The Role of the ‘Pericardial Window’ in AIDS*

David R. Flum, MD; Joseph T. McGinn, Jr., MD; and Denis H. Tyras, MD

Background: The leading cause of pericardial effusion in urban hospitals is now AIDS-related pathologies. Clinically, these effusions are a diagnostic and management dilemma. In our institution, pericardial biopsy and operative drainage have become part of the diagnostic and management plan. Surgical intervention, however, has appeared to have little clinical impact.

Methods: A retrospective review was conducted of all patients (n=29) diagnosed as having AIDS who underwent "pericardial window" for pericardial effusions from 1986 to 1994.

Results: Fluid cultures and pericardial biopsy were performed in all cases. Twenty-four percent of culture or biopsy specimens were diagnostic (7 of 29 = adenocarcinoma, 3 lymphoma, 1 Staphylococcus aureus, 1 Mycobacterium tuberculosis). In 94% of cases, there was no change in clinical management based on operative results. In 4 of 7 cases, the patients were ineligible for the indicated therapy based on underlying illness and in 1 of 7, the patient was receiving appropriate therapy for previously diagnosed disease. Ventilatory complications were noted in 17%. Three patients did not wean from the ventilator and died shortly after the operation. Sixty-nine percent mortality was noted at 8 weeks postoperatively. One hundred percent mortality was noted at 22 weeks with 86% follow-up.

Conclusion: AIDS-related pericardial effusion is associated with a grave prognosis. Operations for diagnostic benefit provide little practical information and are not justified. (CHEST 1995; 107:1522-25)

Key words: AIDS; pericardial effusion; pericardial window

The association between pericardial effusions and AIDS has been well documented. The prevalence and cause of these effusions have been speculated by autopsy studies and in retrospective reviews. AIDS remains the leading diagnosis associated with pericardiocentesis in urban hospitals; however, management decisions concerning these effusions remain anecdotal. Often critical decisions of surgical or nonsurgical intervention are based on a coarse estimation of the patient’s prognosis and are complicated by the desire for a diagnostic specimen.

Our institution’s experience has suggested a low diagnostic yield to such operations and a high in-hospital mortality associated with surgically treated pericardial effusions. A retrospective review of all patients diagnosed as having AIDS who underwent operative pericardial drainage was conducted. We attempt to address our clinical observations and evaluate the following: What are the determinants of operative or nonoperative intervention? Are there clinical benefits to an operative drainage and pericardial biopsy? Is there significant morbidity associated with operative management? Lastly, based on these data, we suggest a clinical strategy for the management of pericardial effusion in patients with AIDS.

Methods

A retrospective review of all inpatients at St. Vincent’s Hospital and Medical Center with the diagnosis of AIDS who had operative pericardial drainage from January 1, 1986 to August 1, 1994, was performed. Twenty-nine patients were identified and data were recorded from medical records and patient/family interviews. Human immunodeficiency virus (HIV) status alone was not sufficient for entry into the review group. Rather, a clinical diagnosis of AIDS was required for consideration. Follow-up was 86% with four patients not located.

Results

There have been 16,259 inpatient cases of HIV infection or AIDS treated at St. Vincent’s Hospital and Medical Center from January 1, 1986, to August 1, 1994. The total number of pericardial effusions treated during this time period was 493. Of these, 29 patients were diagnosed as having AIDS and underwent surgical drainage and biopsy of the pericardium for pericardial effusion. The average age was 38.75 ± 11 years. All patients were men.

In 20 of 29 patients, the operative indication was reported as diagnostic. Nine cases were associated with clinical tamponade. In 3 patients, a prior pericardiocentesis had been performed. In 4 cases, pre-

---

*From the Department of Surgery, Division of Cardiothoracic Surgery, St. Vincent’s Hospital and Medical Center, New York. Manuscript received August 29, 1994; revision accepted October 13.

Reprint requests: Dr. Flum, Department of Surgery, Division of Cardiothoracic Surgery, St. Vincent’s Hospital and Medical Center, Smith 525, 153 W. 11th Street, New York, NY 10011
operative platelet counts were less than 20,000/high-power field (hpf) and each of these patients had a 6-unit platelet transfusion preoperatively.

