



Antibiotic Use in the Emergency Department: What's New?

The emergency physician must understand the current indications, and cost-effectiveness of the wide range of available antibiotics and emerge of bacterial resistance. Special emphasis will be placed on newer antibiotic drugs. Specific clinical situations will be discussed with regard to the various antibiotic options.

- Discuss the indications and cost-effectiveness of frequently used antibiotics.
- List the unique features of antibiotics recently introduced onto the market.
- Identify problems of bacterial resistance.
- Review new guidelines.

TU-88

Tuesday, October 12, 1999

12:30 PM - 2:25 PM

Room # N250

Las Vegas Convention Center

**Research: Bayer, Viropharma, Lilly, Ortho-McNeil*

FACULTY

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Update on Antibiotic Treatment of Emergency Department and Outpatient Infections

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Time to Antibiotics and 30-Day Mortality for Community-Acquired Pneumonia

| | Adjusted Mortality Odds Ratio | P |
|--------------------------------|-------------------------------|--------|
| Initial abx < 8 hrs (75.6%) | 0.85 (0.75-0.96) | <0.001 |

Meehan TP. *JAMA* 1997;278:2080.

Effect of ED/Early Antibiotic Initiation

| Nursing Home Acquired Pneumonia ¹ | Location of 1st Antibiotic Dose | |
|--|---------------------------------|------------------------------|
| | ED (n=74) | Floor (n=16) |
| Time to 1st dose: | 3.1 hours | 14.1 hours |
| LOS by location 1st dose: | 5.5 days | 6.3 days |
| cost savings/patient:† | \$880 | |
| Urinary Tract Infection - Adults ² | | |
| LOS (n=14,476) | Abx <4 hrs (41%) 5.5 days | Abx >4 hrs (59%) 6.1 days |

¹Bonaguro S. *Ann Emerg Med* 1997 (abstract)

²Hood HM. *Am J Med Qual* 1998;13:195.

What's New in 1999?

- . Pneumococcal vaccine
- . Emerging bacterial resistance
- . New quinolones
 - Managed care
- . Short course regimens
- . Outpatient management
 - Practice guidelines
- . Controversies

Heptavalent Conjugate Pneumococcal Vaccine for Infants and Children

- October '95 July '96
- 37,006 children \geq 2 months (2.4.6.12-15 mo.s)
- . Randomized to PCV or meningococcal vaccine
- . Invasive disease: 17/17 cases in fully vac.controls
5/5 cases in partly vac. controls
- Efficacy 82 100%

Black S. 38th ICAAC, San Diego 1998

U.S. Antimicrobial Rx 1996

| | |
|-------------------------------------|-------------|
| 275,000,000 rx total | 1996 |
| Amoxicillin | 26% |
| Cephalosporins | 20% |
| Extended spectrum macrolides | 10% |
| TMP/SMX | 8% |
| Pen V | 6% ↓ |
| Quinolones | 5% |
| Erythromycin | 6% ↓ |
| Tetracyclines | 2% ↓ |

Hutchinson JM 38th ICAAC, San Diego, 15%

New Quinolones

- . Sparfloxacin (Zagam)
- . Levofloxacin (Levaquin)
- . Trovafloxacin (Trovan -IV)
- . Grepafloxacin (Raxar)

New Quinolones

| | Anaerobes | Chlamydia | IV | Phototox | QT | Dizziness |
|-------|-----------|-----------|----|----------|----|-----------|
| Spar | - | - | - | + | + | - |
| Levo | - | (+) | + | - | - | - |
| Trova | + | + | + | - | - | + |
| Grepa | - | + | - | - | + | - |

Once-Per-Day Antibiotics

| Oral | Parenteral |
|--------------------------|------------------------|
| Azithromycin (Zithromax) | → |
| Cefadroxil (Duricef) | Aminoglycosides |
| Cefixime (Suprax) | Ceftriaxone (Rocephin) |
| Ceftibuten (Cedax) | |
| Sparfloxacin (Zagam) | |
| Levofloxacin (Levaquin) | → |
| Grepafloxacin (Raxar) | Trovafloxacin (Trovan) |

