Surgical Treatment of Acquired Valvular Disease as Viewed by the Internist

By William Likoff, M.D.

It is an obvious fact that acquired valvular deformities may impose a serious mechanical burden upon the heart. Over the years, it has been logical to hope that definitive surgical techinques would be developed to alter these defects so as to restore normal cardiac function.

However plausible the need, the evolution of surgery for acquired valvular disease was delayed by the fear that the heart could not tolerate unusual manipulation and continue its necessary function. When it was established that the heart was remarkably durable and competent in the face of arduous operative interference, cardiac surgery developed with dramatic rapidity.

Today, approximately a decade after the first successful modern operation for stenosis of the mitral valve, the current and potential role of surgery in the treatment of acquired valvular disease requires examination. The title of this presentation implies that the medical profession holds an ambivalent view on the matter—one by the internist, the other by the surgeon. Unfortunately this was, and in many areas continues to be, true.

Trained in the unique promise of the direct approach, the surgeon has been an enthusiast. Sensitive to the slowly deteriorating pattern of many diseases, the internist has been reluctant to accord the surgeon a primary role in the treatment of cardiac ailments. This dichotomy should not persist. Perceptive reflection on the work accomplished in the past decade permits an evaluation based on experience and fact, not prejudice. Unfortunately both protagonists and antagonists must admit that much of this information was exploited far beyond its natural importance. The first acknowledgment today must be that all of the truth is not known even at the present time.

The material upon which these comments are based has been obtained from an examination of the surgical techinques now being employed, their effects on the anatomy, pathophysiology, and the subjective and objective manifestations of acquired valvular lesions, the surgical morbidity and mortality rates, and the devolutionary pattern of valvular lesions that are untreated by surgery.

Surgical Techinques

Modern cardiac surgery may be divided into the closed-heart and the open-heart techinques.

In the closed techinques the surgeon applies corrective measures to and within an intact functioning organ. With use of this approach operations have been developed for the correction of stenosis of the mitral, the tricuspid, and the aortic valves alone and in combination, and for insufficiency of the mitral valve.

Closed-heart methods require surgery to be performed in an irritable, constantly moving organ, the portals to which are limited in number, size, and utility. Furthermore, when the surgeon does enter the heart, he is compelled to operate in a field of circulating blood guided by the sense of touch alone. As a final burden he must endure all of his limitations while the capability of the heart to continue to work under this type of duress remains unpredictable.

For these reasons it appears that closed-heart techinques are destined not to survive. Actually they represent a stage in the development of surgical techinques. Although they remain a monument to those who fashioned their principles and a useful tool for those who have mastered their application, only the inadequacies of the current pumps and oxygenators permit their continued use.

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It is freely predicted that simple efficient machines soon will completely free the cardiac surgeon from the limitation of not being able to see what he is attempting to correct or not being able to tailor his efforts precisely to the encountered need. For the present, however, open-heart technics have serious weaknesses. These mainly are related to the hematologic problems that arise from the need of priming the pump and from the intrinsic deficiencies of modern oxygenators. In addition, although the surgeon can view the lesion directly, he often is unable to evaluate function when the cardiac action is arrested.

In the present transition from immature to mature surgical methods technical inadequacies more than any other single factor account for the inability to depend upon surgery as the completely reliable answer to acquired valvular disease.

Results

In an understandable oversimplification of the problem the results of the surgical approach to acquired heart disease were at first measured in terms of symptomatic response. Indeed had a more vigorous demand been made of the early technics, it is questionable whether they would have survived to be developed into more effective methods.

Now the attainments must be evaluated more critically and along a broader base. The measures of anatomy, physiology, and function have been added to the analysis of the symptomatic response. All are interrelated. If the anatomic pattern of a valve is reconstructed without a return of its function, a useless result follows from which a significant regression of pathophysiology can hardly be expected.

