Inefficacy of Quinidine in Preventing Atrial Fibrillation Following Mitral Valvotomy


Atrial fibrillation is a frequent, undesirable complication of mitral valvotomy in patients with sinus rhythm. The reported high incidence of this complication (23 to 50%)\(^1-7\) has been the basis for advocating the prophylactic use of quinidine by Black and associates\(^5\) and Kittle and Crockett.\(^5\) Black and associates have reported reducing the postoperative incidence of atrial fibrillation from 42 to 22% with moderate doses (0.8 to 1.2 g per day) of quinidine. Kittle and Crockett\(^6\) reported that only 16% of 55 digitized patients given rather massive doses of quinidine (2.4 g per day) developed atrial fibrillation in the postoperative period. In contrast to these favorable reports, Wood,\(^2\) Goodwin and associates\(^5\) and Heinz and Hultgren\(^6\) have found quinidine ineffective in preventing postoperative atrial fibrillation. In an effort to confirm the efficacy of prophylaxis with quinidine, the following prospective study was undertaken.

Groups Studied and Method

One hundred consecutive patients in sinus rhythm admitted to Walter Reed General Hospital for closed mitral valvotomy during the period April 1961 to January 1965 were included in this study. Patients were assigned alternately to the control and study groups. In the study group quinidine prophylaxis (200 mg every 6 hours for those weighing less than 120 pounds; 300 mg every 6 hours for those weighing more than 120 pounds) was begun immediately after surgery and continued for 10 days. Initial therapy consisted of quinidine gluconate given intramuscularly; a change to oral therapy was made as soon as it could be tolerated. In all other respects the two groups received identical treatment.

The treated group contained 14 males, while the untreated group contained three males. The two groups were otherwise comparable in respect to race, age, weight, associated mitral insufficiency, history of palpitation, size of the mitral orifice at surgery, calcification of the valve, electrocardiographic evidence of left atrial enlargement, anesthesia employed, as well as functional and therapeutic classification. There were six cases of repeat commissurotomy in the group receiving quinidine, and 10 in the control group. Practically all patients were digitalized at the time of surgery. In all but five patients a mechanical transventricular dilator was utilized to ensure wide splitting of the mitral commissures.

Results

The incidence of postoperative atrial fibrillation was equal in the treated and the control group (table 1). The 16% overall incidence of atrial fibrillation was considerably lower than in most reported series. In 10 patients the fibrillation was transitory and the heart reverted to sinus rhythm spontaneously or following small doses of anti-arrhythmic drugs before the patients left the hospital. Of the six patients who developed permanent atrial fibrillation, four had not received quinidine, and two had received prophylactic quinidine therapy. The difference between the two groups was not statistically significant. Our groups showed a statistically significant, higher incidence of atrial fibrillation in patients beyond 40 years of age. Quinidine, however, proved singularly ineffective in preventing the arrhythmia in this particularly vulnerable group (table 2).

Discussion

The results of this prospective study are in agreement with the experience of Heinz and

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Table 1

Incidence of Postoperative Atrial Fibrillation

<table>
<thead>
<tr>
<th></th>
<th>Quinidine</th>
<th>No quinidine</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients</td>
<td>50</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>Atrial fibrillation</td>
<td>8</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>Permanent</td>
<td>2</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Transient</td>
<td>6</td>
<td>4</td>
<td>10</td>
</tr>
</tbody>
</table>

