The Eeffects of Silver Nanoparticles Alone and in Combination with Imipenem on Inhibition of *Pseudomonas aeruginosa B*iofilm Formation

Khadijeh Ramezani-Ali Akbari [1], Ahya Abdi-Ali[2] *, Mahvash Seifali[3]

1 Department of Microbiology, MSc of Microbiology, Alzahra University, Tehran, Iran
2 Department of Microbiology, Faculty of Biological Sciences, Alzahra University, Tehran, Iran. Phone: 02188044040(2868) e-mail: abdialya@alzahra.ac.ir.
3Department of Plant Sciences, Faculty of Biological Science, Alzahra University, Tehran, Iran.

* abdialya@alzahra.ac.ir

Abstract

Background and objective: *Pseudomonas aeruginosa* is an important opportunistic, forming biofilm pathogen. The its biofilm has created the effective barrier against penetration of antimicrobial agents, in result the drug resistance is increased 1000 times in biofilm cells versus planktonic cells .But nanomaterial are good candidates since their use does not lead to the development of resistance .In current study, the ant biofilm effects of silver nanoparticles alone and in combination with imipenem on biofilm producing *P. aeruginosa* was investigated.

Materials and methods: 60 isolates of *P. aeruginosa* were collected from shahid Motahari burn hospital ,Mehr burn hospital and shahid Rajai Cardiovascular hospital in Tehran. 20 strong biofilm-producing isolates were selected to investigate the ant biofilm effects of silver nanoparticles by microdilution plate technique. The combined effects of silver nanoparticles and imipenem was determined through Checkerboard dilution technique on 10 strong biofilm-producing isolates.

Results: In the presence of a dilution series 0/4-50µg /ml silver nanoparticles, reduction of biofilm biomass was different among the studied 20 isolates and was seen the biomass reduction 4 - 95% in 14 isolates. The effects of imipenem in combination with silver nanoparticles on the inhibition of biofilm formation showed synergistic relationships ($\sum FIC \leq 0/5$) in majority of the isolates.

Conclusion: This study suggests that the silver nanoparticles can be a promising candidate to inhibit the formation of *P.aeruginosa* biofilm .Moreover silver nanoparticles in combination with antibiotics such as imipenem can reduce dramatically *P.aeruginosa* Biofilm formation on surfaces.

Key words: *Pseudomonas aeruginosa*- imipenem- Biofilm- silver nanoparticles

Antibacterial Activity of Melittin Purifed from Iranian Honey Bee Venom Against Strains of *Acinetobacter baumannii* Isolated from Nosocomial Burn Infection

***Fatemeh pashaie*[1] *, Kamran Pooshang Bagheri*[2*]**

1- Department of Microbiology, Zanjan Branch, Islamic Azad University, Zanjan, Iran
2- Pasteur Institute of Iran, Biotechnology Research Center, Biotechnology Dept, Venom and Biotherapeutics Molecules Lab., Tehran-Iran

*k_bagheri@pasteur.ac.ir

Abstract

Background and objective: *Acinetobacter Baumannii* is a dangerous pathogen in many hospitals around the world and is considered an important life threatening factor in burn infections. Nowadays the numbers of multidrug resistance *A. baumannii* are being rising. In this case, Antimicrobial peptides could be an appropriate solution for treating bacterial infections. Concerning to the problem, this project was aimed to study of antibacterial activity of melittin purified from Iranian honey bee venom on clinical isolates of *A. baumannii* from hospitalized burn patients**.**
Materials and methods: In this study, *A. baumannii* strains collected from Shahid Mottahari burn center. Genus and species of the strains were detected by routine methods. Melittin purified from bee venom by Reverse Phase HPLC technique and then lyophilized. Melittin concentration measured by BCA method and the quality of melittin was confirmed using SDS-PAGE. After determining the MIC and MBC of melittin, the results were compared with antibacterial activity of imipenem.
Result: The average of MIC and MBC for melittin in total bacterial population was determined at 0.79 and 1.59 microgram respectively. MIC50, MIC90, MBC50, and MBC90 for melittin calculated as 0.55, 1.1, 1.1 and 2.17 micrograms respectively. In this study, according to the CLSI standard, imipenem-resistant, sensitive, and intermediate strains were 86, 8, and 6 % respectively and also 46% of bacteria had MIC greater than 32 micrograms against imipenem. 100% of the samples had MBC above 32 microgram respectively.
Conclusions: Comparison of inhibitory and bactericidal activity of melittin with imipenem showed that antibacterial activity of melittin is very greater than imipenem. Based on the results it can be concluded that melittin would be used as a preventive or treating agent against colonization of bacteria in burn patients in future.

