The Antibiotic Stewardship Team and the Role of Evidenced Based Medicine

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Who Are We?

- *Medical Staff*
  - This representative is ideally a physician trained and practicing in the area of infectious diseases
    - Active medical staff participation is critical to the success of the program
    - Chair committee – Physician liaison
  - Other groups include
    - Pulmonary
    - ED
    - Hospitalists
    - Intensivists
- *Pharmacy*
  - A pharmacist will coordinate the efforts of this team and guideline development, team meetings, hospital wide education and tracking reporting efforts

Who Are We?

Infection Control

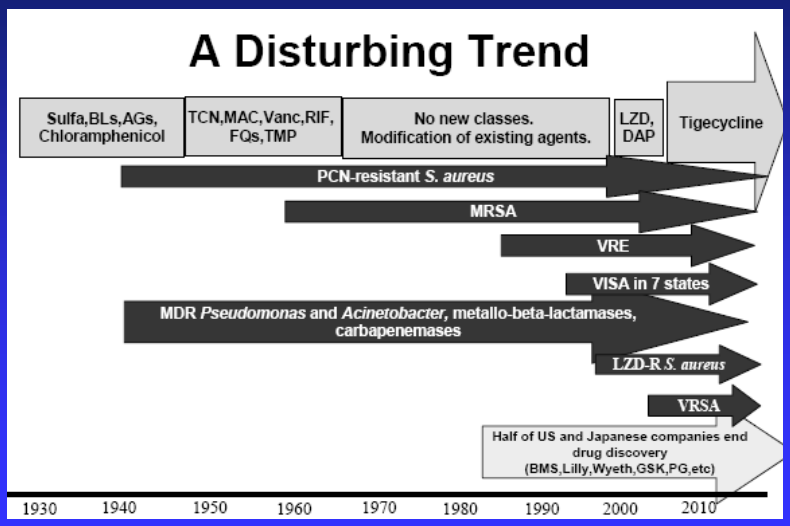
- Infection control trumps everything else
- Hand hygiene – must have hand washing police
- Barrier precautions
- Medical & Nursing staff devoted to all aspects of strict infection control

- ***Microbiology***
  - **How are we doing?**
  - **Trends and data**
  - **Special testing**

Mission

1. **Assist providers in the appropriate use of antimicrobial therapy; to improve patient outcomes; and slow the development of antimicrobial resistance**
2. **Develop evidence based appropriate use guidelines for many antimicrobials or antibiotic classes including a procedure for regimen modification**
3. **Educate providers and staff regarding these guidelines and report results**
   a. **Quarterly educational meetings for entire medical and ancillary staff**
4. **Track resistance patterns at Scottsdale Healthcare**
5. **Report results and opportunities to the Pharmacy and Therapeutics committee and Executive Committee of Scottsdale Healthcare**

Why the Need?



Guidelines for Developing an Institutional Program to Enhance Antimicrobial Stewardship

- Recommendation from the Infectious Diseases Society of America (IDSA)
- Endorsed by the ASHP Board of Directors in March of 2006
- Includes the IDSA Ranking System for Clinical Guidelines.
- Official journal of the IDSA - *Clinical Infectious Diseases*

Joint Commission 2009 –CMS Next

- Reduce the risk of health care associated infections.
  - Comply with current World Health Organization (WHO) hand hygiene guidelines or Centers for Disease Control and Prevention (CDC) hand hygiene guidelines.
  - Manage as sentinel events all identified cases of unanticipated death or major permanent loss of function related to a health care associated infection.
- Implement evidence-based practices to prevent health care-associated infections due to multiple drug-resistant organisms in acute care hospitals.
  - This requirement applies to, but is not limited to, epidemiologically important organisms such as methicillin-resistant *Staphylococcus aureus* (MRSA), *Clostridium difficile* (CDI), vancomycin-resistant *Enterococci* (VRE), and multiple drug-resistant gram negative bacteria.)
- Implement best practices or evidence-based guidelines to prevent central line-associated bloodstream infections.
  - This requirement covers short and long term central venous catheters and PICC lines.)
- Implement best practices for preventing surgical site infections.

