POLICY OF ANTICOAGULANTS AFTER CARDIAC VALVE REPLACEMENT

THESIS

SUBMITTED IN PARTIAL FULFILMENT FOR THE MASTER'S DEGREE IN CARDIOLOGY

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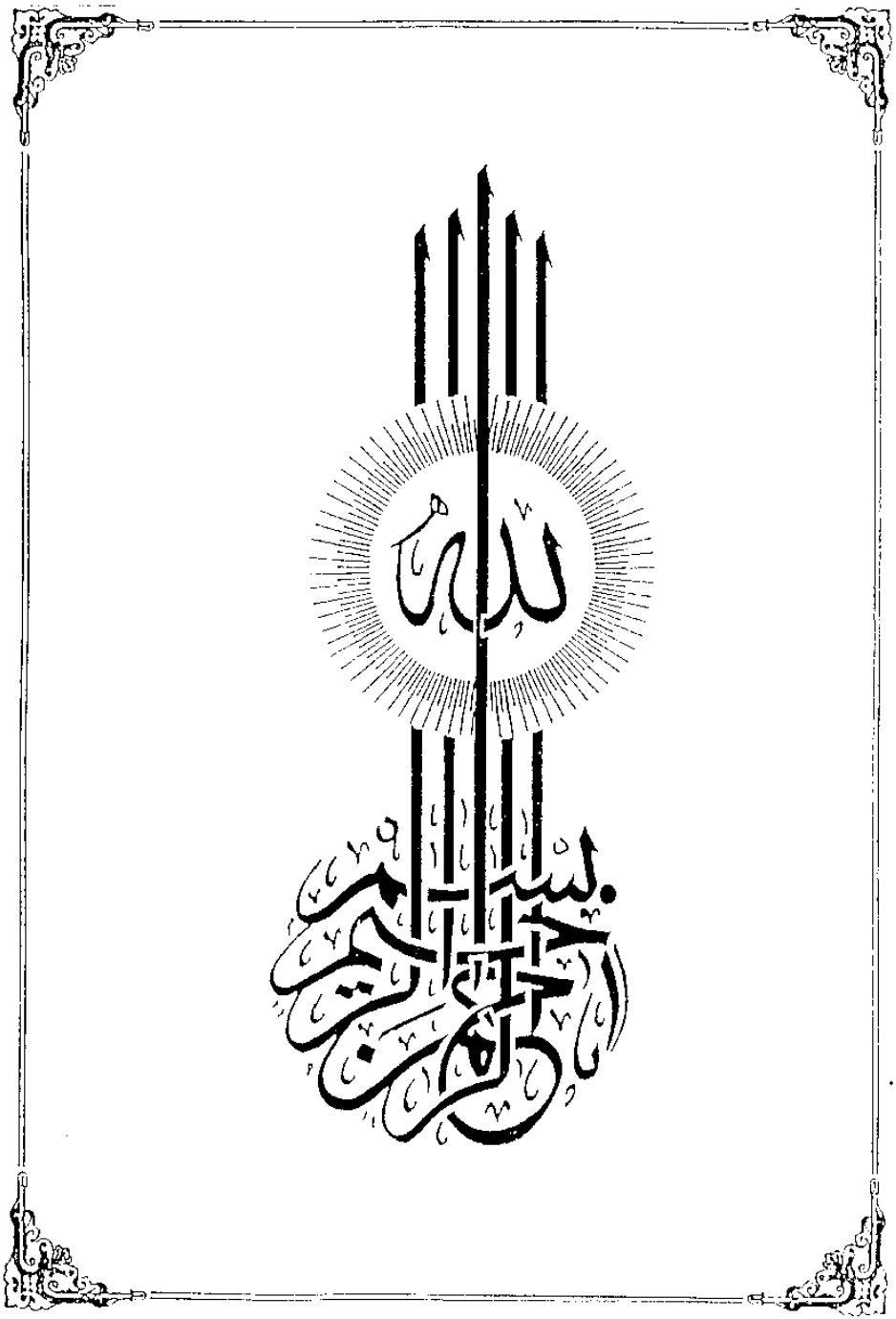

C O N T E N T S

INTRODUCTION

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The ideal and hopeful management of postoperative patients with cardiac valve replacement is without anti-coagulation. This may indeed be possible with the bioprosthesis with or without an initial few months of such therapy. Since it has been clearly shown that anti-coagulants decrease the risk of thromboembolism with mechanical heart valves [39], the risk of this therapy should be born by the majority of such patients. In problem cases, the risk of anticoagulant must be balanced against the liability of thromboembolism in quantitive terms, if possible, so that the pathway of lesser risk is chosen. The overall mortality of chronic anticoagulation varies from 1 % to 3 %.[3]

For the patients, anticoagulation means periodic laboratory tests and daily medication, and for the physician it is an important added responsibility. However, certain basic principles and concepts will be outlined. First, the patient must be knowledgeable with regard to dose, diet and the need for repeated studies of prothrombin time. Second, an organised program of follow up and verification must be available.

The risk factors related to anticoagulants that may lead to serious complications include ignorance, insufficient literacy and visual acuity of some patients to read the

instructions and understand the serious nature of the therapy and the necessity for close control and supervision, which are not always available. Moreover, the negligance of taking the medication, unawareness of the complications that may arise if the patient changes the type of advised anticoagulant without consulting the physician, as the dose differs from one drug to another. Very young and unreliable patients and those living away from the medical and cardiac centers as those residing in rural areas, all may lead to inefficient control of anticoagulation.

