RADIONUCLIDES AND TECHNIQUES USED FOR MYOCARDIAL PERFUSION SCINTIGRAPHY IN PATIENTS WITH CORONARY ARTERY DISEASE : AN UPDATED REVIEW

ESSAY

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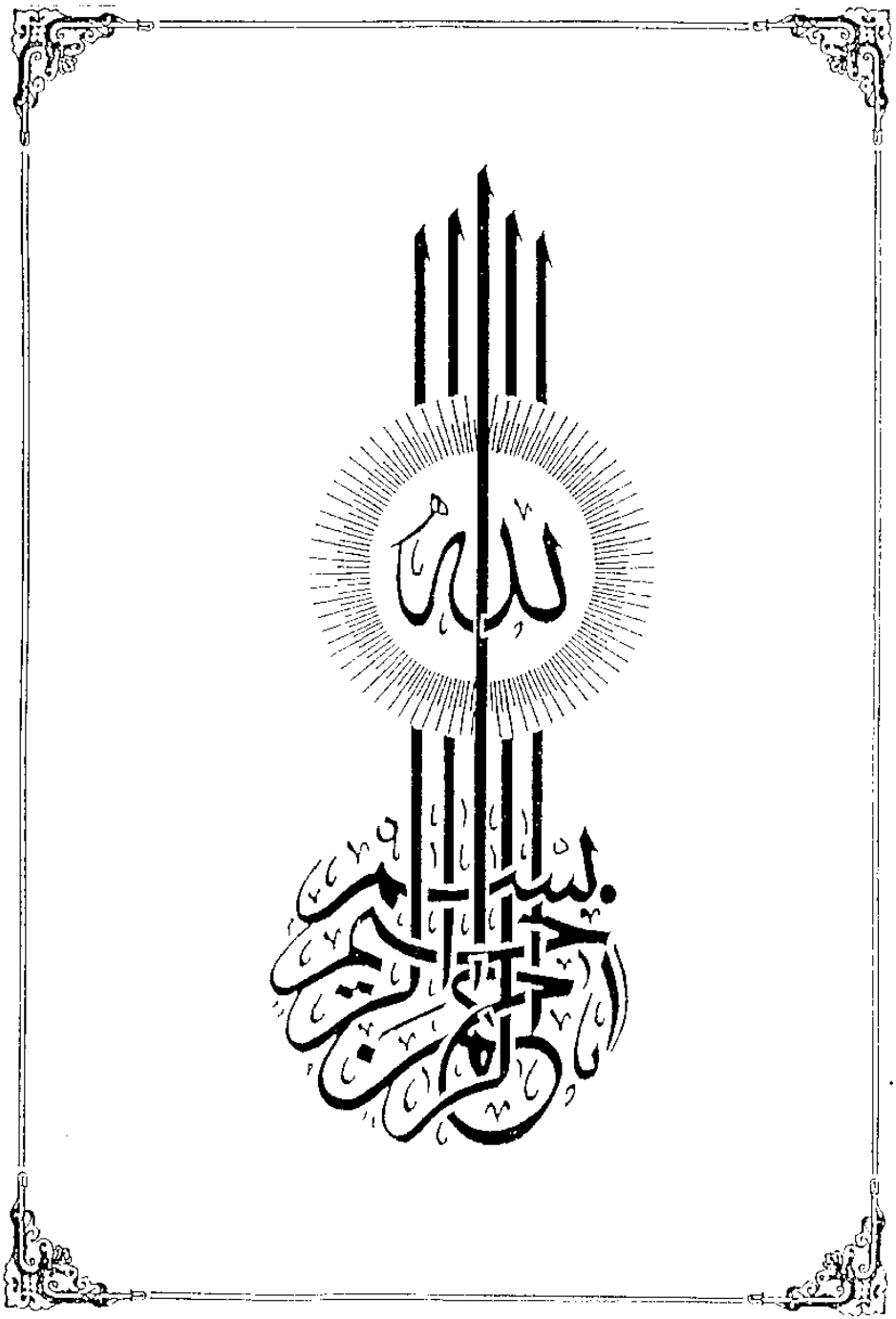

CONTENTS

List of Figures

List of Tables

List of Cases

INTRODUCTION

AND

AIM OF WORK

INTRODUCTION AND AIM OF THE WORK

Rapid progress and changes in the different methods employed to study coronary artery disease have been achieved in the last decade or so . Of these methods , myocardial scintigraphy is the one gaining the focus of most attention , replacing coronary angiography in some clinical situations . particularly towards the diagnosis of the disease and limiting the applications of angiography to pre - operative assessement in many of the cardiac centers worldwide .

Many changes and modifications have developed in the scintigraphic techniques and employed radiotracers . Controversy , is still present and debates are ongoing , as whether to use thallium - 201 or technetium - 99m agents to study myocardial perfusion . whether to start with stress or rest scanning . what is the best form of stress . and whether to re - inject the patient before rest study or not .

Many points of views are there in the literature but the standard technique and choice of a radionuclide have not been established .

