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Evaluation of Tricuspid Valvuloplasty with Mitral Valve Replacement in severely ill patients

H. MOBARHAN, M.D., F.A.C.S.

The indication of mitral valve replacement is well established and clear cut in class III of New York Heart Association Classification. But, in severely ill patients of class III, namely those whom we cannot bring to an optimal cardiac condition, suitable to tolerate open heart surgery, and who resist medical treatment, it is awfully difficult to weigh the benefits of operation against its high risk of morbidity and mortality. Ellis (1) feels the same as he says "perhaps the most difficult aspect of patient selection concerns the desperately ill class III patients (N.H.A.C.) about mitral valve replacement."

× — Professor of Cardiothoracic Surgery, Pahlavi Medical Center, Tehran University, Tehran, Iran.

Our series of mitral valve replacement (July 1970 to April 1973) includes 55 cases, twenty of which or 37 % fall into the said category. Age distribution was between 13 years, the youngest patient and 48 years the oldest one with an average figure of 27 years. Males and females were in equal number. One patient became pregnant and delivered a healthy baby $2\frac{1}{2}$ year following mitral valve replacement.

As a relalively high percentage of our class IV patients also suffered from tricuspid insufficiency we decided to go over our files and to study this problem.

There are many articles about mitral valve replacement. However, there are fewer papers relating to the surgical treatment of tricuspid insufficiency (1,11,12,13,14,15,16,17,18,19,24,25).

Operative Technique:

Midline sternal splitting incisions were used to enter the chest in all cases. Femoral artery was cannulated in early days, while in recent cases we have prefered to use aorta for arterial cannulation. Sarns pump and riggs oxygenators were used. Pump time varied between 52 to 110 minutes. Almost all cases received the benefit of dilution technique which proved to be a very effective and safe procedure (7,8). The stitches were used on septal leaflet of tricuspid valve in such a fashion as to avoid damage to conduction system (11,).

Case Presentation:

Two cases will be presented in detail:

Case No. 1. T.K. (Chart number 4631), a 24 year old white female admitted with a history of long-standing cardiac condition with several episodes of exacerbation. Mitral and tricuspid regurgitation and severe heart failure (class IV) were evident in clinical and X-ray studies. She was considered a candidate for mitral valve replacement despite her poor cardiac condition which was only slightly responsive to medical treatment. She made a good recovery following operation (Fig. 1). Her tricuspid valve had

