Infection Control Professionals: At the heart of Antibiotic Stewardship

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IPAC May 2019

Disclosures
None

Objectives

- Review Goals and objectives of Antibiotic Stewardship
- Areas of potential interventions
  - C.difficile
  - UTI
  - Respiratory tract Infections
  - SSI
- Ten commandments
Patient Safety at Risk

- Antibiotic usage inappropriate or unjustified in 30-50% of cases in healthcare institutions:
  

- Risks:
  - Side Effects
  - Super infections (*Clostridium difficile*)
  - AB resistance


Basic Strategies

- Prospective audits and feedback
- Formulary restriction
- Dedicated resources


The beginnings as a resident...

Driver = Cost

- Antibiotics restricted to ID – mandatory consult
  - Imipenem
  - Metronidazole
  - Tobramycin
  - Third generation Cephalosporins
Consequences....

ID resident Surgery resident

At 3.00 am ....

Goals and Objectives

Coordinated interventions designed to improve and measure the appropriate use of antibiotic agents:
- Right Indication
- Right choice
- Right dose
- Right route
- Right duration


2004: 12 hospitals 22.5/1000 admissions

A Predominantly Clonal Multi-Institutional Outbreak of Clostridium difficile-Associated Diarrhea with High Morbidity and Mortality

Vivian G. Lee, M.D., Louise Poiret, M.D., Mark A. Miller, M.D., Matthew Oughton, M.D., Michael D. Lumen, M.D., Sophie Michaud, M.D., M.P.H., Annie-Marie Bourguignat, M.D., Tuyen Nguyen, M.D., Charles Freyette, M.D., Mirabelle Kelly, M.D., Anne Viable, M.D., Paul Brassard, M.D., Susan Ferrer, M.I.T., Ken Dewar, Ph.D., Thomas J. Hudson, M.D., Ruth Horn, M.D., Pierre René, M.D., Tony Monzant, Ph.D., and André Desaul, M.D.
Appropriate usage of AB:
Retrospective review of CDI cases (n=117, 2003-04)
Validation of Indications and choice

Dgx valid = 79%
Choice AB adequate = 78%

C. difficile
MUHC 2003-2012
Unnecessary Antimicrobial Use in Patients with Current or Recent Clostridium difficile Infection
Megan K. Shaughnessy, Infection control and hospital epidemiology, February 2013, vol. 34, no. 2

Of 246 patients with new-onset CDI, 445 antimicrobial courses.

- 77% at least 1 unnecessary antimicrobial dose
- 26% of patients received only unnecessary antimicrobials
- 45% of total non-CDI antimicrobial days included unnecessary antimicrobials.

The leading indications for unnecessary antimicrobial use were:

- urinary tract infection
- pneumonia

Conclusions. Twenty-six percent of patients with recent CDI received only unnecessary (and therefore potentially avoidable) antimicrobials

C. difficile Plan of Action
New C. difficile Policy : 5 axis

- Isolation and Precautions
- Cleaning and disinfection
- Antibiotic stewardship
- Excreta management
- Administrative / organizational measures

Conclusion #1

- To reduce CDI
  - Have to review AB usage....
Welcome to a new Institution!

- No program
- No pharmacist
- CDI / MRSA / VRE everywhere
- Imipenem / Meropenem / Vancomycin / Timentin used profusely …

Commandment # 1

- Need local guidelines approved locally
  - First by peers
  - Then by all departments
  - Ideally implicated in choices
    - Need local data pathogens (HAI)
    - Sensitivities and antibiogram

First Evaluation: MNH Dec 2011
Usage appropriate: 10/32= 31%

Reasons Inap:
- Indication n = 12
- Choice n = 15
- Dose n = 6
- Route n = 0
- Duration n ≥ 4
Main Problem Encountered

Diagnosis of UTI
- Treatment of ASB bacturia
- U/A not done – not looked at
  - No WBC = No UTI
- Quantification not looked at
- No distinction pathogens/skin flora
- Cipro given as first line

Pneumonia with Normal CXR
Prolong surgical prophylaxis
Meropenem first line AB ($150.00/day)

ATB Stewardship MNH 2012
Appropriate versus Inappropriate use of antimicrobials per period
Role of ICP:
Do you do surveillance for HA-UTI?