Emerging Bacterial Resistance

- . DRSP
- . Vancomycin reduced susceptibility *S. aureus*
- . TMP/SMX-resistant *E. coli*
- . Quinolone-resistant *N. gonorrhoeae*
- . Penicillin-resistant *N. meningitidis*

Drug-Resistant *Streptococcus pneumoniae* (DRSP): USA

| | |
|---------------------------------|--------|
| Penicillin | |
| Intermediate (0.1-1.0 ug/ml) | 20-40% |
| High level (≥ 2 ug/ml) | 10-20% |
| TMP/SMX | 15-20% |
| Macrolides/azalides | 5-20% |
| Third generation cephalosporins | 5% |

Thornsberry C. *Diagn Microbiol Infect Dis* 1997;29:249-57.
Doern GV. *Clin Infect Dis* 1998;27:764-70.

Important Antibiotic Interactions and Contraindications

- Aztemizol/Terfenidine (Q-T prolongation)
 - Erythromycin/Clarithromycin
- Theophylline (increased levels)
 - Erythromycin/Clarithromycin
- . Ciprofloxacin/Enoxacin/Norfloxacin/Oxfloxacin
- Pregnancy
 - . Quinolones/Tetracyclines

Acute Otitis Media: New Concepts

- . Dx: inflamed, immobile TM
- . OK not to treat - 2 day follow-up
 - New dosing, short duration
- . Routine **tympanocentesis**

Antibiotics for AOM: Pros and Cons

| Pros | Cons |
|-------------------------|-------------------------|
| ↑/short-term cure | Treat 7 to benefit 1 |
| ↑rapid pain resolution | Analgesics effective |
| ↓meningitis/mastoiditis | Evidence? |
| Parental expectations | Side effects/resistance |

Culpepper L. *JAMA* 1997;278:1643-5.

Otitis Media: Treatment

| Characteristic | Antibiotic |
|--|--|
| Cost | Amoxicillin TMX/SMX |
| Convenience | Azithromycin Ceftriaxone |
| Taste* | Loracarbef Cefprozil |
| Broad spectrum (treatment failures) | Amox/clav. HD (± amoxicillin) Cefuroxime |

* Steele RW. *Infect Med* 1999 (Mar):197

Acute Otitis Media: 1999 CDC Working Group

- 1st line - HD amoxicillin - 80-90 mg/kg/day
- 2nd line HD amox/clav., cefuroxime, IM ceftriaxone (50 mg/kg)
- Risk groups -day care, prior abx, < 2 years
- Refractory cases - IM ceftriaxone QD X3. clindamycin, tympanocentesis

Dowell SF. *Pediatr Infect Dis J* 1999;18:1

Otitis Media: Antimicrobial Doses

| Antibiotic | Dose |
|---------------|----------------------------|
| Amoxicillin | 40-45 → 80-90mg/kg/d (BID) |
| TMX/SMX | 8mg/kg/d (BID) |
| Azithromycin | 10mg/kg d #1, 5mg/kg d#2-5 |
| Ceftriaxone | 50mg/kg X 1 |
| Cefprozil | 30mg/kg/d (BID)* |
| Lorcarbaf | 30mg/kg/d (BID)* |
| Cefaclor | 40mg/kg/d (BID)* |
| Amox/clav. HD | 45mg → 80-90mg/kg/d BID |
| Cefuroxime | 30mg/kg/d (BID) |
| Erythro/sulfa | 40-50mg/kg/d (TID) |

*10 days duration

Antibiotics for Symptomatic Treatment of Severe Strep Throat

| | % Present | | |
|----------------------|-------------------|-----------------|----------------------|
| Symptoms 24 Hours | Placebo (n=56) | Pen V (n=68) | Cefadroxil (n=70) |
| Sore Throat | 74 | 6 | 6 p<0.01 |
| Fever | 64 | 4 | 4 p<0.01 |
| Headache | 55 | 2 | 4 p<0.01 |

Middleton DB. *J Pediatr* 1988;133:1089.

