AORTIC VALVE REPAIR IN AORTIC REGURGITATION

An essay
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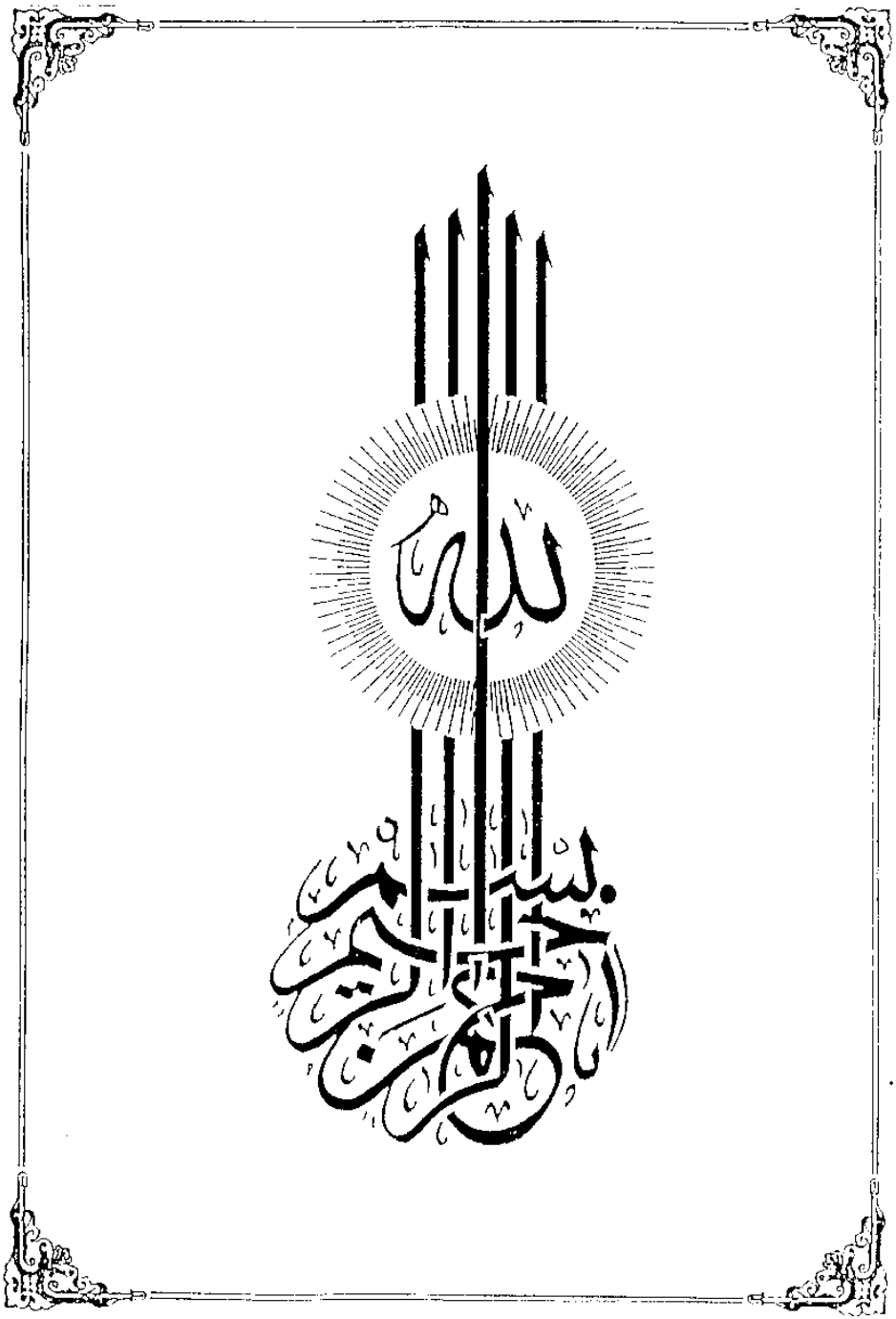

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INTRODUCTION

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Aortic regurgitation (AR) is almost universally treated with valve replacment with very satisfactory results. In the young patients, however, the obligatory permanent anticoagulation required when a mechanical prosthesis issued, or the limited durability of the bioprosthesis repersents a considerable and as yet unsolved problem. The younger the patient, the more significant the problem becomes. Faced with a very young population where permanent anticoagulation repersents a very serious drawback in terms of compliance and because of frequent pregnancies an aggressive attitude towards valve repair was undertaken ***(Naresh, et al., 1992).***

Conservative operation on the aortic valve has received considerable less attention than the repair of the atrioventricular valves. With the exception of stenotic lesion on the very young and regurigitation secondory to septal defects, this attitude is justified by the satisfactory results of the available prosthesis in the aortic area, the lack of valve tissue usually found, and the very precise geometry required to achieve competence ***(Duran, et al., 1991).***

More recently, the awareness of the long term problems of the available prosthesis on the one hand, and the standardization of the repair techniques on the atrioventricular valves on the

other, has awakened a new interest in aortic reconstruction. ***(Naresh et al., 1992).***

The fact that a majority of cases had a concomitant mitral or tricusped lesion, which was very often successfully repaired, stimulated the urge to try to avoid an aortic prosthesis if possible ***(Naresh et al., 1992).***

