Antibacterial Resistance and Virulence Determinants in Staphylococcus aureus Obtained from Food Handlers in Kuwait City

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Introduction: Food handlers are important sources of bacteria causing food poisoning. Consequently, it is important to identify and treat carriers to prevent food poisoning. The purpose of this study was to determine the antibacterial susceptibility patterns and the carriage of virulence genes in S. aureus obtained from food handlers in Kuwait City restaurants.

Methods: Two hundred S. aureus isolates were obtained from stool, nasal and hand swabs of food handlers in different restaurants in Kuwait City. Susceptibility to antibacterial agents was done by disk diffusion and Etest. PCR was used to detect genes for accessory gene regulator (agr); capsular polysaccharide serotypes (cap) 5 and 8, staphylococcal enterotoxins (SE), toxic shock syndrome toxin-1 (TSST-1) and Panton-Valentine leukocidin (PVL).

Results: A total of 188 (94.0%) isolates were resistant to at least one antibacterial agent and 138 (69.0%) were resistant to two or more antibacterial agents. Majority (78.5%) of them were resistant to penicillin, 63.5% were resistant to cadmium; 19.0%, 9.5% and 2.5% were resistant to tetracycline, trimethoprim and kanamycin and streptomycin respectively. Fifty-seven and 38.0 percent of them belonged to cap8 and cap5 respectively. Fifty, 20 and 23.5 percent of them belonged to agr types I, II and III respectively. Genes for SE, TSST-1 and PVL were detected in 70.5, 4.0 and 9.0 percent respectively. Most (45.5%) of them were resistant to penicillin, 63.5% were resistant to a number of other antibiotics. Tigecycline is highly effective against pneumococci and could be a valuable agent in the therapy of severe pneumococcal infections. It could also be a suitable alternative in the treatment of community acquired pneumonia.

Conclusion: Compared to data from many other parts of the world, strains of Streptococcus pneumoniae encountered in Jamaica remain highly susceptible not only to penicillin but also to a number of other antibiotics. Tigecycline is highly effective against pneumococci and could be a valuable agent in the therapy of severe pneumococcal infections. It could also be a suitable alternative in the treatment of community acquired pneumonia.

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Innate Immune Effects of the Urushiol on in vitro Staphylococcus aureus Challenge in Human Skin Keratinocytes

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Background: The main role of innate immunity in skin barrier is to protect skin against exogenous or endogenous dangers as a primary sentinel. Of principal components, Toll-like receptors (TLRs), beta-defensins (hBDs) and cytokines are vital to execute immune function. Korean Rhus verniciflua Stokes has been used as traditional medicine. While, urushiol, major active ingredient of Rhus verniciflua Stokes, was known to mediate T cell-mediated contact dermatitis, the direct innate immune impacts of urushiol are in mystery. To solve this discrepancy, we examined whether urushiol would affect expression of TLRs and hBDs, and proinflammatory cytokine release in human skin keratinocytes (HaCaT cells). Our hypothesis was that urushiol would modulate...

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Comparative In-vitro Evaluation (MICs) of Tigecycline with 9 Other Antibiotics Against Clinical Isolates of Streptococcus pneumoniae Encountered in Jamaica

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Objective: Tigecycline, the first member of glycylcycline group of antibiotics (a derivative of tetracycline) has been shown to be highly effective against Gram positive, Gram negative, anaerobic and atypical bacteria. In this report, we examine its efficacy and compare it with 9 other antibiotics against 62 strains of Streptococcus pneumoniae isolated from various clinical sources including blood, CSF, sputum, ear swab and others in 2 years (2006—2007) at the University Hospital of the West Indies, Kingston, Jamaica.

Methods: The isolates, which were stored in tryptic soy broth with glycerol at −70 degree celcius were thawed in batches, pure cultures were obtained and identified with optochin and bile solubility tests. The MICs were determined by E test (AB Biodisk, Solna, Sweden) using Streptococcus pneumoniae ATCC 49619 as control. Only one isolate was included if there were more than one isolate from the same patient.

Results: All isolates were susceptible to tigecycline. The MICs were extremely low, ranged from 0.016 microg/ml to 0.047 microg/ml. MIC50 was 0.023 microg/ml and MIC90 was 0.047 microg/ml. The rank order of various antibiotics on the basis of lowest to highest MIC90's were, tigecycline MIC90 0.047 microg/ml, vancomycin 0.25 microg/ml, amoxycillin/clavulanate 0.5 microg/ml, ciprofloxacin 0.75 microg/ml,ceftriaxone 1 microg/ml, erythromycin 1 microg/ml, cefuroxime 1.5 microg/ml, penicillin G 1.5 microg/ml,trimethoprim/sulphal 1.5 microg/ml and chloramphenicol 2 microg/ml. Detailed comparative MIC results are depicted in the Table below.

Conclusion: Compared to data from many other parts of the world, strains of Streptococcus pneumoniae encountered in Jamaica remain highly susceptible not only to penicillin but also to a number of other antibiotics. Tigecycline is highly effective against pneumococci and could be a valuable agent in the therapy of severe pneumococcal infections. It could also be a suitable alternative in the treatment of community acquired pneumonia.
innate immune derangements in skin keratinocytes. Toward this, we adopted the modelized system, live *Staphylococcus aureus*-challenged skin keratinocytes.

