained without the expense and complexity of additional pharmacy staff. The tray system eliminated several problems associated with "standardized" carts and drug management by the anesthetist.

References: 1. Am J Hosp Pharm 46:1353-1361, 1989
2. Hosp Pharm 19:458-490, 1984

AN EVALUATION OF ANESTHESIOLOGIST'S PRESENT CHECK-OUT METHODS AND A TEST OF THE VALIDITY OF THE FDA CHECKLIST FOR USE BY ANESTHESIOLOGISTS.

M.G. March, M.D., J.J. Crowley*, BSME
Anes. Dept., George Washington U. Medical Center, Washington, D.C. 20037, *Food and Drug Admin., Rockville, MD 20857

INTRODUCTION: Failure to inspect the anesthesia machine prior to daily clinical use has been identified as a factor in nearly 25% of anesthesia incidents[1]. Since then there has been increased attention focused on patient safety during anesthesia, including the publication of the FDA checklist[2] and the release of the ASA Machine Check-out video[3]. Proper use of these materials should have increased the awareness of proper check-out methods and resulted in improved check-out performance. In 1984, Buffington et al[4] reported that participants in an anesthesia machine check-out study, without the use of a checklist, detected only 44% (2.2/5) of concealed Anesthesia Machine Faults (AMFs). The present study examined the ability of anesthesiologists to detect AMFs, and tested the validity of the FDA checklist for use by anesthesiologists.
METHODS: The study population, all volunteers, consisted of 180 anesthesiologists in private and academic practice and anesthesia residents who were tested at hospitals and at local and national meetings. The participants were familiar with either the Ohmeda Modulus II or the NAD Narkomed 2A used in the study. The participants were first asked to use their own methods to check-out a machine equipped with a set of 4 AMFs. A second set of 4 AMFs was installed, and the participants were then asked to check-out the machine again, this time following the FDA checklist. If properly performed, the FDA checklist should detect all of the built-in AMFs. All 8 concealed AMFs require functional checks to detect, have been reported to occur in clinical practice, and have lead to deaths or serious injuries. A short multiple choice test was administered to correlate knowledge relating to the "mechanics" of anesthesia machines and the participants' abilities to detect AMFs. The questions on this test were directly related to the AMFs built into these anesthesia machines.
RESULTS: The participants' performances on the written test indicated acceptable levels of knowledge of the basic function of anesthesia machines and AMFs. There was a low correlation between these didactic knowledges and the abilities of the participants to detect AMFs (r=0.38) with or without use of the FDA checklist. For only one particular fault was there a statistically significant difference between those who used the FDA checklist and those who used their own methods (Table).

Set	% Machine Faults Detected				p
A	Own Method*		FDA C-List*		
#1	38%	(78%)	61%	(78%)	<0.01 (>0.05)
#2	18%	(79%)	31%	(70%)	>0.05 (<0.05)
#3	30%	(77%)	36%	(76%)	>0.05 (>0.05)
#4	47%	(74%)	49%	(77%)	>0.05 (>0.05)
B					
#1	20%	(64%)	13%	(64%)	>0.05 (>0.05)
#2	9%	(60%)	8%	(56%)	>0.05 (>0.05)
#3	4%	(79%)	4%	(74%)	>0.05 (>0.05)
#4	26%	(63%)	23%	(63%)	>0.05 (>0.05)
* % of correct answers on written tests and p-values are in ( )					

DISCUSSION: One would assume that understanding the fundamentals of anesthesia machine function and using a checklist should improve the ability to detect AMFs. However, use of the FDA checklist only improved the ability of anesthesiologists to detect one of the eight AMFs. The reason for the apparent lack of efficacy of the FDA checklist may relate to the possible cursory reference to the document and/or reliance on the use of personally designed and inaccurate practices. An educational program that motivates anesthesiologists to routinely perform daily check-out, which includes hands-on practice of anesthesia machine check-out, as well as a modification to the presentation of the FDA checklist may be necessary to enable an anesthesiologist to properly perform an accurate machine check-out.
REFERENCES: 1) Anesthesiology 1984; 60:34, 2) Federal Register 1987; 52:36-37, 3) ASA Patient Safety Program, # A. 4) Anesth Analg 1984; 63:79-82