

**ASSESSMENT OF PERITONEAL DIALYSIS
ADEQUACY AMONG CONTINUOUS AMBULATORY
PERITONEAL DIALYSIS (CAPD) PATIENTS IN
JOHANNESBURG HOSPITAL**

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A Dissertation Submitted to the Faculty of Health Sciences,
University of Witwatersrand, Johannesburg in Fulfillment of the
Requirements for the Award of the Degree of Master of Science
in Medicine

Johannesburg 2009

Declaration

I, Dr Aliyu Abdu declare that this research is my own work. It is being submitted for the degree of Master of Science in the University of Witwatersrand Johannesburg. It has not been submitted before for any degree or examination at this or any other university.

Date 22nd March 2010

Signature

A handwritten signature in purple ink, appearing to read 'Aliyu Abdu', is written over a faint, light blue rectangular grid.

Dedication

To all the CAPD patients and the PD Support Group in Johannesburg Hospital.

Publications and Presentations arising from this dissertation

1. Abdu A, Naidoo S, Malgas S, Naicker TJ, Mweemba A, Fabian J, Paget G and Naicker S. Assessment of Peritoneal Membrane Transport Characteristics of CAPD Patients at Johannesburg Hospital. Oral Presentation at the African Association of Nephrology meeting at Abuja, February 2009.
2. Abdu A, Ladiera NP, Naidoo S, Malgas S, Naicker TJ, Naicker S. Assessment of Nutritional status of CAPD patients at Johannesburg Hospital. Oral Presentation at the African Association of Nephrology meeting at Abuja, February 2009.
3. Abdu A, Naidoo S, Malgas S, Ladeira NP, Naicker J, Mweemba A, Fabian J, Paget G and Naicker S. Membrane Characteristics, Small Solute Clearance and Nutritional Status of Indigenous African CAPD Patients. Poster Presentation at the World Congress of Nephrology. Milan, May 2009.
4. Abdu A, Naidoo S, Malgas S, Ladeira NP, Naicker J, Mweemba A, Fabian J, Paget G and Naicker S. Membrane Characteristics, Small Solute Clearance and Nutritional Status of Indigenous African CAPD Patients. Poster Presentation at the World Congress of Nephrology Satellite Meeting on Chronic Kidney Disease in Disadvantaged Populations. Milan, May 2009.

Abstract

Introduction: Measurement of small solute clearance is the objective means of quantifying dose of peritoneal dialysis (PD) and various organisations have issued guidelines on target values. Assessment of PD adequacy involves other factors such as blood pressure control, anaemia management, mineral metabolism, nutritional status and ultrafiltration. Membrane transport characteristic is important for PD prescription on an individual patient basis and is related to patient outcome. In this study the adequacy of PD, using small solute clearance measurement as well as other factors, and membrane characteristics have been assessed and classification of patients using our own reference values is reported for the first time. Nutritional status has been studied and the use of simple tools such as the subjective global assessment has been validated for use in our patients.

Materials and Methods: A cross sectional study involving 80 adult continuous ambulatory peritoneal dialysis (CAPD) patients. Peritoneal equilibration test (PET) was performed to assess the membrane characteristics; 24 hour dialysate fluid and urine samples were collected and used for the measurement of solute clearance, while nutritional status was assessed using the subjective global assessment (SGA) instrument, anthropometric measurements and serum albumin estimation.

Results: The mean age was 38 ± 12.43 years, 42.3% were females and 86% were blacks. Mean duration on CAPD was 19.8 ± 20.67 months. The mean of 4 hour D/P creatinine was 0.74 ± 0.13 and based on this, 18% were high transporters, 33.8% high average, 36.9% low average and 12% low transporters. Mean kt/v urea was 1.72 ± 0.32 , and the recommended level of 1.7 was achieved by 62.8% of the patients. Mean haemoglobin was 10.99 ± 2.14 g/dl and the recommended target value of 11-12g/dl was reached by 55.8% of the patients. The mean BMI

was 24.76 ± 3.50 , mean Mid Upper Arm Circumference (MUAC) was 28.53 ± 3.89 cm and mean serum albumin was 37.10 ± 7.6 g/l. Based on SGA scores, 42% of our patients were well nourished, 50% moderately undernourished while 8% were severely malnourished. We noted significant correlations between SGA score and BMI and MUAC while there was none with serum albumin level. The mean serum calcium and phosphate levels were within normal though the mean PTH level was higher.

