PNEUMONIA 2002:
Outpatient, Inpatient and Nosocomial

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TREATMENT ACTION PLAN

- Antibiotic must kill bug quickly and completely
- Antibiotic must not drive resistance
- Antibiotic must not create emergence of other pathogens (C diff, MRSA, VRE)
- Shorter dose time course of therapy
- If devices are involved, remove + shorten course, 5 – 7 days total
TREATMENT ACTION PLAN

- Strict definition Hospital Acquired Pneumonia
- Purulent or colored phlegm
- Fever
- New chest infiltrate on CXR
- Leukocytosis
- Currently favored therapy includes Pip/tazo combination (Zosyn) because emergence and resistance are rare
Clostridium Difficile

- Pressure by 1st 3 generation cephalosporins and clindamycin, but not cefepime (Maxipime) to emerge
- Produces A + B toxin which produce symptom
- Profuse diarrhea, severe abdominal pain + high WBC's
- Toxicity also related to gram neg sepsis from colon permeability. Here add Zosyn or Maxipime
CLOSTRIDIUM DIFFICILE

- Treatment: Oral Flagyl 250 q6 w/ or w/o oral Vancomycin 250 qid
- High lethality. Do not take this problem lightly.
- Colonoscopy may be needed to determine severity.
- Barriers, alcohol hand solutions and contact isolation helpful to prevent spread.
CLOSTRIDIA DIFFICILE

- Group sequestration helpful.
- Limit number of personnel taking care of patient.
- Pulse therapy. Treat 5 days off 2 and repeat. Allowing spores to form which are more easily killed.
CLOSTRIDIA DIFFICILE

- PROBIOTICS
- Prevent antibiotic associated diarrhea.
- Live organisms that improve microbial balance of the host.
- Commonest used are Lactobacilli 1 gm tid and Saccharomyces boullardii 250 qid
- Reduced diarrhea 15 – 20 %
METHICILLIN RESISTENT STAPHYLOCOCCUS AUREUS

- MRSA or ORSA
- Surgical prophylactic treatment with cephalosporins for 4 days or more increase the risk
- Prophylactic treatment of 2 days or less is probably ok
- Biggest problems occur with 2nd and 3rd generation cephalosporins
METHICILLIN RESISTENT STAPHYLOCOCCUS AUREUS

- Treatment (MRSA) first choice is Vancomycin.
- Synercid/ Linizolid combination has a greater success rate than either alone.
- Reculture in 4 or 5 days. If MRSA is still present, mortality is 70%. If culture is negative, this drops to 20%.
- If Methicillin sensitive (MSSA) don’t rely on vancomycin alone. Vancomycin 8/17 died, Cloxacillin 0/18.
METHICILLIN RESISTENT STAPHYLOCOCCUS AUREUS

- Nasal Bactroban twice a week prevents MRSA in at risk populations such as vent units and nursing home patients.
- Alcohol hand washes have also been shown to help.
VANCOMYCIN RESISTANT ENTEROCOCCUS

- Increased incidence with use of beta lactam drugs (penicillins and cephalosporins) except with cefepime (Maxipime)
- Clindamycin use increases incidence
- Colon is site of colonization
- Barriers not shown to be effective
- May need to sequester patient
- If urine is infected may need to d/c foley and don’t use antibiotics
VANCOMYCIN RESISTANT ENTEROCOCCUS

- Fortaz, Vancomycin and Quinolones all increase the risk
- Synercid or Linizolid for Enterococcus faecium, but not E. fecalis
- Clean sites.
- Pull lines.
- Empiric therapy with Gentamycin and Ampicillin
PSEUDOMONAS AERUGINOSA