The procedure was performed under general anesthesia with endotracheal intubation in all cases. A subxiphoid exploration was performed in 21 patients (72%) and an anterior thoracotomy was performed in 8 patients. The pericardium was incised sharply and a 3x3-cm biopsy specimen was removed. Pericardial specimens were subdivided for general pathologic, cytologic, and microbiologic analysis (including acid-fast testing and cytomegalovirus) and sent fresh to the department of pathology in saline solution. The size of the pericardial effusion was, on average, 625 mL. The quality of the drainage was reported as serosanguineous or bloody fluid. Samplings of pericardial drainage fluid were sent for microbiologic and cyto logic evaluation. A drain was placed in the pericardial space in all cases and a chest tube was inserted in 9 patients. No intraoperative complications were noted.

Morbidity was largely related to respiratory complications. Five of 29 patients (17%) experienced some form of respiratory distress postoperatively requiring prolonged intubation. Among these 5 patients, an average of 5 days was spent in the intensive care unit (ICU). Sixty percent of the group with respiratory complications failed to wean from the ventilator. Twenty-five percent of all patients spent at least 1 day in the ICU. Prolonged pain was the complaint of two patients, and in three patients drainage tubes were left in place more than 5 days. No wound infections were reported.

All patients were alive at 48 h postoperatively; however, 69% mortality was noted at 8 weeks. One hundred percent mortality was noted at 22 weeks postoperatively, although 4 patients could not be contacted for follow-up. Of those who died, 82% died within the same hospitalization as the operation. In 3 patients, the cause of death was associated with the postoperative inability to wean from the ventilator. The remainder of deaths (22 of 25) were not directly related to the operation.

Twenty-two of 29 (76%) specimens revealed no pathologic diagnosis; however, in 7 patients, either the culture or biopsy material was diagnostic (Table 1). In the 3 patients who had prior pericardiocentesis, neither the aspirated fluid nor the subsequent operative specimens were diagnostic.

Management plans and therapy were changed in only 2 patients. In patient 1, *Staphylococcus aureus* bacterial pericarditis was treated with intravenous antibiotic and in patient 2, a short course of radiotherapy was offered for adenocarcinoma of an unknown primary source. Patient 3 had been previously diagnosed as having *Mycobacterium tuberculosis* from bronchial washings and was receiving appropriate therapy at the time of the operation. All patients with diagnosed lymphoma and an additional patient with adenocarcinoma were considered too ill to be candidates for therapy and died shortly after the operation. In summary, only 6% of all patients experienced a change in clinical management based on operative results.

Follow-up of patients who died in the hospital was 100%. Of those who survived the hospitalization, 4 were unavailable for follow-up (14% of all patients). Total patient follow-up was, therefore, 86%.

**DISCUSSION**

AIDS is among the most common of all diseases associated with clinically significant pericardial effusions. The prevalence of this cardiac manifestation of AIDS has been suggested by studies in large urban hospitals and in Africa. Estimates range from 28% to 70% of all pericardiocenteses performed. This has been confirmed by echocardiographic studies of asymptomatic HIV-infected patients that demonstrate effusion frequencies ranging from 10 to 38%. Autopsy studies have confirmed these estimates.

### Table 1—Outcome of Pericardial Window in AIDS-Related Pericardial Effusions*

<table>
<thead>
<tr>
<th>Patient No.</th>
<th>Abnormality</th>
<th>Therapy</th>
<th>Clinical Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><em>S. aureus</em></td>
<td>Prolonged course IV antibiotics</td>
<td>Unavailable for follow-up</td>
</tr>
<tr>
<td>2</td>
<td>Adenocarcinoma, primary unknown</td>
<td>Short course of radiotherapy; not a candidate for chemotherapy</td>
<td>Unavailable for follow-up</td>
</tr>
<tr>
<td>3</td>
<td><em>M. tuberculosi</em></td>
<td>Previously receiving triple-drug therapy for pulmonary tuberculosis</td>
<td>Unavailable for follow-up</td>
</tr>
<tr>
<td>4</td>
<td>Adenocarcinoma, primary unknown</td>
<td>Not a candidate for therapy based on critical condition</td>
<td>Died 2 wk postoperatively</td>
</tr>
<tr>
<td>5</td>
<td>Lymphoma, Burkitts type</td>
<td>Not a candidate for therapy based on critical condition</td>
<td>Died 2 wk postoperatively</td>
</tr>
<tr>
<td>6</td>
<td>Lymphoma mixed type</td>
<td>Not a candidate for therapy based on critical condition</td>
<td>Died 3 wk postoperatively</td>
</tr>
<tr>
<td>7</td>
<td>Lymphoma mixed type</td>
<td>Not a candidate for therapy based on critical condition</td>
<td>Died 2 wk postoperatively</td>
</tr>
</tbody>
</table>

