Prognosis in Dissecting Aneurysm of the Aorta

By Fred M. Kuipers, M.D., and Irwin J. Schatz, M.D.

Dissecting aneurysm of the aorta is one of the few catastrophic cardiovascular emergencies which at times may be amenable to operative repair. Decisions to recommend such therapy, as well as the evaluation of its success, depend upon a thorough understanding of the natural history of this disease.

In the past, dissecting aneurysm was thought to be rapidly fatal in the overwhelming majority of cases. Its course in survivors was difficult to study since adequate diagnostic procedures were not available to provide an unequivocal diagnosis in most patients. Prognosis, therefore, had been largely determined from retrospective study of postmortem cases.1-3 Although a few reports of long-term survival with radiological proof of the disease have now appeared,4 5 analysis of a group of patients with a definite antemortem diagnosis of dissecting aneurysm has not been made.

Material and Methods

The records of all patients with the diagnosis of dissecting aneurysm of the aorta who were seen during the period from January, 1950, to January, 1962, at the Henry Ford Hospital were reviewed. The following cases were excluded: patients with a history of recent significant trauma to the chest, those persons who had manifestations of Marfan's syndrome, and individuals who, at autopsy or operation, proved to have a dissection less than 1 cm. in length.

Twenty-six records were acceptable for study. Antemortem diagnosis had been made in 20 patients. In 19, it was based on the presence of the classical clinical features of the disease, coupled with diagnostic plain roentgenograms or aortograms. Confirmation of diagnosis was obtained by autopsy in 15 patients, by operation in 5 patients, and by aortogram in 5 patients. In the remaining patient, direct confirmation was not available, although it was felt that the clinical features and plain roentgenogram were diagnostic. Survival was calculated from the time at which plain roentgenograms or aortograms were made to substantiate the clinical diagnosis, since in many cases it was not possible to determine by retrospective analysis the time of onset of "typical" symptoms.

Results

Age and Sex

Table 1 summarizes the age and sex distribution at onset of dissection. The average age was 59 years; patients ranged from 36 to 83 years of age.

Operation

Attempts at some form of operative repair of the aneurysm were made in eight patients. Of this group, six were operated on during the acute stage of the dissection (less than six weeks from the time of initial diagnosis), and two survived. Of the two patients with chronic dissection treated surgically, one survived.*

Survival

Of the entire group of 26 patients, 13 died within six weeks from the time the diagnosis was established, and five of these patients died within the first 24 hours (table 2).

Thirteen patients lived more than six weeks from the time of diagnosis. Two of these had successful operative repair of their aneurysm during the acute stage (table 2).

Of the 11 patients who were not operated upon and who had chronic dissection, 7 subsequently died and 4 are alive. The average survival time of the 7 who died was 28 months, with a range from 2 months to 57 months. Of the 4 who are living, survival has been 48 months, 16 months, 10 months, and 8 months (table 3).

Cause of Death

Table 4 lists the cause of death in 20 patients. Of those who died in the acute stage, eight had hemopericardium, and one had a rupture into the mediastinum. Four patients died postoperatively. Of the seven patients with chronic dissection, two died of congestive cardiac failure, and one each had rupture into

*This case is reported elsewhere.5

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the mediastinum and rupture into the right atrium, respectively. One patient died immediately after operative repair of the aneurysm, and the cause of death in two cases was unknown.

**Site of Dissection**

The site of initial intimal rupture occurred in the ascending aorta in 20 patients, in the arch of aorta in two, in the descending aorta in one, and in the abdominal aorta below the renal arteries in one. Nine individuals with chronic dissection had the intimal tear in the ascending aorta.

**Associated Clinical Findings**

Eight patients gave a history of having had hypertension before the onset of dissection. Four of this group had chronic dissection; congestive cardiac failure was present in two patients with chronic dissection. No significant history of prior angina pectoris, myocardial infarction, or hypertension was obtained from the remaining 18 patients.

**Discussion**

Intelligent treatment of any disease requires that the physician have a comprehensive knowledge of its natural history. When a definite diagnosis during life is impossible, then information concerning the characteristics of a disorder is obtained, by necessity, from post-mortem material. That such data may be biased is unquestioned since, unless the condition is fatal in every case, those patients who survive obviously are eliminated from study and the spectrum of the disease is not observed completely. Consequently, the prognosis of the illness as determined in post-mortem studies is unjustifiably considered worse than it really is.

It is possible that such has been the case in the past with dissecting aneurysm of the aorta. The excellent reviews of this disorder by Hirst, Levinson, and Shennan were based almost exclusively on post-mortem studies in which the diagnosis usually had not been suspected clinically. In most patients in these series, the date of onset of dissection was judged retrospectively from the "typical" symptoms which appeared in the patient's history. Invaluable information about the clinical and pathological features of dissecting aneurysm was obtained in these reviews, and a grave prognosis was reflected: 16 per cent, 23 per cent, and 26 per cent of these patients developed chronic dissection, since they lived for more than six weeks from the time of initial diagnosis.

