# **Patient Case Presentation:** Skin Abscess Infection from Previous Antibiotic Use

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# H&P: Hospital Admission Day 1 (8/6/2023)

**CC:** Right hand swelling and pain x 3 days (abscess)

**HPI:** Patient MR is a 19-year-old male who presents to the ED on 8/6/2023 with CC of right-hand swelling, pain, warmth and redness for the past 3 days. Patient had a previous 10-day course of doxycycline 100 mg twice daily for a wound infection back in 6/8/2023.

**PMH:** Not on file
**PTA Meds:** None
**Surgical Hx**: Not on file
**Family Hx:** Not on file
**Social Hx:** Not on file
**Allergies:** NKA

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## Review of Systems:

Pt denies any trauma or animal bite prior to onset of symptoms. Says the symptoms have been gradually progressing over past 3 days. Denies fevers but c/o possible chills. Denies glandular swelling. C/o possible paresthesia but says they have spread to entire body now. C/o some possible weakness in hand. No discharge noted until ED procedure after which pus was noted to extrude from site of incision.

## Physical Exam:

General: He is not in acute distress, well-developed and is not ill-appearing.
HEENT: Head is normocephalic and atraumatic; no oropharyngeal exudate; Conjunctivae normal and pupils are equal, round, and reactive to light; No tracheal deviation.
CVS: Normal heart rate and regular rhythm, normal heart sounds, no murmur heard.
Pulm: Pulmonary effort is normal, no respiratory distress, normal breath sounds, and no wheezing.
Musculoskeletal: **Swelling**, **tenderness** and **signs of injury** present. No deformity. Normal range of motion.
Neuro: Alert and oriented to person, place, and time; Coordination normal.
Psychiatric: Behavior and thought content normal.

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## Vital Signs:

Temp: 37 °C (98.6 °F) (Oral)

Resp: 17

SpO2: 100%

Weight: 51.1 kg

Height: 172.7 cm

## CMP:

| | | |
|---|---|---|
| Sodium: | 141 | 136 - 145 mmol/L |
| Potassium: | 3.6 | 3.5 - 5.1 mmol/L |
| Chloride: | 103 | 98 - 107 mmol/L |
| CO2 Total: | 26 | 22 - 29 mmol/L |
| **Glucose Bld:** | **115 (H)** | **74 - 109 mg/dL** |
| **Creatinine:** | **0.62 (L)** | **0.67 - 1.17 mg/dL** |
| BUN: | 10 | 6 - 20 mg/dL |
| Calcium: | 9.7 | 8.6 - 10.0 mg/dL |
| Total Protein: | 7.8 | 6.4 - 8.3 g/dL |
| Albumin: | 4.9 | 3.5 - 5.2 g/dL |
| Bilirubin Total: | 0.76 | <=1.20 mg/dL |
| Alk Phos: | 92 | 40 - 129 U/L |
| AST: | 27 | <=50 U/L |
| ALT: | 23 | <=50 U/L |
| Anion Gap: | 11 | 2 - 11 |

## CBC:

| | | |
|---|---|---|
| WBC: | 9.5 | 4.8 - 10.8 K/mcL |
| RBC: | 5.22 | 4.70 - 6.10 M/mcL |
| Hemoglobin: | 14.0 | 14.0 - 18.0 g/dL |
| **Hematocrit:** | **41.7 (L)** | **42.0 - 52.0 %** |
| **MCV:** | **79.9 (L)** | **80.0 - 94.0 fL** |
| **MCH:** | **26.8 (L)** | **27.0 - 31.0 pg** |
| MCHC: | 33.6 | 33.0 - 37.0 g/dL |
| Platelets: | 203 | 130 - 400 K/mcL |
| MPV: | 9.9 | 9.0 - 12.0 fL |
| RDW: | 12.8 | 12.0 - 16.0 % |

# Day 1 Course (8/6/2023)

## IV Antibiotics

Vancomycin 750 mg Q8H
Dose by Trough Regimen
Goal Trough: 15-20 for SSTI with Gram (+) and MRSA coverage