Hultgren, Goodwin and associates and Wood, Goodwin and associates and co-workers, but was significantly lower than the potentially dangerous levels employed by Kittle and Crockett. There was one operative death among the 100 patients; this death occurred in the quinidine-treated group and resulted from a complex arrhythmia in the early postoperative period 1 hour after the patient had received his initial intramuscular dose of quinidine gluconate. Although quinidine could not be implicated as the cause of death, neither could it be clearly exonerated. It is of interest that the overall incidence of atrial fibrillation (16%) was considerably less than that in previous reports, even though 16 of the patients had undergone one or more previous mitral commissurotomies. The only ready explanation for this low incidence of atrial fibrillation is that our patients were, perhaps, a younger group. (The mean age of our patients was 32 years, while the mean age of those who developed atrial fibrillation was 42.5 years). Our study indicated that quinidine did not reduce the likelihood of developing the arrhythmia in the patients beyond 40 years of age. In this age group the incidence of postoperative atrial fibrillation was nearly 50% among both the treated and untreated patients. Numerous authors have pointed out that older patients are more prone to develop atrial fibrillation following mitral valvotomy. This was confirmed in our study. Others have indicated that preoperative digitalization probably tends to prevent this arrhythmia. Virtually all of our patients were digitalized prior to surgery, and this probably contributed to the low incidence of fibrillation. Another possible factor is improved anesthesia and surgical techniques with the passage of years, so that recent studies will compare favorably with earlier ones. Some workers have noted that atrial fibrillation rarely occurs during surgery but usually appears during the first week of convalescence. This was our experience. None of the patients in our treated group developed atrial fibrillation before receiving quinidine. Hence, there

Table 2

Incidence of Various Factors and Their Influence on Development of Atrial Fibrillation

<table>
<thead>
<tr>
<th>Factor</th>
<th>Quinidine</th>
<th>No quinidine</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postoperative mitral insufficiency (by palpation at surgery)</td>
<td>30 6 20</td>
<td>31 5 16</td>
<td></td>
</tr>
<tr>
<td>History of palpitation</td>
<td>16 4 25</td>
<td>18 4 22</td>
<td></td>
</tr>
<tr>
<td>Over 40 years of age</td>
<td>11 5 45*</td>
<td>12 6 50*</td>
<td></td>
</tr>
<tr>
<td>Left atrial enlargement on ECG</td>
<td>33 6 18</td>
<td>32 6 19</td>
<td></td>
</tr>
<tr>
<td>Preoperative orifice size 1 cm or less (by palpation at surgery)</td>
<td>26 4 15</td>
<td>25 5 20</td>
<td></td>
</tr>
<tr>
<td>Calcification of valve</td>
<td>15 2 13</td>
<td>10 2 20</td>
<td></td>
</tr>
</tbody>
</table>

*Statistically significant increase by chi-square test.
seems to be no virtue in initiating prophylactic quinidine therapy in the preoperative period, and it appears undesirable to administer a myocardial depressant prior to anesthesia and cardiac surgery.

An increased incidence of postoperative atrial fibrillation has been reported also in male patients and in patients with a history of palpitation. However, a statistically significant increase was not noted in such patients in this study. Similarly, the severity of stenosis as judged by the size of the orifice at surgery, the incidence and magnitude of postoperative mitral insufficiency, the type of anesthesia, the degree of left atrial enlargement as evidenced by changes in ECG, calcification of the mitral valve, or previous valve surgery did not affect the incidence of the arrhythmia in this study.

In this controlled, prospective study the prophylactic use of quinidine was ineffective in preventing postoperative atrial fibrillation in patients undergoing closed mitral commissurotomy, and its routine use for this purpose does not seem warranted.

**Summary**

One hundred patients in sinus rhythm who underwent closed mitral commissurotomy were divided alternately into two comparable groups. One group received prophylactic treatment with quinidine immediately after operation for a period of 10 days. The incidence of atrial fibrillation was 16% in both the treated and the untreated groups. In patients more than 40 years of age, the incidence of postoperative atrial fibrillation was much higher (48%). However, in these older, more vulnerable patients quinidine prophylaxis was no more effective than it was in the younger age groups. The only operative death in the entire series occurred in the treated group and could have been due to quinidine. In this controlled, prospective study the use of quinidine in moderate dosage was ineffective in preventing postoperative atrial fibrillation following mitral commissurotomy. Its routine use is not recommended.

**References**


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