Objectives

Surgical patients are at risk of medication-related adverse events, causing morbidity and mortality. This may be due to the fact that some of these surgical patients have other medical conditions and thus are on medications prior to surgery1-2. Some regular medications may need to be withheld prior to surgery and restarted post-surgery. The longer the patients are without these medications, the more likely they are to suffer from non-surgical complications. However, there is limited published research on the role and impact of clinical pharmacy services in surgery in Ireland.

The aim of the study is to evaluate the effect of clinical pharmacist service on medication safety in surgical patients by answering the following research questions (RQ):

RQ1. What are the types and frequency of the interventions made by a clinical pharmacist in surgical patients?
RQ2. What number of clinical pharmacist interventions carried out on patients in surgical wards prevented a potential or actual adverse drug events (ADE)?
RQ3. What number of clinical pharmacist interventions carried out on patients in surgical wards is associated with prescribers’ (non-)compliance to hospital guidelines?

Study Design

What?
The study was a prospective, uncontrolled, observational study of all clinical pharmacists’ interventions undertaken in surgical patients over a consecutive five week period, (Monday to Friday from 09:00 to 12:30).

Where?
The study was conducted in two surgical wards of a 339 bed, acute General hospital that provides both medical and surgical services as well as maternity and paediatric services to a population of over 300,000. The hospital is a Regional Trauma Centre3. Annual surgical admissions for both wards for the year ending 2016 were 586 and 404 respectively. The wards cover mainly general surgery and urology.

Who?
Inclusion Criteria: Surgical patients ≥ 18 years admitted for longer than 24 hours to either surgical wards.
Exclusion criteria: Surgical patients with palliative-care pharmacist input.

How?
Medication reconciliation and clinical review interventions were recorded on a structured form. A brief summary of the patient admission details (presenting complaint, medical and surgical history, significant clinical parameters) and the completed form were retained as data collected.

A comparison of patient characteristics (age, gender, specialty) was carried out between the study group (100% of study population) and mean monthly data from the preceding 12 months.

The drug-related problems (DRPs) were classified using a modified version of the Pharmaceutical Care Network Europe classification system for drug related problems4 by the clinical pharmacist and independently by a senior clinical pharmacist with consensus reached.

Interventions were graded for associated extent of harm by two surgeons (consultant and specialist registrar) by consensus and independently by the clinical pharmacist using the National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP) Index for categorising medication error5. The number of interventions that prevented a potential or actual ADE was determined.

Prescriptions were reviewed to assess prescribers’ adherence to local guidelines using the following guidelines: VTE prophylaxis guideline6, Antimicrobial guideline7, Diabetic Glucose Potassium Insulin (GKI) infusion guideline8 and recognised guideline on prescribing medicines perioperatively9.

Results

There were no significant differences between the study group (n=122) and mean monthly data from preceding 12 months in terms of mean age, number of patients under, over to equal 65 years, gender and specialties.

The number of patients with at least one intervention were highest in the male, ≥ 65 years and general surgery categories.

One hundred and fifty-two interventions were completed on 71 patients with a prescriber acceptance and action rate of 75%. 51 patients required no intervention. The DRP with highest frequency was omission of regular medication on admission and discharge (24%), new indication for drug treatment (10%) and weight-based dose adjustment (5%).

Discussion

Three-fifths of the study population required at least one clinical pharmacist intervention. 39% of male patients that were 65 years or older and on 4 or more regular medications at time of admission were shown to have at least one intervention completed on them by the clinical pharmacist. Omission of regular medication at admission or discharge was the most frequent type of DRP.

The acceptance rate of interventions was 75%, similar to the findings of two comparable studies, 80%10, 83%11.

Two-thirds of the clinical pharmacist interventions (68%) prevented a potential ADE and 32% of the ADE as categorised by two surgeons by consensus using the NCC MERP Index.

The clinical pharmacist undertook interventions on 11% and 18% of the VTE prophylaxis and Antimicrobial prescribing respectively. There was 100% compliance to peripерoperative guidelines and guidelines related to diabetics requiring GKI infusion.

Further work to support these findings would require the introduction of a control group with no pharmacist involvement and evaluation of the impact of clinical pharmacist service on surgical in-patient length of stay.

Conclusion

There was a high level of medication-related intervention in this study, which if left undetected could have led to harm. The clinical pharmacists’ identification and prevention of potential and actual ADEs as well as support of prescribers’ adherence to local guidelines demonstrated a positive impact on patient safety.

References

6. Two-hundred and thirty-nine patients. The clinical pharmacist undertook interventions on 11% and 18% of the VTE prophylaxis and Antimicrobial prescribing respectively. There was 100% compliance to peripерoperative guidelines and guidelines related to diabetics requiring GKI infusion.
7. Further work to support these findings would require the introduction of a control group with no pharmacist involvement and evaluation of the impact of clinical pharmacist service on surgical in-patient length of stay.

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Table 1. Simplified version of NCC MERP Index category definitions

<table>
<thead>
<tr>
<th>Category</th>
<th>Severity of Adverse drug event (ADE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>No adverse drug event</td>
</tr>
<tr>
<td>B</td>
<td>Potential adverse drug event</td>
</tr>
<tr>
<td>C</td>
<td>Actual adverse drug event</td>
</tr>
</tbody>
</table>

Table 2. Total number of prescriptions in relation to the different guidelines and prescribers compliance

<table>
<thead>
<tr>
<th>Guideline category</th>
<th>Total number of prescriptions</th>
<th>Compliance with guidelines</th>
<th>Non-compliance with guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antimicrobial</td>
<td>79</td>
<td>65 (82%)</td>
<td>14 (18%)</td>
</tr>
<tr>
<td>VTE prophylaxis</td>
<td>89</td>
<td>79 (89%)</td>
<td>10 (11%)</td>
</tr>
<tr>
<td>Diabetic GKI infusion</td>
<td>6</td>
<td>6 (100%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Perioperative</td>
<td>39</td>
<td>39 (100%)</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>

*Data are given as number (percentage).