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DRUG-RELATED PROBLEMS AMONG ELECTIVE SURGICAL PATIENTS

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Abstract

Objectives: The aim of this study was to assess drug-related problems and determinants among elective surgical patients.

Methods: A hospital-based prospective observational study was conducted. Data were collected through patients' interview and physicians' medication orders and charts review using pre-tested questionnaire and data abstraction formats. Drug-related problems were assessed for each patient using drug-related problem classification tool. Data were analyzed using Statistical Package for Social Science for windows; version 21.0. The predictors of drug-related problems were determined by multivariable logistic regression analysis. A *p*-value of less than or equal to 0.05 was considered to be statistically significant.

Results: Of the total 141 participants, 98 (69.5%) of them had at least one drug-related problem during their hospital stay. A total of 152 drug-related problems were identified among 141 elective surgical patients. The most common identified drug-related problems were indication-related problems (39%) followed by effectiveness-related problems (21%) and safety-related problems (21%). The presence of complication (adjusted odds ratio = 2.90, 95% confidence interval (1.302, 3.460)), American Society of Anesthesiologists Physical Status $\geqslant 2$ (adjusted odds ratio = 6.01, 95% confidence interval (1.0011, 9.500)), and postoperative antibiotics (adjusted odds ratio = 6.027, 95% confidence interval (1.594, 22.792)) were independent predictors of drug-related problems.

Conclusion: The prevalence of drug-related problems is high among elective surgical patients. The indication-related problems were the most common category of drug-related problem identified among elective surgical patients. The presence of complication, American Society of Anesthesiologists Physical Status $\geqslant 2$, and postoperative antibiotics were the independent predictors of drug-related problems.

Keywords: Drug-related problems, elective surgical patients.

Introduction

Many problems associated with pharmacotherapy derive from prescribing errors that lead to potentially prevent morbidity, mortality, and increased treatment costs. Especially patients attending surgical wards are at risk, due to the need for pain medication and antibiotics, frequent adjustments of antithrombotic regimens, and blood and fluid loss. [1] A drug-related problem (DRP) is an event involving drug therapy that actually or potentially interferes with desired health outcomes. [2] According to Robert J. Cipolle classification of DRPs, there are four medication related needs of the patients which if unmet predispose the patients to DRPs. These are indication, safety, effectiveness, and compliance. Under this medication-related needs, there are seven categories of DRPs, namely

unnecessary drug therapy, needs additional drug therapy, ineffective drug, dosage too low, adverse drug reaction (ADR), dosage too high, and non-compliance. [3]

Approximately 50% of patients undergoing surgical procedures take regular drugs, with an average of 2.1 drugs per patient for different comorbidities. This increases approximately threefold risk of a postoperative complication. The period of fasting usually affects preoperative medication intake and the need for the route of administration adjustment. These patients will also require antibiotics, analgesics, and muscle relaxants to which many adverse drug events can be attributed. [4] Adverse events due to medication error can be prevented, but improvements in pharmaceutical care and their potential effectiveness in surgical patients are under-evaluated. [5]

Material and methods :

A hospital-based prospective observational study design was conducted. All patients admitted to elective surgical wards during data collection period and those fulfill the inclusion criteria were included in the study.

Sample size was calculated using single proportion formula by assuming 5% margin of error, 95% confidence interval, and 50% prevalence of DRPs in elective surgical patients as there is no previous study on DRPs among elective surgical patients. Since the population is less than 10,000, the sample size was reduced by correction formula. Data from surgical ward monthly report indicate that the previous monthly admitted patients at elective surgical ward ranges from 60 to 80. Accordingly, the total number of patients in consecutive 3 months was 210 patients. Using the correction formula, sample was reduced to 136 and adding 10% for non-response gave the final sample of 150.

Adult patients who were aged 18 years and above were diagnosed with elective surgical condition and admitted for surgical procedure, and those who were hospitalized for ⩾24 h were included in our study. However, those who were not willing to give written informed consent, re-admitted within data collection period, and who were transferred from other wards were excluded from this study.

Results:

A total of 154 patients were admitted for elective surgery during the study period. However, 13 patients were excluded from study as they did not fulfill inclusion criteria. Accordingly, 141 participants (91.6% response rate) fulfilled the inclusion criteria and made the final sample size for analysis. The mean age of study participants was 48.65 (±16) years with an age range of 18–95 years; most study participants were in the age range 31–50 years. However, 80 (56.74%) of them were males. Meanwhile, 92 (65.25%) of the study participants cannot write and read, and 59 (41.84%) were farmers.

