Research Article

Impact of a Clinical Pharmacist on Oncology Pharmacy Rounds

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Received: April 21, 2017; Accepted: July 02, 2017; Published: July 09, 2017

Abstract

Purpose: Clinical pharmacists have been making an impact for years in pharmacy. In recent years, clinical specialists have been assisting physicians on inpatient rounds. Pharmacists have been making recommendations regarding antimicrobial stewardship, renal dosing of medications, anticoagulation therapy, pharmacokinetics and intravenous to oral conversions of medications. However, at many hospitals these positions have not been justified and many physicians do not see the value of a clinical pharmacist on inpatient rounds. The purpose of this study is to demonstrate the impact of a clinical pharmacist with oncology specialty training on inpatient rounds with an oncologist in the hospital. Methods: An assistant professor of pharmacy practice at a pharmacy school in Suwanee, Georgia with post-graduate residency training established an oncology practice site at a 202 bed acute care hospital in Roswell, Georgia. The hematologist/oncologist was approached to allow a pharmacist with specialty training in oncology to assist on daily inpatient rounds. The pharmacist rounded three days a week for four weeks and collected data on interventions made by the pharmacist both accepted and not accepted for one month from July 22, 2013 to August 16, 2013. Interventions were kept in a log-book which was then transcribed to an excel spreadsheet divided in five different categories: pharmacotherapy, antimicrobial stewardship, oncology, drug interactions and counseling. Pharmacotherapy consisted of addition of therapy (stress ulcer prophylaxis, etc.), medication reconciliation, pain management and anticoagulation. Antimicrobial stewardship consisted of renal dose adjustments, streamlining and addition of therapy. Oncology consisted of recommendations to add prophylaxis to regimens, administration information, monitoring information and dose adjustment recommendations. Drug interactions included drug-drug interactions monitoring and procedural interactions. Recommendations made for patients on rounds were in addition to the normal daily activities of two clinical pharmacists at the hospital: one on the medical floor and one in the critical care unit. Results: Of the 37 interventions made in a 4 week period where the clinical pharmacist rounded 12 of the 20 days, 33 recommendations were accepted and 4 were not accepted. There were a total of 12 pharmacotherapy related interventions (9 accepted and 3 not accepted), 6 antimicrobial stewardship related interventions (all accepted), 7 oncology related interventions (6 accepted and 1 not accepted), 5 drug interactions related interventions (all accepted) and 9 patient counseling interventions (all accepted). The most accepted (12) and not accepted (3) interventions fell into the pharmacotherapy category.

Keywords: clinical pharmacist, oncology pharmacy rounds, pharmacotherapy
Introduction

The benefits of incorporating clinical pharmacists into hospital rounds has been documented many times with regards to antimicrobial stewardship, diabetes management, anticoagulation, and many other disease states, however, the impact of the clinical pharmacist in the inpatient oncology setting has been vastly understudied. Cancer drugs rank second in medication error associated mortality only behind drugs that act on the central nervous system, mainly due to the high levels of toxicity associated with these drugs when improperly dosed or administered [1]. The inpatient oncology setting is one that could benefit greatly from clinical pharmacist involvement in regards to improving clinical outcomes in patients and by increasing the proper utilization of cancer drugs and the drugs used in supportive care of patients receiving cancer treatment. Though the data is limited, all studies involving clinical pharmacists roles in the inpatient oncology setting have shown a benefit from their involvement. One such study analyzed pharmacist interventions in the inpatient oncology setting for a period of one year, where the pharmacists identified 552 drug related problems and gave recommendations to the oncologist based on their findings which were accepted and implemented 96% of the time [2]. Another study evaluated the role of clinical pharmacists in relation to the continuum of care in patients in the oncology department that were being transferred to the intensive care unit showed that when a clinical pharmacist was more involved there was a 32% reduction in specific therapy interventions that were needed and more of the patient’s therapies were administered on time [3]. Also, previous studies in this setting have also shown an economic benefit from clinical pharmacist guided protocol in regards to anti-emetic therapy and the utilization of filgrastim in the inpatient oncology setting [4,5]. The purpose of this study is to evaluate the benefit a clinical pharmacist with oncology specialty training can provide on inpatient rounds for an oncologist in the hospital.