Conclusion: The D/P creatinine at 4 hours was higher than those reported in the literature, though the distribution of the transport types was similar. The recommended targets of kt/v and haemoglobin were achieved by the majority of our patients. Mineral metabolism parameters were within normal range. Malnutrition is common and SGA is a reliable method for nutritional assessment in our patients.

Acknowledgement

I thank God almighty for his numerous privileges to me, and making it possible for me to do this work.

My sincere gratitude goes to my supervisors Professor Saraladevi Naicker and Dr Sagren Naidoo for their guidance and supervision through the performance and writing of this work.

I wish to also thank the International Society for Peritoneal Dialysis (ISPD) for the scholarship offered to me under the fellowship programme of the association, after Professor Naicker had graciously accepted me as a fellow in the Division of Nephrology of the University of Witwatersrand. She proved to be a wonderful mentor who has moulded my career in the field of Nephrology.

I thank my collaborators Dr J Naicker and all the registrars in the Chemical Pathology Department, Sister Shirin Malgas and all the nurses in the PD unit of Johannesburg Hospital, Prof P Manga and Dr Nathan Ruhumaya of the Cardiology Division, as well as Nicole Ladiera of the Dietetics Department of the Johannesburg hospital.

I wish to thank all the consultants in the Division of Nephrology of the University of Witwatersrand: Drs Graham Paget, S Wadee, J Fabian and S Naidoo for the professional guidance I received from them during my training. In the same vein I thank Prof Meyers. Similarly, I wish to thank Drs G. Saleshando, A. Mweemba, G. Kalunga, A. Odonmeta and all the Nephrology fellows and the support staff of the Division of Nephrology.

I also thank Dr M.L Umar of the Department of Community Medicine Aminu Kano Teaching Hospital for his assistance in the statistical analysis of this work.

My wife Hafsat and our son Abdullahi have been a great source of inspiration and I thank them particularly for their patience, understanding and all the support they rendered to me. I am also grateful to my brothers and sisters for their support and prayers.

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Abbreviations

AGEs	Advanced Glycation End Products
AMVL	The anterior mitral valve leaflet
ANOVA	Analysis of Variance
APEX	Accelerated Peritoneal Examination
AQP	Aquaporins
BMI	Body Mass Index
BSA	Body Surface Area
BP	Blood Pressure
CA125	Cancer Antigen 125
Ca	Calcium
CAPD	Continuous Ambulatory Peritoneal Dialysis
CCPD	Continuous Cycler-Assisted Peritoneal Dialysis
Cl	Chloride
CrCl	Creatinine Clearance
CV	Cardiovascular
DATT	Dialysis Adequacy and Transport Test
D/D0	Ratio of dialysate glucose concentration at specified time to the initial level in the dialysate solution
D/P	The ratio of solute concentration in the dialysate and plasma
ESRD	End Stage Renal Disease
G6PDH	Glucose-6-phosphate-dehydrogenase
GDP	Glucose Degradation Product

HBV	High Biological Value
HCT	Haematocrit
ISPD	International Society for Peritoneal
IVST _d	Interventricular Wall Thickness During Diastole
k	Solute Clearance
LBM	Lean Body Mass
LV	Left Ventricle
LVEDD	Left ventricular internal dimension measurements in end-diastole
LVESD	Left ventricular internal dimension measurements end-systole
MC	Mesothelial Cells
Mg	Magnesium
MRC	Medical Research Council
MTAC	Mass Transfer Area Coefficient
MUAC	Mid Upper Arm Circumference
MW	Molecular Weight
Na	Sodium
NHLS	National Health Service Laboratories
NIPD	Nocturnal Intermittent Peritoneal Dialysis
NKF	National Kidney Foundation
nPNA	Normalized Protein Nitrogen Appearance
PD	Peritoneal Dialysis
PDC	Peritoneal Dialysis Capacity
PEM	Protein-Energy Malnutrition

PET	Peritoneal Equilibration Test
PTH	Parathyroid Hormone
PWT _d	Posterior Wall Thickness During Diastole
RRT	Renal Replacement Therapy
RSA	Republic of South Africa
SGA	Subjective Global Assessment
SPA	Standard Peritoneal Permeability Analysis
t	Treatment Time
TSF	Triceps Skin Fold Thickness
UF	Ultrafiltration
UKM	Urea Kinetic Modeling
v	Distribution Volume Dialysis