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POLYPHARMACY IN A GENERAL SURGICAL AND CONSEQUENCES OF DRUG WITHDRAWAL:

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ABSTRACT

Aims

To identify drug usage/withdrawal in surgical patients and the relative risk this imposes on postoperative surgical complications.

Methods

A prospective survey of patients' medicines, oral intake (food/fluids/ medicines) and postoperative complications was carried out in the General Surgical Unit.

Results

One thousand and twenty-five general surgical patients aged ≥ 16 years, were entered into the study. Half of the patients were taking medicines unrelated to surgery. On average these patients received 9 different drugs (range 1–47) from a selection of 251, of which 21% were released in the last 10 years. The mean number of these drugs taken increased with age, vascular surgery and other major procedures. The majority of patients (53%) were taking drugs for cardiovascular problems. Only 8% of admissions were on the drugs more traditionally recognized to be of importance to the surgery, i.e. steroids and diabetic therapy. With respect to risk, taking a drug unrelated to surgery was associated with an increased relative risk of a postoperative complication by 2.7 (95% C.I. 1.76–4.04) compared with those who were not taking any drug. Cardiovascular drugs contributed significantly to this risk; when they were excluded from analysis, the risk dropped to 1.8 (95% C.I. 1.14–2.93). Death may be more common in those taking ACE inhibitors. Drug withdrawal and complications were analysed and as the time without medicines increased (range 1–42 days) so did the complication rate ($\chi^2 = 14.7$, DF = 2, $P = 0.007$). Of those patients who were taking a cardiovascular medicine and were without their normal medicines for a period of time postoperatively, 12% suffered a cardiac complication.

Conclusions

Many patients admitted to a general surgical ward, are taking medicines unrelated to surgery. Drug therapy unrelated to surgery is a useful predictor for increased postoperative complications and one for which preventive action can be taken. This study provides evidence that withdrawal of regular medicines may add significant risk to the surgery and further complicate outcome. The longer patients were without their regular medicines the more nonsurgical complications they suffered. Reintroduction of patients' regular medicines early in their postoperative course may decrease morbidity and mortality in-patients.

Keywords: complications, drug therapy, drug withdrawal, surgical patients

Introduction

Advances in both surgical and anaesthetic techniques have resulted in more elderly patients undergoing operative procedures and it is projected that in the next 30 years the number of noncardiac surgery operations will increase by 50% as the population over 65 years increases [1]. Many of these people are on drugs and those drugs often improve their general well being at presentation for surgery and this may allow them to be considered for surgery whereas in the past, they might not have been.

Four previous studies have surveyed drug use in surgical patients and up to 44% of patients may be taking medicines unrelated to surgery on admission to hospital, but little is known about the types of drugs and their impact on peri-operative events. There is a need to investigate this impact because of the large numbers of patients presenting for general surgery who are taking potent drugs and in light of the warnings and perceived dangers of their abrupt withdrawal [6–13]. Previous studies have not addressed the implication of the withdrawal of these drugs, nor has there been a systematic/prospective study of the impact of drug withdrawal. When going forward for surgery, the withdrawal of these critical drugs may have significant adverse impact on morbidity. This applies in particular to cardiovascular (CVS) and central nervous system (CNS) drugs and may be of greatest relevance in general surgical patients where the need to be without oral intake is more common.
The aims of this prospective study were to: (i) identify the drug usage profile of a general surgical population (ii) identify those patients at greatest risk of polypharmacy and quantify the relative importance of those drugs to surgical outcome (iii) identify the frequency and duration of drug withdrawal and relate this to the postoperative outcome.

Material and methods :

The General Surgical Unit at Hospital admits all adult patients (>16 years) who have a general surgical problem. Over a 7 month period, all consecutive patients admitted for either elective or emergency surgery, were eligible for inclusion, whether or not they were taking drugs prior to their admission. There were no exclusion criteria. Day-stay surgical patients (25% of surgical procedures in this Unit) were not included in this study unless they were subsequently admitted to the General Surgical Unit as in-patients. Ethical approval was obtained from the institution's Ethics Committee which waived the need for written informed consent from each patient. Patient and admission identification was by the unique national patient hospital number and the admission date. As some patients were admitted more than once to the Surgical Unit during the period of the study, calculations were based on admissions rather than patients.
Data were collected on a daily basis by JMK. The sources were: patients, relatives/friends of patients, medical and nursing staff, general practitioners, general practitioners, admission letters, drug charts, medical and nursing notes. Extensive cross checking of the sources listed was carried out to ensure complete records were obtained. Four separate sets of data were collected: the medicine history, the oral intake history, the clinical information, and surgical complications.
The medicine history recorded the name of each medicine, route of administration, stop and start dates. Each medicine was assigned an eight-digit drug code based on the American Hospital Formulary Service (AHFS) Pharmacological Therapeutic Classification coding system, modified for local usage. Medicines were also distinguished by whether they were used as part of the patients' regular therapies or part of their surgical care. Regular medicine was defined according to the definition used by Wyld & Nimmo [3], i.e. the patient had been taking the drug for more than 2 weeks prior to admission to hospital.
The oral intake record identified the time periods during which the patients were strictly nil by mouth for food and fluids (nbm), and when drugs were strictly nil by mouth (ndm), the timing of which were entirely at the discretion of each of the clinical teams. It also identified if drugs were continued and if so, the alternative routes used.