Pen vs. Symptomatic Treatment of Severe Strep Throat

| Symptoms at 45 Hours | % Improved | |
|----------------------|----------------------------|------------------------|
| | ASA/Tylenol Placebo (n=23) | ASA/Tylenol Pen (n=34) |
| Sore Throat | 78 | 94 (p< 0.5) |
| Fever | 76 | 87 NS |
| Odynophagia | 76 | 87 NS |
| Malaise | 94 | 88 NS |

Middleton DB. *J Pediatr* 1988;133:1089.

Strep Pharyngitis: Treatment

| Antibiotic | Duration | Characteristic |
|----------------------------|----------|----------------|
| Pen V/Amox/Cef | 10 days | can be BID |
| IM Pen | 1 dose | allergic rxns |
| Azithromycin | 5 days | QD |
| Erythromycin | 10 days | GI upset |
| Cefadroxil | 10 days | QD |
| 2nd/3rd GC, Clarithromycin | 10 days | expensive |

Strep Pharyngitis: Antimicrobial Doses

| Antibiotic | Dose |
|------------------|--|
| Amoxicillin | 40-45mg/kg/d (BID); 250mg TID* |
| Pen VK | 25-50mg/kg/d (QID); 500mg BID* |
| Pen (benzathine) | 30,000U/kg; 1.2 million U (X1 IM) |
| Azithromycin | 12mg/kg/d#1- 5; 500mgd#1, 250mg#2-5 |
| Cephalexin | 25-50mg/kg/d (QID-BID); 500mg BID* |
| Cefadroxil | 30mg/kg/d; 1 gram (QD)* |
| Erythromycin | 40 mg/kg/d (QID); 250mg QID 500mg BID* |

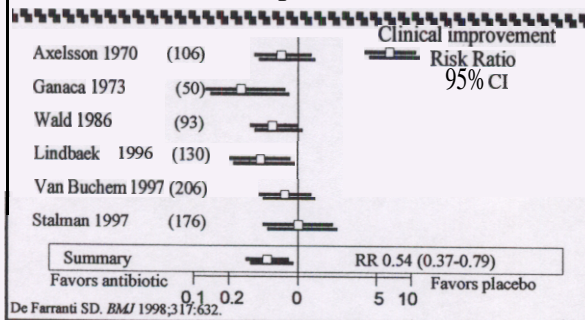
* 10 days duration

Acute Sinusitis: Diagnosis

- . Fever
- . Toothache
- . Poor response to decongestants
- . Facial tenderness
- . Purulent nasal discharge
- . Abnormal transillumination
- . Facial erythema/swelling
- . URI symptoms >10 days

International Rhinosinusitis Advisory Board. *Ear Nose Throat J* 1997;76 (12 suppl) 1
Low DE *Can Med Assoc J* 1997;156 (6 suppl):S1

Antibiotics for Acute Uncomplicated Sinusitis



Antibiotics for Acute Maxillary Sinusitis in Children

* Randomized, double-blind
* Clinical score plus X-ray
* 10 days duration

| | % Cure | | |
|----------------------|-------------------|-----------------|-----------------------|
| | Placebo (n=35) | Amox. (n=30) | Amox./clav. (n=28) |
| Cure at 3 days' (%) | 11 | 43 | 47 |
| Cure at 10 days' (%) | 43 | 67 | 64 |

Wald ER. *Pediatrics* 1986;77:795.

Antibiotics for Adults With Acute Maxillary Sinusitis

| | Lindbaek ¹ (127) | van Buchem ² (206) |
|-------------------------|-----------------------------|-------------------------------|
| Dx | Clinical score & CT | + Plain X-ray |
| X-ray criteria | A/F level/opacified | + mucosa > 5 mm |
| <u>Abx vs. placebo</u> | | |
| Sx resolution | 86% vs. 67%* | 65% vs. 52% (p=.06) |
| Major X-ray improvement | 37% vs. 23%' | 74% vs. 60%' |
| Side effects | 56% vs 36%' | 28% vs. 9 % |

