Evaluation of transesophageal versus transthoracic echocardiography in the selection of patients prior to percutaneous balloon mitral valvuloplasty

Thesis
Submitted in partial fulfilment for
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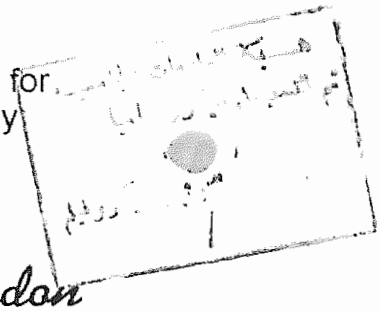

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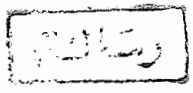

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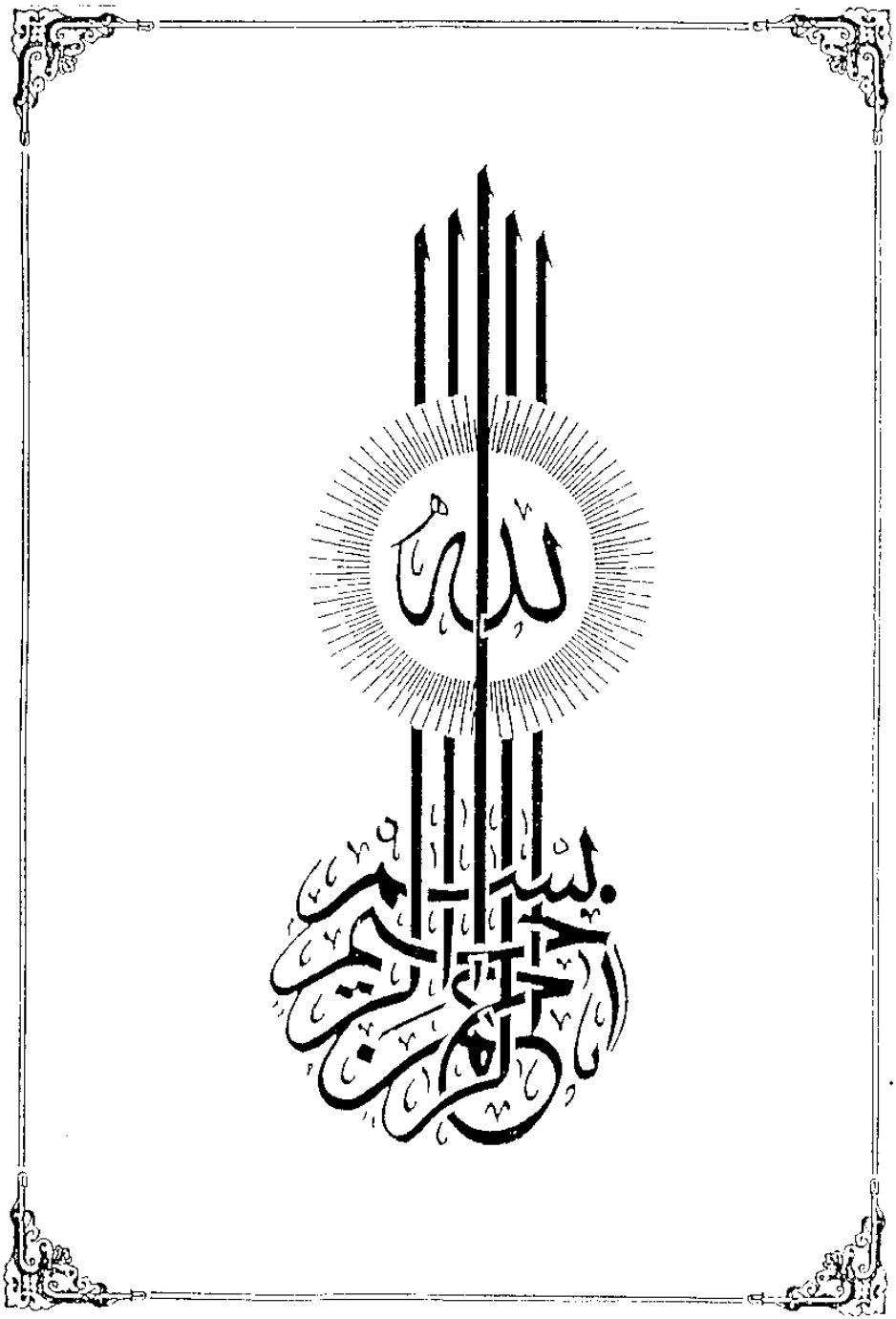

