UC Davis Health Antimicrobial Stewardship Program

Taenia solium (pork) tapeworms are 2-8 m in length, produce an average of 1,000 proglottids/worm, and may produce 50,000 eggs per worm. Cysticercosis is a parasitic tissue infection caused by larval cysts of the tapeworm *T. solium*. These larval cysts infect brain, muscle, or other tissue, and are a major cause of adult onset seizures in most low-income countries.

https://www.nikonsmallworld.com/galleries/2017-photomicrography-competition/taenia-solium-everted-scolex

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The UC Davis Antimicrobial Stewardship Program (ASP) was first established in 1986 and then expanded in pediatrics in 2011 and hospital wide in 2013 in response to the growing challenge of antibiotic resistance. Due to increasing antibiotic resistance, patients are at a higher risk for adverse effects and poor outcomes and treatment strategies become more complex.

Antibiotics are life-saving drugs and their use has important implications for patient care and public health. With this in mind, the UC Davis Health ASP strives to ensure all patients receive optimal antibiotic therapy when indicated. We thank you for your support in putting this very important program into action.

In This Issue

Cellulitis

Diagnosis

- Relatively sudden onset of redness, warmth, tenderness, and swelling of the skin
    - **Nonpurulent**: no evidence of abscess/phlegmon; most cases caused by β-hemolytic streptococci (usually group A strep but also B, C, G) that are susceptible to penicillin; ~10% of cases caused by methicillin-susceptible *Staphylococcus aureus* (MSSA)
    - **Purulent:** evidence of abscess/phlegmon; caused by *S. aureus*, often methicillin-resistant (MRSA)
- Almost always unilateral
- Fever in 22-71%; elevated white blood cell count in 35-50%

- Usually associated with skin surface disruption due to recent trauma, tinea pedis, cutaneous ulcer, past saphenous venectomy, or impaired venous or lymphatic drainage
- Blood cultures are low yield; consider for patients with severe illness or immunocompromise
- Obtain wound culture if purulence is present
- Obtain ultrasound if concern for abscess/phlegmon and physical exam is equivocal

Note: Several noninfectious conditions can mimic cellulitis including venous stasis dermatitis which is often bilateral, associated with skin hyperpigmentation, pitting edema, serous drainage, itchiness; minimal pain and absence of fever

Treatment

Elevate the affected extremity and treat underlying predisposing conditions.

- **Nonpurulent cellulitis**
  - Cover β-hemolytic strep and MSSA; MRSA coverage is not routinely indicated
- **Purulent cellulitis**
  - Cover *S. aureus*, including MRSA
  - Skin abscess with minimal cellulitis: antibiotics are of modest benefit for patients with drained abscesses; antibiotics are recommended for patients with associated systemic illness, diabetes, severe immunocompromise, extremes of age, or location of abscess in an area where drainage is difficult
- **Transition to oral therapy** when patient has clincial improvement; erythema may initially persist or extend despite appropriate therapy but overall improvement (e.g., reduction of erythema and local inflammation and resolution of fevers) generally occurs by day 3
- **Duration:** 5-7 days if clincial response by day 3

Note: Patients who are critically ill, neutropenic, severely immunocompromised or with suspected necrotizing fasciitis should receive empiric broad-spectrum antibiotics. Patients with aquatic injuries, bites, and cellulitis associated with long-standing diabetic foot ulcers may also require alternative antibiotics. Discuss these cases with the antibiotic stewardship program and/or infectious diseases consultant.

University of California Davis Health
EMPIRIC ANTIBIOTIC GUIDELINES FOR ED PATIENTS: ADULTS

Pre-approval of restricted antibiotics not required for initial "one time" dose in the ED **provided drug and indication are listed** in this table.