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AIM OF WORK

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The aim of the present work, is to evaluate the policy of anticoagulation after cardiac valve replacement at the Cardio-Thoracic Surgery Department of Ain Shams University Hospitals in the period between January 1985 to September 1985.

Policies of anticoagulation after cardiac valve replacement with artificial valves and thromboembolism as regard its type, incidence and its management will be also discussed in this study.

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REVIEW OF LITERATURE

HISTORY OF CARDIAC VALVE REPLACEMENT AND PROSTHETIC VALVES

The first successful operation on a human heart valve was performed by Theodor Tuffier, who invaginated the ascending aortic wall with his finger and dilated the valve orifice in a young patient with aortic stenosis in 1914. Also the first successful operation for aquired mitral valvular disease was done in 1923 in Boston where Cutter and Levine inserted a tenotomy knife through the apex of the left ventricle and blindly cut both mitral commissures (1).

In 1925 in London, Souttar successfully enlarged the opening of stenosed mitral valve by inserting his finger through the atrial appendage, but this feat was not repeated untill 1944 when Dwight Harken and Charles Bailey began their series of closed mitral commissurotomies using the left atrial approach(2).

For aortic incompetence, Harken (1950) and Bailey were dependent upon placing a heavy suture around the base of the aorta to constrict the valve annulus. Bailey tried another operation in which he constructed a flap valve from the aortic wall itself and placed it above the competent orifice(1).

Hufnagel and Harvey (1953), inserted a plastic ball valve in the descending aorta(3).

Swan and Kortz (1956), reported an open valvulotomy under direct vision by using deep hypothermia.(4)

The development of the pump - oxygenator by Gibbon (1954) permitted an accurate valvotomy and removal of calcium deposits for the treatment of valve stenosis as well as reconstructive procedures for the treatment of valve insufficiency.(3)

In 1958,Lillehei and Muller replaced the entire aortic valve with a prosthesis which was a bicuspid silicon rubber flap valve device and it was placed in subcoronary position.(3)

Harken in 1960, performed the first successful replacement of the aortic valve with a caged ball prosthesis in the subcoronary position.(5) Shortly thereafter, the first of series of Starr - Edwards ball and cage valves began to be widely used for mitral and aortic valve replacement.(6)

The valve replacement in the early 1960's carried with it a high operative risk due primarily to myocardial injury with prolonged aortic cross-clamping. Magovern and Cromie devised their sutureless valve in 1962 with an automatic fixation mechanism to allow rapid implantation.(7)
Later on, Smeloff - Cutter full orifice cage ball device had been introduced in 1964.(1)

The tilting disc, central flow prosthetic design was introduced as Bjork - Shiley valve (1969) and Lillehei-Kaster valve (1970).(1)

Nicoff en Passes developed the St. Jude medical valvular prosthesis in 1972. The device is a low profile bileaflet valve where it provides long durability, normal haemodynamics and antithrombogenicity.(8)

Inspite of multiple modification of prosthetic valves, there are still many problems present. The most important is the risk of thromboembolism inspite of the use of effective anticoagulant therapy which continues for life. This is difficult in females in the child bearing period and carries the life long threat of complications.(9)

In 1952 the interest in homograft valves was started by Lam and his associates when they implanted fresh aortic valve homograft in the descending aorta of dogs. Later on, in 1955 Gordon Murray began a successful series of fresh homograft valve implantation in man.(1)

The difficulties in procuring homograft resulted in the use of other different available tissues for designing bioprosthesis.(10) Senning published his results in using autogenous free hand fascia lata as designed for valve replacement in 1962.(11) Ross and Ionescu 1969 generated a series of valves by using fascia lata mounted on a cloth-covered metal stent.(1)

In 1965, Duran and Gunning first implanted heterograft aortic valve in the descending aorta of dogs.(11) The first

aortic valve replacement by using a specially prepared xenograft of pig performed by Binet, Carpentier and their associates (1965).[12]

Zerbini (1972) used a homotogenous dura mater as a possible material for the construction of a new trileaflet prosthesis.[13] Ross (1967) has utilized autologous pulmonary valve replacement and pulmonary valve in turn replaced by constructed aortic homograft or heterograft.[10]

All tissue valves ultimately failed from fibrosis with stenosis or insufficiency untill the glutaraldehyde preserved porcine valves were developed primarily by Carpentier in Paris and Hancock in United States. In the past five years, it has become the valve of choice for prosthetic replacement in many centers, although its durability beyond eight or nine years is of serious concern.[3]

In general, currently available valves at present time classified into a mechanical and tissue prostheses:-

1- Mechanical prostheses: are subgrouped into

a) Central occluder valves: subdivided into

1. Ball valves:

1- Starr - Edwards

2- Braunwalld - Cutter

3- Smeloff - Cutter

4- Magovern - Cromie

5- Harken

6- De Bakey - Surgitool

7- Hufnagel.

2. Disc valves:

1- Kay - Shiley

2- Goss - Jones

3- Kay - Suzuki

4- Cooley - Cutter

5- Starr - Edwards

6- Beall - Surgitool

b) Eccentric monocusped valves:

1- Bjork - Shiley

2- Lillehei - Kaster

3- Hall - Kaster

4- Wada - Cutter

c) Eccentric bicusped valves:

1- St. Jude Medical valve

The Starr - Edwards prosthesis eventually became one of the most popularly used devices. The original model which consisted of a silicone rubber ball in a stellite cage was modified several times because of the problems of ball variance and the high incidence of embolic episodes besides to the frequent disproportion between the size of artificial valves and the diameter of the ventricular cavity. Shallower and smaller cages were introduced which were cloth - covered to prevent emboli. The ball substance was changed to stellite and the core was made hollow.(14)