- Look at + URINE CULTURES?
- How often do you find Criteria for HA-UTI?
- Is patient on Antibiotics?
  - MATCH OR MISMATCH?

Role of ICP

- Document nosocomial UTI
  - presence of NHSN Criteria, IPAC definition
- Document Symptoms
- Treatment: appropriate / non-appropriate
- Review cases
  - Round with IC officer/ pharmacist/ ID Md for ABS

Incorporated in Software platform...
From Antibiotic Stewardship to Laboratory stewardship

- Why is the culture done anyway? (or make yourself have less work)

Review of reasons for Urine Cultures on Surgical Wards: N= 344

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<tr>
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<tbody>
<tr>
<td>% Appropriate (excluding undocumented)</td>
<td>63.1</td>
<td>25.6</td>
<td>33.7</td>
</tr>
<tr>
<td>% Inappropriate (excluding undocumented)</td>
<td>22.7</td>
<td>60.2</td>
<td>52.0</td>
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</table>

*Sepsis workup, pre-urologic procedure and repeat testing for contaminated sample were deemed appropriate during analysis.

Results: Causes of Inappropriateness

<table>
<thead>
<tr>
<th>Documented Reason for Testing</th>
<th>Frequency [N (%)]</th>
</tr>
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<tbody>
<tr>
<td>Foul smell</td>
<td>11 (3.2%)</td>
</tr>
<tr>
<td>Cloudy</td>
<td>11 (3.2%)</td>
</tr>
<tr>
<td>Dark color, concentrated</td>
<td>7 (2.0%)</td>
</tr>
<tr>
<td>Urinary retention</td>
<td>12 (3.5%)</td>
</tr>
<tr>
<td>Urinary sediment</td>
<td>7 (2.0%)</td>
</tr>
<tr>
<td>Catheter discomfort, non-localizing pain, perineal pruritus</td>
<td>12 (3.5%)</td>
</tr>
<tr>
<td>Unexplained isolated leukocytosis</td>
<td>8 (2.6%)</td>
</tr>
<tr>
<td>Elevated creatinine</td>
<td>2 (0.6%)</td>
</tr>
<tr>
<td>Sent “off protocol” (at time of catheter insertion, removal, in &amp; out, or when urinalysis ordered)</td>
<td>9 (2.6%)</td>
</tr>
<tr>
<td>Pre-operative non-urologic surgery</td>
<td>4 (1.2%)</td>
</tr>
<tr>
<td>Duplicate test within 1 calendar day</td>
<td>23 (6.7%)</td>
</tr>
</tbody>
</table>
Results: Secondary Outcomes

Urine culture positivity

UTI vs ASB

UTI: 57/344 (16.6%)
ASB: 57/344 (16.6%)

CAUTI: 8/32 (25.0%)

Urology ASB: 19/57 (33.3%)
Non‐Urology ASB: 38/57 (66.7%)

Untreated: 22/38 (57.9%)
Treated: 16/38 (42.1%)

Infections urinaires 19 28 29
ASB non traitées 73 114 111
ASB traitées 28 25 13

Surveillance of Urine Cultures in LTC
France Nadon
What about Emergency?
A look at Respiratory Tract Infections

- A good deal of AB are started in ER….
  - Its not me, its them….
- After SARS, MERS, H1N1 pandemic
  - How many of view validate if syndromic precautions are taken in ER?
  - If so do you look if Antibiotics/Antivirals initiated?
  - Do they need them?