Hence , the aim of this work is to review the literature . including the most recent articles in order to have an overview of the current status of

myocardial perfusion scintigraphy , and perhaps also to deduce the probable future steps towards approaching the most ideal mean of examining the coronary blood flow .

ANATOMY

ANATOMY OF CORONARY CIRCULATION

The coronary arteries are the nutrient arteries of the heart . and are greatly enlarged vasa vasorum . They arise from two of the three dilatations (sinuses) at the root of the aorta . the right coronary artery from the right sinus . and the left coronary artery from the left sinus . (**Romanes , 1975**) .

Angiography visualizes only a small portion of the coronary circulation : The major epicardial branches and their second - , third - . and perhaps fourth - order branches . The myriad of small intra myocardial branches are not visualized because of their small size . cardiac motion . and limitations in resolution of cine imaging systems . Although these small " resistance " vessels play a major role in regulation of coronary blood flow . they are not thought to be important in human coronary artery disease [CAD] . (**Levin and Gardiner , 1987**) .

By cineangiography . the anatomy of coronary arteries is demonstrated in the standard left anterior oblique (LAO) and right anterior oblique (RAO) projections for both the right and the left Coronary system . In addition . an LAO view of the left coronary system with cranial angulation is shown . since this is the most commonly used sagittal - angulation view . (**Figure , 1**) , (**Grossman , 1991**) .

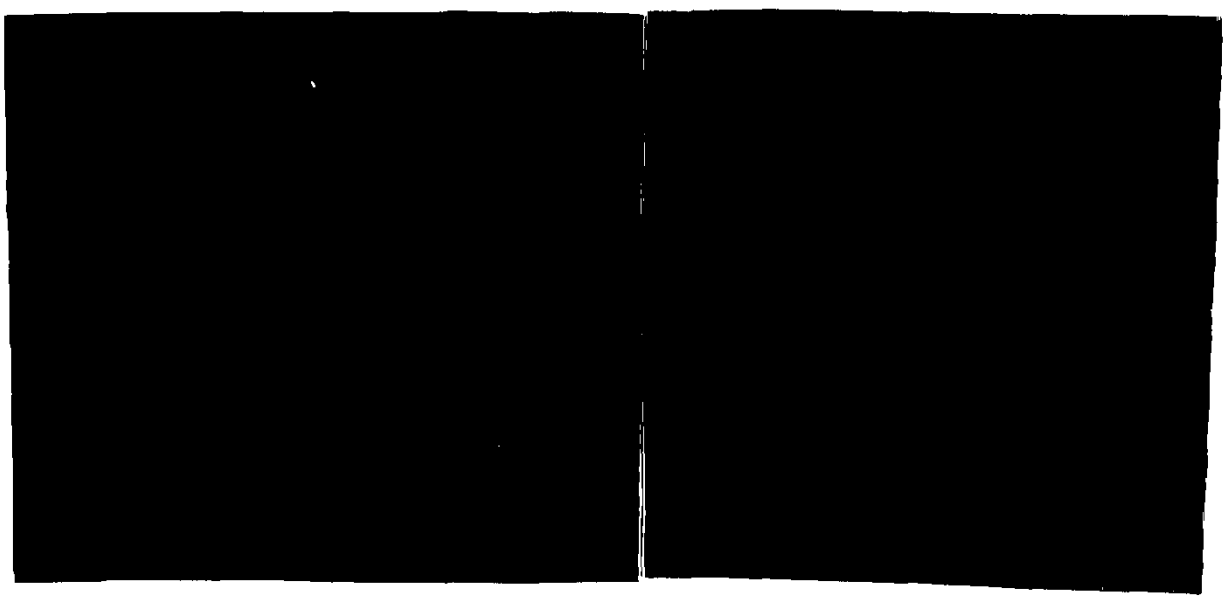

Figure 1 : Anatomy of the coronary arteries demonstrated by cineangiography .

(After Grossman , 1991) .

A - LEFT CORONARY ARTERY (LCA) , (FIGURE 2) :

The main LCA arises from the upper portion of the left aortic sinus , just below the sinotubular ridge . It passes behind the right ventricular outflow tract and may extend for 0-10 mm . It then usually bifurcates into left anterior descending (LAD) and left circumflex branches . (**Click et al. , 1989**) .

1- LEFT ANTERIOR DESCENDING ARTERY (LAD)

The LAD passes down the anterior interventricular groove toward the cardiac apex . In the right anterior oblique (RAO) projection , it extends toward the anterior aspect of the heart . In the left anterior oblique (LAO) projection , it passes down the cardiac midline between the right and left ventricles . Its major branches are the septal and diagonal branches .

(A) The septal branches pass downward into the interventricular septum . They vary in size , number , and distribution . These septal branches interconnect with similar septal branches passing upward from the posterior descending branch of the right coronary artery to produce a network of potential collateral channels .

(B) The diagonal branches pass over the anterolateral aspect of the heart , and it usually is one of these branches which supplies the apex itself .