EVALUATION OF ECG CRITERIA OF ATRIAL ENLARGEMENT BY QUANTITATIVE TWO DIMENSIONAL ECHOCARDIOGRAPHY

Thesis

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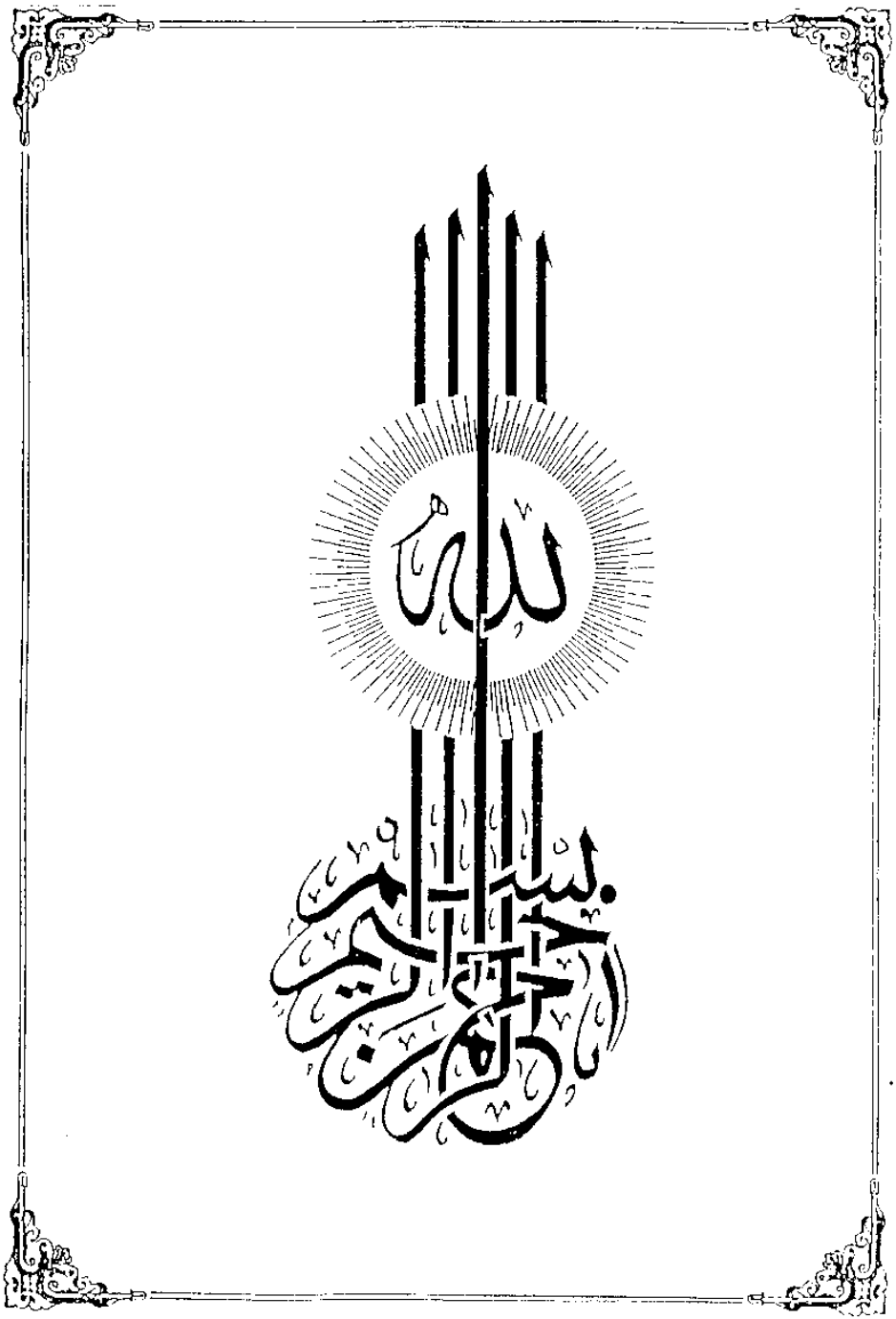

To My Family

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List of Abbreviations

Ao	Aorta
FN	False negative
FP	False positive
HTN	Hypertension
IHD	Ischemic heart disease
LA	Left atrium
LAA	Left atrial appendage
LAE	Left atrial enlargement
LAH	Left atrial hypertrophy
LPV	Left pulmonary vein
LV	Left ventricle
LVOT	Left ventricular outflow tract
MRI	Magnetic resonance imaging
PIF	P wave initial forces
PT	Pulmonary trunk
PTF	P wave terminal forces
RA	Right atrium
RAA	Right atrial appendage
RAE	Right atrial enlargement
RAH	Right atrial hypertrophy
RPV	Right pulmonary vein
RV	Right ventricle
RVOT	Right ventricular outflow tract
TN	True negative
TP	True positive

