Implementing Antimicrobial Stewardship in the Real World: A Case Discussion

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Disclosures

None
Objectives

At the end of the presentation, attendees should be able to:

• Identify infection management and prevention issues presented in the patient case scenario

• Explain how antimicrobial stewardship and infection prevention can improve patient management

• Illustrate real-world examples of antimicrobial stewardship strategy implementation in different healthcare settings
Audience Participation Questions

How to join

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Patient Case: Ambulatory Setting

• 75 year-old morbidly obese man with early Alzheimer’s dementia and pulmonary hypertension

• Visited PCP for sore throat and cough with slightly yellowish phlegm

• Prescribed azithromycin 500mg daily x 3 days for acute bronchitis/upper respiratory tract infection
Audience Participation Question 1

What are the potential improvement opportunities associated with this case?

A. Levofloxacin for 7 days should be prescribed instead of azithromycin
B. Azithromycin should be prescribed for 7 days instead of 3 days
C. Provider should have worked patient up for pneumonia in order to determine if antibiotic is indicated
D. None of the above
What are the potential improvement opportunities associated with this case?

A) Levofloxacin for 7 days should be prescribed instead of azithromycin

B) Azithromycin should be prescribed for 7 days instead of 3 days

C) Provider should have worked patient up for pneumonia in order to determine if antibiotic is indicated

D) None of the above
Audience Participation Question 2

What infection control / antibiotic stewardship measure(s) should be implemented for this type of scenario?

A. Use pre-printed prescriptions with therapy for symptomatic relief
B. Vaccinate patients against influenza and pneumonia
C. Perform pharyngeal swabs to diagnose strep throat
D. None
What infection control / antibiotic stewardship measure(s) should be implemented for this type of scenario?

A) Use pre-printed prescriptions with therapy for symptomatic relief
B) Vaccinate patients against influenza and pneumonia
C) Perform pharyngeal swabs to diagnose strep throat
D) None
Example of Antimicrobial Stewardship: 
*Brodstone Memorial Hospital Clinics*

Key steps to successful antimicrobial stewardship in an ambulatory setting:

- Identified high priority condition
- Collected baseline data
- Identified strengths and weaknesses
- Reported results to providers
- Educated on current guideline recommendations
- Tracked results
- Implemented additional interventions
- Currently tracking results
Improvements in Antimicrobial Use at Brodstone Memorial Hospital Clinics

Adherence Rate to the 2013 AAP Guidelines for Management of Acute Otitis Media

- Appropriate Antibiotic Selected: Before - 55.0%, After Education - 62.5%, After Intervention - 65.6%
- Appropriate β-Lactam Dosing (< 30 kg): Before - 43.9%, After Education - 65.6%
- Appropriate Duration: Before - 95.8%, After Education - 100.0%

Antibiotic Prescribing Rate for Acute Otitis Media Management

- Azithromycin: Before - 11.1%, After Education - 2.5%
- 3rd Gen Ceph: Before - 35.0%, After Education - 25.0%
- Amox or Amox/Clav: Before - 56.3%, After Education - 60.0%
Patient Case: Acute Care Setting

• On the last day of azithromycin
  • Brought to ED with fever, body aches, coughing, sneezing, shortness of breath
  • Tested positive for influenza in the ED
  • Oseltamivir was started and admitted to hospital

• On day 2 of hospitalization
  • Diagnosed with community-acquired bacterial pneumonia based on CXR
  • Treated with a 10-day course of levofloxacin

• On day 5 of hospitalization
  • Developed catheter-associated UTI due to ceftriaxone- and levofloxacin-resistant *E. coli*
  • Treated with a 14-day course of meropenem while levofloxacin was continued
Audience Participation Question 3

What are the potential improvement opportunities associated with this case?

A. Put patient on droplet isolation while in ED
B. Reduce the length of therapy for levofloxacin
C. Reduce the length of therapy for meropenem
D. All options would improve management of this case
What are the potential improvement opportunities associated with this case?

A) Put patient on droplet isolation while in ED
B) Reduce the length of therapy for levofloxacin
C) Reduce the length of therapy for meropenem
D) All options would improvement management of this case
Audience Participation Question 4

What infection control / antibiotic stewardship measure(s) should be implemented for this type of scenario?

A. Perform prospective audit and feedback on antibiotic regimens
B. Implement institution treatment guidelines/ordersets for pneumonia and UTI
C. Evaluate necessity of urinary catheter daily
D. All options should be implemented
What infection control / antibiotic stewardship measure(s) should be implemented for this type of scenario?

