Interval or Permanent Nonoperative Management of Acute Type A Aortic Dissection

Frank G. Scholl, MD; Michael A. Coady, MD, MPH; Ryan Davies; John A. Rizzo, PhD; Graeme L. Hammond, MD; Gary S. Kopf, MD; John A. Elefteriades, MD

Hypothesis: Selected patients with acute type A (ascending) aortic dissection who are treated with delayed operation or nonoperative therapy may have better early and short-term outcomes than was previously expected.

Design and Setting: Retrospective cohort at a university hospital.

Subjects: Data on 75 patients with acute or chronic type A aortic dissection treated at one institution from January 1, 1985, to November 30, 1997, were analyzed. Of these 75 patients, 34 (21 male and 13 female, with a mean age of 65.5 years) did not undergo initial operative treatment, and 15 (10 male and 5 female, with a mean age of 72.6 years) never underwent surgery. For the 19 patients who underwent delayed surgery, the mean period between aortic dissection and intervention was 11.4 ± 4.83 days. The follow-up period ranged from 0.27 to 149 months, with a mean of 20.2 months.

Main Outcome Measures: Vascular complications, hospital mortality, and early survival.

Results: Reasons for interval delay in surgical treatment included initial misdiagnosis or delay in diagnosis (13 [68%] of 19), need to address significant comorbidity (4 [21%] of 19), and initial refusal of operative intervention (2 [11%] of 19). For the 15 patients treated entirely by medical therapy, reasons for electing nonoperative management included extensive comorbidity (5 [33%] of 15), refusal of surgical intervention (6 [40%] of 15), and misdiagnosis or long delay in diagnosis (4 [27%] of 15). Of the 34 patients, 15 (44%) presented with moderate or severe aortic insufficiency, 5 (14%) had evidence of pericardial effusion, 6 (21%) had evidence of concomitant coronary ischemia on electrocardiogram, and 8 (24%) had extension of the dissection into the descending aorta. Four patients (11.8%) died while in the hospital. Of the 34 patients, 30 (88%) who underwent either delayed or no surgery received aggressive medical treatment (β-adrenergic blocking agents and afterload-reducing agents) and were discharged from the hospital. All patients who were operative candidates in the interval treatment group survived to reach definitive operation. There was no statistically significant difference in short-term survival between the group of patients undergoing delayed surgery or medical treatment only and the group of 41 patients undergoing early operation (P = .42).

Conclusions: Immediate surgical therapy is still recommended for acceptable operative candidates with acute type A aortic dissection who seek immediate treatment. However, this study permits the following 2 conclusions: (1) patients with type A aortic dissection who are referred or whose conditions are diagnosed several days after presentation have survived the early dangerous period and can safely undergo surgery semielectively (rather than emergently); and (2) selected patients who are not considered operative candidates and who survive the initial type A aortic dissection without complication may be treated with aggressive medical therapy and achieve acceptable early and short-term outcomes, which is better than previously expected.


EARLY EXPERIENCE1,2 indicated an extremely high immediate mortality from acute ascending (type A) aortic dissection. Accordingly, acute type A aortic dissection is generally considered a surgical emergency. The results of surgical treatment have shown significant improvement during recent years,3,4 and, now, patients with acute type A aortic dissection usually undergo urgent surgical repair. Because of the urgent surgical treatment, the natural history of acute type A aortic dissection treated with nonsurgical therapy in the current era is not well known. Current medical management with aggressive anti-impulse therapy and blood pressure control may influence significantly the early morbidity and mortality of type A aortic dissection treated with nonoperative therapy. The patient who survives an initial episode of aortic dissection may be at lower risk of death than previously thought if aggressive medical treatment is begun.

We examined the outcome of patients at our institution with acute type A aortic dissection who, because of a variety of rea-
PATIENTS AND METHODS

A computerized database is maintained as part of ongoing studies at the Yale Center for Thoracic Aortic Disease, New Haven, Conn. This database currently includes 1962 imaging studies in 598 patients with diseases of the thoracic aorta. From this database, 75 patients with acute and chronic type A aortic dissection treated from January 1, 1985, to November 30, 1997, were identified. Forty-one patients were treated by immediate surgical intervention. Of these patients, 34 (21 male and 13 female) were treated with early medical therapy without initial operative treatment. Of these patients, 15 (10 male and 5 female) never underwent surgical intervention, while 19 patients (11 male and 8 female) underwent interval operation more than 48 hours after the aortic dissection. The time and date of onset of the acute aortic dissection were assumed to be coincident with the onset of pain.

