Balancing Early Antibiotic Administration and Stewardship in Sepsis

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September 20, 2018
Financial Disclosures

- I have nothing to disclose.
Jefferson Health - New Jersey, About Us

• Formerly Kennedy Health.
• Located in South Jersey.
• 2017 Overview:
  • Total Revenue = $635.3 M
  • Charity Care = $10.4 M
  • Capital Improvements = $51.2 M
• 607 total acute care beds:
  • Jefferson Cherry Hill Hospital (CH)
  • Jefferson Stratford Hospital (ST)
  • Jefferson Washington Twp. Hospital (WT)
Antibiotic Stewardship, Sepsis and Infection Prevention: Interrelated Roles
PREVENT SEPSIS BEFORE IT OCCURS!

PREVENT CLABSI and CAUTIs
Follow Central Line & Urinary Catheter Policies. Remove all lines and Foleys if not medically necessary.

PREVENT CDIFF
Choose appropriate antibiotic dose, duration, and stop date. Use PPIs and H2 blockers when medically indicated.

REMEMBER:
- Wash your hands. Every time – everyone!
- Proactively manage high-risk patients.
- Educate patients about infection prevention.

PREVENT SURGICAL SITE INFECTIONS
Follow SCIP protocol. Practice appropriate post-op incisional care.

PREVENT ASPIRATION PNEUMONIA
Maintain 30-degree elevation for feeding and oral care.

PREVENT PERITONITIS
Be aware of constipation, obstruction, and abdominal perforation.

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Prevention of CRE

- Hand hygiene
- Contact precautions if infected/colonized with CRE
- Minimize use of devices (ventilator, central line)
- Antimicrobial stewardship
- Environmental cleaning
Estimated minimum number of illnesses and deaths caused by antibiotic resistance*:

At least 2,049,442 illnesses, 23,000 deaths

*bacteria and fungus included in this report

Estimated minimum number of illnesses and death due to *Clostridium difficile* (*C. difficile*), a unique bacterial infection that, although not significantly resistant to the drugs used to treat it, is directly related to antibiotic use and resistance:

At least 250,000 illnesses, 14,000 deaths
Antimicrobial Stewardship, Defined

- Infectious Diseases Society of America (IDSA):
  - “...coordinated interventions designed to improve and measure the appropriate use of antimicrobials by promoting the selection of the optimal antimicrobial drug regimen, dose, duration of therapy, and route of administration.”
  - **Antibiotic dose, duration, and route for a specific indication.**
- In the hospital, decrease chances of acquisition of MDRO and decrease hospital-acquired CDI & improve patient outcomes.
Risks for CDI

- Any antibiotic (compared to no antibiotic)
- Number of antibiotics (more antibiotics = higher risk)
- Days of antibiotics (more days = higher risk)
- Type of antibiotic
- Proton-pump inhibitors and histamine type 2 blockers
- Duration of hospitalization

- Patient age (increased with age)
- Long-term care residency
- Severity of underlying illness
- Abdominal surgery
- Nasogastric tube
- Prior hospitalization
Antimicrobial Stewardship: Admission through Discharge

**At Admission**
- Source of the infection
- Labs, cultures & studies
- Review old cultures
- Clarify antibiotic allergies
- Age/Cr/seizures/QTC
- Antimicrobial selection based on most likely source/pathogen(s)

**Hospital Course**
- **Antibiotic Time-Out:**
  - Antimicrobial necessity
  - If NO infection, STOP
- De-escalate antimicrobials to most narrow spectrum based on culture results, if available
- Antimicrobial dose, duration, and stop date based on site of infection

**At Discharge**
- Medication Reconciliation
  - Assess necessity for antimicrobials, narrow spectrum, dose, duration, and stop date
  - If antimicrobials are no longer needed, STOP
- Counsel patient on taking antimicrobials as prescribed

Kennedy Health, CDiff Task Force, 2015
The Right Antibiotic Makes a Difference!

**Figure 2.** Survival rate according to the presence of shock and empiric antibiotic treatment (log-rank test, p < 0.001).