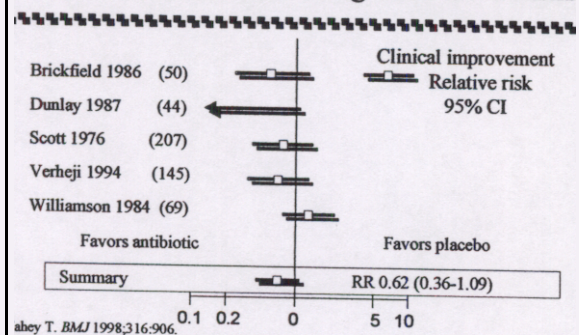
1-BMJ 1996;313:327, 2- Lancet 1997;349:683

Sinusitis: Antimicrobial Doses

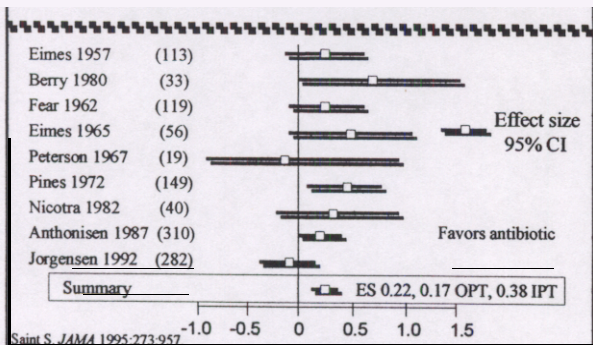
| Antibiotic | Dose |
|----------------|------------------------------------|
| Amoxicillin | 40-45 → 90mg/kg/d (BID); 500mg TID |
| TMX/SMX | 8mg/kg/d (BID); DS BID |
| Amox/clav. HD | 45mg → 90mg/kg/d (BID); 875mg BID |
| Cefuroxime | 30mg/kg/d (BID); 250mg BID |
| Cefprozil | 30mg/kg/d (BID); 250-500mg BID |
| Cefaclor | 40mg/kg/d (BID); 500 mg QID |
| Ceftibuten | 9mg/kg/d; 500mg QD |
| Erythro/sulfa | 40-50mg/kg/d (TID) |
| Clarithromycin | 15mg/kg/d (BID); 500mg BID |
| Levofloxacin | 500mg QD |
| Trovaflaxacin | 200mg QD |

'10 days duration

Antibiotics for Acute Cough and Bronchitis



Antibiotics for Exacerbations of COPD



COPD Exacerbation: Antibiotics

173 patients/362 exacerbations over 3.5 years

| | Antibiotic* (n=182) | Placebo (n=180) |
|-------------------|--|-----------------|
| Success | 68% | 55%* |
| Deterioration | 10% | 19% |
| Antibiotic group: | 1-2 days fewer symptom increased peak flows | |
| Response: | sputum, purulence, dyspnea | |

* TMP/SMX, doxy, amoxicillin X 10 days

Anthonisen NR. Ann Intern Med 1987;108:196.

AECEB: Antimicrobial Doses

| Antibiotic | Dose |
|----------------|------------------------|
| Amoxicillin | 500mg TID* |
| TMX/SMX | DS BID* |
| Doxycycline | 100mg BID* |
| Azithromycin | 500mg d#1, 250mg d#2-5 |
| Amox/clav. HD | 875mg BID* |
| Cefuroxime | 250mg BID* |
| Clarithromycin | 500mg BID* |
| Levofloxacin | 500mg QD* |

*10 days duration

Low-Risk Pneumonia Patients

- . Less than 50 years of age
- . No history of cancer, CHF, cerebrovascular, renal or liver disease
 - Normal mental status
- . P < 125, RR < 30. BP > 90. T 35-40°C

Fine MJ. *NEJM* 1997;336:243.