IDSA Guidelines – Definition of Antimicrobial Stewardship

- Antimicrobial Stewardship is an activity that promotes:
  - The appropriate selection of antimicrobials
  - The appropriate dosing of antimicrobials
  - The appropriate route and duration of antimicrobial therapy

The Primary Goal of Antimicrobial Stewardship

- Optimize clinical outcomes while minimizing unintended consequences of antimicrobial use
  - Unintended consequences include the following
    - Toxicity
    - The selection of pathogenic organisms such as *Clostridium difficile*
    - The emergence of resistant pathogens

Other Aspects of Antimicrobial Stewardship

- The appropriate use of antimicrobials is an essential part of patient safety
  - The frequency of inappropriate antimicrobial use is often used as a surrogate marker for the avoidable impact on antimicrobial resistance.
  - The combination of antimicrobial stewardship and comprehensive infection control has been shown to limit the emergence and transmission of antimicrobial resistant bacteria
  - To reduce healthcare costs without adversely impacting the quality of care

Other Aspects of Antimicrobial Stewardship

- **Monitor the payer/government (CMS) position on reporting**
  - **SCIP**
  - **Stand alone CORE Measure**
  - **State or National reporting of resistance**
- **We are at the forefront of this type of program for community hospitals**
  - **SHC will be recognized as a leader in this area within the Valley and State**
  - **Publication of process and results will serve the greater community**

Keeping Focus

- Will not include any outpatient recommendations
- Antimicrobial stewardship programs improve patient care
  - **Educate – With the intention of providing clinical evidence for change**
  - **Inform clinicians of the evidence behind antibiotic stewardship and improved practice will follow**
- **This is a multi-disciplinary program, NOT a Pharmacy only program**

Getting Started

- The team will meet at least quarterly. The minutes of these meetings will be reported to the Pharmacy and Therapeutics Committee
- Initial Development Stage
  - Create team using existing members of the Antibiotic Subcommittee and other members as needed or suggested
  - Develop protocols for several targeted antibiotics
  - Begin education efforts of medical and other staff regarding the initial guidelines
- Implementation Stage
  - Track adherence to these newly developed guidelines
  - Educate (re-educate) providers that practice outside of the approved guidelines
  - Continue to develop guidelines for other agents
  - Solicit feedback from providers and staff regarding the program

Potential Impact

- Decreased antibiotic resistance?
- Fewer nosocomial infections?
- Shorter courses of antibiotics
  - Cost savings?
- Evidence based medicine at work
  - Recognized as State leader
- Better team work between multiple disciplines (Rx, MD, Nursing , IC, Micro) and groups within medicine

CMS and Others

Core components of antimicrobial stewardship programs

- Prospective audit with intervention and feedback
  - Concurrent and direct education to prescribers at a patient-specific level on local resistance patterns, clinical literature, antimicrobial selection, dosing and duration of therapy.
  - Education has historically been performed by physicians or clinical pharmacists.
- Formulary restriction and pre-authorization, two optimal methods:
  - Closed formulary with a defined set of available agents.
  - Pre-authorization with prescriber justification.

Suggested supplemental components of antimicrobial stewardship programs

- Education – education is essential but only marginally effective in the absence of complimentary clinical interventions.
- Multi-disciplinary teams – including physicians, pharmacists, infection control professionals and microbiologists.
- Guidelines and clinical pathways – evidence based practice guidelines incorporating local microbiology data.
- Antimicrobial order forms – requiring physician justification for antimicrobial utilization.
- De-escalation of therapy – utilizing the most narrow spectrum drug to treat a specific infection based upon culture results.
- Dose optimization – using patient specific criteria in conjunction with pathogen
  specific criteria to optimally dose antimicrobials.
- Computer surveillance and decision support – automating surveillance of antimicrobial utilization, resistance patterns and identification of hospital-acquired infection.
- Monitoring process and outcome measures – both are key elements to assessing the impact and outcomes of stewardship programs.

The First Round…

Linezolid (Zyvox) 600mg IV/PO q12h

1. MRSA pneumonia (HAP, VAP, HCAP, or CAP)

a. Patient is not responding to or is intolerant of vancomycin.

b. MRSA pneumonia in patients with renal failure or concurrent nephrotoxic agents (aminoglycosides, colistin, cyclosporine, tacrolimus).

2. Serious, documented VRE infection such as bacteremia, pyelonephritis, pneumonia, wound infection or other skin and soft tissue infections. (For uncomplicated UTI, cystitis, with VRE, consider the use of Nitrofurantoin or tetracycline)

3. Early discharge or early change to oral (PO) therapy with oral linezolid for MRSA pneumonia or skin and soft tissue infections responding well to IV therapy and may be eligible for earlier discharge.

