Pulmonary edema due to aortic valve prosthesis dislocation in endocarditis
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Clinical History:

49 years old patient presenting with severe dyspnoea / orthopnoea in the emergency department. Dyspnea and fever over the last 6 weeks were reported.

Imaging Findings:

Dear Reviewer, please note that the author has no possibility to make changes in presentation of image numbers. The numbers are assigned automatically. After last revision I wrote a mail containing the same statement to the subject editor. Unfortunately the information was not forwarded to you. Recently I informed the webmaster of Eurorad about the problem and asked him to inform you about the technical restrictions. Unfortunately I did not get an answer. Therefore, I included the message now into the text of the case. Sincerely author A

49-year-old man presented in the emergency department with severe dyspnea / orthopnea. The patient had a mechanical aortic valve prosthesis implanted 2 years ago with the diagnosis of aortic valve insufficiency due to congenital bicuspid valve. A cardiac pacemaker was implanted 1 year ago due to AV-Block II Type Mobitz. The patient showed increasing dyspnea and fever over the last 6 weeks. Increased body temperature was initially subfebrile but increased recently up to septical temperatures. Dyspnea increased suddenly over the last hours. Chest X-ray, computed tomography (CT) and transesophageal echocardiography (TTE) were performed in the emergency room. The X-ray (Figure 1a) showed severe bilateral alveolar pulmonary consolidations. Furthermore, bilateral pleural effusions were present. The atypical position of the aortic valve prosthesis was overlooked initially. CT showed severe bilateral alveolar consolidations with pleural effusions (Figure 2a-d). Alveolar pulmonary edema was diagnosed. The atypical position of the aortic valve prosthesis was seen in retrospect in the x-ray and acute incomplete dislocation of the prosthesis was supposed. Coronal Maximum Intensity Projection (MIP, Figure 2e) showing the atypical valve position further substantiated the diagnosis. TEE (images not shown) revealed an severe paravalvular leak leading to end-diastolic pressure balance between aorta and the left ventricle, massive dilatation of the left ventricle (end diastolic diameter=7.9 cm) and pulmonary hypertension. Ejection fraction was 30% at a heart rate of 130 beats per minute. Peracute cardiac decompensation due to aortic valve prosthesis dislocation was diagnosed and the patient was immediately transferred into the emergency operating room. Severe endocarditis with abscesses of the annulus was found. Debridement and reconstruction of the annulus were performed and a new mechanical prosthesis was implanted. The postoperative course was uneventful. A Chest X-ray 24 hours after surgery showed a complete
regression of the edema.

**Discussion:**

Valvular ring abscesses in acute endocarditis have a low, though not insignificant, prevalence (4). Nevertheless, incomplete or complete valve prosthesis dislocation due to such abscesses may complicate the clinical course in patients previously treated with prosthesis implantations (4). Complete prosthesis dislocations to the abdominal aorta were reported and are often fatal (1). However, even in cases of total dislocation single cases of survival were reported (2). Beside dislocation valve fracture may give cause to an identical clinical presentation, also often with fatal outcome (3). In the present case the dislocation was incomplete but a severe paravalvular leak resulted in acute respiratory insufficiency due to alveolar pulmonary edema and pleural effusions. The diagnosis was made based on conventional x-ray of the thorax and CT. CT showed the typical features: perihilar consolidation ("bat wing alveolar edema"), septal thickening and effusion. Bat wing edema is seen in less than 10% of pulmonary edema and generally occurs in rapidly developing cardiac failure (5). The lung periphery is free of interstitial or alveolar edema whereas the perihilar region shows alveolar consolidation. Increased pulmonary capillary wedge pressure of about 12-17 mmHg leads to cephalization of pulmonary vessels. If the wedge pressure increases further up to 17-20 mmHg Kerley lines occur (5). With increasing pressure of more than 25 mm Hg fluid drainage from the extravascular compartment is at maximum capacity which causes flooding of the alveolar space. These changes occur under chronic conditions first at the subsegmental and segmental levels and migrate centrally. However, under acute conditions the interstitial phase may go undetected radiographically and perihilar alveolar consolidation may be the initial presentation (current case). There are several theories which try to explain the pathophysiology of bat wing edema: 1. Changes of extracellular mucopolisacharid matrix occurring under the condition of high hydrostatic pressure may allow the water to be drained easily in central direction. 2. Peripheral respiratory motion may cause better drainage of the peripheral lung compared to the central parts. 3. Contractile properties of the alveolar septa may facilitate central drainage (5).

**Differential Diagnosis List:** Pulmonary edema due to aortic valve prosthesis dislocation in endocarditis

**Final Diagnosis:** Pulmonary edema due to aortic valve prosthesis dislocation in endocarditis

**References:**

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Clinical and radiologic features of pulmonary edema.
Figure 1

Description: The initial chest X-ray showed bilateral perihilar alveolar consolidations and bilateral (right & left) pleural effusions. The atypical position of the valve prothesis showing the full prothesis ring in a.p. projection was initialey overlooked. Origin:
Figure 2

a

Description: CT image in lung window setting showing extensive alveolar consolidations at the level of the carina. Origin:

b

Description: CT image in soft tissue window settings showing extensive alveolar consolidations. Origin:
**Description:** CT image in soft tissue window settings showing perihilar consolidations as well as pleural effusions (right>left) and an enlarged left atrium. **Origin:**

**Description:** Coronal multiplanar reconstruction showing an apical predominance of the alveolar edema. **Origin:**
Description: Coronal maximum intensity projection showing the cardiac pacemaker and the atypical projection of the displaced ring of the valvular prosthesis. Origin:
Figure 3

**Description:** Complete regression of the pulmonary edema 2 days after surgery. The newly implanted aortic valve prothesis is now shown in typical projection. **Origin:**