CAP Mortality Prediction Rule

| Demographic: | | Exam: | |
|-------------------|----|---|----|
| Age (<10 women, | | MS, RR \geq 30, BP \leq 90 | 20 |
| Nursing home | 10 | HR \geq 125 | 15 |
| | | T < 35° or > 40°C | 10 |
| Co-morbidity: | | Lab: | |
| Cancer | 30 | pH < 7.39 | 30 |
| CHF | 20 | BUN > 30, Na < 130 | 20 |
| CVA, renal, liver | 10 | Glu>250, Hct <30, pO2 <60, pleural effusion | 10 |

Fine MJ. *NEJM* 1997;336:243.

CAP Risk Classes, Mortality, and Management

| <u>Risk Class - score</u> | <u>30 Day Mortality (%)</u> | <u>Rec. Care</u> |
|---------------------------|-----------------------------|-------------------|
| I | <0.5 | Outpatient |
| II <70 | 0.5-1 | Outpatient |
| III 71-90 | 1-4 | Inpatient (brief) |
| IV 91-130 | 4-10 | Inpatient |
| V >130 | >10 | Inpatient |

Fine MJ. *NEJM* 1997;336:243

CAP: Outpatient Treatment

Initial IV/PO Dose

Ceftriaxone 1-2 grams
Levofloxacin 500 mg
Trovafloracin 200 mg
Azithromycin 500 mg

Oral regimens

(14 days)

Azithro 500/250 mg QD'
Erythro 500 mg QID
Levofloxacin 500 mg QD
Cefuroxime 500 mg BID

*5-10 days

Niederman MS. *Am Rev Respir Dis* 1993;148:1418-26.
Bartlett JG. *Clin Infect Dis* 1998;26:11-38.

CAP: Inpatient Treatment

2nd/3rd generation cephalosporin

+/- erythromycin

Levofloxacin 500 mg Q24°

Trovafloracin 200 mg Q24° (ICU 300mg, add Cefepime)

Azithromycin 500 mg Q24°

Niederman MS. *Am Rev Respir Dis* 1993;148:1418-26.
Bartlett JG. *Clin Infect Dis* 1998;26:11-38.

Therapy for Uncomplicated Cystitis

- 3 days -more effective than 1 dose
less side effects than 7 days

- Routine culture not recommended

TMP/SMX DS BID

Ciprofloxacin 100 mg BID

Levofloxacin 250 mg QD

Ofloxacin 200 mg BID

Fosfomycin 3.0 grams X 1 - less effective

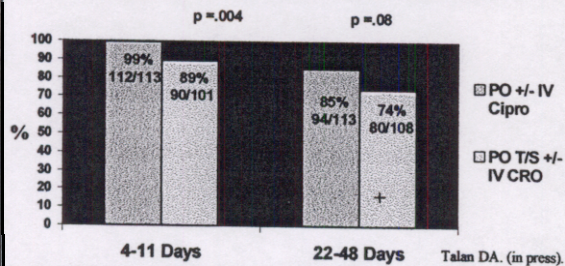
Three Day UTI Regimens

% Cure 2 weeks

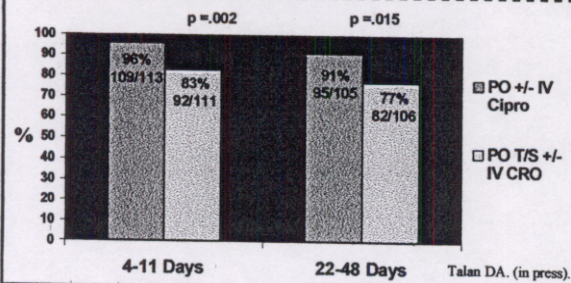
| | |
|----------------------------------|-----|
| ✓TMP/SMX BS BID (n=39) | 82* |
| Nitrofurantoin 100 mg QID (n=36) | 61 |
| Cefadroxil 500 mg BID (n=32) | 66 |
| Amoxicillin 500 mg QID (n=42) | 67 |

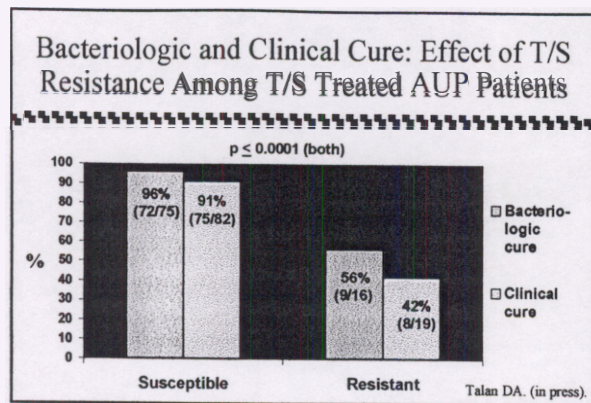
Hooton TM. *JAMA* 1995;273:41.

