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Reducing Errors in Chemotherapy Orders:

The Use of a Two-Part Order System

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In the past year public awareness has increased with regard to harmful (or even fatal) treatment errors in the nation's hospitals. For the first time newspaper articles have appeared that document fatal chemotherapy overdosing. The most notable example occurred at the Dana-Farber Cancer Center and involved an error in cyclophosphamide dosing. More recently, a cisplatin dosing error occurred at the University of Chicago hospitals. In response to these events one of the institutions has initiated a computer system that should reduce medication errors, and the other is considering such a system. This program requires that all orders be entered on the computer, which then checks the quantity of medication ordered against customary standards. Despite the potential for reducing medication errors, the cost and complexity of such equipment may place it out of the reach of the community cancer center at the present time. Although these stories were widely reported due to the prestige of the institutions involved, it is likely that similar incidents have occurred in the community cancer centers around the country.

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Primum non nocere, "first do no harm," remains a core principle of health care ethics. The legal system obligates a health care provider to exercise reasonable care, skill, and diligence. Since this standard is based on reasonableness, allowance is made for the commission of an error in patient care if the conduct is within the bounds of reasonableness. The law does not demand perfection and accepts human error, provided that adequate precautions are taken to reduce error and patient injury in situations where patients themselves cannot monitor the quality of care they receive.

Because medication errors constitute more than one-third of malpractice claims, the problem is a major one. Since at least four different people are involved in medication administration (the prescribing physician, the nurse who transcribes the order, the pharmacist who fills the order, and the nurse who administers the medication), the potential for a medication error is high.

While traditional medication administration error rates have been estimated at 0-1 percent, recent studies have questioned this low figure. The recently publicized study by the Adverse Drug Event (ADE) Study Group in Boston, Mass., put the ADE rate at 6.5 per 100 nonobstetrical admissions. While most of these adverse events were not medication errors, studies of this type have greatly increased public awareness of the problem of harm from medications, including chemotherapy. In response to this publicity, the Institute for Safe Medication Practices, in cooperation with the University of Chicago School of Pharmacy, is currently conducting a benchmarking project to reduce medication errors. The project focuses on self-assessing factors that allow the highest level of medication safety.

The most common errors involve incorrect dose selection, incorrect frequency of administration leading to overdosage, and miscalculation of body surface area (BSA). Most of these errors are minor and do not produce much effect on drug dosing. However, errors in the first digit to the right of the decimal point in a BSA calculation may cause significant overdosage.

Another more serious error occurs with decimal point omission. This problem has been well documented in the literature, particularly with vincristine dosing. A third source of error is the writing of the correct dose, but then substituting the name of an incorrect drug. (We have seen a correct ifosfamide dose written but cyclophosphamide substituted in the order). Finally, errors

Figure 1. Drug Dosing Form

Complete or Imprint with Address-O-Plate

DOE, JOHN
SW00000

MOBILE INFIRMARY MEDICAL CENTER

MOBILE, ALABAMA

DATE OF ORDER	TIME	PHYSICIANS' ORDERS PRESS FIRMLY-USE BALL POINT PEN CHEMOTHERAPY PROTOCOL	NURSE'S INITIAL	NURSE'S NOTATION GIVEN OR DONE	ORD'D	DC'D
		Oncology Diagnosis: CA Testis				
		Protocol Name: PEB (cycle 3)				
		MEDICATION / MAXIMUM SINGLE DOSE/M² / TOTAL # DOSES REGIMEN				
		1. Cisplatin — 20 — 5				
		2. etoposide — 100 — 5				
		3. bleomycin — 20 — 1 (day 2)				
		4.				
		5.				
		6.				
		Patient B.S.A. 1.8				
		Dose Reduction: No ✓ Yes				
		① Cisplatin 35 mg x 5				
		② etoposide 180 mg x 5				
		③ bleomycin 35 units (day 2)				
		Signature J Eteldmann Date 7/15/95				
		NOTE: All Pharmacy items listed will be dispensed unless a line has been drawn through and initialed.				

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have occurred by writing the correct total dose for the entire cycle and then ordering the total dose daily for more than one day. The error occurred in both of the recently publicized chemotherapy fatalities.

THE CHEMOTHERAPY ORDERING PROCEDURE

Recognition of overdosage errors has led staff at the Mobile Infirmary Medical Center in Mobile, Ala., to develop a simple chemotherapy ordering procedure that inserts extra checks into the system, which should greatly reduce the risk of such errors. A previous study by Perlstein and his colleagues in a neonatal intensive care setting has suggested that involvement of both the nurse and the pharmacist in dose calculations and verification would reduce errors by two logs. The authors, however, gave no concrete plan for this involvement.

The diversity and complexity of chemotherapy administration will place a severe strain on nurse and pharmacy reviewers who rely on mere familiarity as a guide to chemotherapy dosing. The two-part chemotherapy order system is an attempt to reduce errors by eliminating simple reliance on experience and substituting a step-wise procedure for dosage verification.

