Cardiac myxomas are the most common primary cardiac tumor with variant symptoms and signs depending on the size and location. The clinical presentations include obstructive cardiac signs, embolic events and constitutional manifestations [1]. Embolic events occur in 26.5% of patients with cardiac myxoma [2], which occur at the central nerve system, retinal artery, pulmonary vessels and the descending aorta [1, 3, 4]. Total occlusion of the aorta could be at suprarenal or infrarenal levels [3]. Early diagnosis of the embolic event and identification of the relatively rare etiology of aortic obstruction is of clinical benefit to initiate early intervention.

**CASE REPORT**

A 52-year-old previously healthy man came to our emergency department due to an acute episode of bilateral lower-extremity weakness and urinary incontinence with 1-day duration. The symptoms were sudden onset after a violent cough owing to his recent common cold. His vital signs were stable. The physical examination revealed nearly total loss of pain sensation and muscle power of the bilateral lower limbs. The pulsation of pedis dorsalis decreased as well. Therefore, acute arterial occlusion was suspected and the emergency computed tomography (CT) scan confirmed near total occlusion of the lower abdominal aorta and bilateral common iliac arteries (Fig. 1). In addition, a large filling defect attaching at the interatrial septum of his left atrium was found (Fig. 2). Intracardiac myxoma complicating with acute aortic and bilateral iliac arterial occlusion was impressed. The large gray-reddish jelly-like tumor fragments in the distal abdominal aorta and bilateral iliac arteries with total occlusion were removed (Fig. 3). The patient also accepted fasciotomy of bilateral lower limbs because of compartment syndrome. Two days later after thromboembolectomy, the left atrial mass was also resected uneventfully. The histopathology proved the myxoma in the left atrium and aorta (Fig. 4).

Due to severe muscle necrosis and wound infection of bilateral lower limbs, debridement and skin grafting were performed accompanying with antibiotic treatment. Unfortunately, the skin graft still failed and sepsis occurred. Then the patient passed away after an episode of septic shock.
Primary cardiac tumors are rarely seen and have an incidence of 0.3% of all open cardiac operations [5]. Myxoma is the most frequent etiology, represented 58–86% of treated cardiac tumors [2, 6]. Most patients range from 50 to 70 years of age; it rarely occurs in individuals younger than 30 years old [7].

The myxomas involve predominantly the left atrial cavities, about 88% of reported cases, and fewer cases at right atrium and ventricle [2, 7]. Most myxomas are attached to the septum via a stalk [7].

The clinical presentations of myxomas, dependent upon tumor location and size, are diverse [7]. Dyspnea and palpitation, resulted from intracardiac obstruction, are the common symptoms [5, 7]. About one-third of these patients
Unusual clinical presentation of intracardiac myxoma

have constitutional manifestations (such as fever, weight loss, fatigue, myalgia, muscle weakness and arthralgia) [1]. Electrocardiographic abnormalities are noted at more than half of cases, including atrial fibrillation, arrhythmia, tachycardia and signs of atrial hypertrophy [7]. The most common laboratory finding is high erythrocyte sedimentation rate [5]. Echocardiography is usually sufficient for the demonstration of the myxomas [5].

More than one-fourth of these patients with myxomas suffer from embolic events and there are 17–26% of reported cases with neurological symptoms [1, 2, 5]. Embolization, originated from a mitral valve myxoma, occurs more often than that from an atrial myxoma because of motion of the valve leaflets. Due to the high pressure of the left ventricle during systole, embolization is more frequently from the left side of the heart [2]. In most reported cases, embolic event occurs at the central nerve system. The remaining locations include pulmonary vessels, aorta and extremities [5].

There were thirteen case reports of intracardiac myxoma complicating with acute aortic occlusion (Table 1) [3, 8-19]. Almost all patients suffered from sudden weakness of bilateral lower extremities with different degrees of severity. Only one patient’s initial presentation did not include weakness of lower limbs; she had pain of limbs, urinary and fecal incontinence, followed with conscious change [12]. Absent or diminished bilateral femoral pulse was found in all cases. The greatest diameter of the intracardiac myxoma ranged from 3.5 cm to 7.5 cm. Connected stalks were mentioned in six cases. There were two patients without detectable intracardiac tumor [13, 17] and total detachment of cardiac myxoma is suspected [17]; therefore, negative finding of the echocardiogram could not completely exclude intracardiac myxoma as an etiology of aortic occlusion. Two of the thirteen patients had suprarenal aortic occlusion and both passed away due to ischemic bowel and potential reperfusion injury [3, 10]. Three of the four patients with stroke expired after extensive brain infarction [12-14]. Therefore, image detection of the level of aortic occlusion and evidence of stroke are of clinical importance regarding to patient prognosis.

Although the underlying mechanism is not fully understood, increased thoracic pressure due to coughing is proposed as a risk factor of cardioembolic stroke and could result in hemodynamic change, facilitating dislodgement of central venous catheters [20, 21]. In a similar way, detachment of myxoma fragment could also be launched during violent cough and generates saddle emboli, leading to aortic obstruction. A similar case was reported without radiological-pathologic correlation [11] as shown in our case report.