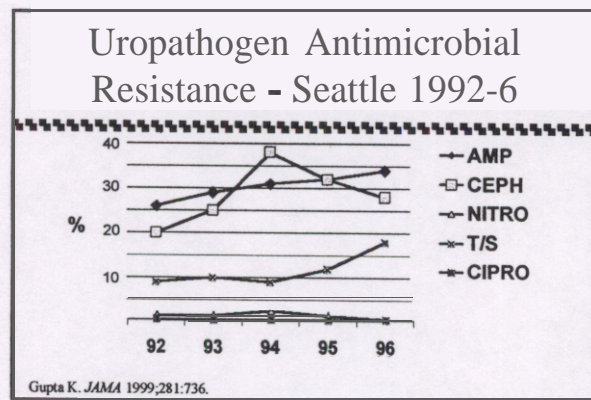
Cipro 7 Days vs. TMP/SMX 14 Days for AUP: Bacteriologic Eradication



Cipro 7 Days vs. TMP/SMX 14 Days for AUP: Clinical Cure







Outpatient ED Treatment of Acute Uncomplicated Pyelonephritis

| | |
|--------------------------------|--|
| Initial PO/IV Dose | Ciprofloxacin 400 mg Levofloxacin 250 mg Gentamicin 57 mg/kg Ceftriaxone 1 gram |
| Oral regimens (14 days) | Ciprofloxacin 500 mg BID Levofloxacin 250 mg QD TMP/SMX DS BID |
| * 7 days | Cephalexin 500 mg QID |

CDC 1998 STD Guidelines.

Treatment of Urethritis and Cervicitis

Gonorrhea

Ciprofloxacin 500 mg
Ofloxacin/Grepafloxacin 400 mg
Cefixime 400 mg
Azithro 2 grams
Ceftriax. 125/cefotax. 500 mg IM

Chlamydia

Azithro 1 gram
Doxy 100 mg BID X 7 d
Ofloxacin 300 mg BID X 7 d
Grepafloxacin 400 mg QD X 7 d

CDC 1998 STD Guidelines.

PID Treatment Options

Old

(10-14 days)

Ceftriaxone*
Cefoxitin/cefotetan + doxycycline*

New

Ofloxacin 400mg* +/- flagyl 500 mg BID
Azithro 500 mg/250mg QD +/- flagyl 500 mg BID (7-10 days)

Antibiotics for Acute Diarrhea

| | Days to Cure | |
|---------------------|--------------|----------------|
| | Cipro (n=59) | Placebo (n=58) |
| <i>All patients</i> | 2.4 | 3.4 |
| (+) fecal WBCs | 2.8 | 3.7 |
| (+) stool culture | 3.1 | 4.0 |
| (-) stool culture | 2.2 | 3.1 |

Goodman IJ. Arch Intern Med 1990;150:541.

Diarrhea: Antimicrobial Doses

| Antibiotic | Dose |
|---------------|--|
| Ciprofloxacin | 500mg BID (3days)* or 750mg X1 |
| Norfloxacin | 400mg BID (3 days)* or 800mg X1 |
| Levofloxacin | 500mg QD (3 days)* or 500mg X1 |
| TMX/SMX | DS BID (3-5 days); avoid use in children |
| Azithromycin | 500mg d#1, 250mg d#2-5 |
| Loperamide | 4mg, then 2mg after each loose stool (16mg/d max) |
| Metronidazole | 500mg TID (7-14 days) if recent abx |

Khan WA. *Ann Intern Med* 1997;126:697.
 Bennis ML. *Ann Intern Med* 1992;117:727.
 Med Letter 1999;41:39

*fever/bloody stools

Low Risk Fever/Neutropenia Patients for Outpatient Management

| |
|---|
| <ul style="list-style-type: none"> • Solid tumors • Expected neutropenia duration < 1 week • Fever occurring outside hospital • Without co-morbidity (e.g., hypotension) • Rx: Ofloxacin Ciprofloxacin and clindamycin Ciprofloxacin and amox/clavulanate |
|---|

Rolston KVI. *Infect Dis Clin N Am* 1996;10:223.