Key words: *Acinetobacter baumannii*, Burn infection, Melittin, Bee venom

Bacterial Flora in Clean and Dust Polluted Air with FAME Technique. Ilam. 2015

Hossin Sobati[*1], Firouz Ebrahimi[2], Valiolah Shahri[2], Mohammad Reza Akbari[2]*

1- Health Research Center,Baqiyatallah University of Medical Sciences,Tehran,Iran
2- Department of Biology Research Center University of Imam Hussein, Tehran, Iran

Abstract

Background and objective: Air pollution by dust of the main problems in the country's West Frontier that is effective role on general health of residents. The presence of bacteria in the air and dust and their harmful effects on human health have been reported in various studies. This study is done to identify the bacteria natural air (free from dust) to dust polluted and compare both the number and diversity of their environment by FAME technique.

Materials and methods: samples of natural air and dust contaminated with Particle deposition method on the plate or gravity and using sterile petri plates containing nutrient medium BHI Agar from 5 points in the city in 15 and 30 minutes was conducted in the summer. Plate transported to the laboratory and was incubated at 37 ° C for 24 to 48 hours. After the growth of bacterial colonies using biochemical tests and techniques FAME Bacterial colonies grown on the medium was studied and identified.

Results: A total of 1114 bacterial colonies were counted on 30 plates collected from 5 locations . With Gram staining methods, MacConkey agar medium and Biochemical tests of 13 different bacteria were identified. In the dust air of the city of Ilam at 15 and 30 minutes most of the genus Rhodococcus (15 minutes) and Bacillus (30 minutes). From1114 colonies were counted; the number of 170 colonies of natural air and 944 colonies was dust in the air. The results showed that the highest number of bacteria has been gram-positive cocci in natural air and gram-positive bacilli in the dust air and was not observed pathogenic bacteria in natural air and dust.

Conclusion: The results showed that due to the high number of bacilli and spores bacteria in the air of dust are more resistant to adverse environmental conditions and that thereby the survival of most of them.

Keywords: Biochemical test, Dust air, FAME technique, Bacterial contamination, Ilam

Sero-prevalence of Hepatitis B Infection in Patients with Intellectual Disability - Ali Akbar Boarding House Center- Southern khorasan- 2014

Zohreh Azarkar[1]*, Gholamreza Sharifzadeh[2], Malihe Vakili[3], Azadeh Ebrahimzadeh[4]

1- Associate professor of Infectious Disease,Birjand Hepatitis Researches Center, Medical Sciences of University, Birjand, IRAN
2- Epidemiologist,Birjand Hepatitis Researches Center Medical Sciences of University, Birjand, IRAN
3- General Physician-Medical Sciences of University, Birjand, IRAN
4- Associate professor of Infectious Disease,Birjand Hepatitis Researches Center, Medical Sciences of University, Birjand, IRAN

* drz.azarkar@yahoo.com

Abstract

Background and objective: Hepatitis B virus (HBV) infection is an important worldwide public health problem and it has been cause of elevated morbidity and mortality rates. The prevalence of HBV among patients with mental disturbances is higher than normal population. Living in institutes, comparing home, leads to higher probability of hepatitis. This study was conducted to determine HBV markers among patients with intellectual disability.

Material and method: This study of 220 patients with intellectual disability living in Ali Akbar boarding house center. Socio demographic data were obtained from questioners and blood sample were taken and tested to determine HBS Ag, HBS Ab, anti HBC-total. The results was analyzed with SPSS-15.

Results: Of the 220 patients, 36.4% female and 63.6% were male. The mean age was 33.5±13.3 years eight affected with Down syndrome, 198 with intellectual disability and 14 affected with other mental disturbances. 24% had aggressive and biting behavior. HBS Ag was positive in 3.2%.35.5% and 79.1% was Anti- HBC and Anti- HBS positive, respectively. It is not significant difference between HBS Ag, Anti-HBC prevalence and duration of stay in center. (P=0.23), (P=1)

Prevalence HBS Ag positive in downs syndrome was higher than other mental patients but there is no significant difference HBS Ag prevalence and kind of mental disability.