The medical regimen for anti-impulse therapy included intravenous β-adrenergic blocking agents (or calcium antagonists when β-adrenergic blocking agents were contraindicated) as well as afterload-reducing agents. The regimen was administered until the patient had a target heart rate less than 60 beats/min and systolic blood pressure less than 100 mm Hg, unless oliguria or evidence of organ ischemia occurred. Oral medications were used after 48 hours of treatment.

Follow-up was obtained via telephone conversations with patients, physicians, or family members and through office and hospital chart review and was available in 99% (74 of 75) of patients. The overall mean follow-up was 20.2 months, with a range of 0.27 to 149 months.

Patients treated nonoperatively were older as a group than those treated with either delayed operative treatment or with initial surgery. Demographic data are shown in Table 1. The reasons for electing either nonoperative treatment or delayed surgical treatment are listed in Table 2. Major reasons for nonoperative treatment included delay in diagnosis, usually at an outside institution, patient's or family's refusal of surgery, and significant comorbidity. The 34 patients treated without initial operation sought treatment a mean of 4.2 days (range, 2-20) after the initial aortic dissection. In the patients who underwent interval operation, the mean time from aortic dissection to surgical intervention was 11.4 ± 4.83 days.

Of the 34 patients, 15 (44%) had moderate or severe aortic insufficiency, 5 (14%) had evidence of peri-

Table 1. Patient Demographics*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Initial Surgical Treatment</th>
<th>Interval Operative Treatment</th>
<th>Medical Treatment Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients (M/F)</td>
<td>41 (28/13)</td>
<td>19 (11/8)</td>
<td>15 (10/5)</td>
</tr>
<tr>
<td>Age, mean ± SD, y</td>
<td>59.49 ± 15.84</td>
<td>58.33 ± 22.40</td>
<td>72.64 ± 15.49†</td>
</tr>
<tr>
<td>Interval from aortic dissection until surgical intervention, mean ± SD</td>
<td>&lt;24 h</td>
<td>11.4 ± 4.8 d</td>
<td>...</td>
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*Ellipses indicate not applicable.
†Significant difference in age (P = .01).

Cardiac effusion, 6 (21%) had evidence of comitant coronary ischemia on an electrocardiogram, and 8 (24%) had extension of the dissection into the descending aorta.

An outcome flow diagram for the study is presented in Figure 1. The hospital mortality rate for the patients treated with delayed surgical intervention was 5.2% (1/19). The cause of death was disseminated intravascular coagulation and massive hemorrhage at the time of operation. All patients who were operative candidates in the interval treatment group survived to reach definitive operation. For patients undergoing medical therapy exclusively, the hospital mortality rate was 20% (3/15). The causes of death were extension of the aortic dissection with cardiac tamponade in 2 patients and acute renal failure and ongoing cardiac ischemia in 1 patient. For the patients undergoing immediate surgical treatment, the hospital mortality rate was 19.5% (8/41). These mortality rates are not statistically different (P = .84; χ² = 0.33). The short-term survival rate (Figure 2) after hospital discharge as determined by the log-rank test did not show a significant difference between the 41 patients treated with initial operative intervention and the 34 patients treated with either interval operation or medical treatment alone. The 1- and 2-year actuarial survival rates for the patients treated with initial operation are 82%. Actuarial survival is 74% at 1 and 2 years for those treated

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suspected extension of the aortic dissection. This report focuses on those patients presenting later in the course of acute type A aortic dissection and those patients who, for other reasons, are not suitable operative candidates.

The well-known complications of acute type A aortic dissection, for example, intrapericardial rupture, acute aortic valve insufficiency, coronary ischemia, and branch vessel occlusion, are often lethal without prompt surgical intervention. This report is not intended to refute in any way the conventional wisdom that acute type A aortic dissection represents a surgical emergency.7,8 This retrospective review is intended to provide a snapshot of 2 distinct groups of patients: those who seek medical attention or whose conditions are diagnosed several days after the onset of acute type A aortic dissection and those who are not appropriate for surgical correction secondary to advanced age, debility, or comorbidity. Scant information is available in the literature regarding these specific subgroups of patients with type A aortic dissection.

