An Approach to Appropriate Antibiotic Prescribing in Outpatient and LTC Settings?

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Disclosures

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Pfizer produces anidulafungin (Eraxis), azithromycin (Zithromax), clindamycin (Dalacin), doxycycline (Vibramycin), erythromycin (ERYC), fluconazole (Diflucan), linezolid (Zyvoxam), piperacillin-tazobactam (Tazocin), tigecycline (Tygacil), and voriconazole (Vfend)

I have served as an expert witness on medicolegal cases involving appropriateness of antimicrobial therapy.

Total income over past two years is < $50K

I receive salary support for my ASP activities at MSH and UHN. This amounts to 0.6 FTE.
Objectives

- Understand the Growing Incidence of Antibiotic Resistance
- Develop an Approach to the Appropriate Prescribing of Antibiotics
- Recognize Opportunities to Practice Antimicrobial Stewardship in Your Practice Setting
Question 1: Which of the following is not a significant risk to your patients

A. Allergic drug reactions from antimicrobials

B. Drug interactions between newly prescribed antimicrobials and other medications they may be on

C. Emergence of drug-resistance because patients fail to complete a course of antimicrobials

D. Development of *C. difficile* infection

E. Emergence of drug-resistance because of prolonged antimicrobial use
Question 1: Which of the following is not a significant risk to your patients

C. Emergence of drug-resistance because patients fail to complete a course of antimicrobials

Antimicrobial resistance emerges in the presence of antimicrobials. By discontinuing antimicrobials, you do not promote resistance but (if anything) avoid it. The risk of premature discontinuation is treatment failure, but there are only a handful of infections (e.g. *S. aureus* bacteremia, endocarditis, osteomyelitis, etc.) where that is a significant risk.
Summary

- Antimicrobials pose risk because of resistance (and lack of new drugs), drug interactions, allergic reactions, and *C. difficile*.

- Stewarding antimicrobials is the best opportunity to minimize this risk.

- In older adults the best ways to start antimicrobial stewardship are:
  - Not treating asymptomatic bacteriuria, URTIs and wound colonization.
  - Minimizing treatment durations.
The rapid spread of resistant bacterial strains. FQRP, fluoroquinolone-resistant *Pseudomonas aeruginosa*; MRSA, methicillin-resistant *Staphylococcus aureus*; VRE, vancomycin-resistant enterococci.

Dalovisio JR. *Clin Infect Dis.* 2005;40:574-8
The Rise in Antimicrobial Resistance

CDC, Antibiotic Resistance Threats in the US, 2013
Selection of a drug-resistant organism

- drug-resistant GN cocci
- drug-sensitive GP cocci
- drug-sensitive GN bacilli
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The antimicrobial pipeline is drying up

The antimicrobial pipeline is drying up

So where to start?

- Use antibiotics wisely

- Can start with “Choosing Wisely Campaigns”:
  - Don’t use antimicrobials to treat bacteriuria in older adults unless specific urinary tract symptoms are present.
  - Don’t use antibiotics for upper respiratory infections that are likely viral in origin, such as influenza-like illness, or self-limiting, such as sinus infections of less than seven days of duration.
So where to start?

- Use antibiotics wisely
- Can start with “Choosing Wisely Campaigns”:
  - Don’t use antimicrobials to treat bacteriuria in older adults unless specific urinary tract symptoms are present
  - Don’t use antibiotics for upper respiratory infections that are likely viral in origin, such as influenza-like illness, or self-limiting, such as sinus infections of less than seven days of duration.
Question 2: Do you prescribe antibiotics wisely?

A. All the time
B. Most of the time
C. Some of the time
D. Rarely
E. Never
Question 3: Consider the person to the left or right of you. Do you think they prescribe antimicrobials wisely?

A. All the time
B. Most of the time
C. Some of the time
D. Rarely
E. Never
Physicians Prescribe Differently: Distribution of antibiotic treatment durations

The most common antibiotic treatment duration was 7 days in 21136 courses (41.0%), but 23124 (44.9%) exceeded 7 days and only 7277 (14.1%) were less than 7 days.

