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CASE REPORT

Resolution of sustained narrow complex ventricular tachycardia and tachycardia-induced cardiomyopathy in a Quarter Horse following quinidine therapy☆

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Abstract Sustained narrow-QRS tachycardia of three months duration and left ventricular systolic dysfunction were identified in a fifteen-year-old Quarter Horse. No underlying cause for the tachyarrhythmia was found and no predisposing structural cardiac lesions were evident by echocardiography. Intravenous diltiazem and lidocaine were administered without achieving successful conversion of the arrhythmia. Oral quinidine therapy converted the tachyarrhythmia to sinus rhythm. Ventricular systolic dysfunction and chamber dilatation subsequently resolved. As with other species, echocardiographic features of dilated cardiomyopathy can be tachycardia-induced and may resolve following successful control of heart rate and rhythm.
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Abbreviations

AT	atrial tachycardia
AV	atrioventricular
cTnI	cardiac troponin I
ECG	electrocardiogram
EHV	Equine Herpes Virus
EIV	Equine Influenza Virus
IV	intravenous
JT	junctional tachycardia
LA	left atrium or left atrial
LV	left ventricle or left ventricular
SVT	supraventricular tachycardia
VT	ventricular tachycardia

Case report

A fifteen year old, male, 597 kg castrated Quarter Horse was presented to the cardiology service of the Washington State Veterinary Teaching Hospital for persistent tachycardia of three months' duration. The horse had initially been evaluated by the referring veterinarian in January 2011 for signs of lethargy and anorexia and was noted to have an elevated heart rate of 76 bpm. Hematology submitted at that time revealed leukopenia (3000 cells/uL; range 4600—11,400 cells/uL), neutropenia (1860 cells/uL; range 2260—8580 cells/uL) and lymphopenia (810 cells/uL; range 1500—5000 cells/uL) with a normal fibrinogen of 400 mg/dL (range 100—400 mg/dL). A mild hyperbilirubinemia (total bilirubin of 4.0 mg/dL; range 0.6—3.7 mg/dL) attributable to anorexia was also noted on serum biochemistry. In light of a recent travel history to a roping competition earlier in the month, a potential viral respiratory infection was suspected based on the examination findings. No diagnostics were pursued. The horse was administered a dose of intravenous (IV) flunixin meglumine and was placed on a ten day course of oral sulfa-trimethoprim[d] and a period of rest. Three weeks later, the horse was re-evaluated by the referring veterinarian for reduced performance; at that time diminished level of activity was noted. The horse was in excellent body condition (body condition score 6/10) and appeared to have a good appetite, but was persistently tachycardic with a resting heart rate of 76—150 bpm confirmed by electrocardiogram (ECG). The horse was referred to the veterinary teaching hospital for further cardiac evaluation.

On initial examination the horse was alert and responsive. His temperature was 99.1 °F, respiratory rate was 44 breaths per minute, mucous membranes were slightly pale and moist, and capillary refill time was less than 2 s. The cardiac rhythm was regular at 150 bpm. No abnormal lung sounds or heart murmurs were heard. Jugular pulsations were increased bilaterally. Arterial pulse deficits were present.

No significant abnormalities were found on the complete blood cell count or serum biochemistry profile. Fecal flotation was negative for ova or parasites. Feces were also floated to look for the presence of sand and none was found. The horse was negative for Equine Infectious Anemia, had been maintained by the owner on a rotating deworming schedule every three months, and was determined to have received vaccinations for Eastern Equine Encephalitis, Western Equine Encephalitis, West Nile Virus, tetanus, Equine Herpes Virus (EHV) -1 and EHV-4, and Equine Influenza Virus (EIV) four months prior to presentation.

A 3 lead ECG identified a narrow complex tachycardia with regular QRS—QRS intervals. The origin of the rhythm could not be determined with certainty (Fig. 1a). Superimposition of P-waves within other waveforms was likely, given the irregular appearance of the T wave and the regularity of these deflections. A ventricular rate of 155 bpm was sustained for the 20 min of recording. Differential diagnoses for a regular tachycardia include ectopic or re-entrant atrial tachycardia (AT) with regular atrioventricular (AV) conduction; atrial flutter with regular AV conduction; ectopic junctional tachycardia (JT); and narrow QRS ventricular tachycardia (VT) with AV dissociation. Presuming independent P-waves were present (Fig. 1a), the most likely diagnoses were JT or narrow QRS 'high' VT with AV dissociation.

Echocardiography was performed during the tachycardia (average heart rate of 148 bpm). Findings included left ventricular (LV) and left atrial (LA) dilation with values of 15.4 cm (LV diastole) and 14.3 cm (LA systole), and impaired LV systolic function (15% shortening fraction). No valvular lesions or regurgitations were evident on 2-D, M-mode or color Doppler echocardiography. The myocardium was uniform in echogenicity (Video 1).

Supplementary data related to this article can be found online at http://dx.doi.org/10.1016/j.jvc.2012.05.004.

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