HBS prevalence in male was 69.3% and being this difference statistically significant (p=0.001). Also, Anti-HBS prevalence in intellectual disability patients were higher than other patients and being this difference statistically significant. (0.02)

Conclusion: The results of present study show high HBV sero prevalence in patients with intellectual disability. According to high risk behavior and transmission of HBV in mental retardation centers importance of HBV specific prevention measures in this groups of patients are emphasized.

Key words: HBV, sero prevalence, intellectual disability

The Beliefs and Factors Influencing Preventive Behaviors of HIV Transmission in HIV-Positive Patients

Mahmood Karimy1, Iraj Zareban2*, Abdorahim Tabasi Darmiyan2, Mohammad Taher3,Neda Fayazi3

1. Department OF public health, faculty of Health, Saveh University of Medical Science, Saveh, Iran
2. Department OF public health, faculty of Health, Zahedan University of Medical Science, Zahedan, Iran
3. Department OF Nursing, faculty of nursing, Saveh University of Medical Science Saveh, Iran

* zareban@yahoo.com

Abstract

Background and objective: Improvement in HIV care have resulted in prolonged life expectancy for HIV-positive persons, hence, identify preventive behaviors of HIV transmission in HIV-positive persons has not only become a necessity, but a main concern in HIV prevention. The aim of this study was to evaluate of beliefs and factors influencing preventive behaviors of HIV transmission in HIV-positive patients.

Materials and methods: A descriptive-analytical study was conducted in two cities (Sarbaz and Saravan) in Sistan&baloochestan Province. Participants included 92 HIV-positive patients. Data were obtained anonymous self-reported questionnaires. Descriptive statistics, multiple logistic regression analyses were employed to identify factors associated with preventive behaviors of HIV transmission.

Result: The 78% and 22% of subjects were male and female, respectively. The result indicated that all Health Belief Model construct were signifcant prediting facotrs for preventive behaviors. Inaddition, percieved barriers, self efficacy, benefit, severity, susceptibility were the most important predictor respectivly. Also, variable of educational level, marital status, perceived depression and anxiety, and social support were significant factors to preventive behaviors ($p<0.05$).

Conclusion: The present study showed that the HBM can be used to explain the predictors of behaviors in HIV-positive patients. . Future prevention interventions should be focused on the improvement in self-efficacy, the reduction in the barriers and the increasing perceived benefits of to preventive behaviors among HIV-positive patients.

Keywords: beliefs , HIV preventive behavior; Health belief model

Misidentification of Common Pathogenic Bacteria in a University Hospital Laboratory

Fateh Rahimi[1]*, Jalal Mehmandoost[1], Maryam Danesh[1]

1- Department of Microbiology, Faculty of Science, University of Isfahan, Isfahan, Iran

*f.rahimi@sci.ui.ac.ir

Abstract

Background and objective: Accurate and definitive identification of pathogenic bacteria is essential for correct disease diagnosis, treatment of infection and trace-back of disease outbreaks associated with microbial infections. *Staphylococcus epidermidis* is a part of the human normal microbiota and known as opportunistic pathogen. This bacterium is the most important cause of indwelling device-related infections. *Escherichia coli* as a member of human and animal gut flora, is the most commonly isolated pathogen from uncomplicated urinary tract infections as well as catheter-associated urinary tract infections. The aim of this study is to report the rate of misidentification of two common bacteria in a university hospital in Isfahan.

Materials and methods: During December 2014 and November 2015, a total of 284 *E. coli* and 135 *S. epidermidis* strains were collected from a university hospital laboratory in Isfahan. All isolated were identified using standard biochemical tests and PCR by specific primers.

Results: The results of phenotypic and genetic testing in the laboratory were consistent with each other, but were not in agreement with results of bacterial identification in the hospital. Therefore, the results showed that 55 (19.4%) and 28 (20.7%) of strains were not *E. coli* and *S. epidermidis*, respectively.

Conclusion: Accurate and definitive identification of pathogenic bacteria, using standard operating procedures (SOP) in medical laboratories and providing useful therapeutic guidelines can help clinicians to remove and eradicate infections from the hospitals and community.