The conservative surgical techniques applied fell into two distinct categories those patients judged to have enough valvular tissue underwent a variety of techniques directed towards achieveing competence without the use of any extra valvular tissue ***(Duran, 1988)***. These techniques, grouped under the heading of "repair" should be taken as a whole, as each of them only achiev partial improvment and required reinforcement by other techniques. Some of these such as commissurotomy and cusp resuspension have been known, and used for long time. Unrolling and stretching of the thickened free edge is a rather unperdictable maneuver and while in some cases it achieves surprisingly a considerable increase in the leaflet area cusp, it may hardly modify the size of the next cusp ***(Duran et al., 1991).***

The selective annuloplasty by plication of the annulus at commissural level ***(Duran et al., 1988)***, had in fact been discribed by Cabrol in 1966 ***(Duran et al.,1993)***. Cosgrove recently reported its successfully use in a group of 21 patients. ***(Cosgrove et al., 1991)***

Finally the enhancement of the supravalvular ridge is of more theoretical value. This increase should reduce the pathological tendencey towards the back rolling of the cusp free edges. However, in the presence of very severee cusp retraction these manoeuvres cant be used and an extension of all 3 cusps was therefore performed with a single strip of fashioned, glutaraldehyde treated pericardium ***(Naresh et al.,1992)***.

Duran in the 1960's a variety of tissues were used for single or multiple cusp extension ***(Bahason et al., 1970)***. Recently,severeal authors have used glutaraldehyde treated pericardium with a favourable results ***(Al Fagih et al., 1988)***. This surgical technique is reproducible and safe in achieveing immediate competence in all cases confirmed by intraoperative echocardiography.

HISTORICAL BACK GROUND

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In 1958, Harken and co workers from Boston in a classic article on the surgical correction of aortic insufficiency ***(Duran, 1993)***, described four principles that , in their opinion were the theoretical possibilities avilable:-

(1) Fracture of the fused commissures allowing more complete and more rapid closure

(2) Placing an obturator above the existing valve

(3) Adding length and flixibility to the existing cusps and

(4) Reduction of the size of the annulus of the aorta. Most of these principles are surprisingly valid to today.

Closed aortic valve commissurotomy was performed long before mitral commiss, urotomy. Tuffier, a French surgeon, reported in 1914 a successful finger splitting through the aorta ***(Duran, 1993)***. In the Mid-1950s, closed transaortic ***(Bailey,et al 1954)*** and transventricular valvtomies were tried widely and with varying success contrary to extraordinary success of mitral commissurotomy, the aortic valve proved to be difficult if not impossible to split without inducing severee regurgitation. Open techniques made avaliable first with hypothermia ***(Swan H et al,1958)*** and later with cardiopulmonary bypass completely displaced the blind technique ***(Lillehei CW,1958).***

Reduction of the aortic annulus was also used in the prebypass era by external plication of the aortic wall ***(Hurwitt***

ES,et al,1980) or placement of a circumferentially constricting band ***(Murphy JP., 1960)*** under direct vision, both techniques of bicuspidization and circumclusion were also used ***(Mulder et al,1960)***. Recently Carpentier and co-workers have resurrected this last technique,reporting its use in a small series of patients.***(Chauvaud, et al., 1990)***

Mulder and Co-Workers in 1960 described a variety of surgical maneuvers they referred to as "valvuloplasty" they stressed the concpt, that no single thechnique could be expected to achieve satisfactory results. They described decalcification, cusp unrolling bicuspidization and tacking a tuck in the wall at one commissure which known now as commissural annuloplasty ***(Duran et al.,:1988)*** and later ascribed to Cabrol who had reported it in 1966. ***(Duran et al., 1993).***

The technique of cusp resuspension by plication of the free edge of the prolapsing leaflet to the aortic wall was described by *Garamella* and Co-Workers ***(Garamella, et al., 1960)*** and later popularized by *Trusler* and Co-Workers ***(Trusler, et al., 1970).*** Cusp enlargement and Co-Workers with different materials has also long history *Lillehei* and Co-Workers in 1958 already discribed the addition of pledgets of compresed polyvinyl sponge to the leaflet ,margins to achieve competence. In 1960, *Mulder* and Co-Workers reinforced one leaflet with a prosthetic cusp and *Harken* and associates, with polyurethane. *Ross* used teflon and autologus pericardium for single or multiple cusp extension or

replacment. In 1967, *Bailey* described the use of aortic wall, and *key* the use of homologous and heterologous aortic cusps. *Bahnson* and associates in 1970 described the experimental use of fascia lata, pleura,peritoneum, and pericardium to fashion one or three aortic leaflets. They also reported satisfactory clinical results with autologous fresh pericardium and fascia lata in 13 patients. *Edwards* had described severeal cases of triple cusp extension with pericardium placed with a double row of sutures. ***(Cosogrove et al., 1991)***.

The introduction of glutaraldehyde as a pretreatment of xenogenic tissues and particularly of bovine pericardium encourged *Batista and co-workers* to use it as a single strip for aortic valve cusp extension.

-ANATOMICAL CONSIDERATION