*CHEST 2003; 123:1615–1624.*
The Right Time Makes a Difference!

- 35,000 ED Patients.
- 21 ED.
- 2010-2013, California.
- Sepsis patients within 6 hrs of ED Registration.
- Looked at in-hospital mortality.

- Median time to antibiotic = 2.1 hours.
- Increase in absolute mortality after hr-delay = 0.3% for sepsis, 0.4% for severe sepsis, and 1.8% for shock.

Impact of Regulatory/CMS

- **Positives.**
  - Improved bundle compliance.
  - Hospital Compare.

- **Negatives.**
  - Time to find the source of the infection.
  - Possibility of sterile cultures from prior antibiotic exposure.
  - Antibiotic exposure - risk of CDI.
CDC and Resistance

• Antibiotic use -> biological pressure -> bacteria develop resistance.
• 50% of the time - inappropriate use of antibiotics -> promotes antibiotic resistance.
• Promote antibiotic stewardship and help preserve antibiotic for the future.

IDSA Concern on sepsis vs. non-infectious syndromes

• 40% to ICU with sepsis do not have infection/sepsis.
• Difficulties with diagnosis of infection, whether organ dysfunction is due to sepsis.
• The Surviving Sepsis Campaign Guidelines - consider differentiation of patients with suspected sepsis and suspected septic shock.
  • Infection (bacterial vs. viral) vs. non-infection vs. unclear.
  • Stable vs. unstable.
  • Potential harms to the patient/general population.
Sepsis Cascade

- **SEPSIS**
  - SIRS CRITERIA WITH INFECTION

- **SEVERE SEPSIS**
  - SEPSIS AND ORGAN DYSFUNCTION
  - LACTIC ACID > 2

- **SEPTIC SHOCK**
  - SEVERE SEPSIS WITH BP REFRACTORY TO 30 cc/kg, PRESSOR(S)
  - LACTIC ACID > 4
To give or not to give (antibiotics)...

- History -> physical examination -> selective labs/studies.

- Differential diagnosis.

- Scroll down the page for all of the labs/studies.
- The right clinical context.
- The urgency in the setting of hemodynamic instability.
Ed Countdown Clocks
Stacked Antibiotic Administration
Antibiotics Stocked in ED
Sepsis Alert with RRT - Floor patients
ED/ICU Bundle Worksheet
Sepsis on the Floors Taskforce
Sepsis Algorithm
Lactate Turn-Around Time Goal 30 min
SOTF Bundle Worksheet
Nurse Initiated Lactic Acid Policy
Putting it All Together Guide
Mandatory ID Consult
Pilot: Direct calling of Sepsis Alerts on Floors
Prevent Sepsis Before it Occurs
Reflex Lactic Acid Redraw for levels >2
Nurse Initiated Blood Culture Policy
Changes made to ABX stocked in ED
Directly calling Sepsis Alerts on Floors rolled out to all campuses

2012
Mortality Rate 17.91%
Lives Saved 130.4

2013
Mortality Rate 13.36%
Lives Saved 189.6

2014
Mortality Rate 11.88%
Lives Saved 321.5

2015
Mortality Rate 10.22%
Lives Saved 334.8

2016
Mortality Rate 8.85%

2017
Mortality Rate 8.52%

2018*
Mortality Rate 9.86%
Lives Saved 151.1*

*Data 1/1/18-6/30/18

Mortality Rate percentage decrease from baseline for each year:
25.4% 33.7% 42.9% 50.6% 52.4%

2015-2017 data refreshed using Crimson template which auto-updates with ICD-10 coding. For 2015, the ICD-9 template utilized per advise of the Crimson advisor, as it maps the corresponding ICD-10 coding for the 4th quarter.

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Hospital Compare Data - Jefferson-ST = JH-NJ

Percentage of patients who received appropriate care for severe sepsis and septic shock.

Why is this important?

For this measure, the rate for the top 10% of hospitals was 76%.

Footnote 2: Data submitted were based on a sample of cases/patients.
Footnote 20: State and national averages do not include VHA hospital data.
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