Antimicrobial Stewardship in Long Term Care

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Disclosure

• Dr. James has no relevant financial relationships to disclose
Objectives

• Evaluate current utilization trends of antibiotics in Long-Term Care (LTC)
• Review proposed regulations in regard to antibiotics in LTC
• Describe barriers to antibiotic stewardship in LTC
• Discuss implementation of antimicrobial stewardship in LTC
Risk of Infection in the Elderly in LTCF

- Age associated changes
- Multiple comorbid diseases
- Polypharmacy
- Malnourished
- Invasive devices
- Residential nature of institution

The rate of infection in Long Term Care is ________ to that of the Hospital.

A. Higher
B. Lower
C. Similar
Infections in Long Term Care Facilities

• Similar rate of healthcare associated infections (HAIs) as acute care

• 1.6-3.8 million HAIs annually

• 150,000 hospitalizations annually secondary to HAIs

• Up to 388,000 people die annually of infections
Antibiotic Utilization in LTC

• Over the course of a year up to 70% of residents in LTC receive a course of systemic antibiotic therapy

• 77-88% of infections receive antibiotic treatment

• In US rate of 0.4-23.5/1,000 resident days

• 40-75% of antibiotic prescribed may be unnecessary or inappropriate

• In 2009 direct antibiotic cost in LTCF/Nursing homes totaled $527 million
Dangers of Inappropriate Antibiotic Use

- Adverse drug reactions
- Drug interactions
- Colonization with antibiotic resistant organism
- Infection with antibiotic resistant organism
- Clostridium difficile infections
- Financial burden

Antibiotic Stewardship Definition

• “Refers to a set of commitments and actions designed to ‘optimize the treatment of infections while reducing the adverse events associated with antibiotic use’”

Barriers to Antibiotic Stewardship in LTCF

• Providers are not in house
• Availability of laboratory services
• Diagnostic uncertainty
• Part time infection control professional
• Off-site laboratory can result in delays in specimen processing
• Institutional exposure - home like environment
• Patient/Family expectations

Nicolle LE. Clin Infect Dis. 2000;31:752-756
“It is the physician’s (or other appropriate authorized practitioner’s) responsibility to prescribe appropriate antibiotics and to establish the indication for use of specific medications. As part of the medication regimen review, the consultant pharmacist can assist with the oversight by identifying antibiotics prescribed for resistant organisms or for situations with questionable indications, and reporting such findings to the director of nursing and the attending physician.”
State Operations Manual: F-Tags & Antibiotics

- Federal Tag 329: Unnecessary Drugs
- Federal Tag 428: Medication Regimen Review
- Federal Tag 441: Infection Control
LTC “Mega Rule” AND Antibiotic Stewardship

- Proposed reform of the requirements for long term care to participate in Medicare and Medicaid
  - Drug Regimen Review
    - Propose that pharmacist review resident’s medical record
      - Every 6 months
      - New to the facility
      - Return to facility
      - During monthly drug regimen review when the resident has been prescribed or is taking a psychotropic drug, an antibiotic or any drug the QAA Committee has requested be included
    - “Requiring an antibiotic stewardship program that includes antibiotic use protocols and a system for monitoring antibiotic use”
Survey and Infection Control Pilot Project

• Issued December 23, 2015

• Overview
  • 3 year pilot project
  • Goal to improve assessments of infection control and prevention regulations

• Details
  • Educational
  • New surveyor tools and processes will developed and tested

• Expected Outcomes
  • New surveyor infection control tools and survey processes

How to Initiate Antibiotic Stewardship in LTCF

- Implementation of the CDC Core Elements for Antibiotic Stewardship in Nursing Homes
  - Leadership Commitment
  - Accountability
  - Drug Expertise
  - Action
  - Tracking
  - Reporting
  - Education

- Recommended to start by implementing 1-2 strategies to start with and keep adding new strategies over time

How to Initiate Antibiotic Stewardship in LTCF

• Dependent on multiple LTCF factors
  • Number of beds
  • Acuity of care (Sub-acute rehab, Ventilator unit, On-site Hemodialysis)
  • Personnel
  • Electronic system
  • Laboratory support
How Can Pharmacy Assist in Initiating Antibiotic Stewardship in LTCF?

