WHAT'S HAPPENING AT UCSD?
THE LATEST NEWS

In July 2016, UCSD implemented an antibiotic timeout best practice alert, which is in accordance with federal and state antimicrobial stewardship program requirements.

This best practice alert now fires on all IV and oral antibiotics after the order has been active for greater than 48 hours to encourage providers to re-evaluate the appropriateness of antibiotics and de-escalate or discontinue therapy when possible.

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Upcoming Educational Programs

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HEPATITIS A OUTBREAK IN SAN DIEGO COUNTY

JUSTINE ABELLA, PHARMD and FRANCESCA TORRIANI, MD

In the U.S., person-to-person transmission through fecal-oral route is the primary means of Hepatitis A Virus (HAV) transmission. Most infections result from close personal contact with an infected household member or sexual partner, or their fecally contaminated environment. Those at increased risk for HAV infection include: travelers with high or intermediate endemicity of HAV, men who have sex with men, illicit drug users, persons with clotting factor disorders, and persons working with nonhuman primates. Homeless individuals have a higher morbidity and mortality when compared with the general population and an increased risk of infection due to living conditions.

As of July 13th, 2017, there have been 228 cases of HAV infections reported in San Diego County residents, of which 167 (71%) required hospitalization and five (2%) died.1 At UCSD, there were 16 cases of HAV reported during Q1 2017.2

Several epidemiologically linked cases have been identified in Downtown San Diego and El Cajon, but no common source has been identified. No specific common food, beverage, or drug sources have yet to be identified and investigations of these cases are ongoing.

Recommendations for Providers from the County of San Diego Health Advisory

1. Consider HAV infection, especially the homeless and illicit drug users with discrete onset of symptoms, jaundice, or elevated liver function tests and provide HAV vaccine if they are not already immunized.
2. Promptly report all confirmed and suspect HAV cases to the Epidemiology Program. Confidential Morbidity Report (CMRa)
3. Provide post-exposure prophylaxis (PEP) for close contacts of confirmed HAV cases, homeless individuals and illicit drug users who are not already immunized. Hepatitis A Postexposure Prophylaxis Guidance
4. Offer HAV vaccination to individuals who have frequent, ongoing contact with homeless individuals and illicit drug users in non-healthcare environments. Hepatitis A Public Health Investigation Guidance
5. Encourage those who are planning an international trip to check the CDC Travelers’ Health website to obtain recommended vaccinations before travel. CDC Travelers’ Health Website

UCSD Health will follow San Diego County Public Health Advisory and is providing the free Hepatitis A vaccine to high-risk UCSD health care workers in response to this outbreak disproportionately affecting homeless and illicit drug-using individuals in San Diego County.

For more information, click to visit the CAHAN website or the CDC website.

References:
1. 1CAHAN San Diego, County of San Diego Health & Human Services Agency, Epidemiology and Immunization Services Branch
2. UCSD Reportable Disease. ICC Q1 2017 update. Click here for more information
ANTI-INFECTIVE UTILIZATION

The graphs below illustrate the most recent data (January-March 2017) for antibacterial and antifungal utilization at UC San Diego Health.

**Antibacterial DOT/1000 Patient Days**

- Aztreonam HC
- Aztreonam LJR
- Aztreonam both
- Daptomycin HC
- Daptomycin LJR
- Daptomycin both
- Ertapenem HC
- Ertapenem LJR
- Ertapenem both
- Linezolid HC
- Linezolid LJR
- Linezolid both
- Meropenem HC
- Meropenem LJR
- Meropenem both
- Piperacillin HC
- Piperacillin LJR
- Piperacillin both
- Cefepime HC
- Cefepime LJR
- Cefepime both
- Vancomycin HC
- Vancomycin LJR
- Vancomycin both

- Oct to Dec 2015
- Jan to Mar 2016
- April to June 2016
- July to Sept 2016
- Oct to Dec 2016
- Jan to Mar 2017

**Antifungal DOT/1000 Patient Days**

- Amphotericin HC
- Amphotericin LJR
- Amphotericin both
- Micafungin HC
- Micafungin LJR
- Micafungin both
- Posaconazole HC
- Posaconazole LJR
- Posaconazole both
- Voriconazole HC
- Voriconazole LJR
- Voriconazole both

- Oct to Dec 2015
- Jan to Mar 2016
- April to June 2016
- July to Sept 2016
- Oct to Dec 2016
- Jan to Mar 2017

*Methodology for calculating days of treatment changed for Jan to Mar 2017*

DOT = days of therapy
The Verigene® is an automated diagnostic test that performs nucleic acid extraction directly from a whole blood sample. An assay is then used to hybridize the nucleic acids onto a microarray for rapid organism and resistance marker identification.

The Verigene® Gram-Positive Blood Culture Nucleic Acid Test (BC-GP) can identify five gram-positive organisms. Specifically, the test can report the presence of the mecA gene in S. aureus and S. epidermidis, with a sensitivity and specificity of 100%. This is important for the rapid determination of methicillin resistance (mecA detected) or sensitivity (mecA not detected) to aid in appropriate antibiotic selection. Similarly, the test can also identify Enterococcus faecium or Enterococcus faecalis organisms and detect the presence of the vanA or vanB genes which indicate vancomycin resistance. The sensitivity and specificity for detection of vanA is 95.8% and 100%, respectively. Although the assay provides accurate organism and resistance marker identification compared to routine laboratory methods, there may still be discordance with polymicrobial blood cultures in detection of the mecA gene and with coagulase-negative staphylococcus isolates.

