Pharmacy Practice

Contributions to Patient Care by a Pharmacy Resident in a Surgical Intensive Care Unit

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INTRODUCTION

Hospital pharmacy residency training is practice-based; therefore, active participation in the patient care area is necessary to provide learning opportunities. Recently, the Pharmacy Department at the Victoria General Hospital introduced the concepts of pharmaceutical care into the philosophy of the residency training program. The goals and objectives for our residency rotations, which focused on pharmaceutical care, were adopted from those described by Bajcar.[1] As a pilot project, a residency rotation was initiated in a surgical intensive care unit (SICU) where no clinical pharmacy service were previously provided. We felt that this was an important area to pursue, as critically ill patients often receive multiple drug therapies and therefore present unique pharmacologic challenges to the clinician.[2-4]

Critical care medicine is being scrutinized due to the high cost associated with caring for critically ill patients.[5] It would seem useful; therefore, to develop a process that strives toward maximizing cost-effective drug therapy in the intensive care unit (ICU). We felt that resident participation in direct patient care may help facilitate this. Therefore, the objectives of this project were: 1) to provide an opportunity for the resident to gain experience in the provision of pharmaceutical care; 2) to assess the identification and resolution of drug-related problems; and 3) to assess the impact of pharmaceutical care on drug costs.

PROJECT DEVELOPMENT

The study was comprised of four consecutive five-day weeks (20 days) beginning on April 24, 1995 and ending on May 19, 1995 in an 8-bed SICU. During the study period, a comprehensive nine-step pharmaceutical process was utilized by a pharmacy resident for each patient admitted to the SICU.[6] To facilitate and document the delivery of pharmaceutical care, a data collection form based on the PMDRP[7] was developed by the resident in collaboration with the project preceptor. The form allowed the resident to capture demographic data, history of present illness, past medical history, medication history, regular and as needed medication while in hospital, nutritional and hydration orders, in addition to a laboratory monitoring section. Furthermore, the form allowed the recording of all drug-related concerns, the pharmacy care plan, proposed clinical outcome, final recommendations and an assessment of the clinical outcome.

The first step in providing pharmaceutical care in the critical care setting involved developing a relationship with the patient. This relationship; however, was difficult to achieve with some patients due to altered mental status. In such cases, the family was called upon, where feasible, to represent the patient's wishes regarding pharmacotherapy.

Next, the pharmacy resident collected relevant information on the patient's clinical characteristics, pharmacotherapy and disease processes, and integrated this information to identify and prioritize any drug-related problems (DRPs). The approach described by Strand et al was used to design a pharmacy care plan.[8] The plan was then subjected to the scrutiny of the SICU team for

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acceptance, rejection, or acceptance with modifications. At this point, discussion of the pharmacy care plan with the patient could ensue, if applicable. After the care plan was implemented, follow-up procedures were conducted along with necessary documentation. From this process, the DRPs identified by the resident were categorized and times to solve DRPs were estimated. In addition, drug information provided to the SICU team was recorded by the resident.

DRPs were classified according to the acceptance by the health care team: accepted without change (therefore, pharmaceutical care plan implemented), accepted with modification, or not accepted. For each accepted recommendation, the costs of changes in drug therapy were calculated by subtracting the acquisition cost of the new drug regimen from an estimated cost of the original drug regimen had the resident not intervened.

EVALUATION

During the four-week study period all patients admitted to the SICU (35) received pharmaceutical care. A total of 140 drug-related problems (DRPs) were identified in 31/35 patients that were reviewed (approximately four DRPs per patient admission). After each DRP was identified, a pharmacy care plan for each was proposed. Of the 140 DRPs identified, 123 (88%) of the proposed recommendations were accepted, 3% (4/140) were accepted with changes, and 9% (13/140) were not accepted. Categories of DRP recommendations that were accepted by the SICU team are outlined in Figure 1.

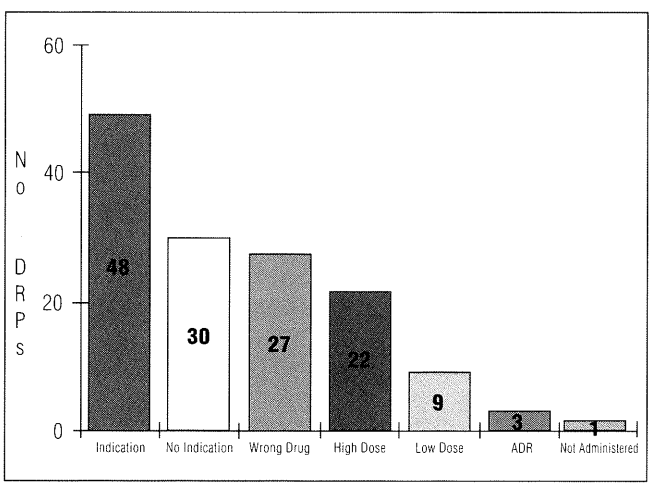

Figure 1: Categories of Drug Related Problems

Indication	-Not receiving a drug for which there is a valid indication
No Indication	-No indication for which a drug is received
Wrong Drug	-Improper drug selection (choice, route)
High Dose	-Receiving too high dose of appropriate drug
Low Dose	-Receiving too low dose of appropriate drug
Adverse Reaction	-Experiencing an adverse drug reaction
Drug Interaction	-Experiencing a drug interaction
Not Administered	-Drug not administered as ordered

Although our study was not designed to measure patient outcomes in a rigorous manner, the resident attempted to ascertain if one of the five clinical outcomes described by Strand et al was achieved.[6] Considering both the frequency of each DRP and length of time required for identification and resolution, an average of 5.5 hours per day were spent collectively on all DRPs. Total time employed in performing all pharmaceutical care activities in addition to drug information was 7.8 hours per day.

The net cost avoidance was $2,006.21 over the study period which represented an average daily cost avoidance of $100.31. If the data on drug costs, collected over 20 working days, were extrapolated to one year, the annual projected avoidance in drug costs would be approximately $26,000. Costs not included in this study were pharmacy and nursing time, ancillary supplies, laboratory monitoring, consequence of drug-induced adverse effects, and information not captured including changes in prescribing patterns and education of surgical residents. Furthermore, the economic value of discontinuing unnecessary therapy can only be crudely quantified as delayed toxicities cannot be predicted.

Other limitations should also be considered in the interpretation of this study. The number of patients admitted to the SICU during the four-week study period was only 75% of usual patient bed census. Additionally, our definition of a week was only five consecutive days. The provision of care and the cost efficiencies might have been different had the number of patients been higher and had the project period encompassed a seven-day week.

Finally, this was the resident's first exposure to the surgical intensive care setting and during the initial project stages, more time was required to perform all pharmaceutical care responsibilities. However, as the project progressed, less time was necessary. During the first week of the project, approximately 10 hours was spent per day as opposed to six hours per day during the latter portion of the study. Therefore, the time required to provide pharmaceutical care and drug information may be somewhat inflated at 7.8 hours. In addition, a practising pharmacist who is specialized in critical care may have produced different results.

With the many recent cutbacks in health care it is becoming increasingly important to justify funding of hospital pharmacy residency programs. The results of this study provide an example of pharmacy residents' ability to identify and resolve drug-related problems, as well as reduce drug costs. Such contributions illustrate the value of the residency program to health care at our institution.

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