Treatment of Bacterial Meningitis: Infants and Adults

| |
|---|
| <ul style="list-style-type: none"> • Ceftriaxone (75mg/kg-2gr Q12hr) plus vancomycin (15mg/kg Q12hr) • Dexamethasone 0.15 mg/kg IV before abx non-HIB vaccinated infant (+) Gram's stain ✓ high clinical suspicion ✓ cloudy CSF ■ Consider repeat LP if steroids ■ No increased adverse effects with steroids |
|---|

Quaghiarello VJ. *NEJM* 1997;336:708.
 McIntyre PB. *JAMA* 1997;278:925.

Bacterial Meningitis: Dexamethsone

| Outcome | DM | Control | OR (95%CI) |
|-------------------------|------------|---------|------------------|
| Sev. Hearing Loss (HI) | Early 4/75 | 7/69 | 0.53 (0.1-1.94) |
| | Late 4/185 | 20/164 | 0.21 (0.08-0.61) |
| Sev. Hearing Loss (SP) | Early 1/52 | 9/51 | 0.09 (0.00-0.71) |
| | Late 6/29 | 8/46 | 1.24 (0.30-4.70) |
| Any Neuro. Deficit (SP) | Early 3/32 | 10/32 | 0.33 (0.04-1.05) |
| | Late 9/21 | 11/31 | 1.36 (0.38-4.89) |

McIntyre PB. *JAMA* 1997;278:925.

Sepsis Syndromes: **Empric** Therapy

| Syndrome | Antibiotics |
|-------------------------|---|
| Urosepsis | Ampicillin and AG |
| Pneumonia | Trovaflloxacin and 3rd/4th GC |
| Abdominal infection | B-lactamase inhibitor or carbapenem, and AG |
| Meningitis/encephalitis | 3rd GC. vancomycin, and acyclovir |
| Endocarditis | Pen. nafcillin, and AG |
| Necrotizing fasciitis | Clinda, BLI and AG (IVIG) |

Antibiotic Options* FWS 3-36 Months

| Consensus conference I | Consensus conference II | Clinical Risk | No Rx |
|--|---|--|-------|
| Temp > 39°C | Temp > 39°C and WBC > 15,000 or absolute neutrophils > 10,000/mm ³ | Temp > 40-41°C (or) Temp > 39°C and Age 6-24 months Sickie cell disease No HIB vaccination Appearance WBC/neut. count Parental choice Follow-up unlikely | |
| *Ceftriaxone 50mg/kg Amoxicillin 60-90mg/kg/d | | | |

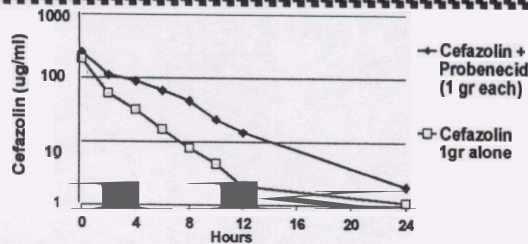
Baraff LJ. *Pediatrics* 1993;92:1-12

Rochester Low-Risk Criteria for Febrile Infants 1-3 Months

- . $T > 38^{\circ}$
- . Non-toxic appearing
- . **Previously healthy**
- . No local infection
- . WBC 5,000-15,000, $< 1,500$ bands/mm³
- . UA < 10 WBCs/hpf
- Diarrhea < 5 WBCS/mm³
- . Stable home and 24 hour follow-up