- Review antibiotic prescriptions during medication regimen reviews
  - New Admission
  - Monthly Medication Regimen Review

- Medication Regimen Review
  - Appropriate indication
  - Untreated indication
  - Improper medication selection
  - Appropriate dose
  - Adverse reactions
  - Drug interactions

Patient Case #1

• Reason For Admission
  • 33 Y/O male admitted to acute secondary to cardiac arrest

• PMH
  • Seizures, sigmoid volvulus, HTN, TBI, asthma, craniotomy, hydrocephalus, VP shunt, GT, tracheostomy

• Course in Hospital
  • Patient started on vancomycin, cefepime, and metronidazole for pneumonia
  • Patient was treated inpatient for 4 days and then send back to the nursing home
Patient Case #1

• Discharge Medication List
  • Docusate 300mg GT QHS
  • Ergocalciferol 50,000 units GT once weekly
  • Famotidine 20mg GT QAM
  • Heparin 5,000 units subcutaneously Q8H
  • Levetiracetam 1,000mg Q12H
  • Metoprolol tartrate 12.5mg GT Q12H

• Amlodipine 10mg GT QAM
• Phenytoin 200mg GT Q12H
• Ipratropium- albuterol 0.5-2.5mg 1 vial via nebulizer Q6H PRN shortness of breath
Patient Case #1

You are the pharmacist doing new admission chart review. Would you:

A. Sign off chart as having no irregularities
B. Contact provider to continue antibiotic for another 7-10 days of therapy
C. Contact provider to continue antibiotic for another 3-6 days of therapy
How Can Pharmacy Assist in Initiating Antibiotic Stewardship in LTCF?

• Dispensing/Vendor pharmacist can ensure appropriate antibiotic therapy

• Requiring all antibiotic orders to have:
  • Dose
  • Duration (Stop Date)
  • Specific indication

• Review medication that available off hours


Patient Case #2

• 80 y/o female noted to have order for levofloxacin 500mg PO Stat and daily for 7 days for complicated UTI

• Demographic Data:
  • Height = 5 feet 4 inches
  • Weight 141.9 pounds
  • SrCr: 2.7
Patient Case #2

You are the pharmacist in the dispensing pharmacy would you

A) Fill the prescription as written
B) Contact MD that dose is wrong
C) Contact MD that frequency is wrong
D) Both B and C
Patient Case #2

• Patient CrCl ~14.35 mL/min

• Recommended dose of complicated UTI
  • 250 mg once daily for 10 days
  • 750 mg once daily for 5 days

• Renal dose adjustment (CrCl 10-19 mL/min)
  • 250mg daily - 250mg every 48 hours (except in uncomplicated UTI)
  • 750mg daily - administer 750mg initial dose followed by 500mg every 48 hours
How Can Pharmacy Assist in Initiating Antibiotic Stewardship in LTCF?

- Clinical/Consultant pharmacist can develop laboratory protocols to monitor drug therapy
  - Expanded pharmacy privileges
  - Attaching laboratory monitoring to orders in electronic health record system

- Working with laboratory to develop institution specific antibiogram

- Working with EHR vendor to have order sets built in the system

- Conducting medication use evaluations to present at P and T meetings/QAPI meetings
How Can Pharmacy Assist in Initiating Antibiotic Stewardship in LTCF?

- Providing education to staff
  - Common infections in LTC
  - Treatment options
  - Criteria for initiation of antimicrobials
  - Drug-Drug interactions
  - Appropriate monitoring

- Developing site specific guidebooks for empiric therapy

- Prevention
My Experience in Pharmacy Lead Antibiotic Stewardship Practices in LTCF

• KJMC has implemented policy and procedures that allow pharmacist to assist providers with appropriate dosing and monitoring of antibiotics

  • Renal dose adjustment policy
  • Vancomycin/ Aminoglycoside dose adjustment policy
  • Therapeutic Monitoring Ordering Policy
Renal Dose Adjustment Policy

• Purpose
  • The purpose of this policy is to appropriately dose medications based on resident’s renal function to maximize therapeutic effect and minimize adverse drug effects

• Procedure
  • Licensed clinical pharmacists and pharmacy residents rounding in the nursing home can automatically adjust the dosing of all medications based on nursing home resident’s renal function using the Cockcroft-Gault equation to estimate glomerular filtration rate (GFR)
Automatic Dose Adjustment of Vancomycin and Aminoglycosides

• Purpose
  • The purpose of this policy is to allow clinical pharmacists to safely and effectively manage vancomycin and aminoglycoside pharmacotherapy of residents in the nursing home

• Procedure
  • Clinical pharmacists and pharmacy residents rounding in the nursing home can automatically modify the dosing for vancomycin and aminoglycosides to improve efficacy and minimize adverse drug events of these medications
Therapeutic Monitoring Order policy

• Purpose
  • In order to assist in the appropriate laboratory monitoring of medication therapy of residents pharmacists and New York State licensed pharmacy residents rounding on resident care units will be allowed to order such laboratory tests.