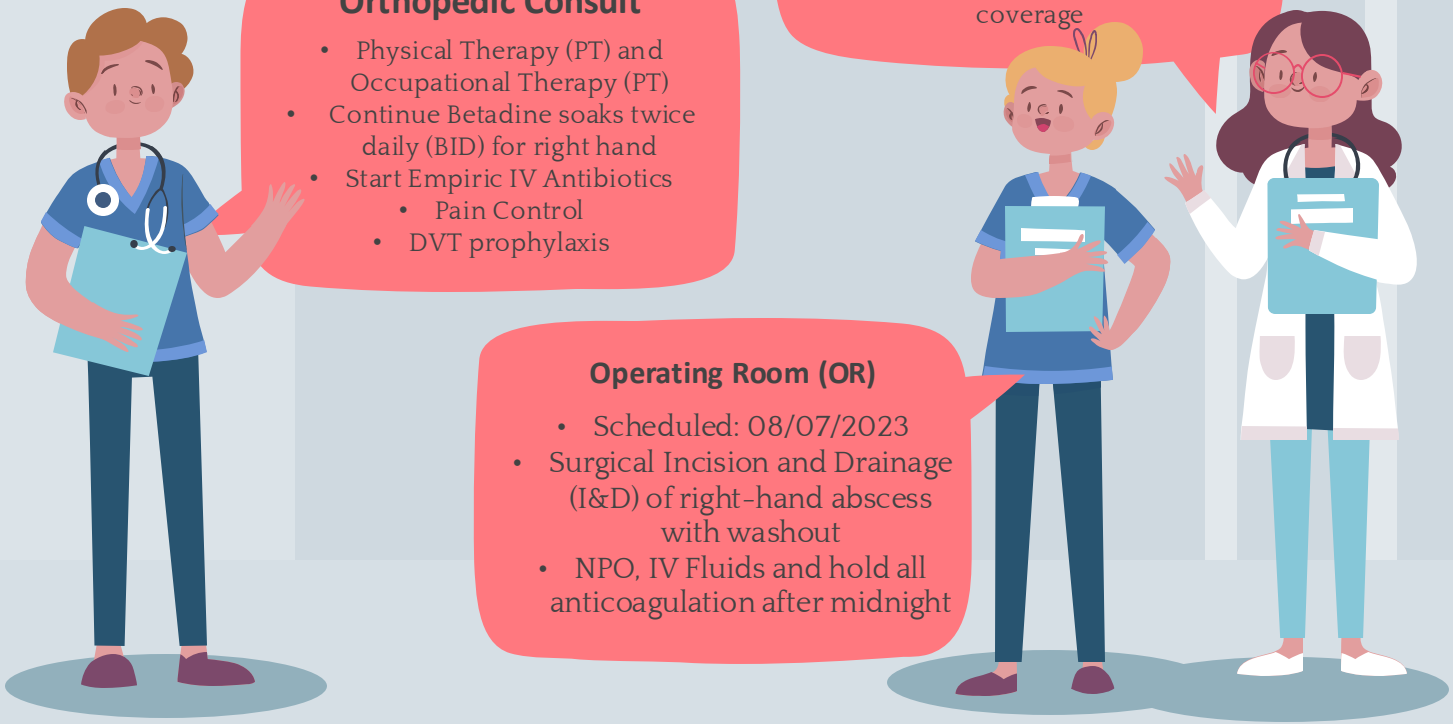
Ceftriaxone 2 g Q24H with Gram (-) coverage

## Orthopedic Consult

- Physical Therapy (PT) and Occupational Therapy (PT)
- Continue Betadine soaks twice daily (BID) for right hand
- Start Empiric IV Antibiotics
- Pain Control
- DVT prophylaxis

## Operating Room (OR)

- Scheduled: 08/07/2023
- Surgical Incision and Drainage (I&D) of right-hand abscess with washout
- NPO, IV Fluids and hold all anticoagulation after midnight



## Infection and Cellulitis

### Infection

Pathologic organisms that damage host tissue and elicit an immune response.

### Cellulitis

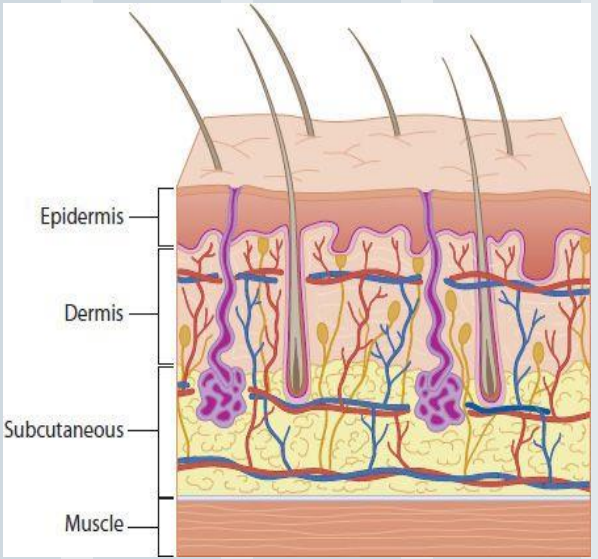
Acute infection that affects the dermis and epidermis of the skin which may be non-purulent or purulent.