Urologic procedures were the most common disease for which elective surgery was sought (28.37%), followed by abdominal surgeries (22.70%). However, 48 (34%) patients had at least one medical comorbidity. Most of the patients (63.83%) were classified as ASA-PS class-1 before undergoing surgery. However, 30 (21.28%) patients experienced at least one complication related to disease condition for which they are seeking surgery. The most frequent (7.80%) complication at admission was urinary tract infection. The prevalence of perioperative complication was accounted to be 10.64%. Majority (85.8%) of patients had low risk for VTE, whereas seven (4.96%) patients had high risk for VTE. The mean duration of hospitalization for the study participants was 16.31 ± 10.8 days. The length of hospitalization was ranged from 3 to 84 days.

Nearly, half of the patients 70 (49.64%) had at least one medication at admission which had been prescribed for medical comorbidities and for surgical conditions. Preoperative antibiotic prophylaxis was administered to all patients where 95.74% of them received ceftriaxone as surgical prophylaxis. However, 67 (47.52%) patients continued antibiotics postoperatively for ⩾24 h. Postoperative pain management was provided to 137 (97.16%) of patients.

The “need additional drug therapy” was the most common (36.84%) DRP identified followed by non-compliance (19%) and ineffectiveness of drug therapy (15.13%). The least type of DRPs identified was an unnecessary drug therapy as it was encountered in three patients . Out of the 14 ADRs detected, 6 of them were identified using Naranjo ADR assessment scale with a score of 4 (possible ADR). The medications associated with ADR during the perioperative admission were enalapril (five

cases), metformin (four cases), hydrochlorothiazide (three cases), digoxin (one case), and nifedipine (one case).

The results from multivariable logistic regression analysis revealed that, out of the five variables described under univariate analysis, the presence of complication, ASA-PS $\geqslant 2$, and the administration of postoperative antibiotics were remained independent predictors of DRPs. Accordingly, patients who have complication were 2.9 times more likely to have DRPs than those who have not (adjusted odds ratio (AOR) = 2.90, 95% CI (1.302, 3.460)). Besides this, patients with ASA-PS $\geqslant 2$ were six times more likely to have DRPs than those with ASA-PS = 1 (AOR = 6.01, 95% CI (1.0011, 9.500)). However, patients who received antibiotics postoperatively were 6.027 times more likely (AOR = 6.027, 95% CI (1.594, 22.792)) to develop DRPs than those who did not take antibiotics postoperatively.

Discussion

This study was conducted to evaluate the prevalence, types, causes, and determinants of DRPs in patients admitted for elective surgical procedures at JUMC. The findings of the current study revealed that 69.5% of elective surgical patients had at least one DRP, with a mean of 1.55 ± 0.66 DRPs during the perioperative period. This is similar to the prospective study [13] conducted in a Canadian adult tertiary care hospital which reported the prevalence of DRPs 66.4% with a mean of 1.6 DRPs. Another retrospective study by Haley et al. [14] in the same country and also from Malaysia [15] showed DRPs of 79.5% and 76.1% with a mean of 1.88 and 1.5 ± 1, respectively, which were higher than the prevalence of the current study. This could be attributable to the difference among population of studies, as the majority of the study participants in their studies were elderly when compared to ours. This population was known to be associated with high prevalence of DRPs due to the increased number of comorbidities and home medications.

The need for additional drug therapy was the most frequent specific type of DRP (36.84%) which was much higher than the finding from Canada (13%) and lower than the other study reported from the same country (25.5%), [14] and all-cause of additional drug therapy was due to untreated indication in our study. This discrepancy could be explained by the difference in the experience of pharmaceutical care services between the study settings, difference in the classification of drug-related events, and study design. In study by Neville et al., [13] the drug without indication was found to be 8% which was higher than that reported in this study (1.97%). This inconsistency might be due to the difference in the categorization of DRPs and smaller sample size in the current study.

Prevalence of effectiveness-related problem class DRP (21%) in our study was in line with the Malaysian study (22.6%) by Zaman Huri et al. [15] Another study from Canadian hospital reported 9% of dose too low type of DRP which was higher than the finding in this study.

The prevalence of safety-related problems in the our study was 21%, of which 11.84% and 9.21% were contributed by dose too high and ADR type of DRPs which was two times higher than the prospective observational study finding in Canada by Neville et al. [13] Moreover, retrospective study from Brazil found lower prevalence of DRP related to ADR (3.1%) in the study of incidents related to the medication in surgical patients. [16] This could be due to the study design difference, and variation in the categorization of DRPs and experience of practice in these settings. Drug safety issue is a major concern in patients undergoing surgical procedures because of increased risk of adverse drug events related to the medications for different comorbidities and medications related to surgery in association with surgical procedure which brings about physiological changes.

Conclusion

There is high prevalence of DRPs among elective surgical patients during the admission for surgery. The indication-related problems were the most frequent type of DRPs from which the need for additional drug therapy was the most common. The presence of complication, ASA-PS $\geqslant 2$, and postoperative antibiotics were the independent predictors of DRPs in elective surgical patients.

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