

BIOCHEMICAL AND HAEMATOLOGICAL PROFILE OF DIABETIC NEPHROPATHY

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By

ASAMOAH-BOADI, HELEN (MS)

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

KUMASI

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DECLARATION

The experimental work described in this thesis was carried out at the Department of Molecular Medicine, KNUST. This work has not been submitted for any other degree.

.....

Asamoah-Boadi Helen

(Student)

.....

Date

.....

Dr. W. K. B.A. Owiredu

(Supervisor)

.....

Date

.....

Prof. Ben A. Eghan Jnr

(Supervisor)

.....

Date

.....

Dr. E. F. Laing

(Supervisor)

.....

Date

.....

Dr R. A. Ngala

(Head of Department)

.....

Date

ABSTRACT

Background: Diabetic nephropathy, a microvascular complication of diabetes mellitus is now considered to be the leading known cause of end-stage renal disease (ESRD) in most countries.

The objective of this study is to establish the haematological and biochemical profile of patients with diabetic nephropathy, so as to gain as much knowledge as possible about the disease, to help prevent the complication where possible and improve the quality of life of those affected.

Method: A total of 101 type 2 diabetics with microalbuminuria (63) and overt nephropathy (38) were recruited for the study. 52 diabetics without nephropathy were recruited as controls. Structured questionnaires were administered to them and their venous blood samples taken for biochemical and haematological assays.

Results: The mean age of the study group was 57.5 ($\pm$ 9.6) years. Duration of disease and systolic blood pressure were significantly higher in the patient group ($p < 0.05$).

Total WBC and neutrophil count were also significantly higher in the patient group as compared to controls.

Fasting blood sugar, serum albumin, globulin, total cholesterol and LDL cholesterol were found to be significantly higher in the patient group ($p < 0.05$). Serum urea, creatinine, sodium, chloride and total iron were also significantly higher in the group. eGFR and serum vitamin B12 were found to be significantly lower in the patient group.

Conclusion: Diabetics who develop microalbuminuria and nephropathy have several haematological and biochemical abnormalities, and these should be assessed and analysed periodically to help effectively manage their conditions.

Key words: Microalbuminuria, Diabetic Nephropathy, Diabetes Mellitus, End Stage Renal Disease.

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DEDICATION

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LIST OF ABBREVIATIONS

1. ACE	Angiotensin Converting Enzyme
2. ADP	Adenosine Diphosphate
3. AGE	Advanced Glycation End-product
4. ATP	Adenosine Triphosphate
5. BMI	Body Mass Index
6. CKD	Chronic Kidney Disease
7. CKD-EPI	Chronic Kidney Disease Epidemiological Collaboration
8. DBP	Diastolic Blood Pressure
9. DHTN	Diastolic Hypertension
10. DM	Diabetes Mellitus
11. EDTA	Ethylene Diamine Tetra-Acetic Acid
12. eGFR	estimated Glomerular Filtration Rate
13. ELISA	Enzyme Linked Immunosorbent Assay
14. ESR	Erythrocyte Sedimentation Rate
15. ESRD	End Stage Renal Disease
16. FA	Folic Acid

17. G6PD	Glucose -6-Phosphate Dehydrogenase
18. GFR	Glomerular Filtration Rate
19. HDL	High Density Lipoprotein
20. HK	Hexokinase
21. HRP	Horseradish Peroxidase
22. ICAM	Intracellular Adhesion Molecule
23. IDDM	Insulin Dependent Diabetes Mellitus
24. IDF	International Diabetes Federation
25. IL	Interleukin
26. KDOQI	Kidney Disease Outcome Quality Initiative
27. LDL	Low Density Lipoprotein
28. LT	Low Turnover
29. MAP	Mitogen Activated Protein
30. MCH	Mean Cell Haemoglobin
31. MCHC	Mean Cell Haemoglobin Concentration
32. MCV	Mean Cell Volume
33. MDRD	Modification Of Diet Renal Disease

34. MMP	Matrix Metallo-Proteinases
35. NADPH	Reduced Nicotinamide Adenine Dinucleotide Phosphate
36. NIDDM	Non Insulin Dependent Diabetes Mellitus
37. OHA	Oral Hypoglycemic Agent
38. PAI	Plasminogen Activation Inhiitor
39. PCV	Packed Cell Volume
40. PKC	Protein Kinase C
41. PTH	Parathyroid Hormone
42. RBC	Red Blood Cells
43. ROS	Reactive Oxygen Species
44. RRT	Renal Replacement Therapy
45. SBP	Systolic Blood Pressure
46. SHTN	Systolic Hypertension
47. SLS	Sodium Lauryl Sulphate
48. TMB	3, 3', 5, 5' - Tetra Methyl Benzidine
49. TNF	Tissue Necrotic Factor
50. VEGF	Vascular Endothelial Growth Factor

51. VLDL	Very Low Density Lipoprotein
52. WBC	White Blood Cells
53. WHO	World Health Organization
54. WHR	Waist/Hip Ratio