<table>
<thead>
<tr>
<th>Medication/ Drug Classes</th>
<th>Laboratory Test</th>
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</thead>
<tbody>
<tr>
<td>Amikacin, Gentamicin, Tobramycin</td>
<td>Peaks and Troughs (baseline at steady state and weekly for duration of therapy)</td>
</tr>
<tr>
<td></td>
<td>SMA-7 (weekly for duration of therapy)</td>
</tr>
<tr>
<td>Vancomycin</td>
<td>Random level (baseline at steady state and weekly for duration of therapy)</td>
</tr>
<tr>
<td></td>
<td>SMA-7 (weekly for duration of therapy)</td>
</tr>
<tr>
<td>Daptomycin</td>
<td>CPK (weekly for duration of therapy)</td>
</tr>
<tr>
<td>Linezolid</td>
<td>CBC (weekly for duration of therapy)</td>
</tr>
<tr>
<td>Warfarin</td>
<td>INR (Baseline, placed on interacting medication per policy, over 30 days since last INR)</td>
</tr>
<tr>
<td>Polymyxin B</td>
<td>SMA-7 (weekly for duration of therapy)</td>
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Impact of a Pharmacy Practice Collaborative Practice on Monitoring Vancomycin in a Long Term Care Facility

• Objectives:
  • **Primary objective:** Determine incidence of acute kidney injury in patients who received vancomycin a year before and a year after implementation therapeutic monitoring policy
  • **Secondary objectives:** Assess percentage of vancomycin troughs in therapeutic range and compliance with laboratory testing

• Inclusion Criteria:
  • 18 years or older
  • Received ≥4 doses of IV vancomycin
  • Drug levels were ordered
  • CrCl >15 mL/min utilizing Cockcroft-Gault
  • Not on hemodialysis
### Baseline Characteristics:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pre – Protocol (n=49)</th>
<th>Post Protocol (n=149)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (yr, mean)</td>
<td>72.6</td>
<td>68.8</td>
<td>0.120</td>
</tr>
<tr>
<td>Sex (male), %</td>
<td>40.8</td>
<td>56.5</td>
<td>0.056</td>
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<tr>
<td>BMI, kg/m²</td>
<td>28.4</td>
<td>26.9</td>
<td>0.276</td>
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<tr>
<td>BUN, mg/dL</td>
<td>28.0</td>
<td>26.9</td>
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<tr>
<td>Serum creatinine, mg/dL</td>
<td>0.7</td>
<td>0.9</td>
<td>0.065</td>
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<tr>
<td>WBC, x10³/mm³</td>
<td>10.0</td>
<td>10.7</td>
<td>0.231</td>
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<tr>
<td>Neutrophils, %</td>
<td>68.3</td>
<td>70.1</td>
<td>0.432</td>
</tr>
</tbody>
</table>
Impact of a Pharmacy Practice Collaborative Practice on Monitoring Vancomycin in a Long Term Care Facility

• Results:
Impact of a Pharmacy Practice Collaborative Practice on Monitoring Vancomycin in a Long Term Care Facility

• Results
• The majority of residents in LTCF will have at least 1 course of system antibiotic use during the course of the year

• A large proportion of this antibiotic utilization is unnecessary and inappropriate

• Pharmacist working in the LTC setting can help to ensure optimal antibiotic pharmacotherapy and compliance with regulations by assisting in development of antibiotic stewardship practices at their institutions
Acknowledgements

• Dr. Andrew Smith a former PGY-1 resident who was the primary researcher on impact of a pharmacy practice collaborative practice on monitoring vancomycin in a long term care facility

• Dr. Catherine Millares who helped in development and implementation of the policies discussed in my lecture today
Questions?