*Twenty-two of 29 patients undergoing pericardial window for AIDS-associated effusions had nondiagnostic samples.
Clinical manifestations of pericardial effusion in the patient with AIDS present in a diverse manner. Like nonimmunocompromised models, this entity ranges from the asymptomatic, in which there is an enlarged radiographic cardiac silhouette, to the more dramatic cardiac tamponade. Management decisions have been anecdotal, often relying on nonimmunocompromised patient models. Principally, the management decision is the choice between bedside (or fluoroscopically guided) pericardiocentesis vs operative drainage and biopsy “window” of the pericardium. Surgical approaches include subxiphoid exploration, anterior thoracotomy, or thoracoscopic pericardial stripping.

This management decision is compounded by the diversity of potential causative agents in this syndrome and the potential for important diagnostic information with a pericardial biopsy. Other authors have identified several potential etiologic agents in AIDS-associated pericardial effusions. These have included mycobacterium, cytomegalovirus, lymphoma, carcinoma, and Kaposi’s sarcoma. As well, both renal and cardiac abnormalities have been offered as etiologic agents. Some authors have addressed the diagnostic yield of pericardiocentesis. Reynolds et al detailed 50 patients undergoing pericardiocentesis, of whom were diagnosed as having AIDS. In of 14, the pericardiocenteses was diagnostic (1 lymphoma, 1 acid-fast batcelli, 1 bacterial). Of the others, 1 in 11 had a pericardial biopsy specimen that was diagnostic for mycobacterium. The diagnostic yield of pericardial fluid obtained through pericardiocentesis compared with those obtained in the operating room has yet to be addressed in the literature. Furthermore, there has yet to be a series to examine the diagnostic benefit of a pericardial biopsy.

In our experience, the decision to proceed with operative intervention has been based on three factors: (1) a clinical assessment is made that the patient’s prognosis warrants an aggressive approach; (2) the likely yield of the diagnostic sampling is considered significant enough to warrant the risk of the procedure; (3) there is reluctance to perform bedside procedures in the setting of concurrent thrombocytopenia. We seek to address these factors leading to operative intervention in light of these data.

A review of our clinical experience indicates that patient mortality is 69% at 8 weeks postoperatively and 100% after 22 weeks. If all patients unavailable for follow-up were survivors (and this is unlikely based on their condition at hospital discharge), this would still represent 86% mortality at 22 weeks. Such dismal short-term survival statistics may suggest the natural progression of this abnormality. Indeed, other authors have quoted mortality of only 29% in patients treated without surgery. It will take randomized trials to determine if surgical intervention is associated with higher mortality or if our group of patients represents a distinct subpopulation. In either case, an aggressive diagnostic search should be tempered by such dismal survival statistics.

In the context of a 69% mortality within 8 weeks of operative intervention, a review of the diagnostic and clinical impact of a pericardial biopsy is essential. Of 29 cases evaluated, 7 specimens were diagnostic. In only two cases were adjustments made in the therapeutic course based on these findings. Bacterial pericarditis and adenocarcinoma with an unknown primary source were treated. An additional patient with the diagnosis of a tuberculous pericardial effusion had been receiving the indicated therapy based on a previous diagnosis of pulmonary tuberculosis. In the four other cases of a diagnostic specimen, the patients were ineligible based on significant underlying disease. Indeed, three of this last group died in the hospital within 3 weeks of the operation and the fourth was unavailable for follow-up after hospital discharge upon his wishes to “die at home.” In 76% of cases, the pathologic findings were nondiagnostic. Significantly, in 96% of cases there was no change in clinical management based on operative findings.