The hallmarks of success in cardiac surgery are unmistakable. They consist of such findings as a disappearance of a pressure gradient, a decrease in cardiac size, and the quieting of a murmur. In short, results are definable in absolute terms. Therefore it must be emphasized that in the large area of paradox where symptoms are observed to improve, but where no objective measurement of success is recorded, the correction and the lasting accomplishments are likely to be small.

Mortality and Morbidity Rates

Mortality and morbidity rates are sensitive indications of the maturity of surgical technics. The present operative mortality for mitral stenosis is recorded as 4 per cent and for mitral insufficiency by open-heart technics as 8 per cent. These compare favorably with the mortality rates now recorded for such abdominal procedures as cholecystectomy and gastrectomy. The mortality for the correction of aortic stenosis and aortic insufficiency by open-heart technics is now estimated at 20 and 25 per cent, respectively. It is to be recalled, however, that less than a decade ago the mortality rate for the correction of mitral stenosis stood in the same general area now noted for aortic stenosis. Furthermore, the mortality rate for gastrectomy a short 2 decades ago was in the same category.

It takes time to transmute failure to success, hesitancy to assurance, and death to life.

Devolutionary Patterns of Untreated Valvular Lesions

The internist is under a constant demand to outline the indications for the surgical treatment of acquired valvular disease. Fundamentally this problem is not a complicated one. The indications are determined when the available technics, the risks of their application, and their effectiveness are compared.
Figure 2
Top. The earliest hemodynamic alterations in patient with mitral stenosis. Bottom. Abnormal hemodynamic data in patient with advanced mitral stenosis. MVA, mitral valve area; PG, pulmonary valve gradient; MVF, mitral valve flow; LA, left atrial pressure (mm. Hg); PA, pulmonary artery pressure (mm. Hg); PVR, pulmonary vascular resistance; CO, cardiac output.

with the devolutionary pattern of the untreated lesion. The term devolutionary pattern has been adopted to indicate the general trend of events in the average patient who suffers from a specific type of acquired valvular disease. It has become increasingly apparent that each type of acquired valvular disease differs strikingly in the length of life it permits and the disability it causes.

Figure 1 illustrates the relative difference in the devolutionary patterns of 4 major acquired valvular lesions. It can be seen that mitral stenosis, relatively speaking, is a casual disease with a slow rate of deterioration. In dynamic aortic stenosis, however, the length of life is relatively short once significant symptoms develop.

Larger differences may also separate the pathophysiological patterns in specific types of acquired valvular lesions. Figure 2 represents the earliest deterioration seen in mitral stenosis as compared with the most significant changes in advanced mitral stenosis. Figure 3 draws the same comparisons between patients with aortic stenosis. It is quite clear that the surgical treatment of acquired heart disease cannot be properly assayed for its immediate or chronic effect until it is clearly understood where in the devolutionary stage of the lesion treatment has been applied. Of equal importance it must be established at which phase of the devolutionary pattern surgical treatment is likely to be accompanied by the most effective result and the smallest mortality and morbidity risk.

Conclusions
Youth is brief. In its growth the surgical treatment of acquired valvular disease has offered the promise of an efficient mechanical answer to what in the final analysis is a mechanical problem. The promise of the future should not be confused with the accomplishments of the present. As techniques improve,
the frequency and efficiency of their application must necessarily increase. For the time being results remain factually impressive.

**Summario in Interlingua**

Le periodo del juventute es breve. In su crescentia verso le matritate, le tractamento chirurgic de acquirite morbo valvular ha offerite le promissa de un efficace responsa mechanic a un problema que, in le ultime analyse, es un problema mechanic. Le del futuro non deberea esser confundite con le attingimentos del presente. Si in le curso del tempore le tecnicas se meliora, il es evidente que similemente le frequentia e le successos de su application se augmenta e meliora. Le resultatos real que ha essite effectuate usque al tempore presente es certo impressionante.

**References**


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