Based on our experience at a 600-bed community hospital, we propose that chemotherapy orders be written in two parts. The first part consists of the drug dosing form shown in Figure 1. The oncologist writes the diagnosis on the first line and the protocol name (or mnemonic) on the second line. The next section presents a listing of all the chemotherapy drugs planned, the standard dose based on body surface area, and the total number of doses planned in the cycle. The body surface area is then recorded and a check mark is placed to indicate whether a dose reduction is planned. The oncologist then writes his or her chemotherapy orders in usual fashion on the second part of the

system, the standard hospital order sheet.

When the patient is admitted, the chemotherapy nurse checks the orders against the drug dosing form. He or she verifies the body surface area calculation based on an independent height and weight, using either a nomogram posted in the unit or a programmed calculator. Both the order sheet and the form are then submitted to pharmacy.

When the forms arrive in the pharmacy, the chemotherapy pharmacist recalculates the BSA, attaches the calculations to the chemotherapy dosing form, and checks the drug doses submitted. These are compared against a standard such as the package insert, a commercially available list of common chemotherapy protocols, locally generated protocol lists, or a research protocol submitted for that individual patient. The reference used for that patient is then recorded on the chemotherapy dosing form to assist other pharmacists if the treatment runs for several days. The total number of doses is carefully checked and the treating oncologist is called immediately if any discrepancy is found between the chemotherapy dosing sheet and the standard orders. This system is especially helpful when the role of chemotherapy pharmacist rotates among members of the pharmacy staff. Finally, a second pharmacist reviews the process before the chemotherapy drugs are sent to the unit.

When the chemotherapy drugs arrive on the unit, the standard orders are checked by two independent nurses and the accuracy of the pharmacy labeling is verified. Written documentation of these nursing procedures is required. Only after all these checks have been completed is the medication administered to the patient.

CONCLUSION

This system addresses most of the common sources of dosing errors. The completion of the drug dosing form as separate from the orders reduces the risk of incorrect drug selection by the oncologist. Since the body surface area is independently calculated by three persons, risk of an error there is virtually eliminated. The requirement to list the number of doses to be given on the form and then again during actual order writing minimizes the risk of multiple day overdosing (continuing a one-day drug beyond day one in a multiday protocol). Finally, the verification of compliance with protocol by the dispensing pharmacist allows a final check on the accuracy of the orders, greatly reducing the risk of drug name substitution or decimal point error. Our pharmacists do not consider these steps too time consuming.

Table 1. Steps in Using the Chemotherapy Dosing Form

1. Physician completes chemotherapy dosing form and standard orders.
2. Floor nurse recalculates BSA, compares doses on the form with those on written orders, and transmits orders and form to pharmacy.
3. Pharmacist recalculates BSA, compares doses on form with standard reference guide, and mixes medication (double-checked by second pharmacist).
4. Floor nurse rechecks mixed chemotherapy against orders (checked by second nurse).

The two-part chemotherapy order system can be easily modified to the office setting. In the office, the lower half of the form can be used to write the actual orders and the single form can be sent to the chemotherapy nurse for verification. Again, the doses are easily checked against protocols used in the oncology practice. In addition, a copy of the most recent chemotherapy order form can be placed in the patient record. This facilitates accurate dose calculations at the next treatment visit, even if the patient's own oncologist is not present.

Although the form does not allow a notation for dose escalation, this procedure is far less common than dose reduction and can be handled by an individual note on the form. We have discouraged the more obvious solution of altering the dose per body surface area, since this negates the ability of the pharmacist to make his or her verification. The form does not allow recording of dose reductions where some but not all of the drugs in the regimen are reduced. In this case, individual notations can be made as desired. Our pharmacists are more concerned about overdosage and will usually let these individual dose reductions pass.

Some oncologists will argue that the use of the two-part system slows up the administration of chemotherapy in a busy office setting. We have been impressed, however, by the number of errors detected with the implementation of this system (which is still voluntary). Most of these errors are trivial and result in small changes in drug dosing. However, at least one significant potential error has been detected in the first six months. Given the disastrous outcome for patients with a major dosing error, the extra time spent on the two-part chemotherapy order system seems worthwhile.

SUGGESTED READINGS

American Society of Hospital Pharmacists. ASHP guidelines on preventing errors in hospitals. *Am J Hosp Pharm* 50:305–14, 1993.

Areen J., King P.A., and Capron A.M. *Law, Science, and Medicine.* Mineola, NY: The Foundation Press, Inc., 274–275, 1984.

Bates D.W. et al. Incidence of adverse drug events and potential adverse drug events. *JAMA* 274:29–34, 1995.

Crane M. The medication errors that get doctors sued. *Medical Economics,* 36–41, Nov. 22, 1993.

Furrow B.R. et al. *Health Law* (2nd ed.). St. Paul, MN: West Publishing Co., 24–40, 120–150, 1991.

Leape L.L. et al. Systems analysis of adverse drug events. *JAMA* 274:35–43, 1995.

Perlstein P.H. et al. Errors in drug computations during newborn intensive care. *Am J Dis Child* 133:376–79, 1979.

Pozzar G.D. *Legal Aspects of Health Care Administration.* Rockville, MD: Aspen Publishers, 87–90, 1990.