A) Perform prospective audit and feedback on antibiotic regimen
B) Implement institution treatment guidelines / ordersets for pneumonia and UTI
C) Evaluate the necessity of urinary catheter daily
D) All options should be implemented
Example of Antimicrobial Stewardship: Mary Lanning Healthcare ASP Team

• Created in 2017

• Prospective audit and feedback on high-risk and broad-spectrum antibiotics

• Pharmacist reviews daily on Mondays to Fridays and consults with ID physician on complex cases

• Antibiotic time-out at 48 hours for all inpatient carbapenems, daptomycin and piperacillin-tazobactam + IV vancomycin concurrent therapy

• Update antibiotic order sets
  • CAP – reduce duration from 7 → 5 days
  • Pharmacy consult for IV → PO conversions when specific criteria met
Improvements in Antimicrobial Use at Mary Lanning Healthcare

• Antimicrobial utilization decreases:
  • Fluoroquinolones (↓ 29%)
  • Carbapenems (↓ 28%)
  • Piperacillin-tazobactam (↓ 19%)
  • IV vancomycin (↓ 11%)

• Modest increases in cephalosporin utilization

• In the first full year of ASP implementation
  • Hospital-acquired *Clostridioides difficile* infection rate decreased by 61%
  • ESBL infection rate decreased by 45%

• Adherence to CAP protocol appears satisfactory on retrospective audits
Patient Case: Long-Term Care Setting

• Discharged to skilled nursing facility (SNF) for rehabilitation after 21 days of hospitalization

• On day 2 of SNF stay
  • Developed confusion while other vital signs remained stable
  • Nurse called PCP to get order for UA and urine culture
  • PCP gave order for ciprofloxacin for suspected UTI instead of diagnostic workup

• Developed diarrhea next day and condition continued to worsen
  • Transferred back to hospital and diagnosed with severe *C. difficile* infection
  • Developed toxic megacolon despite PO vancomycin + IV metronidazole requiring total colectomy
Audience Participation Question 5

What are the potential improvement opportunities associated with this case?

A. IM ceftriaxone should be used instead of ciprofloxacin
B. Initiate active monitoring protocol (e.g., encourage fluids, frequent vital checks) instead of ciprofloxacin
C. Obtain urinalysis and urine culture after the 1st dose of antibiotic
D. No change in management is necessary
What are the potential improvement opportunities associated with this case?

- A) IM ceftriaxone should be used instead of ciprofloxacin
- B) Initiate active monitoring protocol (e.g., encourage fluids, frequent vital checks) instead of ciprofloxacin
- C) Obtain urinalysis and urine culture after the 1st dose of antibiotic
- D) No change in management is necessary
Audience Participation Question 6

What infection control / antibiotic stewardship measure(s) should be implemented for this type of scenario?

A. Use standard criteria (e.g., Loeb’s criteria) to determine if antibiotic therapy should be initiated

B. Implement standard communication strategy (e.g., Situation-Background-Assessment-Recommendation) for suspected UTI

C. Review transfer form or hospital discharge summary for infection and antibiotic therapy histories

D. Implement contact isolation for all residents with a history of ESBL upon admission to facility
What infection control / antibiotic stewardship measure(s) should be implemented for this type of scenario?

A) Use standard criteria (e.g., Loeb's criteria) to determine if antibiotic therapy should be initiated.
B) Implement standard communication strategy (e.g., SBAR) for suspected UTI.
C) Review transfer form / discharge summary from hospital for infection and antibiotic therapy histories.
D) Implement contact isolation for all residents with a history of ESBL upon admission to SNF.
Example of Antimicrobial Stewardship:
Lancaster Rehabilitation Center & Community Pharmacy

- Used facility-provided resident-days and pharmacy dispensing data to determine baseline measures
  - Antibiotic starts / 1000 resident-days
  - Days of therapy / 1000 resident-days

- Consultant pharmacist collected data on all antibiotic courses at the time of monthly Medication Regimen Review and recorded in pharmacy-created app
  - Indication
  - Inappropriateness for any reason (e.g., not meeting McGeer/Loeb’s criteria, wrong duration)

- Pharmacist sent letter to prescriber on each ‘inappropriate’ antibiotic course with option to justify use
Example of Antimicrobial Stewardship: 
*Lancaster Rehabilitation Center & Community Pharmacy*

- For problematic cases treated frequently with antibiotics for UTIs, created pre-emptive recommendations based on historical C&S data for future treatment of UTIs

- Provided to in-house providers copies of
  - SBAR tools for different infections (UTI, RTI, SSTI)
  - Facility-specific antibiogram
  - Recommended duration of therapy

- Provided prescriber-specific feedback
Improvement in Antimicrobial Use at Lancaster Rehabilitation Center

- **Starts / 1000 Resident-Days**
  - Before: 10.2
  - After: 8.6
  - 16% Decrease in Starts

- **Days of Therapy / 1000 Resident-Days**
  - Before: 145.4
  - After: 110.5
  - 24% Decrease in Days of Therapy
Reduction in Urine Cultures at Lancaster Rehabilitation Center

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<th>No. of Urine Cultures Sent to Lab</th>
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No. of Urine Cultures Sent

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Urine Cultures / 1000 Resident-Days

43% reduction in both categories.