Keywords: Bacterial identification, *E. coli*, *S. epidermidis*

Isolation of Methicillin Resistant *Staphylococcus aureus* from Zayanderud River in Isfahan

Fateh Rahimi1*, Sharmin Karimi1

2- Department of Microbiology, Faculty of Science, University of Isfahan, Isfahan, Iran

*f.rahimi@sci.ui.ac.ir

Abstract

Background and objectives: *Staphylococcus aureus* has the remarkable ability to acquire antimicrobial resistance genes and now become a major problem in hospitals worldwide. Resistance to methicillin is due to the presence of *mecA* and *mecC* genes. *mecA* is a part of large mobile genetic element that is known as staphylococcal cassette chromosome *mec* (SCC*mec*). The aim of this study was to isolate, identify and type methicillin resistant *S. aureus* strains isolated from Zayanderud River during November and December 2015.

Materials and methods: Sampling was carried out three times during November and December 2015 from Zayanderud River in Isfahan. To achieve colonies of MRSA strains, samples were filtered and filters were transferred to HiCrome aureus agar supplemented with 1 µg/ml oxacillin and incubated for 48h at 37˚C. All isolates were identified as MRSA using PCR assay by specific primers. For typing of strains, SCC*mec* and prophage typing assays were employed using separate multiplex-PCR assays.

Results: A total of 38 colonies were collected and all were confirmed as MRSA strains. Eighty two percent of MRSA isolates harbored SCC*mec* type III and 18% were positive for SCC*mec* type IVa. On the other hand, 5 prophage types and 2 different prophage patterns were identified among strains.

Conclusion: These findings indicating the presence and persistence of MRSA strains in Zayanderud River. The high prevalence of SCC*mec* type III illustrated the hospital origin of MRSA strains in present study. Prevalence of hospital acquired-MRSA (HA-MRSA) strains with high potential to cause broad spectrum of infectious diseases could be a serious risk for public health in Isfahan.

Keywords: MRSA, prophage typing, SCC*mec* typing

Identifications and Antimicrobial Susceptibilities of *Enterococci* Species Isolated from Clinical Samples

Reza Faraji1, Mahnaz Sabzi2, Feridoun Sabzi3*

1- Ph.D student, Preventive Cardiovascular Research Centre Kermanshah, Kermanshah University of Medical Sciences, Kermanshah, Iran
2- Ms.C, Preventive Cardiovascular Research Centre Kermanshah, Kermanshah University of Medical Sciences, Kermanshah, Iran
3- Cardiac surgeon, Professor, Preventive Cardiovascular Research Centre Kermanshah, Kermanshah University of Medical Sciences, Kermanshah, Iran

* dr_sabzi@yahoo.com

Abstract

Background and objective: Enterococcus is an important group of bacteria that live as normal flora in human gastrointestinal tract and animal, but under certain circumstances they can cause infection. The aim of this study was to identifications and antibiotics susceptibility of *Enterococci* isolated from clinical sample in Imam Ali Hospital Kermanshah, Iran, from July 2014 to July 2015.
Materials and methods: This descriptive–analytic study was performed on 58 of *Enterococci* strains isolate during one year period from clinical sample (urine, blood, wound, sputum, feces) in Imam Ali Hospital Kermanshah, Iran. Complimentary tests were carried out after isolating and identifying 58 strains of *Enterococci* from clinical sample. Antibiotic susceptibility test was using Kirby-Bauer disk diffusion method and CLSI criteria. Statistical analysis was performed using the SPSS 16.
Results: The results showed that 42 cases (72/41%), 8 cases (13/79%), 4 cases (6/9%), 2 cases (3/44%), 1 case (1/73%), and 1 case (1/73%) were *E. faecalis*, *E. feacium*, *E. hirea*, *E. avium*, *E. gallinarium*, and *E. mundtii* respectively. Most of *Enterococci* strains isolated from urine samples with 48.27% (28 cases). The mostly resistant to penicillin (95%) while lowest antibiotic resistance to linezolid (0%). A significant statistical difference between Enterococcus and length of stay in hospital was found (P = 0.03).
Conclusion: Based on the results of present study, the most separated species from the patients was *E. faecalis*. And also suggests in order preventing the antibiotic resistance and an appropriate antibiotic before the treatment, antibiogram test done for each patient.
Key words: Enterococcus, hospital infections, antibiotic resistance.