What Is Your Diagnosis?

In cooperation with

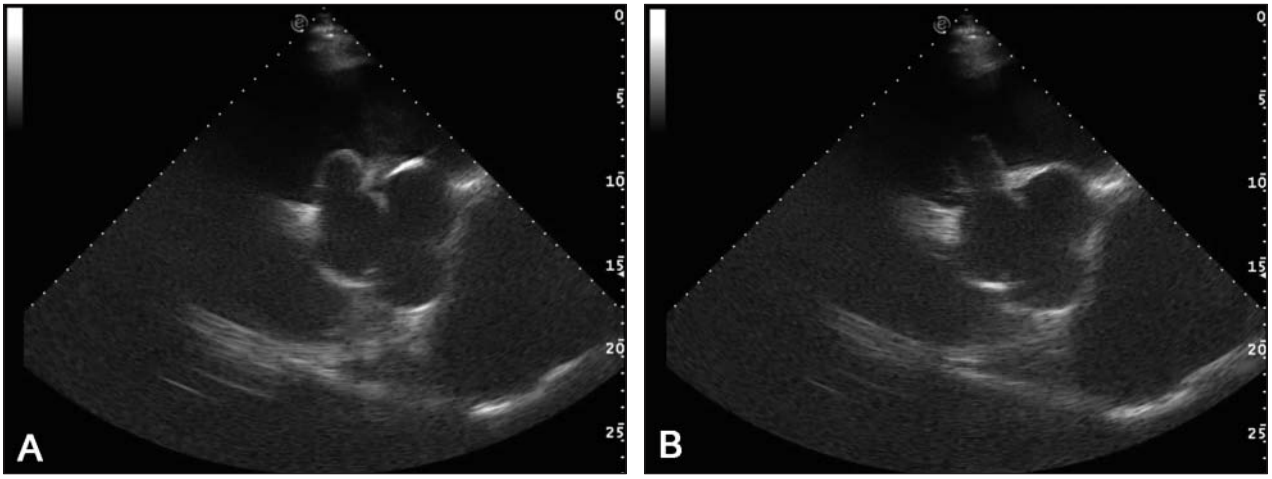

Figure 1—Right parasternal short-axis echocardiographic images (heart base with the aortic root in the center of the image) of the heart of a 13-year-old Thoroughbred gelding with a history of fever, tachycardia, edema, lethargy, and sudden-onset heart murmur. Images were obtained with a 2.5-MHz probe. Scale along the right side indicates distance in centimeters.

History

A 13-year-old Thoroughbred gelding was referred to the Texas Veterinary Medical Center, Texas A&M College of Veterinary Medicine and Biomedical Sciences, for echocardiographic evaluation. The horse had been hospitalized at the referring veterinarian's clinic for approximately 1 week for fever, tachycardia, limb edema, and lethargy. Results of a CBC revealed marked leukocytosis (20,390 WBCs/µL; reference range, 5,400 to 14,300 WBCs/µL). Treatment included antimicrobials, glucocorticoids, and NSAIDs. The sudden onset of a loud right-sided heart murmur prompted referral for further evaluation. At the time of admission, the horse was quiet and alert and afebrile, with mild sinus tachycardia (heart rate, 52 beats/min) and pale pink oral mucous membranes. A coarse grade 5/6 holosystolic murmur was ausculted with the point of maximal intensity over the tricuspid valve area, and a coarse grade 3/6 diastolic murmur was ausculted with the point of maximal intensity over the aortic valve area. No dysrhythmias were detected, and no overt signs of heart failure were evident. Echocardiographic images of the heart were obtained (**Figure 1**).

Determine whether additional imaging studies are required, or make your diagnosis from Figure 1—then turn the page →

This report was submitted by Tracy E. Norman, VMD, DACVIM; Sarah E. Achen, DVM; Michelle C. Coleman, DVM; and Jenni D. Schroeder, DVM; from the Departments of Large Animal Clinical Sciences (Norman, Coleman) and Small Animal Clinical Sciences (Achen), College of Veterinary Medicine and Biomedical Sciences, Texas A&M University, College Station, TX 77843; and Waller Equine Hospital, 28234 FM 2920, Waller, TX 77484 (Schroeder). Dr. Achen's present address is Michigan Veterinary Specialists, 1425 Michigan St NE, Ste F, Grand Rapids, MI 49503.
Address correspondence to Dr. Norman (tnorman@cvm.tamu.edu).

