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April 11, 2017

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Agenda

- Didactic: Paul Pottinger *Sepsis, Part 2*
- Case Discussion: TURP Prophylaxis
- Open Discussion

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Sepsis, Part 2: *Stewardship Opportunities*

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URL: http://rwpoll.com
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This presentation is intended for educational use only, and does not in any way constitute medical consultation or advice related to any specific patient.

Disclosures

- No financial conflicts of interest
- Everything we discuss is QI, thus protected from legal discovery under WA State Code

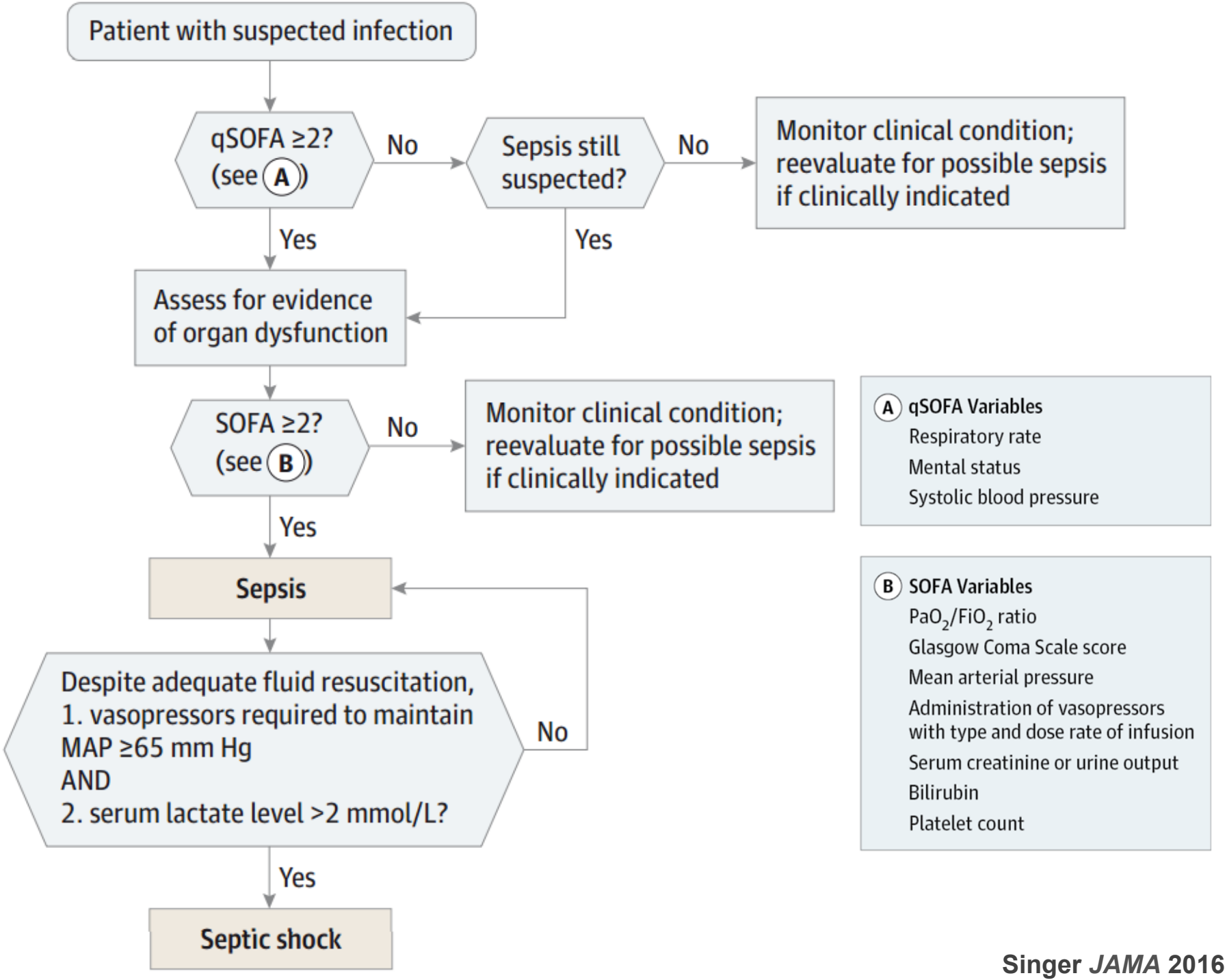
Sepsis 2: *"So, your patient is septic… what next?"*

Diagnostic Uncertainty

Is the patient infected?

