INCIDENCE OF URINARY TRACT INFECTION IN CANCER PATIENTS UNDER CHEMOTHERAPY AND THE PREVALENCE OF MULTIDRUG RESISTANT STRAINS AMONG THE ISOLATED BACTERIAL PATHOGENS

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DISSERTATION

SUBMITTED TO THE CENTRAL DEPARTMENT OF MICROBIOLOGY

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IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF SCIENCE IN MICROBIOLOGY (MEDICAL)

BY

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RECOMMENDATION

This is to certify that **Ms. Sunila Manandhar** has completed this dissertation work entitled "**INCIDENCE OF URINARY TRACT INFECTION IN CANCER PATIENTS UNDER CHEMOTHERPY AND THE PREVALENCE OF MULTIDRUG RESISTANT STRAINS AMONG THE ISOLATED BACTERIAL PATHOGENS**" as a partial fulfillment of Masters of Science Degree in Microbiology under our supervision.

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On the recommendation of **Prof. Bharat Jha and Dr. Dwij Raj Bhatta** this dissertation work by **Ms. Sunila Manandhar** entitled **"INCIDENCE OF URINARY TRACT INFECTION IN CANCER PATIENTS UNDER CHEMOTHERAPY AND THE PREVALENCE OF MULTIDRUG RESISTANT STRAINS AMONG THE ISOLATED BACTERIAL PATHOGENS"** has been approved for the examination and is submitted to the Tribhuvan University in partial fulfillment of the requirement for Masters of Science Degree in Microbiology.

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ABSTRACT

Cancer and its treatment causes both direct and indirect effect on a patient's immune system which increases the susceptibility of immunosuppressed cancer patients to infections.UTI is the common bacterial infection generally detected in cancer patients specially in those who are on chemotherapy. UTI in cancer patients should be considered complicated when it occurs as a result of suppressed immunity.

This study was conducted in OM Hospital and Research Center, Kathmandu among cancer patients under chemotherapy from February 2009 to July 2009. The aim of this study was to investigate the incidence of UTI in these patients, establish an antibiotic susceptibility profile of the isolated organisms and determine the prevalence of MDR strains. This study was also carried out with an objective to find the possible association between the blood cell count and occurrence of UTI among these patients.

Altogether, 127 mid-stream urine samples from cancer patients under chemotherapy were investigated by conventional semi-quantitative culture technique, pus cell count, and albumin test for detection of UTI. Meanwhile blood samples were also collected from all the patients to determine their total WBC count and absolute neutrophil count.

Out of 127 urine samples, 26 (20.5%) samples showed significant bacterial growth. Status of significant bacteriuria was found higher in females (65.4%) than in males (34.6%). However, association between significant bacteriuria and gender of the patients was found to be statistically insignificant ($P>0.05$). The highest number of growth positive samples belonged to the age group 70-80 (38.5%). Maximum occurrence of UTI (n=13, 50%) were found in those patients who had received 6-8 chemotherapy cycles followed by those who had received 4-6 cycles (n=10, 38.5%). No significant association was found between the total WBC count and the occurrence of UTI ($P>0.05$). Similarly, no significant association could be established between UTI and the condition when ANC <1500 ($P>0.05$) .

Out of the 26 bacterial isolates, 25 were gram negatives and the remaining one isolate was a gram positive cocci. *Escherichia coli* was found to be the most predominant isolate (73%). Other bacterial isolates which were found in the study were *Citrobacter fruendii* (7.7%), *Klebsiella oxytoca* (7.7%), *P. aeruginosa*(3.9%), *Acinetobacter* spp.(3.9%) and *S. aureus* (3.9%).

Among the Gram negative organisms, Amikacin was found to be the most effective antibiotic followed by Ceftazidime and Nitrofurantoin. Fluoroquinolones were found to be highly resistant towards the majority of gram negative isolates. The only isolate of *S. aureus* was found susceptible towards Amikacin and Novobiocin.

Multidrug resistance (MDR) was observed in 88.5% (23/26) of the total bacterial isolates. Among the 19 *E. coli* isolates, 16 (84.2%) were MDR-strains. All the other batcerial isolates were also found to be multi-drug resistant.

Key words: UTI, cancer, chemotherapy, MDR, Total WBC count and ANC

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LIST OF ABBREVIATIONS

ANC	Absolute Neutrophil Count
BA	Blood Agar
CC-MSU	Clean Catch Mid Stream Urine
CFU	Colony Forming Units
CONS	Coagulase Negative Staphylococci
DNA	Deoxyribonucleic Acid
HPF	High Power Field
L	Litre
LPF	Low Power Field
MA	MacConkey Agar
MDR	Multi-drug Resistant
MHA	Mueller Hinton Agar
µl	Microlitre
MRSA	Methicillin Resistant *Staphylococcus aureus*
MRVP	Methyl Red Voges Proskauer
MSU	Mid-Stream Urine
NA	Nutrient Agar
NB	Nutrient Broth
nm	Nano Meter
NCCLS	National Committee for Clinical Laboratory Standards
ONPG	*o*-nitrophenyl-β-D-galactopyranoside
PAF	Prostatic Antibacterial Factor
PDA	Phenylalanine Deaminase
RBC	Red Blood Cell
SIM	Sulfide Indole Motility
TC	Total Count
TMP-SMX	Trimethoprim-Sulfomethaxole

TPD	Tetramethyl *p*-phenylene diamine dihydrochloride
TSIA	Triple Sugar Iron Agar
UPEC	Uropathogenic *E. coli*
UTI	Urinary Tract Infection
WBC	White Blood Cell
WHO	World Health Organization

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