Aortic Valve Perforation in Bacterial Endocarditis

By Ralph Tompsett, M.D., and Glenn D. Lubash, M.D.

The modern treatment of bacterial endocarditis may be expected to result in bacteriologic cure in 90 to 95 percent of patients who complete a course of treatment. Nevertheless, as many as 25 percent of patients die from emboli or cardiac failure within the first 6 months from initiation of treatment. In addition to the underlying heart disease, the additional factor of destruction of all or part of a valve may be added during the course of bacterial endocarditis and contribute to congestive heart failure, despite bacteriologic cure. The importance of the development of dynamically significant aortic insufficiency during the course of bacterial endocarditis has been described in numerous case reports and various authors have commented on its significance.

During the course of observation of approximately 150 patients with proved bacteriologic endocarditis over a 10-year period we have also recognized the importance of this complication appearing during treatment or the early convalescent period. Moreover, the clinical features have seemed to be reasonably typical in most cases and, when present, have generally been followed by progressive, often intractable heart failure. The recent interest in surgical procedures that may afford a significant chance of improvement in these patients has made it seem worthwhile to review the problem with a view to directing attention

Table 1

Summary Data on Patients with Aortic Valve Perforation in Bacterial Endocarditis

<table>
<thead>
<tr>
<th>Case no.</th>
<th>Sex</th>
<th>Age</th>
<th>Type of heart disease</th>
<th>Cusp involved</th>
<th>Lesion of cusp</th>
<th>Relation of signs of aortic insufficiency to endocarditis</th>
<th>Duration of life after either appearance of or change in signs of aortic insufficiency (mo.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M</td>
<td>49</td>
<td>Syphilitic</td>
<td>Posterior and right</td>
<td>Perforation</td>
<td>Changed</td>
<td>3-5</td>
</tr>
<tr>
<td>2</td>
<td>M</td>
<td>47</td>
<td>Rheumatic</td>
<td>Posterior and left</td>
<td>Perforation</td>
<td>Appeared</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>M</td>
<td>48</td>
<td>Congenital (IV septal defect)</td>
<td>Posterior, right and left</td>
<td>Perforation and rupture</td>
<td>Appeared</td>
<td>33</td>
</tr>
<tr>
<td>4</td>
<td>M</td>
<td>43</td>
<td>Rheumatic</td>
<td>Right and left</td>
<td>Perforation</td>
<td>Uncertain, probably new</td>
<td>2-6</td>
</tr>
<tr>
<td>5</td>
<td>M</td>
<td>55</td>
<td>Uncertain, probably rheumatic</td>
<td>Posterior</td>
<td>Perforation</td>
<td>Perforation</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>F</td>
<td>53</td>
<td>Rheumatic</td>
<td>Posterior and left</td>
<td>Perforation</td>
<td>Appeared</td>
<td>½ to 6</td>
</tr>
<tr>
<td>7</td>
<td>F</td>
<td>55</td>
<td>Rheumatic</td>
<td>Right</td>
<td>Perforation</td>
<td>Changed</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>F</td>
<td>64</td>
<td>Rheumatic</td>
<td>Right</td>
<td>Perforation and rupture</td>
<td>Appeared</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>M</td>
<td>30</td>
<td>Rheumatic</td>
<td>Posterior</td>
<td>Perforation</td>
<td>Changed</td>
<td>4</td>
</tr>
<tr>
<td>10</td>
<td>M</td>
<td>71</td>
<td>Rheumatic</td>
<td>Posterior</td>
<td>Perforation</td>
<td>Appeared</td>
<td>2-8</td>
</tr>
</tbody>
</table>
AORTIC VALVE PERFORATION

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to the recognition of this complication of bacte-
rial endocarditis.

The present report summarizes observations
in patients with bacterial endocarditis seen at
the New York Hospital between 1944 and
1956, in whom dynamically significant aortic
insufficiency appeared after initiation of ther-
apy and in whom postmortem examination re-
vealed perforation or destruction of one or
more aortic valve cusps.

