



**Jefferson**

Philadelphia University +  
Thomas Jefferson University

# CDU Curriculum: Cellulitis

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# Objectives

- **Define cellulitis**
- **Define how to identify**
- **Define when to hospitalize**
- **Explain role of CDU**
- **Touch on special Types**

# Cellulitis Defined

- **Skin Infection as a result of bacteria breaching the skin barrier replicating in the tissue**
- **Presents with Pain Erythema Edema**

# Diagnosis

- **Based on clinical presentation**
- **Biopsy not generally useful**
- **If suspect more systemic infection blood cultures**
- **Inspect for source of skin barrier breakdowns IE spider bite**
- **X-ray is suspect underlying foreign body or osteomyelitis**
- **Ultrasound for abscess “cobblestoning”**



# Pathology

- **Bacterial Pathogens**
- **Most commonly Staph and Strep Including MRSA**
- **Much less likely gram negative pathogens**
- **Determined by risk factors**



# MICROBIOLOGY

<b>SSTI Type</b>	<b>Common organisms</b>
<b>Non-purulent</b>	<ul style="list-style-type: none"><li>• <i>Streptococcus pyogenes</i> (Group A strep) - most common</li><li>• <i>Streptococcus agalactiae</i> (Group B strep or GBS)</li><li>• Other beta-hemolytic Streptococci (Groups C, G)</li><li>• <i>Staphylococcus aureus</i> (mostly MSSA)</li></ul>
<b>Purulent</b>	<ul style="list-style-type: none"><li>• <i>Staphylococcus aureus</i> (MSSA/MRSA) – most common</li><li>• Beta-hemolytic Streptococci</li></ul>
<b>Complicated SSTI and Necrotizing fasciitis</b>	<ul style="list-style-type: none"><li>• <i>Streptococcus pyogenes</i></li><li>• <i>Staphylococcus aureus</i></li><li>• Gram negative rods</li><li>• Clostridium species</li><li>• May be polymicrobial including mixed aerobic and anaerobic flora</li></ul>

# Treatment Recommendations

- Tailor antibiotics by regional antibiogram and symptoms
- MRSA coverage if
  - Purulent drainage
  - Penetrating trauma
  - Known MRSA colonization
  - IV drug use
  - SIRS/Sepsis
- Usually 5-day treatment duration

Gram (-)	# of patients	Aminoglycosides			B-Lactams			Cephalosporins			Quinolones		Others	
		Amikacin	Gentamicin	Tobramycin	Ampicillin	Imipenem	Piperacillin/Tazobactam	Ceftriaxone	Cefoxitin	Cefazolin	Cefazidime	Ciprofloxacin	Nitrofurantoin	TMP/SMX
<i>Echerichia coli</i>	4	100	100	100	100	100	100				100	75		
<i>Klebsiella sp</i>	13	100	84.6	92.3	38.5	100	92.3	84.6	100	100	100	38.5	92.3	38.5
<i>Proteus sp</i>	7	71.4	57.1	71.4		85.7	85.7				57.1	57.1		71.4
<i>Pseudomonas aeruginosa</i>	13	100	83.3	92.3	91.7		100			81.8	100	100	30.8	69.2

Gram (-)	# of patients	Penicillins			Cephalosporins		Quinolones		Others							
		Penicillin	Ampicillin	Oxacillin	Nafcillin	Cephalexin	Ceftriaxone	Ciprofloxacin	Moxifloxacin	Gentamicin	Linezolid	Rifampin	Tetracycline	TMP/SMX	Vancomycin	Nitrofurantoin
<i>Staph aureus (all)</i>	8	0		0	0			0	0	87.5	100	100	100	100	100	100
Methicillin Resistant (MRSA)	8	0		0	0				0	87.5	100	100	100	100	100	100
Methicillin Susceptible (MRSA)	0															
<i>Enterococcus sp</i>	4	100	100					50		75				25		100

## SSTI SEVERITY CLASSIFICATION

<b>Classification</b>	<b>Definition</b>
<b>Mild</b>	Local symptoms only without signs of systemic infection
<b>Moderate</b>	<ul style="list-style-type: none"><li>• Local symptoms with signs of systemic infection or SIRS (temperature &gt; 100.4 F, HR &gt; 90 bpm, RR &gt; 20 breaths/min, WBC &gt; 12,000 cells/mm<sup>3</sup>)</li><li>• Rapid progression of erythema without signs of systemic toxicity</li><li>• Local symptoms in close proximity to indwelling device or prosthetic</li><li>• Clinical worsening despite appropriate oral antibiotic treatment ≥ 48 hours</li></ul>
<b>Severe</b>	<ul style="list-style-type: none"><li>• Patients with suspected / confirmed necrotizing fasciitis</li><li>• Rapid progression of erythema with signs of systemic toxicity</li><li>• Patients who have clinical worsening despite initial appropriate IV therapy / clinical worsening ≥ 48 hours</li><li>• Severely immunocompromised patients (hematologic cancer with neutropenia, hematopoietic stem cell transplantation, solid-organ transplant &lt; 3 months)</li><li>• Patients with severe sepsis (refer to Sepsis Guidelines)</li></ul>



