EFFECT OF TRANSVENOUS BALLOON MITRAL VALVULOPLASTY ON RIGHT VENTRICULAR FUNCTION ASSESSED BY EQUILIBRIUM RADIONUCLIDE ANGIOCARDIOGRAPHY

Thesis

Submitted in Partial Fulfillment for the

M.D. Degree in Cardiology

By

MOHSEN FAHMY METWALLY ALY
Master Degree in Cardiology
Ain Shams University

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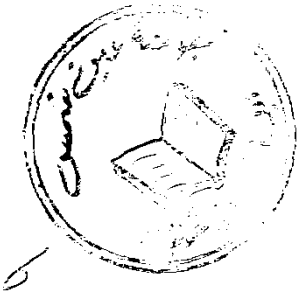

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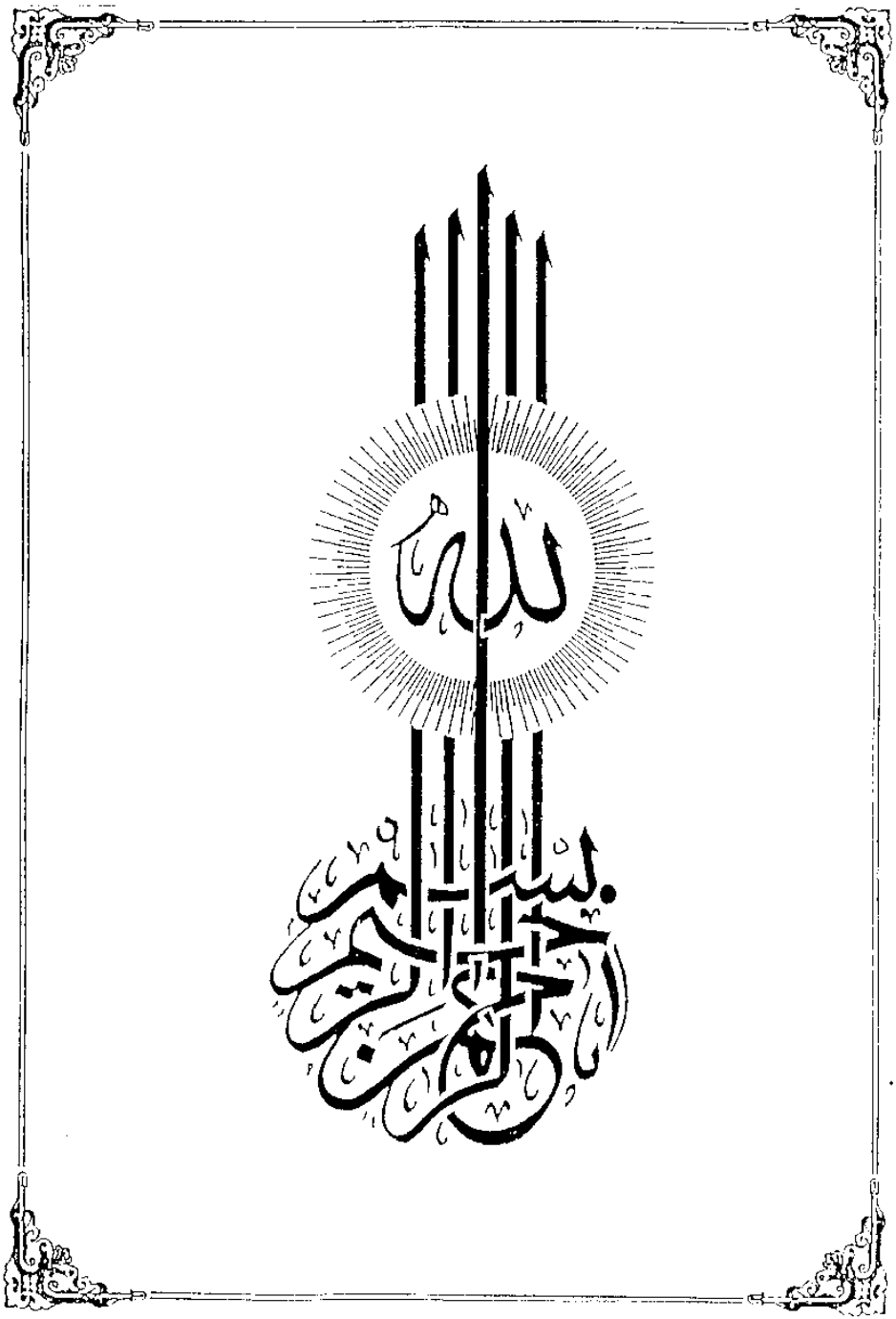