Dagan R. *J Pediatr* 1985;107:855-60

Effect of Probenecid on Cefazolin Concentrations



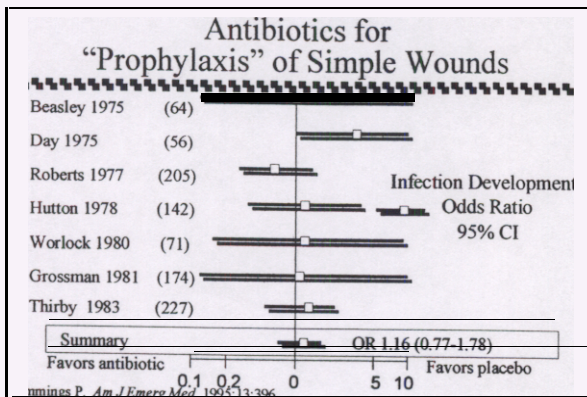
Brown G. *J Antimicrob Chemother* 1993;31:1009.

Mupiricin Cream vs. Cephalexin for Minor Wound Infections

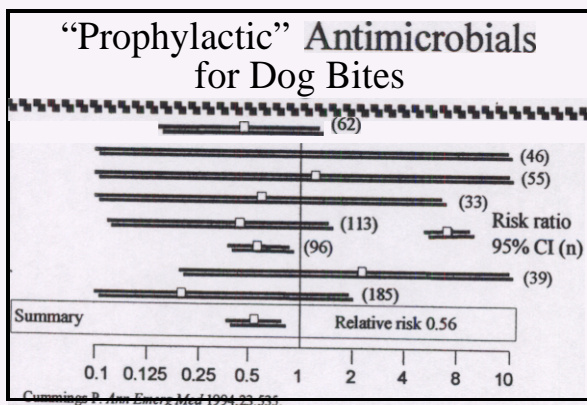
- 10 days duration
- Superficial
- < 2 cm erythema
- Healthy patients

| | Mupiricin (TID) n=245 | Ceph. (250mg QID) n= 233 |
|----------------------|--------------------------|-----------------------------|
| Clinical success (%) | 95 | 95 |
| Adverse effects (%) | 7.6 | 9.5 |

Kraus SJ. *J Fam Pract* 1998;47:429.



- ### Dog and Cat Bite Infections
- *Pasteurella* sp. ≥ 50% dog and cat bites
Cats, abscesses, arm/hand, rapid onset
 - Anaerobes 50%, staph/strep 30-50%
 - DF-2, EF-4, *Eikenella* rare
 - *Reimerella*, *Erysipelothrix* in cat bites
 - Rx: B-lact./B-lactamase inhibitor
Cefoxitin/cefotetan
Azithromycin
- Talan DA. *NEJM* 1999;340:85.



Diabetic Foot Infections and Osteomyelitis

- Frequently sub-clinical osteomyelitis
- Test-of-choice - MRI
- Mixed aerobic/anaerobic
- Early surgical debridement/amputation
- Oral therapy
 - Clindamycin 150-900mg QID
 - and ciprofloxacin 500-750mg BID)
- Cellulitis - 2 weeks, Osteo - months

Skin Infections: Antimicrobial Doses

| Antibiotic | Dose |
|----------------|---|
| Cephalexin | 25-50mg/kg/d (QID-BID); 250-500mg BID-QID |
| Dicloxacillin | 250-500mg QID |
| Erythromycin | 25-50mg/kg/d (QID); 250-500mg QID |
| Amox/clav. HD | 45mg/kg/d (BID); 875mg BID |
| Cefuroxime | 30mg/kg/d (BID); 250mg BID |
| Azithromycin | 10mg/kg/500mg d#1; 5mg/kg/250mg d#2-5 |
| Clarithromycin | 15mg/kg/d (BID); 500mg BID |
| Ciprofloxacin | 500-750mg B I D |

The Future

- DRSP vs. vaccine
- TMP/SMX res. *E. coli*
- Quinolones
- Cultures for cystitis?
- VRE and VRSA
- New antimicrobials
- New infections
- Coronary artery disease?
- Outpatient care