Evaluation of Inpatient Medication Errors in HIV Patients Receiving HAART

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Disclosure statement: these individuals have the following to disclose concerning possible financial or personal relationships with commercial entities (or their competitors) that may be referenced in this presentation.

- Susan Norman nothing to disclose
- Samantha Bailey nothing to disclose
- Jason Brady nothing to disclose
Presentation Objective

Describe the role of a clinical pharmacist in assuring correct use of antiretrovirals in hospitalized patients
Background

- Highly active antiretroviral therapy (HAART) can substantially reduce mortality and morbidity in patients with HIV.
- Current literature reports a high number of patients with at least one HAART related error, in the range of 25% to 86%.

HIV: Human immunodeficiency virus

Factors Contributing to Errors

- 28 different formulations of antiretrovirals for treatment of HIV
- Complex regimens
- Patient comorbidities, concurrent medications
- Need for renal and hepatic dosage adjustments
- Lack of HIV expertise by clinicians
The Clinical Pharmacist’s Role

• Heelon et al. found a reduction in duration of errors\(^1\)
  • 3.5 days in retrospective cohort
  • 1 day in a prospective group where clinical pharmacist reviewed medication profiles for errors

• Pastakia et al. identified at least one error in 84% of patients and found a 100% clinical pharmacist recommendation acceptance rate to rectify errors\(^2\)

Medication Reconciliation

- It has been estimated that 46% of medication errors occur on admission or discharge
- Occurs as a multi-step process at Orlando Regional Medical Center (ORMC)
  - Traditionally nursing responsibility to obtain medication list
  - Physician reviews and signs list
  - Active orders entered by unit secretary or nurse

## Medication Reconciliation

<table>
<thead>
<tr>
<th>Drug Name</th>
<th>Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atripla oral tablet</td>
<td>1 tab(s) orally once a day (in the evening)</td>
</tr>
<tr>
<td>Multiple Vitamins oral tablet</td>
<td>1 tab(s) once a day</td>
</tr>
<tr>
<td>Zegerid 20 mg-1100 mg oral capsule</td>
<td>1 tab(s) once a day</td>
</tr>
<tr>
<td>Percocet 5/325 oral tablet</td>
<td>1-2 tab(s) orally every 4 hours as needed for pain</td>
</tr>
</tbody>
</table>
# Medication Reconciliation

## Home Medication: Physician Verification & Order/Medication Reconciliation

<table>
<thead>
<tr>
<th>Current Location</th>
<th>Patient Name</th>
<th>Age</th>
<th>MR#</th>
<th>Acct#</th>
<th>Admission Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Allergies/Reactions:** penicillin, sulfur topical

**Weight:** 68.04 Kg (149.69 lbs)  | 01/15/2011 | Height: 177.8 cm (5 ft. 10 in.) | 31/15/2011

**Date Printed:** 04/06/2011 13:53

### Home Medication / Product Summary

<table>
<thead>
<tr>
<th>M.D. to complete during hospitalization?</th>
<th>ADM</th>
<th>Medication or Product Name</th>
<th>Route</th>
<th>Frequency Indication Required for All PRN</th>
<th>Date/Time of Last Dose. (Write if known)</th>
<th>M.D. to complete after hospitalization?</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>Yes</td>
<td>Atripla oral tablet</td>
<td>600 mg-200 mg-300 mg</td>
<td>oral 1 tab(s) orally once a day (in the evening)</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
<td>Yes</td>
<td>Multiple Vitamins oral tablet</td>
<td></td>
<td>once a day</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
<td>Yes</td>
<td>Percocet 5/325 oral tablet</td>
<td>325 mg-5 mg</td>
<td>oral 1-2 tab(s) orally every 4 hours as needed for pain</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
<td>Yes</td>
<td>Zegerid 20 mg-1100 mg oral capsule</td>
<td></td>
<td>once a day</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Medication Reconciliation

