Acute Aortic and Mitral Valve Perforations Caused by Granulomatosis With Polyangiitis

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A previously healthy 11-year-old girl was transferred to our facility with fevers, polyarthralgias, abdominal pain, tachypnea, palatal ulcers, petechiae on the dorsal feet, and vesicular rash on the extensor elbows. Two weeks earlier, she was treated with 3 days of cephalaxin and penicillin for cellulitis of the left foot, followed by a week of oral clindamycin. She had persistent arthralgias and later developed abdominal pain, tachypnea, and hypoxia, for which she was admitted to an outside hospital 3 days before transfer to our facility. At the outside hospital, she had extensive laboratory and imaging studies, including chest computed tomography, which showed bilateral peripheral opacification, and she was started on vancomycin and ampicillin/sulbactam for presumed pneumonia. Her laboratory studies were significant for normocytic anemia, elevated inflammatory markers, prolonged prothrombin time, elevated D-dimer and haptoglobin, and a positive c-ANCA (anti-neutrophilic antibody directed against proteinase 3). She received packed red blood cells for worsening anemia, tachycardia, and persistent oxygen requirement. Her deteriorating clinical status and new petechiae on the palms and soles resulted in initiation of doxycycline on the fourth hospital day and ceftriaxone on the fifth day for possible rickettsial infection.

The patient’s infectious workup included multiple negative blood cultures, viral studies, and serologies. A screening echocardiogram performed on the second day of her admission at our hospital showed normal cardiac anatomy and function. Her laboratory studies were significant for normocytic anemia, elevated inflammatory markers, prolonged prothrombin time, elevated D-dimer and haptoglobin, and a positive c-ANCA (anti-neutrophilic antibody directed against proteinase 3). She received packed red blood cells for worsening anemia, tachycardia, and persistent oxygen requirement. Her deteriorating clinical status and new petechiae on the palms and soles resulted in initiation of doxycycline on the fourth hospital day and ceftriaxone on the fifth day for possible rickettsial infection. Her respiratory distress and anemia worsened despite antibiotic therapy, and methylprednisolone was initiated on the sixth hospital day.

By the 8th day of her hospitalization, her tachypnea continued to worsen, and a new murmur was auscultated. A repeat echocardiogram revealed the interval development of moderate to severe aortic insufficiency and moderate mitral insufficiency. She had perforations of the left and noncoronary cusps of the aortic valve leaflets (Figures 1 and 2 in the online-only Data Supplement) and perforations in the anterior mitral valve leaflet (Figure 3 and Movie II in the online-only Data Supplement). A 12-lead ECG was obtained and was normal (Figure 4). Because these dramatic valve findings were recognized after 48 hours of steroid treatment, the possibility was raised of valvulopathy from culture-negative endocarditis with rapid progression after steroid initiation. As a result, vancomycin was added without a change in her anti-inflammatory therapy. In addition, heart failure therapy with furosemide and enalapril was initiated. Daily echocardiograms did not demonstrate further significant changes in valve pathology.

During evaluation to discriminate between rheumatologic and infectious causes, high-resolution chest computed tomography showed bibasilar ground-glass opacities consistent with interstitial lung disease, and biopsy of skin lesions demonstrated leukocytoclastic vasculitis. The lung and skin findings, in combination with high c-ANCA titers, suggested granulomatosis with polyangiitis (formerly known as Wegener granulomatosis), and her immunosuppressive therapy was escalated with the addition of cyclophosphamide on the twelfth day. By the thirteenth day, after increases in furosemide dosing, her oxygen requirement decreased, and chest radiographs demonstrated improvement in the bilateral lung opacities. On the twentieth day, she was discharged home on oral cyclophosphamide, prednisone, enalapril, and furosemide. She has remained clinically stable as an outpatient and is expected to undergo cardiothoracic surgery for repair versus replacement of her aortic and mitral valves.

Granulomatosis with polyangiitis is a subtype of ANCA-associated vasculitis. In ANCA-associated vasculitis, ANCA antibodies contribute to the pathogenesis of small-vessel vasculitis; however, cardiac involvement is rare and usually presents as coronary vasculitis, myocarditis, or pericarditis. Given the rarity of valvulopathy secondary to ANCA-associated vasculitis, along with the possibility of positive ANCA antibodies in the setting of bacterial endocarditis, this case illustrates the importance of distinguishing these entities for proper medical management in these patients. In our patient, negative blood cultures and lack of response to antimicrobial therapy made bacterial endocarditis less likely, whereas her laboratory, lung, and skin findings directed us toward a final
diagnosis of granulomatosis with polyangiitis. The rapid onset of valvular findings in this patient suggests a role for serial screening echocardiograms in patients with ANCA-associated vasculitis to evaluate for progressive valvular disease, a rare but potentially devastating complication.

Disclosures

None.

References


Figure 1. Two-dimensional parasternal short-axis view of the aortic valve demonstrates a large perforation (5×3 mm) of the left coronary cusp of the aortic valve. The perforation of the noncoronary cusp was not shown well by 2-dimensional imaging.

Figure 2. Three-dimensional view of the aortic valve leaflets as viewed from the aorta. Perforations in both the left and noncoronary cusps are demonstrated.

Figure 3. Three-dimensional view of the mitral valve with color Doppler as viewed from the left atrium. Two jets of mitral insufficiency are seen through perforations in the anterior mitral valve leaflet.
Figure 4. A 12-lead ECG from the time when the valve perforations were first identified shows normal sinus rhythm with no ST- or T-wave abnormalities.
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