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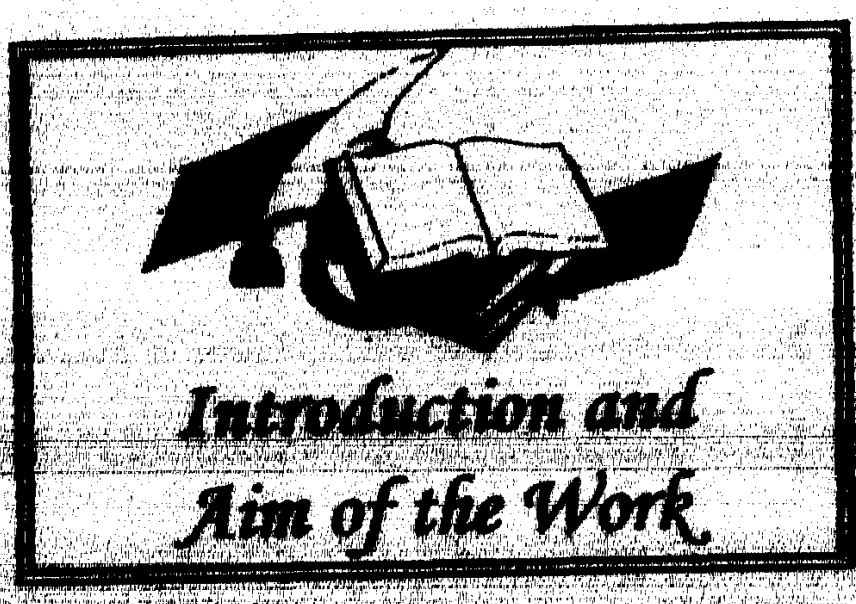

Introduction and Aim of the Work

INTRODUCTION

Quantitative two-dimensional echocardiography has been shown to be reproducible method for evaluating normal and enlarged left and right atrium ***(Yang et al., 1984).***

Reliable electrocardiographic (ECG) criteria for atrial enlargement were thought to offer a simple and inexpensive way to detect the presence of atrial enlargement in tricuspid, in pulmonary and mitral valve diseases, pulmonary hypertension, cardiomyopathy and some forms of congenital heart diseases. However, traditional ECG criteria of atrial enlargement have been increasingly criticized as insensitive and non-specific ***(Surawiczz et al., 1986).***

Some studies found that the most previously reported ECG criteria for atrial enlargement have a low predictive value. For example, (P pulmonale) detected only in 6% of patients with right atrial enlargement ***(Kaplan et al., 1994).***

In a study of 57 patients with echocardiographically confirmed left atrial enlargement, the sensitivity of various ECG criteria of left atrial enlargement, varied from as low as 15% for notched P wave to as high as 83% for negative P wave of more than 0.04 second in lead V1 ***(Munuswamy et al., 1984).***

Further studies are needed to prospectively validate the previous findings.

AIM OF THE WORK

The aim of the study therefore is to evaluate electrocardiographic criteria of atrial enlargement by quantitative two-dimensional echocardiography.

GROSS AND ECHOCARDIOGRAPHIC ANATOMY OF THE RIGHT AND LEFT ATRIUM

The right atrium is a thin-walled (slightly thinner than the left) irregularly shaped that occupies the majority of the right superior quadrant of the heart The posterior and superior border of the right atrium lies at the same level as and are continuous with those of the left atrium ***(Weyman et al., 1994).***

The right atrium is located anterior as well as to the right of the left atrium also extending inferior to it as the interatrial septum oblique. Its wall forms the right upper sternocostal surface, the convex right border as well as a little of the right side of the anatomic base ***(Gray et al., 1995).***

The right atrial chamber can be divided neatly (for purpose of description) into two parts; anterior and posterior which are very different in internal appearance and developmental origin. The posterior half developed from the sinus venosus of the embryo; it is a smooth rounded channel, a half cylinder into which the superior and inferior vena cavae enter such that all the three structures (SVC, right atrium, IVC) are all in the same vertical axis. On the other hand, the anterior right atrium developed from the primitive atrium is lined by transverse parallel ridges (pectinate bands) and opens near its upper pole into the right atrial

appendage. The latter is a small, blind pouch, the inner surface of which is made uneven by irregular small corrugations. Its chief significance is that it is a common site for small thrombi to form if atrial blood is rendered sluggish by atrial fibrillation, gross atrial dilatation or tricuspid valve stenosis ***(D'Cruz, 1996).***

The right atrial appendage is short with a wide base ***(Peter et al., 1996).*** An extensive muscular pouch "the auricle" projects anteriorly to overlap the right side of the ascending aorta and has a wide junction with the true atrial component of the atrium ***(Gray et al., 1995).***

At the junction of the posterior and anterior halves of the right atrium, are certain anatomic landmarks representing persistent remnants of embryonic structures: (1)The crista terminalis is a ridge that starts above the junction of the SVC and the right atrium and then runs vertically downwards along the lateral (right) atrial wall almost as far as the anterior edge of the IVC opening. The sinus node is located at the upper edge of the crista. On the external right atrial surface, a groove (sulcus terminalis) corresponds to crista terminalis inside. (2)The eustachian valve a crescentic fold of endocardium is located at the anterior rim of IVC opening. (3)The thebesian valve a smaller but similar endocardial fold guards the opening of the coronary sinus into the right atrium. Whereas, these structures are normally present another structure (4)Chiari network also derived from embryonic