In our group of 15 patients examined at autopsy, four (27 per cent) had chronic dissection, a figure which is comparable to those quoted. However, when considering our entire group of 20 patients (excluding those who were operated upon during the acute stage), 11 (55 per cent) lived more than six weeks, and seven of these lived for more than one year. This suggests that the survival of patients with dissecting aneurysm of the aorta may be better than has been reported previously.

**Associated Findings**

It has been stated that survival could be related directly to the site of intimal tear:
Chronic Dissecting Aortic Aneurysm: Essential Data

<table>
<thead>
<tr>
<th>Case no.</th>
<th>Age at onset</th>
<th>Means of diagnosis</th>
<th>Date of onset of symptoms</th>
<th>Length of survival (months)</th>
<th>Disposition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>38</td>
<td>Aortogram 5/60</td>
<td>5/60</td>
<td>16</td>
<td>Operation 8/61</td>
</tr>
<tr>
<td>2</td>
<td>83</td>
<td>Roentgenogram 11/56</td>
<td>11/56</td>
<td>39</td>
<td>Died suddenly 2/60</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No autopsy</td>
</tr>
<tr>
<td>3</td>
<td>61</td>
<td>Aortogram 12/61</td>
<td>12/61</td>
<td>8</td>
<td>Living 3/63</td>
</tr>
<tr>
<td>4</td>
<td>62</td>
<td>Roentgenogram 3/57</td>
<td>Epigastric pain radiating to testicle and back intermittently since 1/48</td>
<td>37</td>
<td>Died 4/60</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Congestive cardiac failure</td>
</tr>
<tr>
<td>5</td>
<td>55</td>
<td>Aortogram 11/61</td>
<td>11/61</td>
<td>10</td>
<td>Living 3/63</td>
</tr>
<tr>
<td>6</td>
<td>36</td>
<td>Roentgenogram 11/50</td>
<td>Intermittent epigastric pain since 3/48</td>
<td>39</td>
<td>Died 2/54</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Congestive cardiac failure</td>
</tr>
<tr>
<td>7</td>
<td>56</td>
<td>Roentgenogram 6/58</td>
<td>Intermittent epigastric pain to chest since 4/52</td>
<td>18</td>
<td>Died 4/60</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Following operation</td>
</tr>
<tr>
<td>8</td>
<td>58</td>
<td>Aortogram 12/58</td>
<td>12/58</td>
<td>48</td>
<td>Living 9/62</td>
</tr>
<tr>
<td>9</td>
<td>59</td>
<td>Roentgenogram 2/54</td>
<td>2/58</td>
<td>57</td>
<td>Died 11/58; rupture into right atrium</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Aortogram 2/58</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>64</td>
<td>Roentgenogram 4/50</td>
<td>4/50</td>
<td>2</td>
<td>Died 6/50; rupture into mediastinum</td>
</tr>
<tr>
<td>11</td>
<td>61</td>
<td>Aortogram 7/59</td>
<td>7/59</td>
<td>7</td>
<td>Died suddenly 2/60</td>
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<td></td>
<td></td>
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<td></td>
<td>No autopsy</td>
</tr>
</tbody>
</table>

Surgical Therapy

The promise of a successful reconstructive aortic operation offers new hope to patients with dissecting aneurysm. Operative repair falls into two categories: attempts at creating a re-entry of the dissection into the aortic lumen, or the partial or complete replacement of the involved aorta by prosthetic material.

DeBakey reports survival of 65 per cent of 72 cases treated by prosthetic replacements, with some patients followed for up to five years. Of Hufnagel's group of 28 patients treated by various operative procedures, 68 per cent survived the operation. Re-entry procedures are reported by Rob and Kenyon (6 patients surviving of 7), and by Beckwith et al. (4 surviving of a group of 11).

The evaluation of such therapy is difficult, since surgical series obviously consist of patients specifically selected for operation. On the other hand, our series is unselected. Consequently, only limited conclusions can be reached by comparing groups of surgically treated patients with ours. For example, in DeBakey's group, 60 per cent had dissection...
which started in the aorta distal to the left subclavian artery, while in our group dissection started distal to the left subclavian artery in only 2 of the 26 patients.

There is no doubt that the risk of operative repair in a patient with dissecting aneurysm of the ascending aorta is considerable. From the present data, it is impossible to establish arbitrary indications for operation. The purpose of this report is to provide some guide to prognosis in an unselected group of patients with this disease. With such information at hand, and the prospect of further reports of surgical experience (including longer follow-up), physicians may be better able to decide when, or if, to recommend operation.

Summary

Of 26 patients with dissecting aneurysm of the aorta diagnosed at the Henry Ford Hospital from 1950 through 1962, 13 patients lived less than six weeks from the time of initial diagnosis. Of the other 13 patients, 2 had had successful operative repair of the aneurysm during the acute stage. The average survival of the remaining 11 patients was 26 months. Prognosis of this unselected group of patients was better than has been reported previously for this disease.

No significant correlation could be found between survival of the patient and the presence of past hypertension, associated recognized cardiovascular disease, or site of intimal rupture.

References