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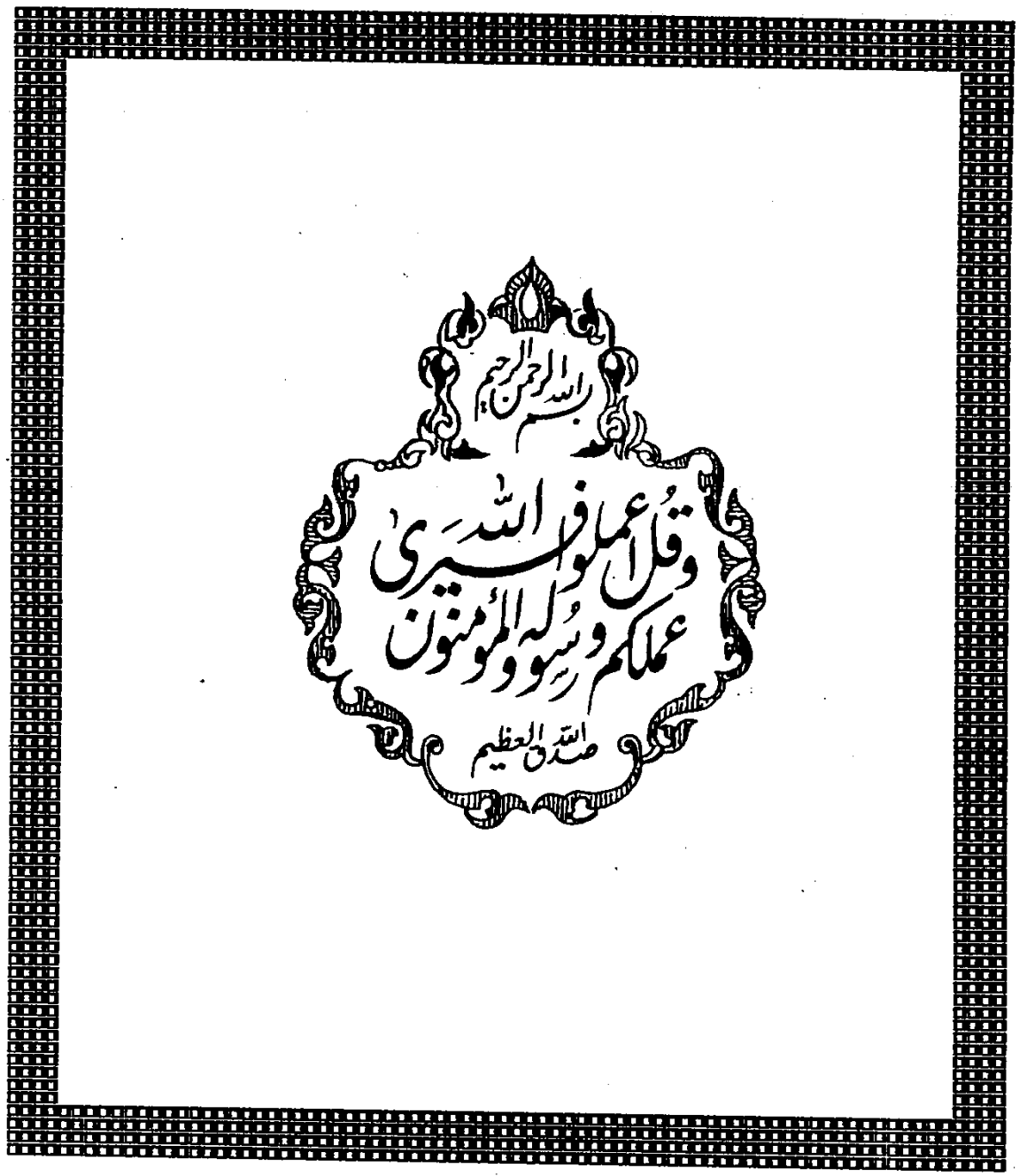

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To
My Parents
and
Brothers

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Acknowledgement

It is a great thing to feel success and have the pride of achieving all what is always aspired. nevertheless, one must not forget all those usually help and push him onto the most righteous way that inevitably ends with fulfillment and perfection.