Lastly, the linked issues of operative morbidity and reluctance to choose a bedside procedure should be addressed. The risks of general anesthesia are well documented in the general population. This in itself is not significant enough to support nonoperative intervention; however, 17% of these patients experienced prolonged ventilatory dependence. Indeed, 10.7% of patients were unable to wean off the ventilator and died soon after the operation. It has been suggested that underlying pulmonary disease may contribute to this morbidity. As well, the bulk of these cases are done on a semigent basis, which does not require that the patient cease oral intake for a prolonged period. This increases the risk of aspiration, which may be important in the manifestation of respiratory complications postoperatively. Other procedure-related morbidity included the need for prolonged drainage tube placement and pain syndromes related to these tubes. Bleeding complications were minimal and as indicated, platelet transfusions were administered in all patients when the platelet count was less than 20,000/hf. There is the consideration that similar transfusion practices could be performed prior to bedside procedures. Lastly, there were three cases in which a pericardiocentesis was performed in the acute setting and a follow-up diagnostic pericardial window was performed. No further diagnostic material emerged from this group. No procedure-related morbidity was reported in the group undergoing previous pericardiocentesis.
In review of our clinical findings, we suggest the following conclusions. There is little diagnostic benefit of pericardial biopsy and operative drainage in this population of patients. In cases where there was a diagnostic result, there was little clinical impact of that information either because the patient had been receiving that therapy or the patient did not survive long enough to recognize the therapeutic benefit. There is morbidity and mortality associated with this procedure largely related to prolonged ventilatory dependence. Lastly, short-term mortality is 69% and 100% at 8 and 22 weeks, respectively. This dismal statistic must be considered in the ethical provision of care. Operative intervention is a costly, potentially morbid management choice that should be reserved for those who will benefit from it.

Based on these conclusions, we offer a clinical strategy for the management of pericardial effusions in the setting of AIDS. Patients presenting to the hospital with either subclinical or clinical effusions should have a diagnostic and therapeutic pericardiocentesis performed at bedside. Additionally, this procedure can be performed with fluoroscopic guidance. Recurrent effusions within the same hospitalization should be addressed with repeated pericardiocentesis. Patients with recurrences at greater than 8 weeks should be considered for surgical intervention. Pericardial biopsy should not be offered as a first-line diagnostic intervention for the bulk of patients with AIDS-associated effusions.

If there are patients with AIDS who develop late recurrences, they may represent a subgroup with early disease or higher survivability for whom the morbidity of surgery may be outweighed by the potential of a diagnosis. As well, this may be the only subgroup with an opportunity to recognize the benefits of the indicated therapy.

When considering an operative approach, either a subxiphoid surgical exploration or an anterior thoracotomy provides acceptable access to the pericardium. Thoracoscopic pericardial stripping can now be offered and should be compared with the more traditional approaches in a controlled setting. Despite the operative approach, the procedure is highly standardized. Though the term “pericardial window” is commonly applied, the procedure described in this article is a subxiphoid surgical exploration and pericardial drainage/biopsy. Pericardial window more properly describes a communication between the pericardial and pleural spaces. It is often employed in chronic effusions. Because no patients in this population developed postoperative recurrence, it is unlikely that a pericardectomy, a larger pericardial biopsy, or a communication of pleura and pericardium would be advantageous. In nonimmunocompromised patients, a lower postoperative recurrence rate is occasionally noted with more extensive procedures. It is unlikely that any advantage is conferred by more extensive procedures.

The pitfalls of making clinical decisions based on nonrandomized, noncontrol compared studies cannot be overestimated. However, in this clinical entity, the data reviewed are so dramatically contradictory to conventional standards that we believe a change of protocol is in order.

Pericardial effusion in the setting of AIDS offers many diagnostic and therapeutic challenges. Clinical trials and prospective studies are the only meaningful ways to confirm our retrospective analysis and to address these challenges. Based on our experience, AIDS-related pericardial effusion is not well served by surgical intervention.

**References**