CONDITION	ADMIT OR DIS - CHARGE	CULTURE NEEDED?	1ST CHOICE	ALTERNATIVES (intolerant to 1st choice)
Cellulitis Mild	Discharge	No	Dicloxacillin 500 mg PO Q6H or Cephalexin 500 mg PO Q6H	Clindamycin 300 mg PO Q6H
Moderate Consider Dalbavancin Pathway for patients ≥12 years of age as an alternative to hospitalization	Admit	No	Cefazolin 1-2g IV /Cephalexin 500mg PO Q6H	1. Clindamycin 900 mg IV / 300mg PO Q6H *or* 2. Nafcillin 2 gms IV/ Dicloxacillin 500mg PO Q6h
Severe (includes diabetic foot)	Admit	Yes Blood Culture	Ceftriaxone 2g *and* vancomycin IV	Rule out necrotizing process – emergency surgical debridement. Consult General Surgery
Necrotizing soft tissue infection	Admit Call Surgery	Yes	Clindamycin 900 mg IV *and* piperacillin/tazobactam IV *and* Vanco IV	(Pen allergic pts) Clindamycin 900 mg IV *and* Gentamicin 5mg/kg *and* Vancomycin 1 gm IV
Abscess – Skin Mild < 5 cm	Discharge	No	I & D	I & D
Moderate > 5 cm Consider Dalbavancin Pathway for patients ≥12 years of age as an alternative to hospitalization	Discharge	Yes Send syringe	TMP-SMX (Bactrim-Septra) DS BID 5 – 7 days	Doxycycline 100 mg PO BID x 5 – 7 days
Severe	Admit	Yes Send syringe	Vancomycin 15-20mg/kg/dose IV Q8-12H, not to exceed 2g/dose	Clindamycin 900 mg IV *or* Daptomycin 4mg/kg IV (Requires ID approval) Linezolid 600mg IV BID (Requires ID approval)

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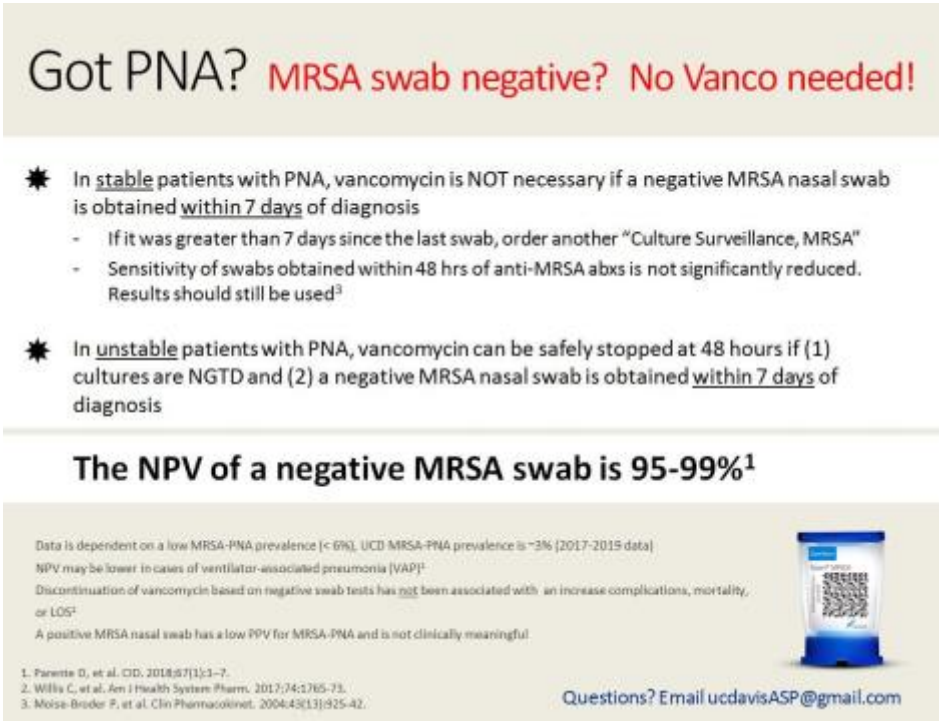
To vanco or not to vanco? That is the question!



Test Your Knowledge

Would you like to win a $10 gift certificate to the sunshine café? Complete the following post-newsletter quiz and submit to ucdavisASP@gmail.com to be entered into a raffle for a free lunch. Congratulations to Amy Crandall for winning last month's raffle!

A 50 year old man with morbid obesity (125 kg) and no known drug allergies presents with left lower extremity swelling. States he noticed a blister on the top of his foot earlier in the week and popped it with a non-sterile needle. Within the next few days he noticed redness at the site of the blister that

spread up his leg, along with swelling and increased pain that is described as "tightness." The patient saw his PCP 2 days ago and was given clindamycin 450mg Q8hrs but the redness continued to worsen and he reported subjective fevers so he presented to the ED. Abscess is ruled out via ultrasound, no purulence is noted at the site of infection and the patient is admitted for IV antibiotics given he failed oral therapy.

