CASE REPORT

Atrial Fibrillation and Right Bundle Branch Block Complicating Coil Embolization of a Huge Pulmonary Arterio-Venous Malformation

Marco Colotto1, Silvia Da Ros1, Giulia Barbarossa1, Alessandra Renzi1, Fabio Vinci1, Paola Coletta1 and Filippo Maria Salvatori2

Abstract

Coil embolization is a safe therapy for pulmonary arterio-venous malformations (PAVMs). We report the case of a 72-year-old woman affected by hereditary hemorrhagic teleangectasia who experienced right bundle branch block and atrial fibrillation 36 hours after embolization of an extended PAVM. To our knowledge, this is the first case of such a complication of embolization of a pulmonary fistula, presumably due to an acute pressure overload on both the right atrium and ventricle. This case report suggests that, after embolization of extended pulmonary fistulas, patients should be carefully monitored for rhythm disturbance and new onset of intraventricular conduction defects.

Key words: coil embolization, pulmonary artero-venous malformation, hereditary hemorrhagic teleangectasia, atrial fibrillation, right bundle branch block

(Intern Med 50: 2983-2986, 2011)  
(DOI: 10.2169/internalmedicine.50.6136)

Introduction

Pulmonary Arteriovenous Malformations (PAMVs) are not rare in patients affected by Hereditary Hemorrhagic Teleangectasia (HHT) (1). Metal coil embolization is considered a safe technique for the definitive treatment of PAMVs. The method was first introduced by Porstmann in 1977 and it has now completely replaced surgical resection as first line therapy (2-9). Complications associated with this procedure are generally rare and self-limited. The most frequent adverse events related to coil embolization are listed in the order of frequency in Table 1 (3, 5, 10-13). The present article describes the first case of an HHT patient who, at 36 hours after coil embolization of an extended PAMV, experienced the onset of high ventricular rate paroxysmal atrial fibrillation (AF) and right bundle branch block (RBBB), which were both resolved spontaneously in a few days.

Case Report

A 72-year-old Caucasian HHT woman presented a huge PAVM, originating from both the superior and the inferior lobar branch of the left pulmonary artery with an extended draining vein (Fig. 1). The patient’s clinical history was remarkable for dyspnoea on light exertion and recurrent nose bleeding episodes for many years. She denied symptoms such as palpitations, tachycardia, chest pain, or syncope. No history of atrial fibrillation or any kind of cardiac rhythm disturbance was reported by the patient. Physical examination showed labial, upper and lower extremities cyanosis, telangiectases in the skin of her face, fingertips and nasal mucosa. Arterial blood gas analysis showed a severe hypoxemia associated with normocapnia and reduced oxygen saturation (SaO2) in room air (Table 2). The electrocardiogram showed sinu rhythm at a rate of 78 beats/minute. The echocardiogram did not show any pathological finding. Common extrapulmonary visceral arteriovenous malformations were ex-

1Department of Internal Medicine and Medical Specialties, “Sapienza” University-Policlinico Umberto I-Rome, Italy and 2Department of Radiological Sciences, “Sapienza” University-Policlinico Umberto I-Rome, Italy

Received for publication July 9, 2011; Accepted for publication September 4, 2011

Correspondence to Dr. Marco Colotto, m.colotto@policlinicoumberto1.it
Table 1. Common Complications of Metal Coil Embolization of PAVMs (in Order of Frequency)

- Chest Pain
- Pleursy
- Hemothorax
- Pulmonary Infarct
- Deep Vein Thrombosis in the Catheter Introduction Site
- Device Embolization
- Stroke
- Severe Pulmonary Hypertension

Table 2. Patient’s Arterial Blood Gas Analysis before and after Metal Coil Embolization of PAVM

<table>
<thead>
<tr>
<th></th>
<th>Before PAVM embolization</th>
<th>After PAVM embolization</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>7.3</td>
<td>7.41</td>
</tr>
<tr>
<td>PaO2 (mmHg)</td>
<td>46</td>
<td>73</td>
</tr>
<tr>
<td>PaCO2 (mmHg)</td>
<td>42</td>
<td>41</td>
</tr>
<tr>
<td>HCO3 (mmol/L)</td>
<td>28</td>
<td>26</td>
</tr>
<tr>
<td>SaO2(%)</td>
<td>83</td>
<td>95</td>
</tr>
</tbody>
</table>

Figure 1. Huge pulmonary arteriovenous malformation originating from the left pulmonary artery with a large draining vein (arrow).

Figure 2. Angiographic control after embolization of the pulmonary arteriovenous malformation (PAVM) showing the complete exclusion of the fistula.

Discussion and Conclusion

Coil embolization of PAVM is generally considered a safe intervention with a low complication rate. In a literature search, only one other case report was found, which de-
scribed atrial fibrillation complicating coil embolization of a PAVM (14). However, the above-mentioned case concerned the coil embolization of a fistula from the circumflex artery to the pulmonary system. The authors of the report hypothesized that the onset of atrial fibrillation was provoked by the occlusion of a small branch supplying the sinus node. In our opinion, the present case needs a completely different physiopathological explanation: both atrial fibrillation and right bundle branch block could be interpreted as a consequence of the sudden change which occurred in pulmonary hemodynamics after the AVM closure. Indeed, the exclusion of a considerable reservoir for the blood flow coming from the left pulmonary artery may have caused an acute pressure overload on the right sections of the heart, thus leading to the onset of RBBB and AF.

A possible explanation of the prompt restoration of sinus rhythm (i.e. 24 hours) and the rapid disappearance of RBBB (i.e. few days) is that a progressive reduction of pressure overload in the right chambers of the heart could have occurred. In our opinion two possible mechanisms could explain this reduction:

1) Diltiazem exerts a direct vasodilator effect on pulmonary circulation thus allowing a reduction in pulmonary pressure. Moreover, the therapy with diltiazem may have contributed to the restoration of sinus rhythm due to its activity on slow calcium channels as a class IV antiarrhythmic agent.

2) The new hemodynamic condition created by the occlusion of the huge arteriovenous fistula may have caused a progressive adaption of pulmonary microcirculation through the opening of capillary arteriovenous shunts, as it has already been demonstrated in the case of increase in pulmonary pressures (15).

In conclusion, although coil embolization is considered a very safe and effective intervention, this case suggests that after an occlusion of extended PAVMs through coil embolization, patients must be carefully monitored for the possible onset of rhythm disturbance and intra-ventricular conduction defect.
The authors state that they have no Conflict of Interest (COI).

References