If so….

- ✓ Is the patient resuscitated?
- ✓ What is the syndrome?
- ✓ Is the source controlled?
- ✓ What bug juice is appropriate now?
- ✓ What bug juice will be appropriate in the coming days?



Singer *JAMA* 2016

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Mimics of Sepsis

- Acute myocardial infarction
- Acute pancreatitis
- Acute adrenal insufficiency
- Acute gastrointestinal hemorrhage
- Acute pulmonary embolus
- Fat emboli syndrome
- Overzealous diuresis
- Transfusion reactions
- Adverse drug reactions
- Procedure-related transient bacteremia
- Amniotic fluid embolism

Not all that looks like sepsis is actually sepsis

Unfortunately, you need to act before diagnosis is confirmed!

Cuhna BA, *Crit Care Clin* 1998; 14:1

Site	Interventions
Sinusitis	Surgical decompression of the sinuses
Pneumonia	Chest physiotherapy, suctioning
Empyema thoracis	Drainage, decortication
Mediastinitis	Drainage, debridement, diversion
Peritonitis	Resection, repair, or diversion of ongoing sources of contamination, drainage of abscesses, debridement of necrotic tissue
Cholangitis	Bile duct decompression
Pancreatic infection	Drainage or debridement
Urinary tract	Drainage of abscesses, relief of obstruction, removal or changing of infected catheters
Catheter-related bacteremia	Removal of catheter
Endocarditis	Valve replacement
Septic arthritis	Joint drainage and debridement
Soft tissue infection	Debridement of necrotic tissue and drainage of discrete abscesses
Prosthetic device infection	Device removal

Abx alone may not do it!
Source control is key!

Marshall JC 1995

Immediate Actions – Severe Sepsis

- Time Zero = meets SEPSIS criteria
  - ED, acute care, ICU
  - Early recognition is critical, hence the push
- Resuscitation bundles
  - 3 and 6 hours bundles
  - Key elements are antibiotics and resuscitation (EGDT)

Immediate Actions – Severe Sepsis

Please do not delay abx while awaiting cx draw!

Within 3 hours of presentation*

1. Measure lactate level
2. Obtain blood cultures prior to administration of antibiotics
3. Administer broad spectrum antibiotics
4. Administer 30ml/kg crystalloid for hypotension or lactate ≥4mmol/L

* "Time of presentation" is defined as the time of triage in the emergency department or, if presenting from another care venue, from the earliest chart annotation consistent with all elements of severe sepsis or septic shock ascertained through chart review.

Immediate Actions – Severe Sepsis

Within 6 hours of presentation

1. Apply vasopressors (for hypotension that does not respond to initial fluid resuscitation) to maintain a mean arterial pressure (MAP) ≥65mmHg
2. In the event of persistent hypotension after initial fluid administration (MAP < 65 mm Hg) or if initial lactate was ≥4 mmol/L, re-assess volume status and tissue perfusion and document findings according to Table 1.
3. Re-measure lactate if initial lactate elevated.

Immediate Actions – Severe Sepsis

Table 1 (assessing resuscitation)

EITHER

- Repeat focused exam (after initial fluid resuscitation) by licensed independent practitioner including vital signs, cardiopulmonary, capillary refill, pulse, and skin findings.

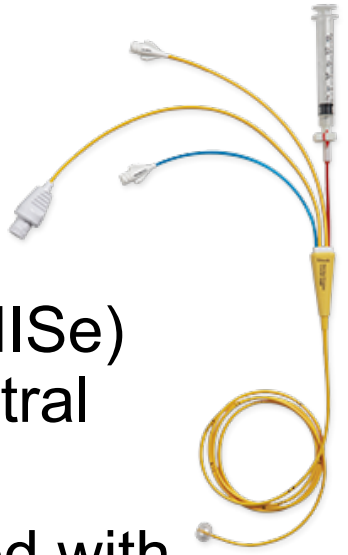
OR TWO OF THE FOLLOWING:

- Measure CVP
- Measure ScvO2
- Bedside cardiovascular ultrasound
- Dynamic assessment of fluid responsiveness with passive leg raise or fluid challenge

Invasive monitoring not required!

Controversy – Monitoring

Invasive monitoring… should we?