Special Monitoring/Considerations

Use oral route when possible - 100% bioavailable

Liver function tests, CBC with diff and platelets weekly in any patient on linezolid for greater than 2 weeks (linezolid can cause bone marrow suppression).

Peripheral neuropathy and retinopathy have also been reported with prolonged use.

Linezolid has been associated with the serotonin syndrome when used concurrently with SSRIs.

Daptomycin (Cubicin) 4-6 mg/kg/day (actual body weight)

1. Skin and skin structure infections (4mg/kg/day)

Vancomycin (MRSA) and oxacillin/nafcillin (MSSA) are considered first line therapy for these infections. However in cases with clinical intolerance to, or failure of these first line agents, daptomycin is an alternative agent to use.

2. S. *aureus* bacteremia, including right sided endocarditis (6 mg/kg/day)
3. Failure of first line agents for VRE bacteremia not responding to linezolid, or methicillin resistant coagulase negative staph bacteremia not clearing with vancomycin and removal of infected lines.

Special Notes and Monitoring

1. Daptomycin should not be used to treat pneumonia.
2. Serum CK/CPK should be monitored while receiving daptomycin

Caspofungin (Cancidas) LD: 70mg IV x1; MD: 50mg IV q24h (now using mycafungin)

Culture to rule out Candida albicans must be initiated before use

1. Empiric therapy for Candidemia or other deep candidal infections (intra-abdominal abscess, peritonitis, pleural space infection) until species is determined.

If Non-albicans Candida strain detected from a significant positive culture (e.g., blood, bile, intraabdominal abscess, pleural space), Consider continuation of caspofungin.

2. Esophageal candidiasis with an azole resistant strain.
3. Neutropenic fever

Special Considerations

A. ID Consult required. Invasive aspergillosis (Patient intolerant of or refractory to other therapies (Voriconazole, Amphotericin B, ABLC.)

B. If *C. albicans* is detected, use or switch to Fluconazole IV/PO

C. NOT for use in a patient with yeast or *Candida* isolated from a non-sterile site, (urine culture or sputum culture) as this most likely represents colonization or is due to a fluconazole-sensitive *C. albicans* isolate.

Tigecycline (Tygacil) LD: 100mg x 1 dose; MD: 50mg IV q12h

1. Complicated skin and skin structure infections due to MRSA and vancomycin sensitive *E. faecalis* in patients either intolerant of vancomycin or with no clinical improvement with vancomycin.
2. Complicated intraabdominal infections, when other first-line (Zosyn, Unasyn or Ertapenem) can't be used. (Documented allergy, intolerance, or failure)

Special Monitoring/Notes

A. Not active against *Pseudomonas aeruginosa*.

B. Monitor for signs of nausea and vomiting

Other Areas

- Didn't focus on SCIP
  - Other areas of SHC focused on this area
- IDSA "Bad bugs, no drugs" campaign
  - 10 by 2010
- IDSA Guidelines updates

Our Experiences…Things are always darkest…

- Teach them and they will learn
  - Most practitioners abided by the guidelines
  - ID was the main outlier
- Must have teeth, EBM is nice but without Administration and governmental pressure efforts can be muted
  - Director released during first phase of plan
  - No physician support at subsequent meetings
  - I took a new position and cut backs at SHC didn't allow for a hospital replacement

The next phase…recovery and hope

- SHC is hiring a full-time ID Stewardship Pharmacist!!
  - Physician leadership participating in Stewardship meetings
- ADHS is working on a program to help all hospitals start or improve their Stewardship efforts
- CMS and Joint Commission said do it or else…

New Challenges

- I don't want to practice "cook book" medicine (especially ID)
- Why is a Pharmacist telling me "what to do"?
- Tell them over and over that this is important and that someone is watching
- Use the new guidelines to teach, not as a weapon
- Let CMS and JC take the blame…

Key References

"Guidelines for Developing an Institutional Program to Enhance Antimicrobial Stewardship"; *Clinical Infectious Diseases* 2007; 44: 159-77

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"Guidelines for the Selection of Anti-infective Agents for Complicated Intra-abdominal Infections"; *Clinical Infectious Diseases 2010, 50: 133–164*