- Emergence driven by prolonged surgical prophylaxis
- In Hospital Acquired Pneumonia incidence is 19% if no prior antibiotics, 65% if prior Rx
- Using 2 drug therapy cuts mortality in half
- Either antipseudomonal Betalactam drug w/ aminoglycoside
- Or antipseudomonal Betalactam drug w/ quinolone
Another successful therapy is cefepime/pip-tazo. Important to consider local antibiograms. High dose Levaquin 750 qd or 500 mg bid IV. Produces large amount of green phlegm. Presence of ETTube increases risk.
Risk factors for Nosocomial Pneumonia

Patient related Factors

- Severe acute or chronic illnesses
- Coma
- Malnutrition
- Prolonged hospitalization and/or preop period
- Hypotension
- Metabolic acidosis
- Cigarette smoking
Risk factors for Nosocomial Pneumonia

Patient related factors

- CNS dysfunction
- COPD
- Diabetes mellitus
- Alcoholism
- Azotemia
- Respiratory failure
- Advanced age
Risk factors for Nosocomial Pneumonia

Infection Control Related Factors

- Poor infection control practices
- Not washing hands or changing gloves between patients
- Contaminated respiratory therapy devices and equipment
Risk factors for Nosocomial Pneumonia

Intervention Related Factors

- Prolonged or complicated surgery, especially thoracoabdominal procedures
- Endotracheal tubes
- Nasogastric tubes
- Enteral feedings
- Antacids and histamine type 2 blockers
- Prolonged or inappropriate use of antibiotics
Bacteriology of Nosocomial Pneumonia

Early Onset (2 - 5 days)

- S pneumoniae
- H influenzae
- M catarrhalis
- S aureus
- Enteric gram negative bacilli
Bacteriology of Nosocomial Pneumonia
Late Onset (>5 days)

- P. aeruginosa
- Enterobacter species
- Acinetobacter species
- Klebsiella
- S. marcescens
- E. coli and other gram negative bacilli
- MRSA
Bacteriology of Nosocomial Pneumonia

Indeterminate Onset

- Anaerobic bacteria
- *Legionella pneumophila*
- Candida
# Effect of Initial Rx on VAP Mortality

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Current Therapy Nosocomial Pneumonia

Monotherapy

- Piperacillin/ tazobactam or ticarcillin/ clavulanate
- Carbapenem (imipenem, meropenem)
- Broad spectrum cephalosporin (ceftazidime or cefepime)
- Ceftriaxone or cefotaxime if Pseudomonas unlikely
- Quinolone if penicillin allergic
Current Therapy Severe Nosocomial Pneumonia

- These include patients at risk for Pseudomonas
- Dual therapy indicated here
- Piperacillin/ tazobactam or ticarcillin/ clavulanate or ceftazidime or cefepime or imipenem or meropenem
- Plus aminoglycocide or quinolone
- If penicillin allergic, use quinolone w/ clindamycin
**Current Therapy Nosocomial Pneumonia**

- Consider adding Vancomycin if gram stain shows GPC’s and MRSA is present in facility.
- Consider adding aminoglycoside to pen allergic protocol to improve GNR coverage.
- Risk factors which increase severity include prolonged ICU stay, steroids, antibiotic use, underlying lung disease.
Preventing VAP

Effective Measures

Nonpharmacologic

- Hand washing
- Semi-recumbent position
- Avoid gastric distention
- Subglottic suctioning

Pharmacologic

- Limit stress-ulcer prophylaxis
- Chlorhexidine oral rinse
Preventing VAP
Ineffective Measures

Nonpharmacologic
Routine change of ventilator circuits or in-line suction catheters
Dedicated disposable suction catheters
qD change of moisture reservoirs
Chest physiotherapy

Pharmacologic
Aerosolized antibiotic therapy
Selective GI decontamination
Summary

Outpatient, Inpatient and Hospital Acquired Pneumonias

- Logical approach
- Local knowledge of Antiibiograms
- Shorter course surgical prophylaxis
- Effective therapy of Nosocomial pneumonia reduces mortality
- Ventilator acquired pneumonia preventive measures do exist