Observations

The postmortem records at the New York
Hospital from January 1944 to January 1956
were reviewed. Forty-seven cases of bacterial
endocarditis were autopsied during this pe-
riod. The clinical records were reviewed and
compared with the postmortem observations.
Those cases were chosen that fulfilled the
following criteria:

1. Absence of dynamically significant aortic
insufficiency prior to the development of endo-
carditis. 2. The development of dynamically
significant aortic insufficiency during or soon
after treatment. 3. Autopsy evidence of either
perforation or destruction of an aortic valve
cusp due to bacterial endocarditis.

Ten suitable cases were found and are sum-
marized in table 1. A representative illustra-
tion of the changes seen in the aortic valve is
presented in figure 1.

Discussion

These cases illustrate what appears to be an
important complication of bacterial endo-
carditis, namely, perforation or destruction of
the aortic valve cusps. In all of the patients,
bacteriologic cure of the endocarditis had
been achieved or could reasonably have been
anticipated had it not been for the fact that
progressive cardiac failure supervened.

It is impossible to estimate the frequency of
aortic valve perforation in bacterial endocard-
itis from the data at hand. During the 12
years covered by this study, approximately
150 patients at this hospital were recognized
during life to have bacterial endocarditis and
treated for it. Forty-seven cases were autop-
sied during this period. (It should be noted

that not all of these were recognized during
life and treated.) Of those cases autopsied, 15
had perforation of the aortic valve. Although
only 10 cases are included here because of the
criteria mentioned in the introduction, it is
possible that aortic valve perforation was an
important factor in other patients as well.

The very complexity of the clinical situa-
tion in which valve perforation occurs tends
to obscure the fact that valve perforation has
occurred and that the likelihood of progress-
tion to intractable heart failure is good. It is
hoped that a greater awareness of the impor-
tance of aortic valve perforation in bacterial
endocarditis coupled with improved surgical
procedures for correction of aortic insuffi-
cency may enhance the outlook for this group
of patients.

Summary

This report describes 10 patients with bac-
terial endocarditis who during observation de-
veloped signs of dynamic aortic insufficiency
or experienced marked worsening of the
manifestations of pre-existing aortic insuffi-
ciency. The autopsy findings in these patients
provide evidence that the clinical signs were
associated with perforation or rupture of the
aortic valve cusps. It is suggested that this
sequence of events in the course of bacterial
endocarditis is common and that its occur-
rence must be regarded as an ominous prog-
nostic sign.

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Acknowledgment

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References


To put the discovery of the systemic circulation of the blood in its true light, we must have some notion of the history of philosophy, science and medicine. Medicine, and herein it is in contrast with Theology and Law, had its sources almost wholly in the Greeks. Not only in the doctrine of the four elements of Empedocles, a doctrine which has survived almost to our own day, and in the physical theories of Heraclitus and Leucippus, did medicine, for good or ill, first find a scheme of thought, but in the schools of Hippocrates and of Alexandria it was based also, and far more soundly, upon natural history and anatomy. The noble figure of Galen, the first experimental physiologist and the last of the great Greek physicians, stood eminent upon the brow of the abyss when, as if by some convulsion of nature, medicine was overwhelmed for fifteen centuries. To the philosophy of medicine, Galen had given more than enough; to its natural history he had contributed in the following of Hippocrates; to its discoveries he had given the greatest of all means of research, individual genius; to its methods he had given, but in vain, that indispensable method, practised first perhaps in history by Archimedes and the Alexandrians, of verification by experiment; a method, after Galen, virtually lost till the time of Gilbert, of Galileo and of Harvey.—THOMAS CLIFFORD ALLBUTT, M.A., M.D. Science and Medieval Thought. London, C. J. Clay and Sons, 1901, p. 20.
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