Efficacy of phage typing as a diagnostic bio-marker tool in MRSA outbreaks and staphagetherapy evaluation

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73 Staphylococcus aureus isolates were collected from microbiology lab hospitals in Riyadh and Jeddah. Distribution of methicillin resistant Staphylococcus aureus (MRSA) isolates among clinical departments and isolations from different specimens showed that the wound infections resemble the highest percentage of the clinical sites (26%). The all over percentage of MRSA topical infections (70%) was higher than MSSA infections. All isolates were sensitive to vancomycin which is the drug of choice for MRSA infections. Mupirocin showed low degree of resistance, which was 6%. Susceptibility to other commonly used antibiotics was variable. Resistance oxacillin was the highest 34%. Some degrees of resistance to sulphmethoxazole/trimethoprim and fusidic acid (34%) were noticed. Terms like boarder line resistant, low-level mutation, and boarder-line susceptible had also been obtained in our studied isolates of S. aureus for methecillin using Minimum Inhibitory Concentration (MIC) test; which was observed in the percentage of MRSA isolates in our data that had MICs of 256µg/ml (30.83%). Studying the distribution of phage type patterns among Staphylococcus patients isolates in Saudi cohort; it was found that only 30.56% were typable with different degree, and 69.7% were non typable. Differentiation increased in the phage typing, and genome typing yielding 20 and 23 different S. aureus types, respectively. A 61.71% of the MRSA isolates were genetically typed by PFGE resulting one type of MRSA with one genetic difference. Genome typing by PFGE was a powerful tool not only for strain identification but also for the resolution of clonal relationships of S. aureus strains. Observation on UV induction of S. aureus strains showed that the number of infective centers increased by more than 100%. As seen in our electron micrographs, our studied phages designated from ph1 to ph10; five of these phages ph2, ph4, ph5, ph7, and ph10 were morphotype A, present in Myoviridae group, their DNAs were in the range 43.6 kb-48.5 kb that is very close to this size range with minor differences in phage strain. Ph9 and ph10; had more than one band in their pattern. A mixture of ten phages differed in their virulence to MRSA isolates were used with all patient isolates (30) that were lysed completely by spot-test. Phage therapy for 30 patients of MRSA in different skin infection cases showed that phage therapy was highly effective. Using a mixture of 10 phages daily (7-10 days), treatment gave us a close success rate of 90%.

Biography

Nagwa Mohamed Amin Aref has completed her PhD in Ain Shams University, Cairo, Egypt as a channel system study with University of Hohenheim, Institute fur phytoimidizine, Stuttgart, Germany. In 1984, in Virology and Virus diagnoses and postdoctoral studies from Michigan State University, Department of Botany and Plant Pathology and Center of Electron Optics in East Lansing, USA, participating in the detection of Plant viral disease of the research program 1984-1989. Co-investigated at AGERI (Agriculture Genetic Engineering Research Institute), Ministry of Agriculture, Egypt, 1990-1996 in UNDP project entitled: “Engineering tomato transgenic plants resistant” in contribution with Scripps Research Institute, San Diego, USA. She was an Exchange Visitor Professor for a research scholarship in Electron Imaging Center, California NanoSystem Institute (CNSI, University of California (UCLA) in Los Angeles, USA. She has published more than 40 publications in reputed journals supervising postgraduate students and serving as an editorial board member of reputed journals. She is working now as a Professor in Botany and Microbiology Department in College of Science, King Saud University.

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