## Pathophysiology

- The skin serves as a **barrier** between humans and their environment functioning as a primary defense against infection
- Epidermis = Outermost layer
- Dermis = Layer under the epidermis that consists of connective tissue, blood vessels, lymphatics, nerve endings, sweat, sebaceous glands, hair follicles and smooth muscle fibers

- **Cellulitis = An infection that affects the dermis and epidermis**

Non-Purulent → Streptococcus pyogenes, Staphylococcus Aureus
**Purulent (Abscess) → Methicillin-Resistant Staphylococcus Aureus**



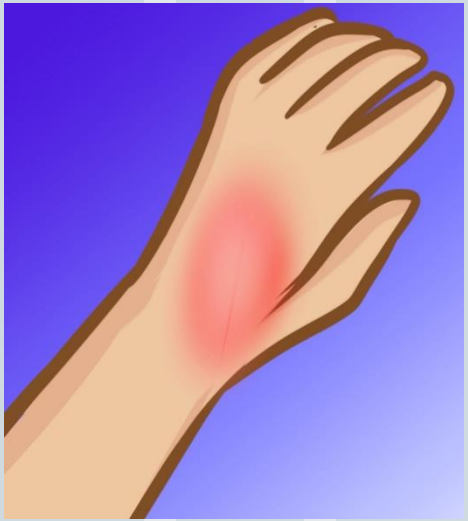
## Pathophysiology

- **Three host defenses under normal conditions:**
    1. Skin surface needs to be dry with pH of ~5.6
    2. Continuous renewal of epidermal layer
    3. Sebaceous secretions hydrolyzed to form free fatty acids

- **How does bacteria enter the host via skin?**
    1. High concentration of bacteria
    2. Excessive moisture on skin
    3. Inadequate blood supply
    4. Availability of bacterial nutrients
    5. Damage to the epidermis

# Clinical Presentation and Goals of Therapy

**Clinical Presentation:**
Pain, feeling hot at infection site, erythema, edema
**MR had mild cellulitis since there were no systemic signs of infection**



**Goals of Therapy:**
1. Resolution of infection signs and symptoms for the appropriate duration.
2. Source control via I&D.
3. Covering identified bacteria while protecting normal flora and not covering unnecessary bacteria via narrow spectrum antibiotics.
4. Prevention of infection recurrence.

# Recommendations per Sanford Guide to Antimicrobial Therapy

**Inpatient**:

**I&D**, receive wound culture
**Empiric Therapy:**
**Vancomycin 15-20 mg/kg IV q8-12h**

Definitive Therapy
**MRSA → Vancomycin**
MSSA → Nafcillin, Oxacillin and Cefazolin

**Outpatient**:

Low MRSA Prevalence:
Dicloxacillin 500 mg PO TID-QID
Cephalexin 500 mg PO TID-QID

**Moderate/High MRSA Prevalence:**
Bactrim 160/800 PO BID
**Clindamycin 300-450 mg PO TID**

Antibiotic Stewardship: **Recent studies indicate that shorter course of therapy (5-7 days) are as effective as a 10-14 day course!**

# Day 2 (8/7/2023)

## Post-Op

- MR tolerated procedure well
- Infection still present at time of I&D per surgeon
- Resume betadine soaks, follow-up on cultures, PT/OT, resume DVT prophylaxis