- In some cases, sure….
- Three negative studies (ProCESS, ARISE, ProMISe) showed no benefit to routine use of invasive central perfusion monitoring.
- SSC: “While no suggestion of harm was indicated with use of a central line in any trial, and published evidence shows significant mortality reduction using the original SSC bundles, the committee has taken a prudent look at all current data and, despite weaknesses as in all studies, determined the above bundles to be the appropriate approach at this time.”

No Controversy – Resuscitate!

Sepsis… not just bug juice

- Crystalloid first
- Pressors next, if no response
- Determine the source & deal with it
- All of this is enables good stewardship! If BP looks bad, we assume the infection is not appropriately covered, and broad spectrum empirics are continued.

Antibiotics – Choice Matters

If source not clear, treat broadly

- Most patients should receive Vancomycin (gram +)
- Cover Pseudomonas if likely (indwelling foley, bronchiectasis, diabetic foot): Ceftazidime
- Cover anaerobes if likely (intraabdominal, cavitary lung abscess): add Metro vs replace ceftaz with Pip-Tazo

Many will end up on Vanco + Pip-Tazo

Antibiotics – What's Best?

All of our order sets meet criteria for "broad spectrum"

IT DEPENDS…

- Careful H&P essential… therapy should be guided against the correct infection if possible.

MENINGITIS

(*S.pneumoniae, N.meningitidis and H.influenzae* Consider Listeria and HSV in patients age > 50, immuno-compromised or alcoholic.)
Diagnosis: Order antibiotics immediately; Do not wait for results of LP to initiate antimicrobials. LP for opening pressure, gram stain, culture, HSV PCR, cell count, glucose, and protein. Add cryptococcal antigen for HIV patients.

Non-surgical, community-acquired:

- Consider Dexamethasone 0.15mg/kg IV q6 hours for 2 -4 days, give 15 minutes prior to abx if possible
- Ceftriaxone 2g IV q 12h **PLUS**
- Vancomycin**
- **ADD** Ampicillin 2g IV q4 hours for Listeria coverage
- **ADD** Acyclovir 10mg/kg IV q8h for HSV coverage when appropriate

Typical duration: 7-21 days depending on organism

PNEUMONIA

A. Community-acquired pneumonia [non-aspiration risk] (*S. pneumoniae, atypicals*)
Diagnosis: Send sputum gram stain & culture, CXR, urinary pneumococcal antigen and blood cultures.

- Ceftriaxone 1 gm IV q24h **PLUS**
- Azithromycin 500 mg PO/IV q24h x 5 days
- If previous MRSA colonization or infection, **CONSIDER ADDING:** Vancomycin**

Typical Duration: 7 days

No single regimen covers all infections

URINARY

B. Catheter-associated UTI or Hospital- acquired:(Resistant Gram-negative rods)
Diagnosis: In symptomatic pts, obtain specimen from new foley, or from sterilized port on existing foley, not from collection bag or urimeter. Send U/A with reflexive gram stain and culture (UACRC). WBCs and Bacteria on direct stain suggests infection, but colonization also very common.

- Ceftazidime 2g IV q8h
- If GPC seen on gram stain, add: Vancomycin**
- De-escalate or discontinue coverage if alternate source found for patient symptoms.

Typical Duration: 7-14 days

De-Escalation – Really Necessary?

Targeted therapy better for pt, and better for everyone

- Pip-Tazo not necessary for CAP with *S. pneumoniae*
- Ceftriaxone not necessary for *legionella*
- Imipenem not necessary for cipro-susceptible *E.coli* pyelonephritis
- Etc, etc….

De-Escalation – Really Necessary?

Targeted therapy better for pt, and better for everyone

- Daily review: can we de-escalate?
- Be ready for the old chestnut: “I don’t want to change, she’s getting better”