Methods

An assistant professor of pharmacy practice with a post-graduate residency in the field of oncology, conducted a prospective trial where she rounded with a hematologist/oncologist at a 202 bed acute care hospital three days a week for a four week period from July 22, 2013 through August 16, 2013 while still completing her day to day responsibilities as a clinical pharmacist at the hospital. Data was collected on interventions recommended by the pharmacist that were implemented or not implemented by the hematologist/oncologist. The interventions were broken down into five separate categories consisting of pharmacotherapy, antimicrobial stewardship, oncology, drug interactions, and counseling. Pharmacotherapy interventions were defined as the addition of therapy for stress ulcer prophylaxis, home medication reconciliation, pain management and anticoagulation. Antimicrobial stewardship interventions were defined as renal dose adjustment of antimicrobial therapy, streamlining and addition of therapy. Oncology interventions were defined as recommendations to add prophylaxis to treatment regimens, administration information, monitoring information and dose adjustment recommendations. Drug interaction interventions consisted of drug-drug interaction monitoring, and procedural interactions. A log was kept by the pharmacist during this four week period and every intervention (accepted or not) was documented. At the end of the 4 week period, the pharmacist divided all interventions into four categories as stated above to see which ones were accepted and fell in which type of intervention category. This study was approved by the Institutional Review Board of Philadelphia College of Osteopathic Medicine.

Results:

A total of thirty-seven interventions were suggested to the oncologist of which thirty-three were accepted and four were not accepted (Figure 1). Of the thirty-seven interventions made, twelve were pharmacotherapy, nine were
patient counseling, seven were oncology, six were antimicrobial stewardship, and five fell in the drug interactions category (Figure 2).

**Figure 1.** The total recommendations made by clinical pharmacist.

**Figure 2.** Types of interventions made by clinical pharmacist.
The pharmacotherapy (nine of twelve accepted) and patient counseling (nine of nine accepted) categories had the highest total of accepted interventions followed by oncology (six of seven accepted). Antimicrobial stewardship (six of six accepted) and drug interactions (five of five accepted) were less frequent but had a high rate of acceptance (six of six and five of five respectively). Interventions that were accepted on week 7/22/13 included a vast array of things. One intervention included a patient that was on a home medication that was stopped inpatient for arthritis; however, the patient was having flare ups and the pharmacist suggested to restart it. The pharmacist also recommended a patient with inadequately controlled pain to have a dose increase on fentanyl patch from 12 mcg to 25 mcg. Another one included an oncology patient on warfarin 1 mg PO QD secondary to past medical history of blood clots and lenalidomide use was listed as allergic to aspirin. After speaking with the patient about the allergy it was discovered that there was no allergy so the pharmacist recommended changing warfarin to aspirin 325mg PO QD while on a medication called pomalidomide. Also, the pharmacist counseled a patient on bevacizumab and informed the pharmacy technician as well as nursing to not give with D5W. Recommendations not accepted were two addition of therapy recommendations. First recommendation being the addition of vitamin D to a patient with multiple myeloma with consistently low calcium despite calcium supplementation and the other recommendation was switching a patient with possible septic shock from prednisone to hydrocortisone based on the SIRS guidelines.

On the week of 7/29/13 all recommendations were accepted. Interventions included two antimicrobial stewardship recommendations including the discontinuation of ceftriaxone in a patient with Providencia in urine catheter with no temperature, WBC and a clear urine analysis. The second recommendation was changing a patient from aztreonam to either doripenem or meropenem for empiric coverage in a patient with sulfa allergy and no penicillin allergy. Two addition of therapy recommendation were accepted one being to initiate pantoprazole in an untreated patient with coagulopathy and gastroesophageal reflux disease and the other being the addition of sequential compression devices for prophylaxis in a patient whose warfarin was stopped for a bronchoscopy. The pharmacist also recommended monitoring for QTc interval due to a patient taking amiodarone and quetiapine. The pharmacist made an oncology recommendation to look at a lactate dehydrogenase (LDH) level on a patient with B-cell lymphoma. The LDH level came back normal.