When the instant comes to appreciate all those kind-hearted people. I soon mention Prof. Dr. Mahmoud El-Sherbini, Professor of cardiology, Ain Shams University, the person who gave me the honor by reading every word written in this thesis. He really helped me by his precious opinions and contributive comments that served much in the construction of this work.

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Last but not least. I would like to extend my recognition to my parents who are behind each fruitful step in my life with their wisdom, encouragement and tender guidance.

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CONTENTS

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LIST OF ABBREVIATIONS

M = male F = female Ca = calcification
SR = sinus rhythm AF = atrial fibrillation
S1 = first heart sound
P2 = pulmonic component of second heart sound
N = normal ↑ = loud ↓ = weak
+1 = short late diastolic rumble
+2 = mid-to late diastolic rumble
+3 = long diastolic rumble
MVA = mitral valve area
MDPG = mean diastolic pressure gradient
MV = mitral valve
T = thickness
M = motion
S = subvalvular affection
LA = left atrium
MR = mitral regurgitation
Ao. R. = aortic regurgitation
RVSP = right ventricular systolic pressure
LVEF = left ventricular ejection fraction
TR = tricuspid regurgitation
PAT = pulmonary acceleration time
mPAP = mean pulmonary artery pressure
IAS = interatrial septum
TEE = transesophageal echocardiography
RVEF = right ventricular ejection fraction
PFR = peak filling rate
TPFR = time to peak filling rate
EDV = end diastolic volume
msec = milli second
SPAP = systolic pulmonary artery pressure
A = after B = before

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INTRODUCTION

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INTRODUCTION

Rheumatic heart disease is the most common heart disease in much of the developing countries[1]. Mitral stenosis is the most valvular lesion complicating rheumatic fever[2]. Mitral stenosis represents an important cause of pulmonary hypertension with subsequent right ventricular failure. After corrective surgery, both pulmonary hypertension and pulmonary vascular resistance decline; the major extent of which is noted within the first postoperative week[3].

Mitral Stenosis is now commonly treated by balloon valvuloplasty. Balloon mitral valvuloplasty (BMV) was first described in 1984 by Inoue et al.[4], and then by Lock et al., in 1985[1]. In 1986, Al Zaibag et al., has introduced double balloon mitral valvuloplasty technique[5].

Balloon mitral valvuloplasty has provided the opportunity to observe the effects of relieving the mitral valve obstruction free from the obscuring effects of general anaesthesia, intubation, and thoracotomy. Substantial reversibility of the pulmonary hypertension, reduction of the elevated pulmonary vascular resistance, and improvement of right ventricle had been observed following successful BMV, in patients with advanced mitral stenosis[6]. As might be expected, the extent of reversal of elevated pulmonary vascular resistance has varied depending on the adequacy of the valvuloplasty procedure in producing an increase

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in the mitral orifice area and whether the patient develops mitral restenosis in the months following balloon dilatation[6]. Right ventricular failure is a common complication of tight mitral stenosis. This may be due to increased after load, chronic volume overload, myocardial failure or a combination of all[3,7]. The degree of pulmonary hypertension and right ventriclular failure have been considered as determintal factors in the natural history of mitral stenosis[8].

Initial studies of right ventricular function depended on invasive cardiac catheterization and contrast angiography and was based on radiographic validation of right ventricular volumes from postmortum casts of right ventricle[9], and on stroke volume determination by thermodilution technique[10]. However, assessment of right ventricular ejection fraction (RVEF) poses problems that are not encountered when measuring left ventricular ejection fraction. Since the right ventricular cavity is irregular and crescent in shape and has numerous trabeculations, it does not conform to any regular geometric model. Right ventricular ejection fraction calculation from contrast ventriculography and echocardiography is therefore, unreliable[3, 11].

Radionuclide cineangiographic techniques, being counts based, overcome the constraints of complex geometry and are therefore, more suited for studies of right ventricular function[12].

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