Pilot program at ORMC involves a pharmacy team
- Consists of pharmacists and trained pharmacy technicians
- Obtain medication history from patient
- Allows for physician computerized review and ordering
Purpose

To evaluate the number and type of errors and identify improvements in the care of HIV inpatients through clinical pharmacist identification and reconciliation of errors.
Objectives

• Describe the number and type of errors that occur related to HAART during hospitalization
• Evaluate the role of a clinical pharmacist in identifying these errors
• Assess the acceptance of a clinical pharmacist’s interventions to the prescriber
Study Design

• Single-center, IRB-approved, concurrent study
• Conducted at ORMC from November 2010 – February 2011
• Inclusion
  • Age ≥18 years
  • Receiving HAART for treatment of HIV
  • Active inpatient HAART orders
• Exclusion
  • Patients initiated on HAART during current hospitalization
Data Collection

- Patient identification through clinical information system
- Chart review and medication history
- Demographics: age, gender, height, and weight
- Allergies
- Active inpatient medication profile
- Laboratory data
Errors to be Evaluated

- Medication reconciliation incorrect or incomplete
- Prescribing errors
  - Incomplete regimen
  - Dosing errors (under/overdose)
  - Incorrect renal adjustments
  - Drug-drug interactions
  - Administration schedule errors
  - Delays of therapy > 24 hours
  - Other
Baseline Demographics

Patient Selection: 89 patients screened and 87 included in data analysis

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>N=87</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, median (range), years</td>
<td>48 (21-71)</td>
</tr>
<tr>
<td>Male, n (%)</td>
<td>63 (72)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>n=47</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD4⁺ cell count, median (range), cells/µL</td>
<td>206 (5-902)</td>
</tr>
</tbody>
</table>
## Results

### Identified Errors

<table>
<thead>
<tr>
<th>Parameter</th>
<th>N=87</th>
</tr>
</thead>
<tbody>
<tr>
<td>Errors, n</td>
<td>134</td>
</tr>
<tr>
<td>Errors, mean ±SD</td>
<td>1.54 ±1.26</td>
</tr>
<tr>
<td>Patients with ≥ 1 error, n (%)</td>
<td>67 (77)</td>
</tr>
</tbody>
</table>
Results

Errors by Category

- Medication Reconciliation: 34%
- Dosing: 19%
- Administration Schedule: 13%
- Delay > 24 hrs: 11%
- Interaction: 11%
- Incomplete Regimen: 5%
- Interaction: 11%
- Other: 4%
- Renal Dosing: 3%

Total Errors = 134

N=87
Results: Medication Reconciliation

Registered Nurse
- Correct: 60%
- Incorrect: 40%
- n=68

Pharmacy Team
- Correct: 79%
- Incorrect: 21%
- n=19

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- Correct: 60%
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## Results

### Impact of Clinical Pharmacist

<table>
<thead>
<tr>
<th>Parameter</th>
<th>N=87</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interventions, n (mean)</td>
<td>106 (1.2)</td>
</tr>
<tr>
<td>Interventions accepted, n (%)</td>
<td>106 (100)</td>
</tr>
</tbody>
</table>
Conclusions

• Significant number of errors identified
  • Medication reconciliation
  • Dosing
• High acceptance rate of interventions
• Pharmacy led medication reconciliation team reduced errors
Limitations

• Not all errors captured
  • Patients not started on home antiretrovirals
  • Errors rectified at time of order entry
• Not all types of errors considered
  • Omission of instructions for administration related to food was not included
  • Only ordered administration times were assessed
Future Directions

- Education for pharmacy medication reconciliation team
- Improvements in clinical information system
- Clinical pharmacy involvement in care of HIV patients receiving HAART
Self Assessment

What was the most common error identified in this study?

A. Delay in initiation of HAART
B. Incorrect dosing
C. Incorrect/incomplete home medication reconciliation
D. Drug-drug interactions
Acknowledgement

• Jason Brady, Pharm.D., BCPS
• Samantha Bailey, Pharm.D.
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