The subgroup profile of patients in this report should not be interpreted to reflect general patterns of this disease, because there is likely a selection bias inherent in the referral pattern of a tertiary referral center serving a broad geographic area. Specifically, the patients presented in this report are those who have survived long enough to have their conditions diagnosed and be referred and transported. Thus, the relative size of the group of patients who did not undergo initial operation may be exaggerated by this selection bias.

The decision about the timing of surgery when a patient with acute type A aortic dissection is referred 2 days into the disease course is difficult. Usually, the decision revolves around whether the patient should be taken to the operating room at night or undergo operation semielectively the next day when a full complement of staff can assist in the challenging procedure. This report suggests that after 48 hours the aortic dissection may have passed the most critical phase and can be aggressively managed with anti-impulse therapy and operated on semielectively. The absence of mortality prior to operation in the subgroup of patients undergoing interval operation supports this reasoning. The low operative mortality in this subgroup (5.2%) likely represents both self-selection of a more stable group of patients and the benefits of a semielective optimal operative environment.

Because most patients with acute type A aortic dissection undergo urgent surgical management, few current data are available regarding the group of patients treated solely with medical therapy. The group of medically treated patients in this report is different from patients with chronic type A aortic dissection who present months or years after the acute event. These patients' conditions were all diagnosed during the acute phase of the aortic dissection shortly after the initial event. The data in this series show that the outlook for these patients, at least in the short term, may be better than previously expected both during hospitalization and after discharge from the hospital. This conclusion is consistent with data from Masuda and colleagues, who reported that survival of medically treated patients with acute type A aor-

Figure 1. Outcome of all patients treated for acute type A aortic dissection. COPD indicates chronic obstructive pulmonary disease; ARF, acute renal failure.

Figure 2. Kaplan-Meier actuarial survival curve from date of initial presentation and treatment. Comparison made using log-rank test (P = .44).
Acute type A aortic dissection is an indication for urgent operation and we advocate prompt surgical treatment for patients with acute type A aortic dissection. However, the results of the current study suggest the following: (1) patients with type A aortic dissection who present for treatment several days after initial aortic dissection have survived the initial dangerous period and can safely undergo surgery semiselectively rather than emergently; and (2) those patients who are not operative candidates due to age, overwhelming comorbidity, or refusal may be treated with anti-impulse therapy and achieve reasonable early and short-term outcomes, which is better than previously expected.


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REFERENCES

Dr Scholl: I’d like to thank Dr Hilgenberg and Dr Singh for their excellent comments.

With regards to your initial question, Dr Hilgenberg, the advantages to the patients in delaying the operation, we find that once some of these patients are admitted to the hospital, the dissection occurred some time ago and they have been hemodynamically stable without evidence of end-organ ischemia. If we then treat them with aggressive medical therapy, the operation can be safely delayed until such time as they can be operated on in a semielective fashion, with a fresh operative team and all available resources on hand to assist in their care. Also, this allows time for more accurate and sometimes multiple diagnostic studies of these complex patients.

However, the fact is, as you mentioned in your comments, that these patients have biologically self-selected themselves by the simple fact that they are hemodynamically stable and have withstood the initial dissection without significant end-organ injury. We also have no way of knowing how many of these patients died before arriving at the hospital.

Regarding your question as to the types of operations required, the acutely operated-on patients tended to require more valve replacements due to the fact that some of them were brought to the operating room with significant aortic insufficiency or very proximal dissection with tamponade.

As far as the future management of patients with ascending aortic dissections, we continue to advocate prompt surgical treatment for all patients who present with acute type A dissection. We feel that the patients with acute type A dissections who present at a later time and who are hemodynamically stable without signs of end-organ damage can be safely managed with aggressive anti-impulse therapy and semielective operation as the operating room schedule permits. We will continue to follow this group of patients, as well as the group treated with medical therapy alone, and critically evaluate their long-term outcomes.

In response to Dr Singh’s comments, the majority of the medically treated patients were treated more recently, thus follow-up on this group is relatively short; in addition we have a few patients lost to follow-up. Thus, we don’t yet have a good idea of the long-term prognosis of these medically treated patients as the number of patients who are out at the longer follow-up intervals is quite small. We will be looking at these patients closely over the next few years to see if they succumb to complications of their dissection.