Results RVH ER

![Diagram showing appropriate and inappropriate antibiotic use](image)

- Inappropriate: 13/21 = 62%
- Appropriate: 8/21 = 38%

Table 2. Repartition of inappropriate ATB (RVH)

<table>
<thead>
<tr>
<th>Choice</th>
<th>Indication: 4/7 (57%)</th>
</tr>
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Table 3. Distribution of ATB prescription by agent

- [Graph showing distribution by agent]

Table 4. Distribution of ATB prescription by indication

- [Graph showing distribution by indication]

Results RVH ER Choice
Description of inappropriate ATB use

1. First line agent for COPD exacerbation:
   - Avelox IV/PO prescribed but no risk factors for resistance
   - First choice:
     - Amoxil PO
     - Septra PO
     - Doxy PO
   Decrease use of Quinolones:
     - a. Risk of C. diff
     - b. Good agent for resistant pathogens

PCR for respiratory viruses very useful for clinical decision

Description of inappropriate ATB use

2. First line agent for UTI lower:
   - Cipro PO prescribed but acute uncomplicated UTI
   - First choice:
     - Septra PO
     - Nitrofurantoin PO
   Decrease use of Quinolones:
     - a. Risk of C. diff
     - b. Good agent for resistant pathogens

Is it a virus or a bacteria?

Brief Report
Evaluating the impact of the multiplex respiratory virus panel polymerase chain reaction test on the clinical management of suspected respiratory viral infections in adult patients in a hospital setting

Am J Infection Control - accepted
Impact on Antimicrobial Usage

<table>
<thead>
<tr>
<th>Term results</th>
<th>Antimicrobial</th>
<th>Antibiotic treatment</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Empirically</td>
<td>Controlled</td>
</tr>
<tr>
<td>Hospitalized patients</td>
<td>83</td>
<td>3 (3.6)</td>
</tr>
<tr>
<td>Positive s. aureus</td>
<td>18</td>
<td>4 (22.2)</td>
</tr>
<tr>
<td>Positive clostridium</td>
<td>17</td>
<td>7 (41.2)</td>
</tr>
<tr>
<td>Patients diagnosed in the emergency room</td>
<td>10</td>
<td>8 (80)</td>
</tr>
<tr>
<td>Positive s. aureus</td>
<td>20</td>
<td>7 (35)</td>
</tr>
<tr>
<td>Positive clostridium</td>
<td>46</td>
<td>19 (41.3)</td>
</tr>
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Do you do SSI surveillance?
- If you do, do you validate prophylaxis?

Evaluate prophylaxis in case of SSI
- Indication
- Choice
- Dose
- Route
- Duration
SSI Report – 2018
Susan Rachel

Systematic Audit
Post Feedback (2013-14)
Systematic Evaluation of prophylaxis
50 consecutive OR charts reviewed / service

Global conformity (%)

- Pre-intervention: 51.6%
- Post-intervention: 77.6%

Choosing the right AB for prophylaxis:
Know your pathogens!
Pathogens of SSI in cardiac Surgery 2011-2012 (Connie Patterson)

Recommendations

- Better gram negative coverage
  - Cefazolin 2 gms Q8h X 24 hours
  - Gentamicin 5 mgs / kg X1 dose
Rate of SSI in Cardiac Surgery

All Cardiac Surgical Site Infections - Yearly Comparison

CNISP
Regional HA-CDI rates per 10,000 pt-days, 2013 to 2018*

CNISP-Anti Microbial Usage

Abdesselam et al. AMMI 2018
The 10 Commandments (Andrew Morris)

- Thou shalt have no other antibiotics before dental procedures to prevent endocarditis or prosthetic joint infections.
- Thou shalt not treat wound swabs, asymptomatic bacteriuria, or other culture results without clear evidence of infection.
- Thou shalt not use the terms “pan-culture” or “broad-spectrum” in vain.
- Remember that most patients need a rest from antibiotics by the 7th day.
- Honor your culture and susceptibility results.

- Thou shalt not use antibiotics “just in case” or “to be safe”.
- Thou shalt not commit to antibiotics post-operatively: use them like you would a condom (just before and during the event).
- Thou shalt not claim that “finishing all of your antibiotics” will reduce resistance: it breeds it.
- Thou shalt not covet guidelines when they fly in the face of evidence or common sense.
Who is the black sheep?

- Awareness
- Leadership support

"An idea that is developed and put into action is more important than an idea that exists only as an idea" -- Buddha

It is easier to divert a river than to change behavior…

20/06/2019