P348

The relationship between antibiotic tolerance and severity of clinical isolated Pseudomonas aeruginosa in respiratory disease patients

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Introduction: Pseudomonas aeruginosa is an important pathogen in chronic respiratory tract infections, such as bronchiectasis, chronic obstructive pulmonary disease (COPD). It typically makes a biofilm, which makes treatment of these infections difficult. Biofilm cells are difficult to eradicate with antimicrobial treatment, despite the bacterium is susceptible to the antibiotics in vitro. One of the reasons is that bacterial biofilm acquired the antibiotic tolerance. The capacity of bacteria to survive, but not grow during antibiotic treatment may be defined as antibiotic tolerance.

Objectives: The purpose of the present study is to evaluate the relationship between clinical symptom and antibiotic tolerance in respiratory tract infections.

Methods: We collected imipenem (IPM) sensitive 9 clinical isolates of P. aeruginosa from respiratory tract infections. We measured MIC and MBC of adherent cells to IPM by using the simple method with 96 well plates and calculated the MBC/MIC ratio. As virulence factors, we measured pyocyanin production, gelatinase production, phenazine-mediated swimming, twitching and biofilm formation. Respiratory symptom score calculated according to the four categories as shortness of breath, cough, sputum, and diary or not.

Results: 89% of the patients had bronchiectasis, 11% COPD. They were divided into two groups; one is high tolerance (ratio: 128) group (n=3 age 88±10y) and the other is from 2 to 64 ratio group (n=6 age 64±3.6y). Respiratory symptom score with high tolerance group was significantly higher (p < 0.001) than the other group. The frequency of hospitalizations for respiratory exacerbations with high tolerance group was 1.5 per year. The other group have no hospitalization. Oxygen saturation were lower and supplemental O2 were given to all patients with high tolerance group, while no patients in the other group was given. High tolerance could be a risk factor for severity in respiratory disease patients. Tolerance range from 2 to 64 were found 6 strains, as expected, there was positive correlation between tolerance and biofilm formation, and was negative correlation between tolerance and gelatinase production. Antibiotic tolerance has no correlation with pyocyanin production, swimming and twitching.

Conclusion: This study shows that antibiotic tolerance was positively correlated with biofilm formation and negatively correlated with gelatinase production. In the high tolerance group, clinical symptoms were extremely severe. Antibiotic tolerance could be an efficient factor to estimate a clinical prognosis for respiratory tract infections of P. aeruginosa.

P349

Intensive care management for tetanus – A critical need

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Introduction: Surya Kanta Hospital (SK), an infectious wing of Mymensingh Medical College Hospital regularly encounter some overlooked infectious diseases amongst which Tetanus and Rabies need critical care. Tetanus remains a health problem in the developing world and is still stumped upon in the developed world. The facilities available to manage severe tetanus have a major impact on the therapeutic options and mortality.

Objectives: The objectives of the study are to evaluate the management and outcome of tetanus in resource limited country.

Methods: This is a longitudinal follow up study. Here we describe the 45 cases of diagnosed tetanus admitted in SK Hospital during the period of 6 months from July to December 2012.

Results: Median age of the patients was 40 (IQR: 5–70) years and 84.4% (32) were male. Most 95.6% (43) patients were from rural area; 62.2% (28) had family income around 100 US$/month. Forty percent (18) were farmer; 22.2% (10) had business. Forty two percent (19) had no formal education. Most of the patients 93.3% (42) had no history of tetanus vaccination. Mean duration from wound and tetanus developed from 6–90 days. Clinical pictures revealed almost all (95.7%) had lock jaw, pain in the neck and back. Opisthotonos, generalized convulsion, laryngeal spasm with respiratory distress present in 91.1% patients. Inj. TT and TIG (3000 IU) was given intramuscularly in all patients. All patients were treated with Metronidazole. The treatment was controlled by inj. Diazepam requiring 100 mg to 400 mg/day ranging from 4 days to 15 days. Inj 4% Magnesium sulfate was used as an additional therapy in 30 cases for control convulsion. Out of 45 patients, 15 (33.3%) died due to respiratory failure, 6 (13.3%) recovered with sequelae like contratracture. Most of them 75% (6) died in 5 days of treatment. Vigorous and aggressive management of muscle spasms is a cornerstone of therapy. Tetanus is very difficult to manage without ICU care. The effect of different modes of assisted ventilation in tetanus has not been evaluated. There is a little evidence base in tetanus for these advanced modes of support. Since tetanus occurred in resource poor country there is urgent need for new treatments that reduce the necessity for ventilation and improved cardiovascular stability in an effort to reduce mortality.

Conclusion: Magnesium sulfate is promising for controlling the spasm without the need for ventilatory support. The infusion rate of magnesium recommended that a carefully designed double-blind randomized controlled clinical trial of sufficient sample size will be initiated to confirm the safety in the management of tetanus.

P350

Can outcomes of blood culture-positive intensive care unit (ICU) patients be predicted based on pathogenic bacteria?

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Objectives: We examined whether the outcomes of blood culture-positive ICU patients can be predicted by pathogenic bacteria. Influential factors and clinical characteristics were considered.

Methods: A retrospective chart review of all patients who underwent blood cultures between April 2010 and December 2012 in the ICU of Tokyo Women's Medical University Hospital. Only direct puncture samples were employed. Samples were classified into two groups; positive for Gram-positive cocci only (GPC alone) and positive for Gram-negative rod and other bacteria (GNR groups); samples positive for anaerobic bacteria, fungi, or Gram-positive rod were excluded. In both groups, the following clinical characteristics were retrospectively surveyed based on medical records: sex, mean age, Simplified Acute Physiology Score II (SAPS II), underlying disease, detected bacteria, causative infectious disease, mortality rate 30 days after bacteremia detection, and mean number of days from blood culture until death.

Results: Eighty-seven positive cultures were examined, and 39 patients with positive blood cultures were included in the study. Of these, 16 and 23 were in the GPC alone and GNR groups, respectively. SAPS II scores were 68 and 73 points, respectively. The underlying disease in the GPC alone group were malignant tumor (n=5); those in the GNR groups were collagen disease (n=11), hematologic disease (n=6). In the GPC alone group, Methicillin-resistant Staphylococcus aureus (27.7%, n=5) and S. epidermidis (27.7%, n=5) were detected. In the GNR group, P. aeruginosa (37.5%, n=9) and E. coli (16.6%, n=4) were detected. As causative infectious diseases, catheter-related bloodstream infection (CRBSI) accounted for 37.5% of the GPC alone group. In the GNR group, causes were intra-abdominal infection (26.0%, n=6), febrile neutropenia (21.7%, n=5), and infectious disease of unknown origin (17.3%, n=4). The mortality rate in 30 hospital days after bacteremia detection in the GPC alone and GNR groups were 33.3% and 47.7%, respectively, and significantly different (p = 0.03). The mean duration from blood culture-positive result to death in the two