## Antibiotic Adjustments

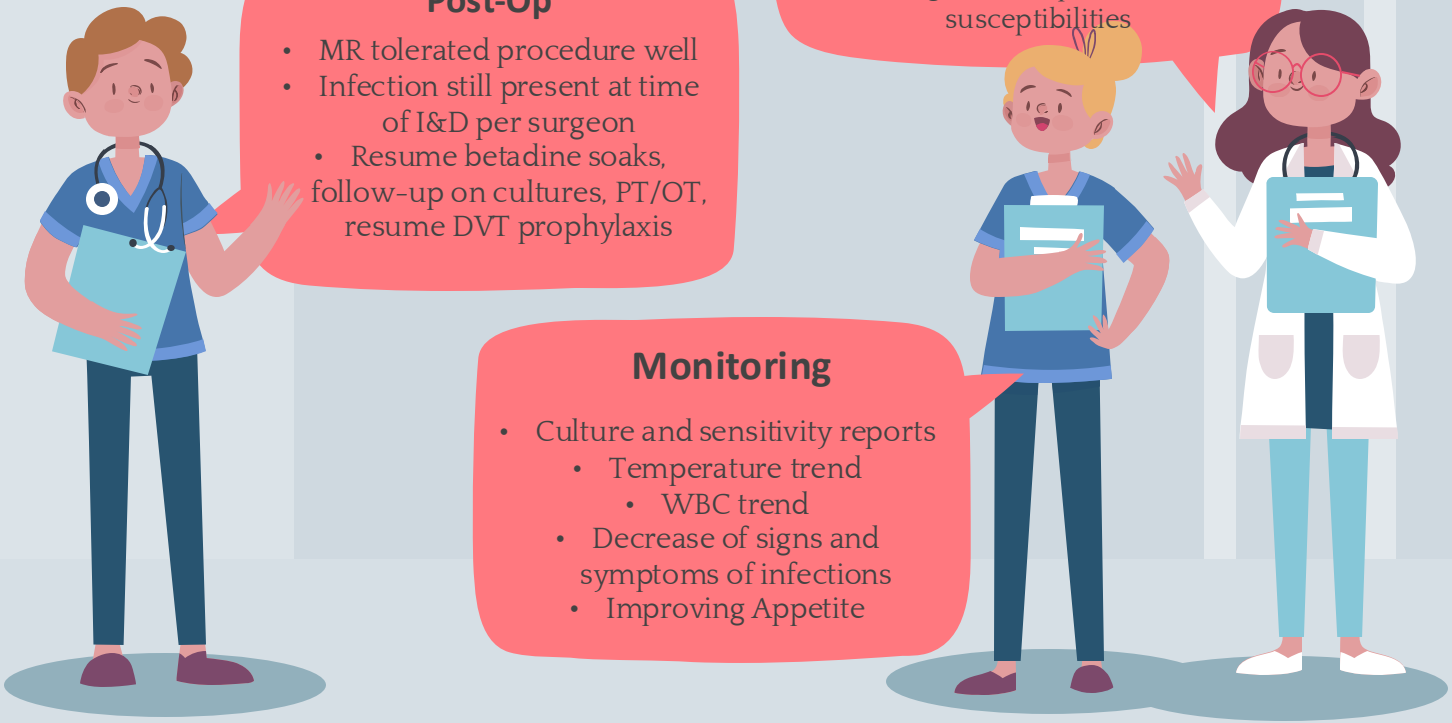
Discontinue vancomycin and ceftriaxone per ID consult

Start Linezolid 500 mg BID

Pending follow-up cultures and susceptibilities

## Monitoring

- Culture and sensitivity reports
- Temperature trend
- WBC trend
- Decrease of signs and symptoms of infections
- Improving Appetite



