Mitral balloon valvotomy and left atrial thrombus

T R D Shaw, D B Northridge, N Sutaria

The presence of thrombus in the left atrium (LA) is an important factor in the selection of cases for percutaneous mitral balloon valvotomy (MBV). This is because of the danger of embolisation caused by manipulation of guidewires and balloon catheters. The American College of Cardiology/American Heart Association recommendations for MBV emphasise absence of LA thrombus. Transoesophageal echocardiography (TOE) has a high sensitivity for detection of cavity and appendage LA thrombi (93–100%) and is normally carried out before MBV. We report our experience of MBV in patients who had an LA thrombus at initial TOE.

Methods

Of 313 patients admitted for MBV, TOE was tolerated in 310. The characteristics of these patients are shown in table 1. Each patient had a two dimensional Doppler transthoracic echocardiogram (TTE) and TOE on the morning of the planned MBV. Warfarin treatment had been stopped at home three days earlier. Subcutaneous heparin was not given. MBV was by the Inoue technique.1 Intravenous heparin (100 units per kg body weight) was given after transseptal puncture.

Results

LA thrombus was found in 41 (13%) of the 310 patients. In those with thrombus 98% had received warfarin treatment. Overall 95% of patients had been receiving warfarin treatment. The characteristics of the patients who did, and did not, have LA thrombus are compared in table 1. The patients with thrombus were significantly older, had atrial fibrillation more often, and had more severe mitral stenosis with a lower cardiac output and higher right ventricular systolic pressure. They also had a significantly larger LA echo-dimension. Thrombus was significantly more likely in those patients considered unsuitable for cardiac surgery. On multiple regression analysis the independent predictors of LA thrombus were severity of mitral stenosis (p < 0.001) and presence of atrial fibrillation (p < 0.05).

Five (7.9%) of the 63 patients who had had previous surgical valvotomy had an LA thrombus of any type, while in the 247 patients without previous valvotomy, thrombus was detected in 36 (14.6%). The corresponding incidence for LA thrombus in MBV was 9%. Differences did not reach significance (p = 0.06). Patients with mitral reflux also had a non-significant trend to less LA thrombus (p = 0.06). Patients with mitral reflux had an LA thrombus of any type 9% compared with 13% in those with mitral reflux (p = 0.06). Patients with mitral reflux also had a non-significant trend to less LA thrombus (p = 0.06). Patients with mitral reflux had an LA thrombus of any type 9% compared with 13% in those with mitral reflux (p = 0.06).

Table 1 Characteristics of patients with and without LA thrombus at initial TOE before planned MBV

<table>
<thead>
<tr>
<th></th>
<th>Patients with no LA thrombus at TOE</th>
<th>Patients with LA thrombus at TOE</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients</td>
<td>269</td>
<td>41</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Age (years)</td>
<td>60.2 (12.7)</td>
<td>64.9 (11.1)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Female</td>
<td>217 (81%)</td>
<td>31 (76%)</td>
<td>NS</td>
</tr>
<tr>
<td>Previous rheumatic fever</td>
<td>102 (38%)</td>
<td>13 (32%)</td>
<td>NS</td>
</tr>
<tr>
<td>Previous surgical valvotomy</td>
<td>58 (22%)</td>
<td>5 (12%)</td>
<td>NS</td>
</tr>
<tr>
<td>Atrial fibrillation</td>
<td>189 (70%)</td>
<td>38 (93%)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Warfarin therapy</td>
<td>253 (94%)</td>
<td>40 (98%)</td>
<td>NS</td>
</tr>
<tr>
<td>Echo score</td>
<td>6.3 (2.7)</td>
<td>7.0 (3.0)</td>
<td>NS</td>
</tr>
<tr>
<td>LA echo-dimension</td>
<td>5.34 (1.17)</td>
<td>5.71 (0.93)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Parsonnet score</td>
<td>14.5 (8.7)</td>
<td>17.1 (8.7)</td>
<td>NS</td>
</tr>
<tr>
<td>Patients unsuitable for cardiac surgery</td>
<td>52 (19%)</td>
<td>14 (34%)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Mitral reflux on LV angiogram</td>
<td>89 (33%)</td>
<td>100 (24%)</td>
<td>NS</td>
</tr>
<tr>
<td>LV impairment</td>
<td>20 (7%)</td>
<td>4 (10%)</td>
<td>NS</td>
</tr>
<tr>
<td>RV systolic pressure (mm Hg)</td>
<td>50.4 (18.0)</td>
<td>57.7 (17.6)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Mean LA pressure (mm Hg)</td>
<td>25.2 (7.1)</td>
<td>26.7 (5.9)</td>
<td>NS</td>
</tr>
<tr>
<td>Valve gradient (mm Hg)</td>
<td>12.0 (5.1)</td>
<td>11.6 (3.7)</td>
<td>NS</td>
</tr>
<tr>
<td>Cardiac output (l/min)</td>
<td>3.67 (0.94)</td>
<td>3.10 (0.72)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Valve area (cm²)</td>
<td>0.97 (0.30)</td>
<td>0.78 (0.23)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Data are represented as mean (SD).

Abbreviations: LA, left atrium; LV, left ventricle; RV, right ventricle, TOE, transoesophageal echocardiography.
Six patients had a smooth surface, laminar thrombus attached to the LA wall. Each had MBV immediately after their TOE. One patient had a transient episode of diplopia resolving within two days. No thrombus was detected in any of these six patients at TTE.

In 28 patients there was thrombus only at the LA appendage. The thrombus was entirely within the appendage in 21 patients. Each of these 21 patients proceeded to same day MBV. None had evidence of embolism. In seven patients the thrombus protruded just beyond the mouth of the appendage or had a mobile portion lying at the mouth. One of these seven patients was found at TOE to have mitral valve morphology unsuitable for MBV and this patient was referred for valve replacement. The remaining six all had a further period of intensive anticoagulation for three months. There was complete clearing of the thrombus in three patients while the three remaining patients showed partial resolution, with the thrombus then lying entirely within the appendage. All six patients had MBV immediately after their repeat TOE and none had embolism. TTE had not detected the thrombus in any of these 28 patients.

DISCUSSION
We found that LA thrombus in patients with mitral stenosis is not uncommon (13%), despite warfarin treatment. However, further intensive anticoagulation therapy can resolve the thrombus in some, but not all, patients. Many of the patients in this series were elderly with co-morbidity which made surgical treatment contraindicated or high risk. In those with a pressing need for MBV, valve dilatation can occur (0.8% in our series) at MBV in those without LA thrombus.

REFERENCE

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