Results:

There were 1027 admissions to the General Surgical Unit. Two patients refused the invitation to participate, leaving 1025 admissions for analysis.. When compared with the Indian population, where the group older than 60 years of age comprises 20% of the population, 50% of the admissions were older than 60 years of age. The admissions were categorized according to their primary presenting pathology. These were: – 'vascular' (17%), 'cancer' (18%), 'inflammatory/infection' (22%), 'others' (22%) and 'no operation' (18%). The average day stay was 9.92 days and the median day stay 6.2 days (range < 1–124 days) and the older the age group, the longer the average day stay was in hospital.

In total, 286 different drugs (251 excluding anaesthetic agents) were administered to admissions whilst they were in hospital by a variable number of routes (21% of these drugs were released in the last 10 years). These included regular medicines for conditions unrelated to their surgical conditions, as well as medicines used in the peri-operative period. Only a small group of patients (3%) did not receive any drugs. The majority of admissions received more than one drug (all drugs including anaesthetic drugs; average = 9.38 drugs per admission; range 1–47) whilst in-patients.

Nearly 50 percent (49%) of admissions were taking medicines unrelated to the surgical admission. The mean number of these drugs (2.4 ± 2.8; mean ± s.d) increased with age , and was greatest for in-patients admitted for vascular surgery (4.0 ± 2.7; $P < 0.05$) and those undergoing major procedures. Of those patients taking drugs unrelated to surgery the majority (48%) were on drugs for cardiovascular problems (diuretic 4%, cardiovascular 24%, and both 18%) and more than 90% of these admissions were taking 2 or more of these type of drugs (mean 2.4; range 1–7). The most common drugs in this group were frusemide, β-adrenoceptor blockers, and angiotensin converting enzyme (ACE) inhibitors. In addition 45% ($n = 224$) were taking the CNS drugs, e.g. tranquillisers, antidepressants or hypnosedatives. The other large group comprised drugs acting on the gastrointestinal system (34%) in particular laxatives, H_2-receptor antagonists, and antiemetics. Other drugs included anti- asthmatics, antineoplastics and different hormone replacements. Only 8% of admissions were on the drugs more traditionally recognized to be of importance to the surgical team, i.e. steroids and diabetic therapy.

Discussion

Surgical patients often develop complications peri-operatively and this study asked two questions central to this issue: 'were the drugs unrelated to surgery a predictive factor for developing postoperative complications?' and 'did acute withdrawal of a patient's regular drug therapy make a contribution to their postoperative complications?' This study also identified the drug usage profile of a general surgical undergoing a comprehensive range of general surgical procedures. Nearly 50% of patients were admitted taking medicines unrelated to the surgery. This is higher than the 24–44% observed in the other studies, the last of which was published in 1991. Half the patients were older than 60 years and the older the patient, the more drugs they were taking, irrespective of type of surgery they underwent. The more major the surgery, the more comorbid disease patients have, as evidenced from their concurrent (often multiple) drug therapy. This observation is not unexpected as it mirrors the pattern in an ageing society as comorbid diseases increase with age, and with the national prescription patterns for the elderly. As in-patients, almost all receive drugs, in addition to those which they are already taking, the range of which encompasses almost the entire pharmacopoeia. Very few patients were taking drugs which surgeons immediately recognize as posing problems for management in the peri-operative period.

Numerous other studies of prognostic indicators for surgical outcomes have been reported none of which has considered drug therapy. In this study, we would contend that admission drugs are a predictive factor for developing postoperative complications as they mask the predisposing frailty of many of these patients. Univariate analysis showed patients already taking cardiovascular drugs to have more cardiac complications postoperatively and logistic regression analysis confirmed this. This type of analysis took into account that older patients were more likely to be taking drugs and have more major surgery, but still demonstrated that drugs are having an independent effect. Clearly it is

not necessarily the drug *per se* that increases the risk of postoperative complications, but it is clear that being on a drug unrelated to the surgery highlights a risk. This may be by simple association, by reflecting severity of comorbidity or more directly because of the patient's need of the drugs to withstand the stresses of the postoperative period of an operation.

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