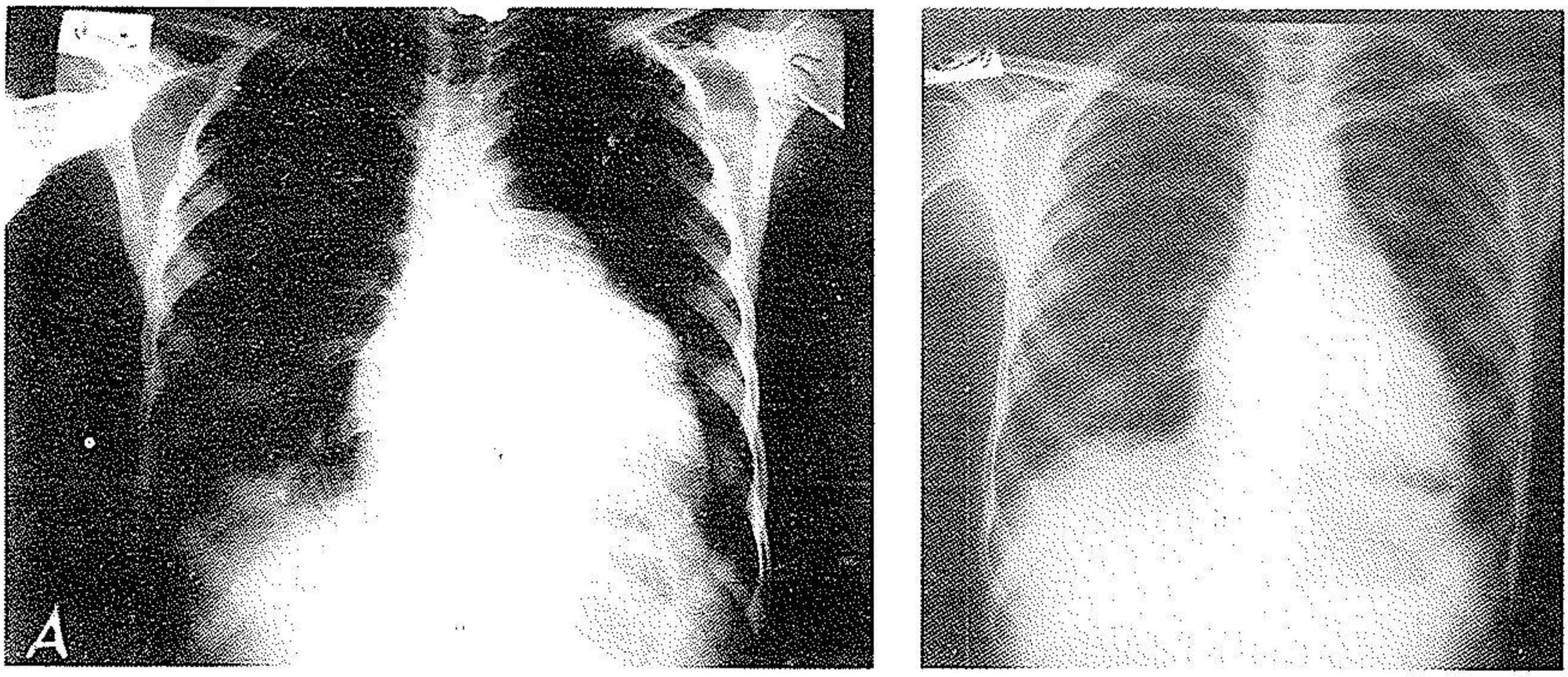
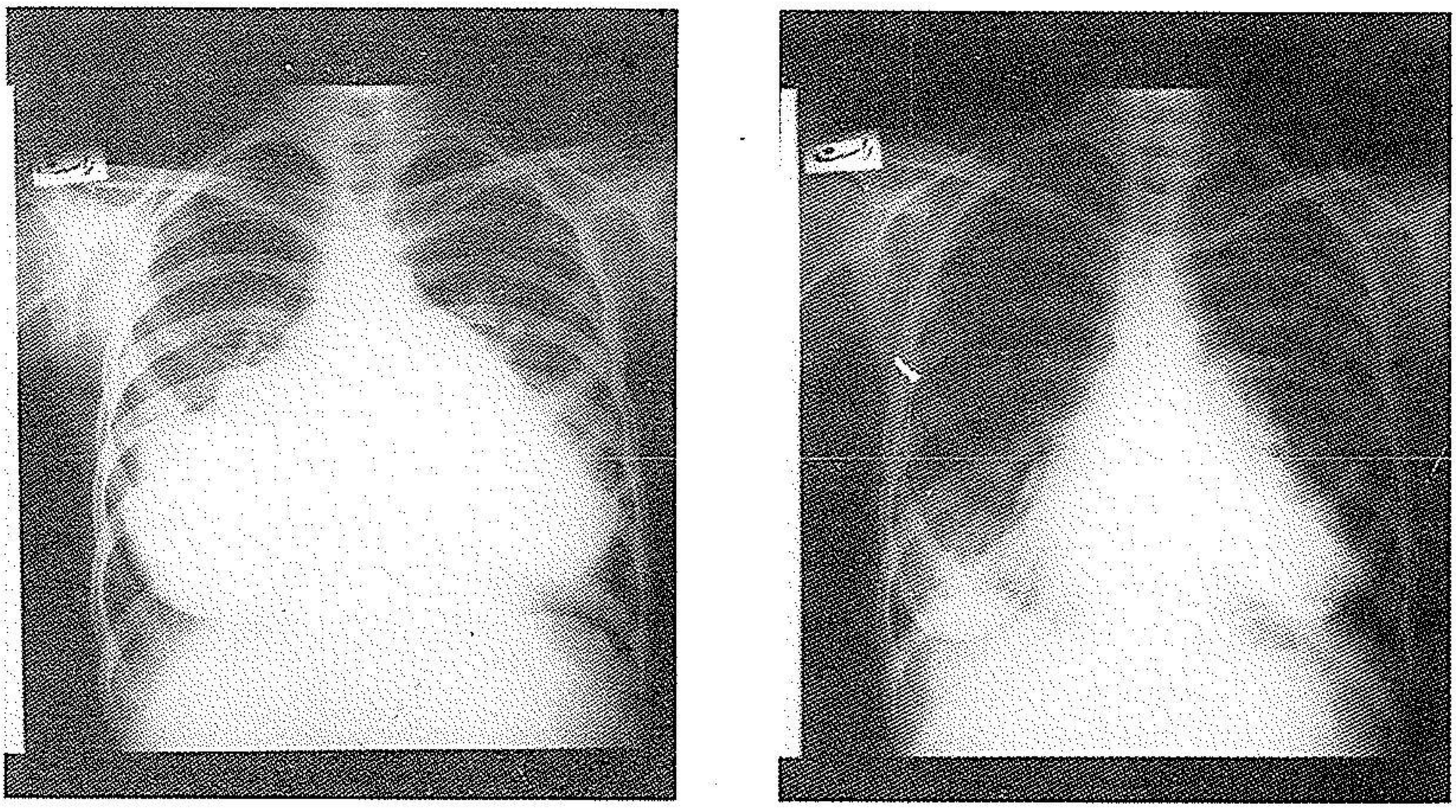


Fig. 1



to be repaired at two commissures, namely, beside annuloplasty two separate stitches at the medial and at the posterolateral commissures were inserted. The adequacy of the repair of the tricuspid valve could be seen by direct vision and also checked by index finger following bypass procedure. Also, disappearance of systolic murmur of the tricuspid valve incompetence and other signs were quite evident. Tricuspid insufficiency seemed to be of dual pathologic process of organic and functional types.