In contrast, the Verigene® can also identify nine gram-negative organisms with the Gram-Negative Blood Culture Nucleic Acid Test (BC-GN): Escherichia coli, Shigella spp., Klebsiella pneumoniae, Klebsiella oxytoca, Pseudomonas aeruginosa, Acinetobacter spp., Proteus spp., Citrobacter spp., and Enterobacter spp.. Detectable resistance markers include various carbapenamases (i.e. KPC, NDM, VIM, IMP, and OXA-23, -40, -48, and -58) associated with Carbapenem-Resistant Enterobacteriaceae (CRE) and CTX-M gene which is associated with Extended-Spectrum Beta-Lactamase (ESBL) organisms. The sensitivity and specificity exceeds 97% for all organisms except for K. pneumoniae (86.1%).

Prior to the Verigene®, a microbiological diagnosis could be made within 30 hours and the Verigene® decreases this time to 2.5 hours. The impact on patient outcomes allow for more rapid identification to both effective and optimal antibiotic therapies to promote antimicrobial stewardship. Conversely, providers should be aware that accurate organism identification is limited to blood cultures yielding one organism and interpretation becomes less reliable with mixed cultures.

References:
1. Journal of Clinical Microbiology. July 2013 Volume 51 Number 7 2072-2076
2. Antimicrobial Agents and Chemotherapy. March 2015 Volume 59 Number 3 1588-1595
A LOOK INTO BACTERIOPHAGE THERAPY

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WHAT ARE THEY? Bacteriophages (phages) are ubiquitous, living viruses that reproduce in, and kill, bacteria. The therapeutic potential of phage therapy was first discovered and studied in Europe in the early 20th century, but was quickly abandoned with the introduction of penicillin and other antibiotics. In recent years, the appearance of multidrug-resistant bacteria has caused phage therapy to be reintroduced into Western medicine.

For therapeutic purposes, phages are genetically produced in research laboratories and are specific for one species of bacteria. In clinical practice, when the pathogen is known (i.e. Acinetobacter), the lab will produce a phage "cocktail" to increase the probability that at least one phage will select for the desired bacterial strain.

HOW DO THEY WORK? Phages can be administered orally, systemically, or topically. When a phage encounters a target bacterial cell, it binds to the cell and injects its own DNA. The phage DNA gets incorporated into the host genome and begins replication, ultimately leading to bacteriolysis and release of phages back into systemic circulation. Once the bacterial target is completely eliminated, the phages are naturally cleared. Phages can also disrupt the biofilm of Pseudomonas spp. through production of alginate.

WHEN ARE THEY USED? Phages are not readily available and are not FDA approved. Phage therapy may only be considered for last-line, salvage therapy against extensively resistant pathogens when all other clinical considerations have been evaluated. Providers must submit an investigational drug application to the FDA prior to use, and a protocol must be set up in accordance with IRB standards.

ARE THEY SAFE? In general, phage therapy is well tolerated. However, there is a disparity of phage studies in humans; the interaction with the human immune system and long-term consequences remain unclear. Additionally, since genetic material is exchanged between phages and bacteria, there is the potential for bacterial acquisition of genes that may enhance pathogenicity or resistance.

THE BOTTOM LINE

Phage therapy has many potential advantages compared to conventional antibiotics, including: bactericidal activity against highly-resistant pathogens, rapid laboratory development, specificity against a single bacterial species causing less harm to normal flora, self-replication with exponential growth at the target site (i.e. bacterial cell), and limited toxicity. However, research in the United States is lacking; phage therapy is not FDA approved and is only indicated for compassionate use.

To learn more about a successful case of phage therapy at UCSD, click here!

References
COMMENT FROM THE EDITORS

This is the first edition of the Antimicrobial Stewardship Newsletter, an electronic publication issued by a subgroup of the P&T Antibiotic Utilization Committee (AUC) at UC San Diego Health. The purpose of this newsletter is to disseminate an institution-wide forum for education, internal updates and initiatives, and resources related to infectious diseases, epidemiology and antimicrobial stewardship. We encourage readers to contact us with any questions concerning the content of this newsletter, or with requests for specific topics of interest.

WANT TO LEARN MORE?

There are many opportunities to attend seminars, gain experience, and earn CE credit. Take a look at what’s happening on campus and around San Diego!

IDWeek

San Diego Convention Center October 4-8th, 2017
http://www.idweek.org/
Registration is now open!
Offering CMO, CME, and CPE credits!

HAVE AN IDEA?
CONTACT US!

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Antibiogram (01 2017)

CHECK IT OUT!

UC San Diego Health has many tools and resources available online to assist with optimal management of antimicrobials, including quarterly epidemiology data. All resources are located on PULSE intranet under medication resources.
Click on the links below to find out more!