THE ROLE OF ALPHA THALASSAEMIA IN UNEXPLAINED MICROCYTOSIS AT THE WITS ACADEMIC HOSPITALS

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A dissertation submitted to the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, in fulfillment of the requirements for the degree of Masters of Science.

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DECLARATION

I declare that this dissertation is my own work. It is being submitted for a Masters of Science at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any other degree or examination at any other university.

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Signature

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ABSTRACT

Introduction:

At the University of Witwatersrand academic hospitals, unexplained microcytosis is a commonly encountered clinical problem. The differential diagnosis of microcytosis includes iron deficiency, anaemia of chronic disorder, sideroblastic anaemia (both congenital and acquired e.g. lead poisoning) and thalassaemia trait. α thalassaemia trait is most often not detected through conventional laboratory methods and molecular analysis becomes necessary in this setting.

Aim:

To investigate the role of α thalassaemia trait in South African subjects with unexplained microcytosis using a multiplex PCR assay.

Methods:

Multiplex PCR testing was employed to detect the seven most common deletional defects described in alpha thalassaemia. Other causes of microcytosis were excluded by way of iron studies and Hb sub-fractionation.

Results:

The control and patient groups comprised 97 and 86 subjects respectively. In the patient group, α thalassaemia trait accounted for 78% of unexplained microcytosis.

Conclusion:

This study demonstrates that alpha thalassaemia is the commonest cause of unexplained microcytosis.

DEDICATION

Dedicated to;

My daughter Atiyya

and

my husband

Hassen Essop Loonat

1958 - 2000

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LIST OF ABBREVIATIONS

ACD	Anaemia of chronic disorders
ARMS	Refractory mutation system
ASO	Allele specific oligonucleotide
BSA	Bovine serum albumin
CHBH	Chris Hani Baragwanath Hospital
CMJH	Charlotte Maxeke Johannesburg Hospital
DNA	Deoxyribonucleic acid
EDTA	Ethylenediamine tetra-acetic acid
EVH	Extravascular Haemolysis
G6PD	Glucose phosphate dehydrogenase deficiency
Hb	Haemoglobin
HbC	Haemoglobin C
HbE	Haemoglobin E
HbS	Haemoglobin S
HbH	Haemoglobin H
HCT	Haematocrit
HE	Hereditary Elliptocytosis
HPFH	Hereditary persistence of foetal haemoglobin
HPLC	High performance liquid chromatography
HS	Hereditary Spherocytosis
MCH	Mean cell haemoglobin
MCHC	Mean cell haemoglobin concentration

MCV	Mean cell volume
NADP	Nicotinamide adenine dinucleotide phosphate
PCR	Polymerase chain reaction
PLT	Platelet
PK	Pyruvate Kinase
RCC	Red cell count
RDW	Red cell distribution width
RET	Reticulocyte
ROC	Receiver operating characteristic curve
SAS	Statistical analysis system
WCC	White cell count