Conclusions

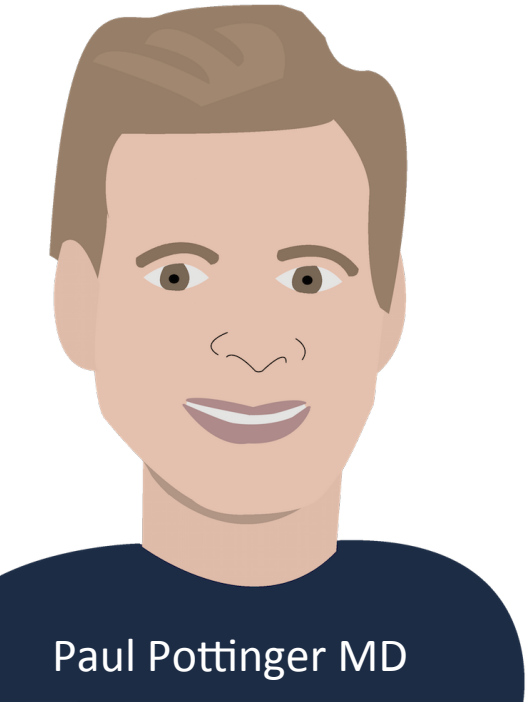
Sepsis 2: *"Beyond Antibiotics"*

<u>Early Goal-Directed Therapy</u>

Remains the Law of the Land

Time of the Essence

- ✓ Resuscitate (fluids, pressors)
- ✓ Identify the syndrome
- ✓ Control the source
- ✓ Obtain cultures
- ✓ Start abx
- ✓ Re-Examine choice at least daily, and de-escalate PRN



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Case Discussions

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Thank you!

See you next week!

Tuesday April 18, 2017

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Empiric Abx: *CAP*

Pearls:

****Vancomycin Dosing:**
Loading dose IV x1 (2 gm if ≥70 kg, 1.5 gm if <70kg), then 15 mg/kg IV q8-12 hours

Pitfall:

SIGNIFICANT PENICILLIN ALLERGY

- Example: anaphylaxis, airway compromise, etc.
- CONSULT ALLERGY for evaluation and possible skin testing

For CAP: Replace Ceftriaxone or Ampicillin-Sulbactam with Moxifloxacin 400mg PO/IV q24h

PNEUMONIA

A. Community-acquired pneumonia [non-aspiration risk] (*S. pneumoniae, atypicals*)

Diagnosis: Send sputum gram stain & culture, CXR, urinary pneumococcal antigen and blood cultures.

- Ceftriaxone 1 gm IV q24h **PLUS**
- Azithromycin 500 mg PO/IV q24h x 5 days
- If previous MRSA colonization or infection, **CONSIDER ADDING:** Vancomycin**

Typical Duration: 7 days

B. CAP with cavitary lesion(s) (*Oral anaerobes and MRSA*)

- Ampicillin/Sulbactam 3 gm IV q6h **PLUS**
- Azithromycin 500 mg PO/IV q24h **PLUS**
- Vancomycin**

Typical Duration: 10-21 days

CF or Lung transplant patients: Call Pulmonary Transplant and Transplant Infectious Diseases Consult.

Empiric Abx: *HCAP*

Pearls:

F. For all Pneumonia pts:

⇒ **Anaerobic coverage such as Piperacillin-tazobactam is NOT recommended for HAP or VAP.**

⇒ **During flu seasons, send Flu testing and then give oseltamivir 75mg - 150mg PO/NGT q12.**

⇒ **Yeast in the sputum rarely represents true infection.**

Pitfall:

SIGNIFICANT PENICILLIN ALLERGY

- Example: anaphylaxis, airway compromise, etc.
- CONSULT ALLERGY for evaluation and possible skin testing

- Replace Meropenem, Ceftazidime, Cefepime, or Piperacillin-Tazobactam with Ciprofloxacin 400mg IV q8h +/- Aztreonam 2gm IV q8h

PNEUMONIA

C. Healthcare associated pneumonia [i.e. from skilled nursing facility, etc]

- Cefepime 2g IV q8h +/- Vancomycin** if h/o MRSA infection/colonization

Typical Duration: 7 days

D. <u>UWMC only</u>: Ventilator-associated Pneumonia (VAP) regardless of hospitalization day

- Treat as **Healthcare associated pneumonia (section C)**

E. <u>HMC only</u>:

- **Early onset VAP (i.e. <u><</u> 4 days of hospitalization or ventilation) or aspiration:** Ceftriaxone 1g IV q24h **<u>OR</u>** Ampicillin-sulbactam 3g IV q6h

Typical Duration: 7 days

- **Late-onset [> 4 days inpatient],** treat as **Healthcare associated pneumonia (section C)**

Empiric Abx: *UTI*

URINARY

A. Community Acquired Pyelonephritis (Enteric Gram-negative rods)

Diagnosis: Clean catch midstream U/A with reflexive gram stain and culture (UACRC). Neutropenic and transplant patients may not mount WBC response; appropriate to cover these patients empirically even without positive U/A if presentation suggests pyelonephritis.