**Methods:** HaCaT cells were preincubated with or without urushiol, and then treated with live *S. aureus*. Expression of innate immune parameters (hBD1-4, TLR2, IL-6, IL-8, and TNF-α) is analyzed by RT-PCR. The kinetics of these parameters was assessed by western blotting. Nitrite concentration was determined by Griess reagent.

**Results:** Expression of TLR2 was clearly induced by urushiol or live *S. aureus* in HaCaT cells. Interestingly, activation of hBDs in *S. aureus*-infected HaCaT cells was elicited by urushiol. In parallel, there was an augmented release of proinflammatory cytokines such as TNF-α, IL-6 and IL-8. These innate foot-print markers might be regulated via, at least, activation of NF-κB and MAP kinase cascades.

**Conclusions:** These results suggest that urushiol would modulate innate immune derangements in skin keratinocytes. As important clinical implications, the control of urushiol or *S. aureus* infection in skin barrier. This is a first report regarding innate immune profiles of urushiol in skin keratinocytes.

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The Pattern of Parenteral Antibiotics Usage and Susceptibility Test at A. Wahab Sjahranie General Hospital Samarinda, Indonesia

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**Background:** Antibiotics resistance is a major problem all over the world, including Indonesia. Overuse of antibiotics and inappropriate choice of antibiotics are the most important factors that cause antibiotics resistance, besides other factors such as inadequate dosage, low quality products.

The aims of this study are to know the pattern of parenteral antibiotics usage and susceptibility tests at A. Wahab Sjahranie General Hospital Samarinda, Indonesia.

**Methods:** A retrospective study was performed by collecting data from medical records of patients treated at the Department of Internal Medicine, Department of Pediatric, Department of Surgery, Department of Obstetric - Gynecology who obtained parenteral antibiotics from October to December 2006. Data analyzed included final diagnosis, type of parenteral antibiotics used, culture and susceptibility test.

**Results:** There were 1,627 patients involved in this study with 1,695 prescription of parenteral antibiotics. The most common parenteral antibiotics used were cefotaxime (48.9%), amoxicillin (24.9%), cefuroxime (5.1%), cephalothin (4.8%), gentamicin (4.4%). Only 25 specimen cultures including blood, urine, feces, pus were performed (1.5%). Most specimens were pus (88%). Aerob cultures showed bacteria found were *Eschericia coli* (6 isolates), *Staphylococcus aureus* (5 isolates), *Staphylococcus albus* (3 isolates), *Klebsiella sp* (2 isolates), *Pseudomonas sp* (2 isolates), *Proteus vulgaris* (2 isolates), *Citrobacter freundii* (1 isolate), *Proteus mirabilis* (1 isolate), *Proteus provideria* (1 isolate), *Staphylococcus citrus* (1 isolate), *Streptococcus hemolyticus* (1 isolate). All bacteria from cultures were resistant to cefotaxime and amoxicillin, the two most common used parenteral antibiotics, and also to gentamicin. Antibiotics that had sensitivity at least 50% were piperacillin/tazobactam, meropenem, fosfomycin, cefpirome, ciprofloxacin. Fosfomycin had best sensitivity to *S. aureus*, while piperacillin/tazobactam had best sensitivity to *E. coli*. Amikacin had good sensitivity to gram negative bacteria (75%).

**Conclusions:** The most common parenteral antibiotics used at the four major departments at A. Wahab Sjahranie General Hospital Samarinda are beta lactams, cefotaxime (48.9%) and amoxicillin (24.9%) which are resistant to all cultured bacteria. Only 1.5% of patients are treated with culture-based antibiotics, while others are treated empirically without any good guidance. The most common bacteria found from culture are *E. coli* (24%) and *S. aureus* (20%). Gram negative bacteria are more common found than gram positive bacteria (60% vs 40%).

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Antibiotic Resistance and Its Molecular Mechanisms Among Pneumococci from Children with Acute Respiratory Tract Infections in HaiPhong City, Northern Vietnam

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**Background:** Drug-resistant *Streptococcus pneumoniae* has spread worldwide since 1970s and has reached high level in southeast Asia. There are limited data concerning antibiotic resistance pattern and its molecular mechanisms published in Vietnam. Those data need being updated and well studied in order to provide a suitable prevention and treatment for pneumococcal infections.

**Methods:** Eighty two *S. pneumoniae* isolates were identified from hospitalized children with acute respiratory infections in HaiPhong pediatric hospital in Northern Vietnam from July 2006 to October 2007. MICs of pneumococcal isolates and resistant strains were determined using agar dilution method according to instructions of Clinical and Laboratory Standards Institute (CLSI). Molecular mechanisms of penicillin and erythromycin resistance were studied by using three duplex PCR assays targeting genes coding for penicillin-binding proteins (pbps)1A, 2B, 2X, and mef(A)/erm(B) macrolide resistant genes, associated with development of the antibiotic resistance.

**Results:** All the 82 isolates were susceptible to amoxicillin/clavulanate and ofloxacin, 95% and 84% of the isolates reduced susceptibility to penicillin (51.3% intermediate,