In summary, the possibility of acute occlusion of abdominal aorta and its branches from a cardiac myxoma should be included in the differential diagnosis if the patient presented an acute weakness and decreased pulse of lower extremities, following a forceful, valsalva maneuver-like action. Emergent thromboembolectomy would benefit the outcome of the patient after confirming the finding of CT study covering the chest and abdomen as early as possible.

Figure 4. Pathological examination revealed the composition of loose mesenchymal cells distributing in myxoid background; myxoma is compatible.
<table>
<thead>
<tr>
<th>Author (Year)</th>
<th>Sex</th>
<th>Age</th>
<th>Lower limb weakness</th>
<th>Intracardiac myxoma</th>
<th>Occlusion of the aorta</th>
<th>Stroke</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chang, Y. C. (2014)</td>
<td>M</td>
<td>52</td>
<td>Bil. paresis</td>
<td>LA 3.2 x 3.1 x 1.5&lt;sup&gt;g&lt;/sup&gt;</td>
<td>Infarenal Bil. CIA</td>
<td>-</td>
<td>Expired (Infection of bil. lower limbs, followed with septic shock)</td>
</tr>
<tr>
<td>Muhammad Amin, A. U. (2013) [8]</td>
<td>F</td>
<td>21</td>
<td>Bil. paresis below the groin</td>
<td>LA 5 x 5&lt;sup&gt;d&lt;/sup&gt;</td>
<td>Infarenal Bil. CIA; shunt occlusion at right popliteal artery</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Hong, S. (2012) [9]</td>
<td>F</td>
<td>41</td>
<td>Weakness in bil. legs</td>
<td>LA 6.7 x 5.8 x 4.5&lt;sup&gt;e&lt;/sup&gt;</td>
<td>Infarenal Bil. CIA; reduced blood flow in bilateral anterior and posterior tibial arteries</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Lin, Y. H. (2010) [11]</td>
<td>M</td>
<td>63</td>
<td>Paraplegia</td>
<td>LA 7 x 3.2 x 3&lt;sup&gt;d&lt;/sup&gt;</td>
<td>Infarenal Bil. CIA</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Yadav, S. (2009) [12]</td>
<td>F</td>
<td>62</td>
<td>+/- (Collapse)</td>
<td>LA 4.8 x 2.2&lt;sup&gt;d&lt;/sup&gt;</td>
<td>Infarenal Occlusion distal to bilateral FA; pulmonary emboli</td>
<td>+</td>
<td>Expired (Stroke)</td>
</tr>
<tr>
<td>Binning, M. J. (2009) [13]</td>
<td>F</td>
<td>45</td>
<td>+/- (Slumping down)</td>
<td>X</td>
<td>Infarenal Bil. CIA, proximal EIA</td>
<td>+</td>
<td>Expired (Stroke)</td>
</tr>
<tr>
<td>Neff, C. M. (2008) [14]</td>
<td>F</td>
<td>45</td>
<td>+/- (Slumping down)</td>
<td>X</td>
<td>Infarenal Bil. CIA, proximal EIA</td>
<td>+</td>
<td>Expired (Stroke)</td>
</tr>
<tr>
<td>Shavit, L. (2007) [15]</td>
<td>M</td>
<td>42</td>
<td>Bilateral paresis</td>
<td>LA 7.5&lt;sup&gt;d&lt;/sup&gt;</td>
<td>Infarenal Bil. CIA, bil. IIA; emboli at bilateral RA, total occlusion of splenic artery</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Zhang, J. (2006) [16]</td>
<td>M</td>
<td>35</td>
<td>Paraplegia</td>
<td>LA 3.5 x 2.4&lt;sup&gt;d&lt;/sup&gt;</td>
<td>Infarenal Bil. CIA; partial involvement of right RA</td>
<td>-</td>
<td>Amputation due to necrosis of the left calf and foot</td>
</tr>
<tr>
<td>Ouattara, A. (2002) [18]</td>
<td>M</td>
<td>50</td>
<td>Paraplegia reaching the T10 level</td>
<td>LA 6 x 4 x 2&lt;sup&gt;e&lt;/sup&gt;</td>
<td>Infarenal N/A</td>
<td>-</td>
<td>Residual paralysis of the lower limbs</td>
</tr>
<tr>
<td>Kao, C. L. (2001) [19]</td>
<td>M</td>
<td>79</td>
<td>Bilateral paresis</td>
<td>LA N/A</td>
<td>Infarenal Emboli at distal FA</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> LA, left atrium; N: no intracardiac tumor; X: pathologic analysis of the specimens obtained during embolectomy is consistent with a cardiac myxoma

<sup>b</sup> Bil., bilateral; CIA, common iliac artery; EIA, external iliac artery; FA, femoral artery; IIA, internal iliac artery; RA, renal artery; SMA, superior mesenteric artery

<sup>c</sup> Between parentheses: etiology of mortality; blank at this column: total recovery or no significant neurological deficit

<sup>d</sup> Measurement with transthoracic or transesophageal echocardiogram

<sup>e</sup> Size of the specimen

<sup>f</sup> Initial presentation with pains at limbs, urinary and fecal incontinence, followed with acute neurological compromise

<sup>g</sup> Specimen obtained from the aorta
REFERENCES

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