LTC Facilities can be characterized by their treatment durations

Physicians Prescribe Differently: Proportion of antibiotic prescriptions exceeding 7 days (by prescriber)

Potentially excessive antimicrobial use in Ontario

LTC factors affecting prescribing

Workflow

- logistical challenges with provision of medical care
- pharmacy support
- nurse-driven infection management
- institutional policies and guidelines
- external expertise and diagnostic facilities

Medical Journal of Australia 2014; 201: 101-105
LTC factors affecting prescribing
Cultural

- pressure from family to prescribe
- lack of nursing knowledge in antimicrobials
- institutional use of advance care directives
UTI in LTC and Older Women

Urinalysis

- 45% of LTC residents have asymptomatic pyuria
- using leuks (leukocyte esterase) and nitrites on urine dipstick is sensitive to pick up bacteriuria (65-100%)
- positive predictive value of urine dipstick is <50% … so a positive test means nothing
- negative predictive value of urine dipstick is >90% … so a negative test means there is no urinary tract infection

Infect Control Hosp Epidemiol. 2007;28:889-91*
Facts about UTI in LTC and Older Women

Urine Culture

- 25-50% of LTC residents have asymptomatic bacteriuria (believed to be higher in women than men)
- positive urine cultures are, therefore, of little value in independently determining UTI in older patients

UTI clinical criteria in older women include 2 of:

- fever
- suprapubic tenderness
- CVA pain or tenderness
- increased urinary frequency or urgency
- acute dysuria

BMC Fam Pract. 2011;12:36
JAMA. 2014;311:844-854
The Asymptomatic Bacteriuria Cycle

1. LTC resident “not right”
2. Urine culture ordered
3. Urine growing drug-susceptible *E. coli*
4. Patient treated with ciprofloxacin
5. Patient again felt to be not right
6. Urine culture ordered
7. Urine growing ciprofloxacin-*resistant* *Klebsiella*
8. Patient treated with amoxicillin-clavulanic acid
9. etc ...
Solutions for Asymptomatic Bacteriuria

- an educational intervention to a) discourage nurses from collecting urine cultures in the absence of UTI symptoms and b) discourage physicians from treating asymptomatic bacteriuria in LTC had a sustained effect:
  - 30% reduction in antibiotic days
  - 65% reduction in urine cultures collected

- a systems intervention to reduce the routine reporting of non-catheterized urine specimens by Leis et al resulted in:
  - a reduction in treatment from 48% to 12%

*Am J Infect Control. 2008;36:476-80*
*Clinical Infectious Diseases 2014;58:980–3*
Solution for Asymptomatic Bacteriuria

stop ordering urine cultures

AND/OR

have microbiology lab stop reporting urine cultures
in 1998, there were roughly 76 million primary care visits for URTI in the US, resulting in 41 million prescriptions.

Data in the UK last year showed an excess of antimicrobial prescribing for URTI.

Decision support systems at time of prescribing can dramatically reduce ABx treatment of URTI.
upwards of 50% of women in LTC have asymptomatic bacteriuria

100% of men and women in LTC have asymptomatic bacteridermia (and asymptomatic bactericolononosis and asymptomatic bacterinasopharyngeria, etc …)

the positive predictive value for “chronic infected wounds” is believed to be 77% when compared to biopsy

the non-sterile wound swab should therefore probably be banned

there is a paucity of data describing the utility of wound swabs … even in diabetic foot ulcers

*Adv Skin Wound Care. 2013;26:211-9
Diabet Med. 2006;23:341-7*
What is Antimicrobial Stewardship

- Several complicated definitions have been proposed

- Put simply: Making sure patients get the right antibiotics … when they need them (and only when they need them)
Antimicrobial Stewardship in LTC

- very little is known

- we know that there is a need of education of healthcare providers in LTC

- we also know that the interventions will likely require addressing the factors demonstrated to influence antimicrobial prescribing:
  - cultural factors
  - workflow factors
Antimicrobial Stewardship in LTC

• the starting points should be:
  • avoiding the treatment of asymptomatic bacteriuria
  • minimizing the duration of therapy whenever antimicrobials are prescribed
  • don’t use swabs do diagnose infection
  • don’t treat URTI symptoms with antibiotics
Summary

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