# Treatment Recommendations

## • Reasons to inpatient admit

- **OR debridement/washout**
- **Sepsis**
- **Significant involvement of face or genitalia**
- **Significant comorbidity requiring treatment**

<b>Purulent Cellulitis</b>	<i>Mild</i>	<p><b>Mild infections with complete I&amp;D may not require antibiotics (see above)</b></p> <p>Sulfamethoxazole/trimethoprim 1-2 DS tab po Q12h  <b>OR</b> doxycycline 100 mg po Q12h</p>	5 days
	<i>Moderate</i>	Vancomycin IV <sup>®</sup>	5 – 7 days (may consider extending treatment if infection has not improved)
	<p><i>Severe- refer to table above if any concern for necrotizing fasciitis.<sup>5</sup></i></p>	<p>Vancomycin IV<sup>®</sup> + piperacillin/tazobactam 3.375 g IV q8h</p> <p><b>OR</b></p> <p>Vancomycin IV<sup>®</sup> + cefepime 2 g IV q8h + metronidazole 500 mg IV q8h</p> <p><i>Non-IgE mediated beta-lactam allergy<sup>6</sup>:</i></p> <p>Vancomycin IV<sup>®</sup> + cefepime 2 g IV q8h + metronidazole 500 mg IV q8h</p> <p><i>Severe beta-lactam allergy:</i></p> <p>Vancomycin IV<sup>®</sup> + aztreonam 2 g IV q8h + metronidazole 500 mg IV q8h</p>	7 – 14 days based on clinical response

# Role of CDU

## Inclusion Criteria

- **Probability of D/C within 24 Hours >80%**

## Exclusion Criteria

- **Meets Inpatient criteria**
- **Suspect Necrotizing fasciitis**
- **SIRS/Sepsis**

# Cellulitis in CDU

- Review of ED lab work and imaging
- ABX
- Analgesia
- Mark areas of involvement
- Elevate area of involvement
- D/C planing and care coordination
- Don't forget to treat withdrawal



## CDU Pathway to Home vs Admit

- **Home if**
  - **Stable course**
  - **Clinical improvement**
  - **Tolerating meds**
  - **Follow up arranged**
- **Admit if**
  - **Requires IV antibiotic > 24 hours**
  - **Developing SIRS/Sepsis**
  - **Hemodynamic instability**

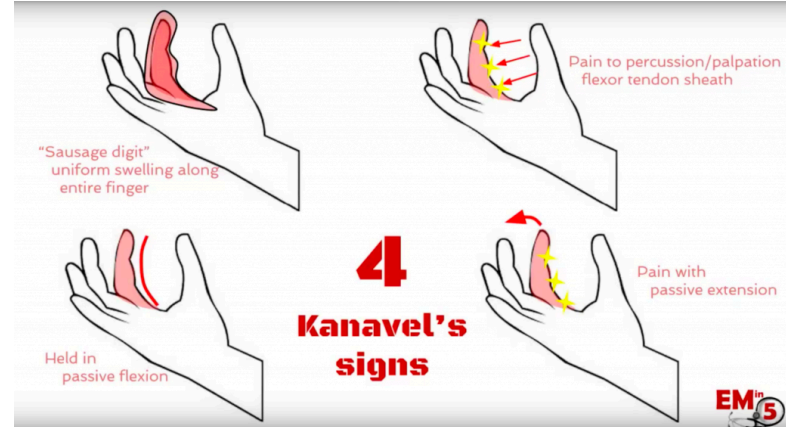
# Special types of cellulitis-Orbital

- **Cellulitis of the periorbital soft tissues and evidence of eye dysfunction from pressure ie proptosis double vision painful EOM ECT**
- **Evaluation included CT orbit W contrast**
- **Ocular emergency**
- **Analogous to compartment syndrome**
- **IV ABX and optho consult**



# Special types of cellulitis- Hand

- If involving flexor surface raise level of concern
- Hand surgery consult
- Is a “compartment syndrome” of the flexor tendons within their sheath





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