# RED CELL SIZING AS A NEW SCREENING METHOD FOR HEMATOLOGISTS

THESIS SUBMITTED
FOR PARTIAL FULFILMENT OF
MASTER DEGREE

IN

*CLINICAL PATHOLOGY*

BY

*MOHAMED HASSAN SHAHEEN*



SUPERVISED BY

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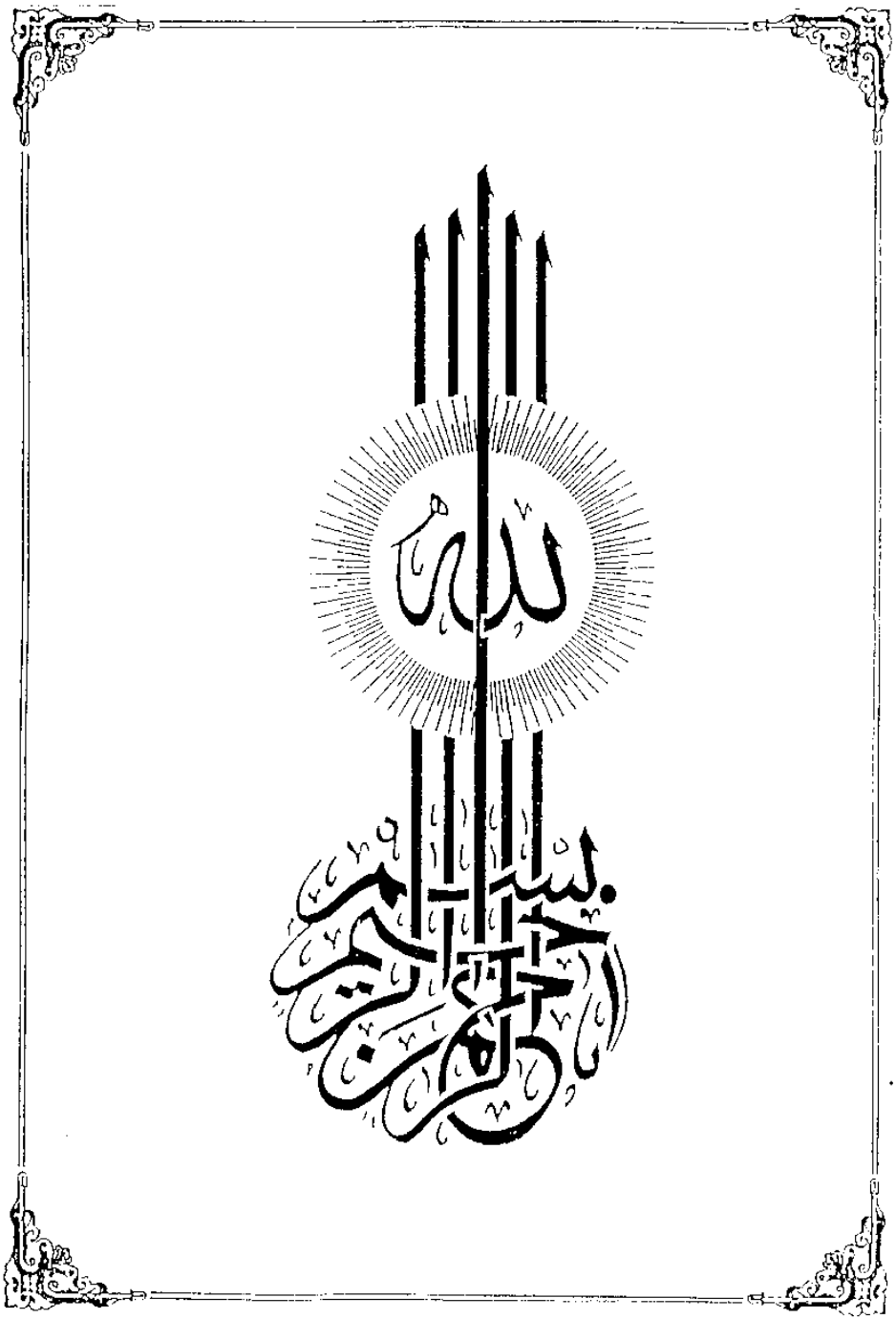

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*TO MY PARENTS*

## ACKNOWLEDGEMENT

I sincerely express my grattitude to Professor Wageeh Naguib not only for supervising this thesis but also for his remarkable way in teaching hematology. Indeed, we enjoyed the interesting discussions throughout his lectures which rendered the subject far from being theoretical.

I feel most grateful to Professor Samir Hanna for his valuable lecture on "thesis writing". In fact, his new trend in teaching statistics to candidates of clinical pathology was of great benefit that I have felt while dealing with this subject.

Thanks to Professor Sawsan Fayaad for her valuable assistance.

Lastly, I highly appreciate the kind co-operation of Dr. Nevine Kassem, who raised the idea of this work.

# INTRODUCTION

# INTRODUCTION

The modern hematologist should follow the advances of technology in medical laboratory. In recent years, there is a great increase in the laboratory generated data which need to be understood by clinicians. Red cell size measurements are among these laboratory data which have been subjected to intensive studies over the past century.

The observatoins made by earlier workers that the red cell size varies in different disease states, has excited the invitaion of so many technics for red cell sizing. The clinical utility of red cell size measurements have been the matter of intensive study.

Four red cell size measuremnts are going to be discussed here namely, the mean corpuscular volume "MCV", the hematocrit "HCT", red cell distribution width "RDW" and red cell volume distribution curves. Althogh these parameters are routinely available from multifunctional electronic cell counters, technics for their measurements were available earlier in this century. These early technics were tedious and time consuming especially those used for quantitative assessment of the variation of red cell size distribution by Price-Jones (1910).

This essay aimed at two objectives, the first is to

give short note on various technics used for red cell sizing. Two of these technics, the Coulter aperture impedance method for counting and sizing blood cells and the centrifugal hematocrit method are discussed in details. The second objective is to clarify the clinical importance and utility of these parameters as a screening method for; possible cause of anemia, selection of further diagnostic and confirmatory tests and monitoring patients progress on an appropriate therapy.

The various technics used for determination of the MCV and the hematocrit and their clinical utility were subject ot intensive studies over the past 60 years. The clinical utility of the relatively new parameters; red cell distribution width "RDW" and the red cell volume distribution curves which were first introduced on routine basis in 1978 by Coulter counters Model S pulus series has not been fully established.

The introduction of these new measurements has evoked criticism by clinicians, what information they give more than those we get from stained blood film, are they measurements searching for clinical role ?.

Therefore, the clinician who will use these parameters should have good idea about the mechanism of measurement, meaning, indications and pitfalls. Only then

may these parameters be judged to possess clinical utility. After reading this essay one hope to give the answer of this question; is red cell size output from Coulter S plus series of instruments "convenient, precise and clinically informative" as claimed by Jones (1982) ?.

# CHAPTER I

# HISTORICAL ASPECTS AND PRINCIPLES OF RED CELL SIZING