On week 8/5/13 except all recommendations from the pharmacist were accepted. Two antimicrobial stewardship recommendations were accepted. The pharmacist recommended starting imipenem/ Cilastatin 500mg IV Q6H in a patient with E.coli that was not receiving any antibiotics. Discontinuation of antibiotics in a patient with resolved cellulitis that received cephalaxin for 20 days. Two oncology recommendations included the addition of Bactrim DS 1 tablet PO MWF for PCP prophylaxis for a patient receiving R-EPOCH and a 25% dose reduction for a 71 year old patient also receiving R-EPOCH. Two drug interaction related interventions were made which included the recommendation to hold aspirin for a patient scheduled to receive a Mediport implant. Another involved a patient with increased blood pressure on etoposide and started on metoprolol the pharmacist recommended to monitor BP closely and decrease the dose of metoprolol if needed because etoposide may cause hypotension. The pharmacist made three additions of therapies interventions. The pharmacist recommended starting stress ulcer prophylaxis with famotidine secondary to possible pneumonia from pantoprazole for an intubated intensive care unit trauma patient. Another patient on pantoprazole for stress ulcer prophylaxis was recommended to start famotidine for clostridium difficile risk reduction. The pharmacist recommended to start amlodipine 10mg by mouth daily in a patient with arrhythmias, increased SBP and no blood pressure medications, but was left off of the home medication list. The pharmacist also counseled a patient on R-EPOCH and pegfilgrastim for aggressive B cell lymphoma. One recommendation that was not accepted was to not initiate filgrastim in a patient with febrile neutropenia per the
infectious diseases society of America guidelines as it may falsely elevate WBC. The physician did not accept this recommendation and started filgrastim.

During the week of 8/12/13, seven of eight pharmacists’ interventions were accepted. Two drug interaction interventions were made. A patient with oral thrush on amiodarone was recommended to start nystatin over fluconazole. Another was discontinuing heparin on a patient with possible heparin induced thrombocytopenia. Two therapy addition recommendations included the addition of famotidine in a patient with flare-ups, severe anemia, and coagulopathy and another patient on prednisone 5mg PO QD for ulcerative colitis not restarted in hospital was recommended to restart inpatient. One oncology intervention was made for a patient receiving a second dose of bevacizumab, but did not have labs or urinalysis, the pharmacists recommend obtaining these labs before starting the dose. Two patients were counseled: one on warfarin and another on congestive heart failure. The recommendation that was not accepted was an addition of therapy. The pharmacist recommended to add a long acting pain medication (morphine XR 30 PO Q12) for a patient with sciatica and pain form deep vein thromboses.

During week one and week two, a total of six interventions were made per week. During weeks three and four, thirteen and twelve interventions were made per week respectively.

Of the four interventions not accepted, three were pharmacotherapy/internal medicine/infectious disease interventions in the sub category of addition of therapy and one was oncology related.

**Discussion and Conclusion:**

Clinical pharmacists are increasingly present on patient rounds and clinical services (7,8). Pharmacists in these positions have the ability to provide recommendations and advice in real time to the medical team. This type of service can be beneficial in specialty areas where pharmacotherapy plays an important role such as oncology. This study provides evidence which shows that a clinical pharmacist with advanced training in oncology rounds can have a positive impact on patient care.

The acceptance rate of pharmacist recommendations was 89% which was slightly lower than a previous study which showed 92% acceptance in an inpatient oncology setting (2). This may be due to the fact that the pharmacist in this study was unable to round full time. Increased participation from the pharmacist may facilitate better relationships with the rounding team and improve trust and acceptance.

Pharmacist relationship with the rounding team should be assessed in the future. Some physicians and other medical staff may be more accepting of certain types of interventions from pharmacists. A previous study done in a Swedish hospitals oncology ward showed that most physicians and nurses felt that the pharmacists’ contribution was valuable [9].

**Limitations**

This study does not analyze the benefits of interventions implemented on patient outcomes and cost. Future studies should include more detailed patient information such as length of stay and diagnosis, larger sample size, and reproducible interventions that can be implemented systematically.

There have been many studies indicating the cost savings that pharmacy interventions can provide. Future studies specifically in the oncology setting should provide detailed cost effect analyses of each intervention and institutions specific cost savings. The time spent by the pharmacist on rounds may also be a factor on these outcomes. The pharmacist was not able to round daily. This may limit the ability of the pharmacist to achieve optimal improvements.
Even with the limited duration and infrequent rounding opportunities 89% of the interventions were accepted and implemented. Based on these results there could be potential benefits by implementing an oncology pharmacy rounding service. Implementing a more robust pharmacy service may reveal greater benefits such as cost savings for the hospital and benefits on patient care.

Acknowledgements

I would like to thank Christopher Pitts and David Veasey PharmD Candidates C/O 2016

References