- Ceftriaxone 1 gm IV q24h
- If patient hemodynamically unstable or history MDRO, **CHANGE TO:** Ertapenem 1g q24h

Typical Duration: 14 days

Pitfall:

SIGNIFICANT PENICILLIN ALLERGY

- Example: anaphylaxis, airway compromise, etc.
- CONSULT ALLERGY for evaluation and possible skin testing

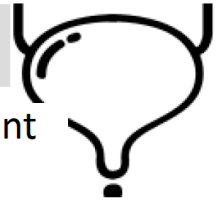
- Replace Meropenem, Ceftazidime, Cefepime, or Piperacillin-Tazobactam with Ciprofloxacin 400mg IV q8h +/- Aztreonam 2gm IV q8h

Empiric Abx: *UTI*

Pearls:

- ABU≠CAUTI
- Bladder Bundle!

URINARY



B. Catheter-associated UTI or Hospital- acquired:(Resistant Gram-negative rods)

Diagnosis: In symptomatic pts, obtain specimen from new foley, or from sterilized port on existing foley, not from collection bag or urimeter. Send U/A with reflexive gram stain and culture (UACRC). WBCs and Bacteria on direct stain suggests infection, but colonization also very common.

- Ceftazidime 2g IV q8h
- If GPC seen on gram stain, add: Vancomycin**
- De-escalate or discontinue coverage if alternate source found for patient symptoms.

Typical Duration: 7-14 days

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Empiric Abx: *Belly*

Pearls:

- No double-anaerobic coverage
- Short course post-appy

INTRA-ABDOMINAL

A. Community-acquired, mild-moderate
(Enteric Gram-negative rods, anaerobes)

- **HMC only:** Ertapenem 1g IV q24h
- **UWMC only:** Ceftriaxone 2g IV q24h **PLUS** Metronidazole 500mg PO/IV q8h
- For uncomplicated ***biliary*** infections, anaerobic coverage usually not necessary, use Ceftriaxone alone

Typical Duration: 4 days following source control

B. Hospital-acquired, severe physiological disturbance, advanced age, immunocompromised

- Vancomycin** **PLUS**
- Piperacillin-tazobactam 4.5gm X 1, then 4 hours later, start 3.375gm IV q8h infused over 4 hours

Typical Duration: 4-7 days from source control; if source control is not attained, then duration is variable.

C. Intra-abdominal infections:

⇒ **Double anaerobic coverage is not required (i.e. metronidazole + piperacillin/tazobactam)**

⇒ **Abdominal Transplant patients: Same as above and consult Transplant Infectious Diseases**

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Empiric Abx: *Skin*

Pearls:

- Cellulitis = *Strep* (beta lactam)
- Pus = *S.aureus* (I&D)

CELLULITIS

Not-applicable to device-related infections (eg ICD, pacemakers, VADs, etc): Consult Infectious Diseases

A. Non-purulent skin/soft tissue infection:
(Streptococcus species)

- Cefazolin 2g IV q8h
- PO option for Strep/MSSA: Cephalexin 500mg QID

B. Purulent/abscess forming skin/soft tissue infection:
(*S.aureus:* MSSA or MRSA)
Diagnosis: I&D abscess; send pus (not wound swab) for gram stain and culture.

- *Usually abx are unnecessary unless significant surrounding cellulitis or pt clinically unstable*
- Vancomycin**
- De-escalate when culture data available
- PO options for MRSA: Bactrim or Doxycycline (Consult ID)

Typical Duration: 5-7 days; Consult Infectious Diseases for PO step-down options

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Empiric Abx: *CNS*

Pearls:

- A true emergency
- Do not delay abx for LP or CT

MENINGITIS

(*S.pneumoniae, N.meningitidis and H.influenzae* Consider Listeria and HSV in patients age > 50, immuno-compromised or alcoholic.)

Diagnosis: Order antibiotics immediately; Do not wait for results of LP to initiate antimicrobials. LP for opening pressure, gram stain, culture, HSV PCR, cell count, glucose, and protein. Add cryptococcal antigen for HIV patients.

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- Vancomycin**
- **ADD** Ampicillin 2g IV q4 hours for Listeria coverage
- **ADD** Acyclovir 10mg/kg IV q8h for HSV coverage when appropriate

Typical duration: 7-21 days depending on organism

Post-surgical meningitis: *(S.epidermidis, S.aureus, P.acnes,* gram-negative rods *(including P.aeruginosa)*

- Cefepime 2g IV q8h **PLUS**
- Metronidazole 500mg IV q8h **PLUS**
- Vancomycin**

Duration: variable