1. If this patient has moderate cellulitis, what empiric IV antibiotics should be started at this time?

a. Vancomycin 1g Q12hrs + cefepime 2g Q8hrs

b. Cefazolin 2g Q8hrs

c. Vancomycin 1g Q12hrs

d. Clindamycin 900mg Q8hrs

2. True or False: True cellulitis is almost always unilateral and bilateral cellulitis should raise suspicion for non-infections mimickers of cellulitis including venous stasis dermatitis.

3. A 59 year old male with ESRD on HD (TTS), paroxysmal atrial fibrillation, and chronic alcohol dependence with prior withdrawal symptoms presents to the ER with palpitations, dizziness and tremors. 5 days after admission, during which an initial MRSA nasal swab was collected and resulted as negative, he develops a fever, cough, leukocytosis, and his chest x-ray shows patchy lower lobe infiltrates. Procalcitonin is 0.51 and he is hemodynamically stable but is requiring 2L NC O2 and he has not received any prior antibiotics during this admission. What would be the best course of therapy for the patient?

a. Vancomycin + Ceftriaxone + Azithromycin

b. Vancomycin + Cefepime

c. Cefepime alone

d. Vancomycin + Cefepime + order a repeat "Culture Surveillance, MRSA".

4. What is the average number of people that an individual infected with measles will infect while he or she is contagious, assuming that everyone in the population is susceptible to the disease?

a. 2

b. 4

c. 10

d. Up to 18

Answers to last month's quiz: 1. A, 2. True, 3. C, 4. B

ASP Gold Star Recognition

The following staff have been recognized by the Antimicrobial Stewardship team for their dedication to combatting antimicrobial resistance and commitment to the principles of antimicrobial stewardship:

Gerald Diaz

Robyn Huey

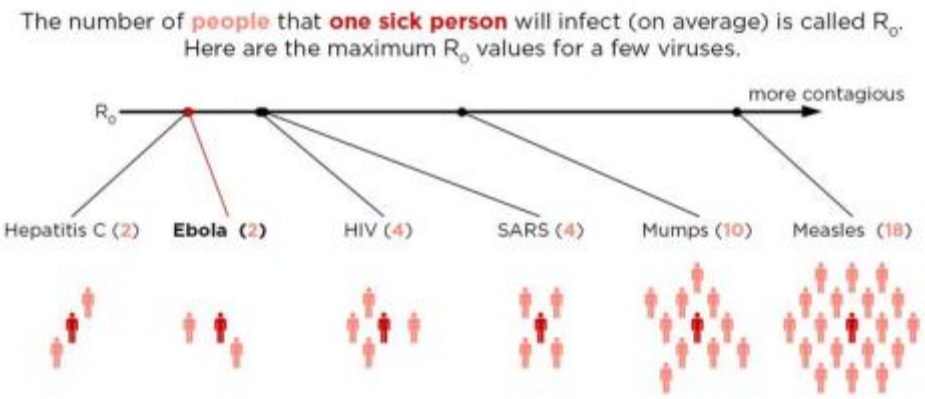
Tom Bullen

Meet the Stewardship Team

After getting bachelor's degrees in both Political Science and Biology at UCLA, Archana Maniar attended medical school at UC Davis where she also completed residency and fellowship. Since joining the faculty after training, she has been involved in all aspects of clinical infectious diseases and was an original member of the Antimicrobial Stewardship Program. She also serves as Chief of Infection Prevention at VA Northern California Health System where her primary interests are outbreak response and contact tracing. In her free time, she takes joy in traveling, reading, dabbling in writing fiction, and finding novel ways to embarrass her children.

Fun Microbe Fact

Think Ebola is scary? R0 (pronounced "r-nought") is defined as the average number of people that an infected individual will infect while he or she is contagious, assuming that everyone in the population is susceptible to the disease. It's a quick and dirty way to describe how likely it is for a disease to spread through a population. The R0 of last year's ebola epidemic was estimated to be between 1.5 and 2.5. For measles, the number is much larger: between 12 and 18.



Contact Us

The Antimicrobial Stewardship Program Team Members

Adult ASP Physicians:

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- Ritu Cheema, MD
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- Nicola Clayton, PharmD
- Matthew Davis, PharmD

Antibiotic questions? Contact us.

See the On-Call Schedule for the ASP attending/fellow of the day

Contact the ASP Pharmacist at 916-703-4099 or Vocera "Infectious Disease Pharmacist"