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INTRODUCTION & AIM OF THE WORK

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Percutaneous balloon mitral valvuloplasty (PBMV) is now well established as an alternative to surgery in a selected group of patients with symptomatic dominant mitral stenosis.

The outcome of PBMV is related to the structures of the mitral valve and subvalvular apparatus. Simple criteria obtained non-invasively by 2D echocardiography can predict the likelihood of success of the procedure and hence the transthoracic (TTE) echocardiography was routinely used to select suitable patients for PBMV.

Transesophageal echocardiography (TEE) now provides a sensitive mean of examining the left atrium and left atrial appendage. TEE is semi-invasive and involves a variable amount of discomfort to the patient. So clear clinical benefit to the patient should be shown before it is introduced into routine practice before PBMV.

The value of transesophageal echocardiography in the assessment of patients before PBMV is studied.

TEE and TTE are compared concerning the mitral valve morphology (leaflet thickening, mobility, calcification) and the subvalvular apparatus in patients with rheumatic mitral stenosis candidate for PBMV.

REVIEW OF LITERATURE

I. Transesophageal Echocardiography

(1) Introduction:

Transesophageal echocardiography (TEE) is a new approach that can be used to image the cardiac structures. It combines two existing technologies; cardiac ultrasound and endoscopy. M-mode TEE was first introduced in Chicago in the mid 70's but then forgotten until it was resurrected in the early 80's mainly by anesthesiologist who found it as a useful mean for monitoring cardiac function during surgery, **[Frazin et al., 1976]**.

In the late 80's an intense and wide interest in TEE occurred among echocardiologists who realized that the procedure was applicable for general use to visualize posterior cardiac structures and thus complement precordial echocardiography. The esophagus provides an airless posterior ultrasonic window to the heart directly behind the left atrium. In order to circumvent the chest wall, ribs, and lungs, a miniature phased array transducer is placed at the tip of a flexible gastroscope. Since the esophagus is contiguous to the posterior aspect of the left atrium TEE provides excellent visualization of this chamber including the left atrial appendage.

The mitral and aortic valves are well seen, as the left ventricular outflow tract, the descending thoracic aorta, the aortic root, the left main coronary artery and the interatrial septum.

(2) Current Transesophageal Echocardiographic Probe Technology, [Lee and Schiller, 1991]:

Most commercially-available transesophageal echocardiographic probes utilizes 3.5 to 5.6Mhz, 32 to 64 element phased array imaging crystals incorporated into moderate-sized (9mm shaft, 100cm length) adult gastroscope like devices, interfaced with echocardiographic machines to provide two dimensional sector, M- mode, pulsed Doppler and color flow imaging. Basal control knobs enable anterior and posterior (90 to 120 degrees) as well as right and left lateral (60 to 120 degrees) tip flexion. These maneuvers, along with manipulating the probe by gentle advancement, withdrawal and rotating it axially along its shaft, enable image optimization.

(3) Indications of TEE:

TEE can be performed easily and quickly in a variety of clinical settings including ambulatory clinic, **[Mohr-Kalaly et al. 1989]**, operating room during cardiac surgery, and intensive care unit in critically ill intubated patients, **[Oh et al., 1990]**. The test has an excellent safety record with no death recorded or esophageal perfora-