Case No. 2. (Chart No. 2917) Z.O. An 18 year old white female admitted with severe distress due to her mitral and tricuspid regurgitant valves. Her recovery following mitral valve replacement and tricuspid valvuloplasty was remarkable. She developed sternal dehiscene and anterior mediastinal suppuration. Her infection was treated by antibiotics, irrigation and two operative procedures for debridement and drainage. She had to stay in hospital for three months. Chest X-ray films showed marked improvement (Fig. 2). Her tricuspid valve had to be repaired at two commissures in addition to annuloplasty. This valve as in the other patient was incompetent functionally, also due to organic changes.

Discussion:

Our series of patients is of course too small to draw a definite conclusion. However, the following points deserve more attention and may be useful in practice.

We selected Bjork-Shiley prosthesis as it is an artificial valve with a low rate of thromboembolic complication (3,4,5), no risk of aortic outflow tract abstraction of the left ventricle and irritation of ventricular septum, wide orifice area, laminar and almost central flow (3,5,6) which guarantees minimal pressure loss across the valve.

The percentage of our desperately ill class IV patients is rather high, 37 %, and this may due either to the fact that our charity hospital absorbes the poorest group of society or to the fact that most people prefer to be operated upon by university surgeons.

A higher percentage of patients with combined mitral and tricuspid valvular disease are in class IV (1). They require correction of both and it

should be mentioned that association of tricuspid valvuloplasty and mitral valve replacement does not necessarily increase the risk of morbidity and mortality (1). But tricuspid and mitral valve replacement of course do carry a higher risk. We ought to express the importance of correction of tricuspid insufficiency together with mitral valve replacement as the right heart failure may progress if the tricuspid valve remains uncorreeted. Two of our patients continued to have progressive right heart failure and finally died due to this negligence. Although their mitral valves were replaced and the hemodynamic disturbances initiated at the mitral valve had been correeted, severe tricuspid insufficiency caused their cardiac deterioration. We improved our judgment and technique and we could save the other seven patients with combined mitral and tricuspid valvular disease. We prefer to repair tricuspid valve rather than to replace it. Fortunately, we have been successful in this operation and the repaired valves did not show signs of recurrent insufficiency up to an average period of 2 $\frac{1}{2}$ years following surgery. Correction of concomittent pathology is highly recommended by other surgeons as well (1,11,).

We cheek the tricuspid valve by digital exploration of the right atrium before cannulation is effected. Competence of the valve and adequate repair is fairly easy to recognize and in case of doubt we squirt saline solution into the right ventricle. By this means the tricuspid leaflets move toward each other and the competence of the valve can be estimated.

Cases with significant tricuspid insufficiency, requiring correction, made up nine out of fifty five cases or 16 % of total number of patients who underwent mitral valve replacement. However, they included a good percentage (45 %) of severely ill class IV patients. This implies how important is the correction of hemodynamic disturbances.

In three cases the incompetence was only functional in nature and in six cases a combination of organic and functional insufficiency was present; two cases of the latter group required correction of two commissures and were reported in detail. The pathologic process of tricuspid valve in organic or functional aspects is the same as is seen in mitral insufficiency. Ring is

dilated. leaflets are shrunken and fibrotic. and areas of calcification are seen. together with resulting hemodynamic disturbances such as dilated atrium. This proves that the presence of a significant residual postoperative tricuspid valvular insufficiency indicates higher risk to the postoperative result of the combined valvular disease. This is in harmony with the views expressed by other groups with experience in this field (11,14,20,21,22,23).

The mortality rate in our series. 3 out of 20 cases. is almost the same figure reported by other centers (3,5,9,10) 15 "$_{0}$-to-26 "$_{0}$. Causes of death were arrythmia and heart failure in all deceased cases. Heart failure seemed to be due to incorrected tricuspid insufficiency in two cases.

Although pulmonary hypertension carries a grave prognosis. many patients with this condition will demonstrate a pronounced drop in pulmonary artery pressure following the operation (1,2).

The significant complications **considered** of attacks of arrhythmia. respiratory distress in the first few days after operation in a few cases. and suppurative infection of incision and anterior mediastinum in one case. These were well taken care of without any significant sequellae remaining except in deceased cases.

We always try to teach our patients about their disease. how to use digitalis and anticoagulants under the care of their family physician. They are discharged if they have learned these lessons perfectly. We don't believe in operating and not making every effort. including teaching the patient. to prevent formation of the clot on the prosthesis.

If the indication for operation is definite. namely the severity of hemodynamic disturbances, incompatible with life, and cannot be brought to a tolerable state. we de not hesitate to operate even if the disease is far advanced. except in the presence of primary myocardial disease or advanced coronary artery disease.

Summary and Conclusion:

A group of twenty cases of class IV of New York Heart Assiciation Classification is reported. They were selected among 55 cases of mitral valve

to be carried out in seven cases. In two cases, reported in detail, two commissures and ring had to be repaired. The nature of pathology was organic and functional while in the remaining five cases it was only functional. None of the cases required tricuspid valve replacement. We believe that tricuspid valvuloplasty has an important position in heart surgery and should not be underestimated. Also, we conclude that no patient should be denied operation on the basis of the severity of his disease unless advanced coronary disease or primary myocardiac disease are also involved.

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