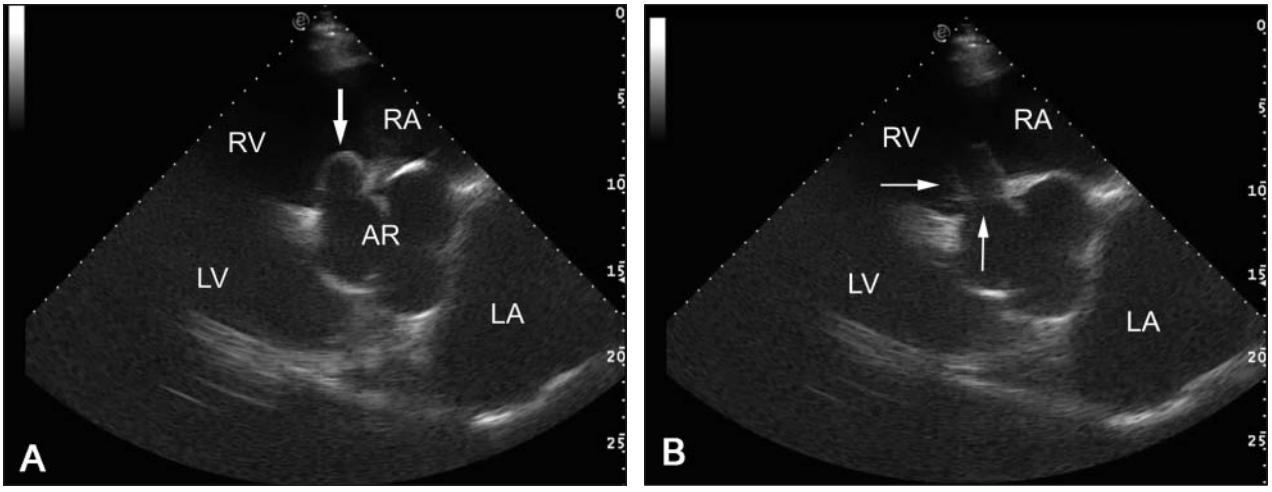

Figure 2—Same echocardiographic images as in Figure 1. A—Notice the aneurysmal dilation of the aortic root into the right atrium (arrow). B—Notice the windsock appearance at the site of aneurysmal rupture of the aortic root (arrows), opening into the right atrium at the level of the tricuspid valve. Scale along the right side indicates distance in centimeters. AR = Aortic root. LA = Left atrium. LV = Left ventricle. RA = Right atrium. RV = Right ventricle.

Diagnostic Imaging Findings and Interpretation

An aneurysm of the right aortic sinus is evident on B-mode (2-D) echocardiography (**Figure 2**). Rupture of the aneurysm allows communication between the aortic root and the right atrium at the level of the tricuspid valve. Tissue associated with the fistula flutters in the right atrium with a windsock appearance.

Color flow Doppler echocardiography was performed to confirm the flow of blood from the aortic root into the right atrium (**Figure 3**). Other findings included nodular thickening of the mitral and aortic valves, enlargement of right and left atria and ventricles (more dramatically in the right atrium and ventricle), and a low left ventricular fractional shortening value. On the basis of these findings, a diagnosis of ruptured right aortic sinus (sinus of Valsalva) aneurysm, valvular endocarditis, and cardiac volume overload with early failure was made. Because of an overall poor prognosis, the owner elected to have the horse euthanatized.

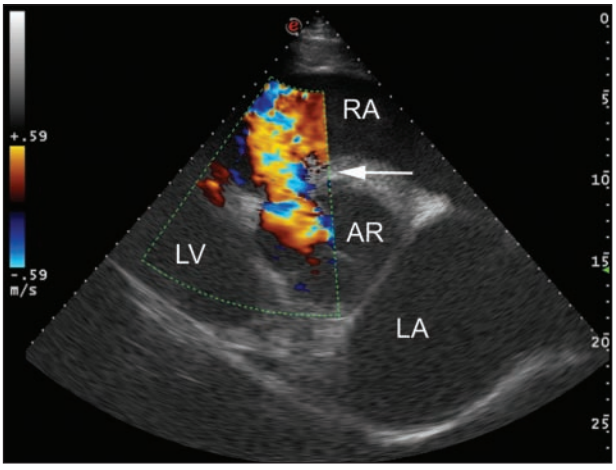

Figure 3—Color flow Doppler echocardiographic image of the horse of this report at the same site and orientation as in Figure 1, demonstrating blood flow across the defect between the aortic root and right atrium (arrow). m/s = Blood flow in meters per second. *See* Figure 2 for remainder of key.

Comments

Postmortem examination of the heart confirmed aneurysmal rupture in the right aortic sinus, permitting communication between the aorta and the right atrium just above the right atrioventricular valve. A large, fibrous jet lesion was identified on the atrial wall opposite the fistula. Histologic examination of the aneurysm wall revealed a deep mucinous layer under a fibrous and elastic wall with multifocally distributed lymphocytes. Inflammation and increased vascularity toward the tip of the aneurysm suggested chronic remodeling of an acquired aneurysm, leading to rupture. Examination of the mitral, tricuspid, and aortic valves revealed mild to moderate endocarditis. No etiologic agents were identified on histologic examination of affected tissues or on microbial culture.

Aneurysm of the aortic root has been described in horses, and the right aortic sinus is a favored location in this species, as it is in humans.[1–3] It should be mentioned that the images that best demonstrated the aneurysm and related fistula in this horse were obtained by viewing the aortic root in a right parasternal short-axis image, which is not among the standard views obtained in routine echocardiography. Aneurysm of the sinuses of Valsalva in humans is commonly a congenital defect of the wall of the aortic root but may also occur secondary to degeneration of the elastic tissue through trauma, atherosclerosis, or infection.[3] Histologic examination of aneurysms in other horses with sinus of Valsalva rupture suggests that, as in humans, both congenital and acquired aneurysms occur. Endocarditis, however, has not been reported to be a feature of the disorder in horses. Given this horse's history of fever, tachycardia, edema, and leukocytosis prior to the onset of the murmur and the evidence of endocarditis on echocardiography and necropsy, the 2 seem likely to be related.

1. Sleeper MM, Durando MM, Miller M, et al. Aortic root disease in four horses. *J Am Vet Med Assoc* 2001;219:491–496.
2. Marr CM, Reef VB, Brazil TJ, et al. Aorto-cardiac fistulas in seven horses. *Vet Radiol Ultrasound* 1998;39:22–31.
3. Feldman DN, Roman MJ. Aneurysms of the sinuses of Valsalva. *Cardiology* 2006;106:73–81.