# Day 2 – Wound Culture

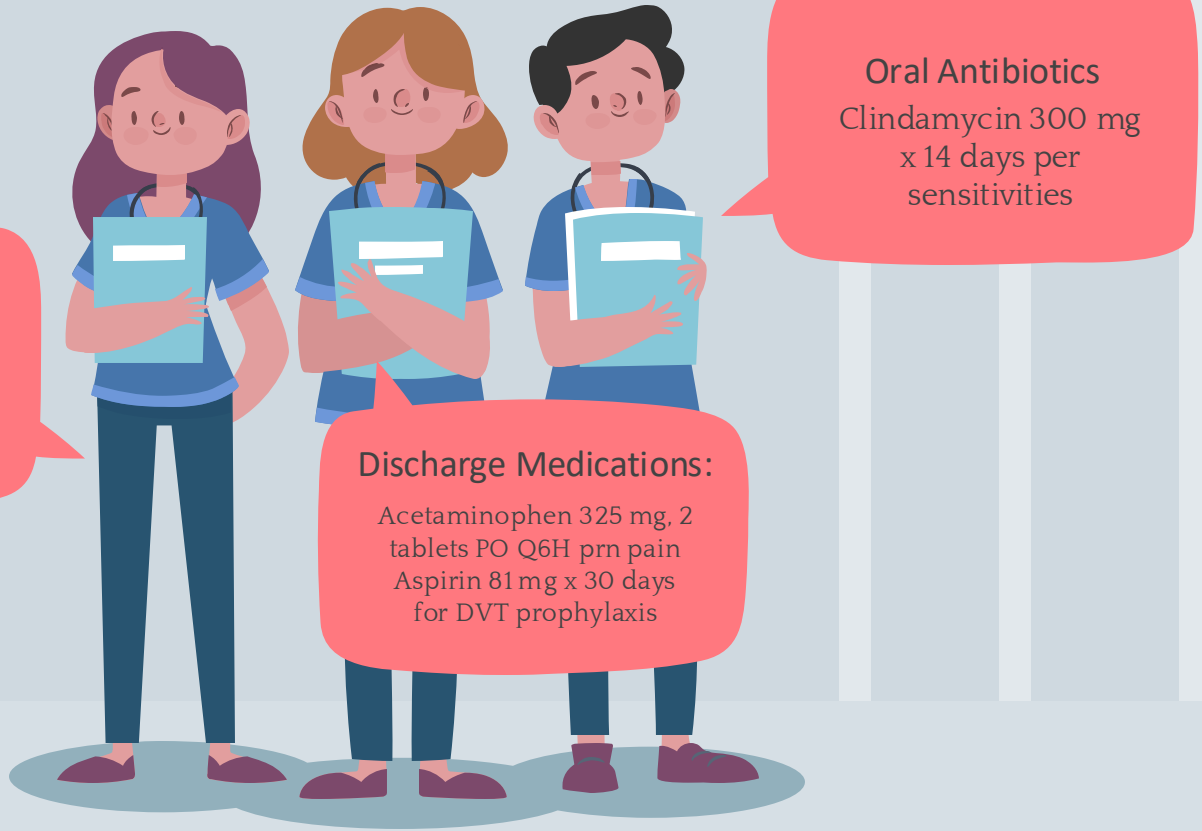
Wound culture is growing **MRSA**

Aerobic Culture (8/6) – Resulted 8/8

**Risk Factors of MRSA:**
**Hospitalization < 12 months**
**Antibiotic use < 6 months**

Sensitivities will determine what oral antibiotic patient will go home with...

# Day 3 (8/8/2023) DISCHARGE!



Per MD's note, patient's pain improved after I&D

Oral Antibiotics

Clindamycin 300 mg x 14 days per sensitivities

Discharge Medications:

Acetaminophen 325 mg, 2 tablets PO Q6H prn pain
Aspirin 81 mg x 30 days for DVT prophylaxis

| | Staphylococcus aureus<br>MINIMUM INHIBITORY CONCENTRATION 2 |
|---|---|
| Ampicillin | **Resistant** |
| Cefazolin | **Resistant** |
| Ceftaroline | **Sensitive** |
| Ciprofloxacin | **Sensitive** |
| Clindamycin | **Sensitive** |
| Daptomycin | **Sensitive** |
| Erythromycin | **Sensitive** |
| Gentamicin | **Sensitive** |
| Levofloxacin | **Sensitive** |
| Linezolid | **Sensitive** |
| Oxacillin | **Resistant** |
| Rifampin | **Sensitive** |
| Tetracycline | **Sensitive** |
| Trimethoprim/Sulfamethoxazole | **Sensitive** |
| Vancomycin | **Sensitive** |

# References

Gilbert DN, Chambers HF, Saag MS, et al. *The Sanford Guide to Antimicrobial Therapy.* 53rd edition. Antimicrobial Therapy, Inc.; 2023.

Stevens DL, Bisno AL, Chambers HF, et al. Practice guidelines for the diagnosis and management of skin and soft tissue infections: 2014 update by the Infectious Diseases Society of America [published correction appears in Clin Infect Dis. 2015 May 1;60(9):1448. Dosage error in article text]. *Clin Infect Dis*. 2014;59(2):e10-e52. doi:10.1093/cid/ciu444

In: DiPiro JT, Yee GC, Posey L, Haines ST, Nolin TD, Ellingrod V. eds. *Pharmacotherapy: A Pathophysiologic Approach, 11e*. McGraw Hill; 2020. Available at: https://accesspharmacy-mhmedical-com.proxy-ln.researchport.umd.edu/content.aspx?bookid=2577&sectionid=248126979. Accessed August 15, 2023.

# Questions?