CHARACTERIZATION OF *PSEUDOMONAS AERUGINOSA* ISOLATED FROM INTENSIVE CARE UNITS IN SHAHID GANGALAL NATIONAL HEART CENTER

A

Dissertation

Submitted to the Central Department of Microbiology

Tribhuvan University

In Partial Fulfilment of the Requirements for the Award of the Degree of

Master of Science in Microbiology

(Medical Microbiology)

By

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2011

RECOMMENDATION

This is to certify that Mr. Shiva Bhandari has completed this dissertation work entitled **"Characterization of *Pseudomonas aeruginosa* Isolated from Intensive Care Units in Shahid Gangalal National Heart Center"** as a partial fulfilment of M.Sc. degree in Microbiology under our supervision. To our knowledge, this work has not been submitted for any other degree.

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ACKNOWLEDGEMENTS

First, I express my deepest acknowledgement to my supervisors Mr. Binod Lekhak and Dr. Dwij Raj Bhatta of Central Department of Microbiology, TU and Dr. Shyam Raj Regmi, Consultant Cardiologist, of SGNHC for providing an opportunity to work under their supervision and guidance, without which this work would not have come into shape.

I ineffably thank Dr. Megha Raj Banjara whose help during my work will be retrieved throughout my life.

I am greatly indebted to Dr. Arun Maskey, the then Executive Director and Consultant Cardiologist, SGNHC, Mr. Mahendra Lamsal and the whole hospital family for providing me a workable laboratory environment to conduct my work without any obstacles.

I would like to express my gratitude to Ms. Sharada Bajracharya, Mr. Bindeshwor Yadav, Mr. Prashant Koirala, Mr. Binod Yadav, Mr. Santosh Acharya, and Mr. Raj Naryan Mishra for their kind helping hands and support during my entire working hours. My Sincere thanks also go to all other members of the Pathology Laboratory, SGNHC. I am deeply thankful to in-charge of ASICU, PSICU and MICU and all the other staffs for their co-operation and assistance during my sampling periods. Likewise, I also thank to the members of the central department.

My profound appreciation goes to all my friends, especially Ananta Bhandari, Sudeep Khanal, Bishnu Dhakal and Ishwori Bhandari for the help during statistical analysis. I deeply value the help provided by Mr. Dhurba Adhikari, Mrs. Pratik Bhattarai, Mr. Ananda Ghimire, Mr. Rameshwor Mahato and Jeevan Ter.

I dedicate this piece of work to my family members and my beloved Ambi Aryal to whom words alone cannot express what I owe them for their constant support, encouragement and unconditional love in every way possible throughout the process of this course and still beyond.

And especially to God, who made all things possible.

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ABSTRACT

Pseudomonas aeruginosa is a gram negative bacterium responsible for several nosocomial infections in highly immunocompromised and catheterized patients in Intensive Care Unit (ICU). In order to characterize and determine the prevalence of *P. aeruginosa* in the ICUs of Shahid Gangalal National Heart Center, a six month cross sectional microbial study was undertaken. A total of 700 clinical specimens and 360 surface swab samples from ICU were collected and analyzed for bacteriological profile. The bacterial isolates were identified by biochemical testing. Antibiotic susceptibility testing of isolated bacteria was performed by Kirby Bauer disc diffusion technique. In all clinical samples analyzed, *P. aeruginosa* was detected in 66 (9.43%) samples while in all surface swab samples analyzed, *P. aeruginosa* was detected in 60 (16.67%) samples. 48 (72.7%) of clinical samples yielded mucoid strains while it was only 24 (40%) for surface swab samples. Among clinical samples, 61 (92.4%) were pigment producing strains while 5 (7.6%) were non-pigmented strains. Likewise, among the surface swab samples, 45 (75.0%) were pigment producing strains of *P. aeruginosa* while 15 (25.0%) were non-pigmented strains. Antibiotic Susceptibility Test demonstrated that among clinical isolates 56 (84.8%) were sensitive to cefoparazone-sulbactam followed by 42 (63.6%) to polymixin-B and 36 (54.5%) to piperacillin-tazobactam, while among surface swab sample isolates more than 90% isolates were sensitive to most of the common antibiotics used. 59 (89.4%) Multi-drug Resistant *P. aeruginosa* (MDRPA) were isolated from clinical samples while it was only 7 (11.7%) from surface swab samples. This study signified that *P. aeruginosa* was an important cause of infection in patients admitted in the ICUs and it could be present in the inanimate surfaces of ICUs posing threat to the ICU patients. Regular monitoring of antimicrobial susceptibility and rational use of antibiotics would be the essential steps to eliminate possible outbreaks of MDRPA in the ICUs.

Key words: *P. aeruginosa*, MDRPA, Clinical Samples, Surface Swab Samples

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LIST OF ABBREVIATIONS

AK	Amikacin
ASICU	Adult Surgical Intensive Care Unit
AST	Antibiotic Susceptibility Testing
BA	Blood Agar
BHI	Brain Heart Infusion
BSI	Blood Stream Infection
CAZ	Ceftazidime
CFM	Cefixime
CIP	Ciprofloxacin
COPD	Cardiac Obstructive Pulmonary Disease
CR-BSI	Catheter Related Blood Stream Infection
CSL	Cefoparazone+Sulbactam
CTR	Ceftriaxone
CVC	Central Venous Catheter
CVP	Central Venous Pressure
GEN	Gentamicin
GI	Gastro Intestinal
GNB	Gram Negative Bacteria
GPC	Gram Positive Cocci
GPR	Gram Positive Rods
HCW	Health Care Worker
HEPA	High Efficiency Particulate Air
ICU	Intensive Care Unit
LF	Lactose Fermenter
MA	Mac Conkey Agar

MDR	Multiple Drug Resistance
MDRPA	Multi-drug Resistance *P. aeruginosa*
MHA	Mueller Hinton Agar
MICU	Medical Intensive Care Unit
MEM	Meropenem
NA	Nutrient Agar
NI	Nosocomial Infection
NLF	Non Lactose Fermenter
NNIS	National Nosocomial Infection Surveillance
PABSI	*P. aeruginosa* bloodstream infection
POL	Polymixin B
PSICU	Pediatric Surgical Intensive Care Unit
PT	Piperacillin+Tazobactam
SGNHC	Sahid Gangalal National Heart Center
UTI	Urinary Tract Infection
VAP	Ventillator Associated Pneumonia
WHO	World Health Organisation