

Syncope in Small-Breed Dogs

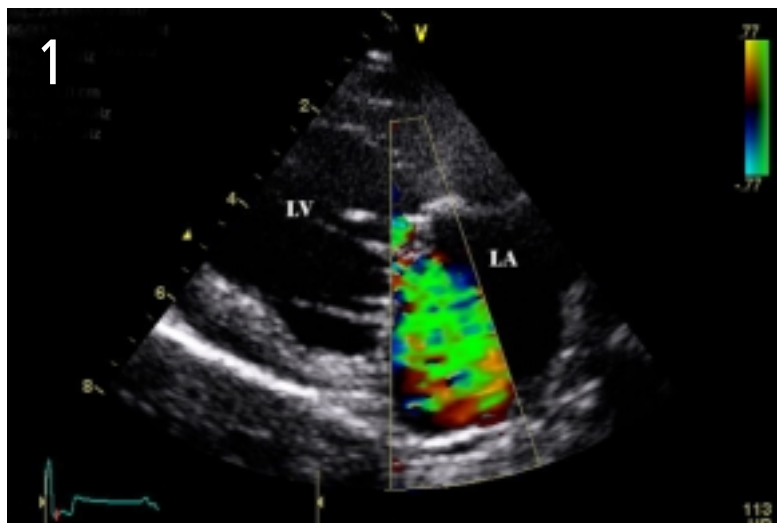
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Syncope, or episodic weakness, is common in elderly small-breed dogs with myxomatous mitral valve disease.

Affected dogs may lose consciousness or have ataxia, weakness, or collapse. The history probably reveals that the collapsing episode is associated with excitement. The physical examination is usually unremarkable except for a prominent left-sided systolic apical (5th intercostal space) heart murmur. Results of the complete blood count and serum chemistry are also unremarkable. Echocardiography reveals a markedly enlarged left atrium and ventricle.

The differential diagnosis of syncope in elderly small-breed dogs requires assimilation and integration of information derived from the patient history, physical examination, thoracic radiographs, ECG, and cardiac ultrasonography.



Color-flow Doppler echocardiogram

ASK YOURSELF ...

In elderly small-breed dogs presented for syncope, what is the most common abnormality noted on physical examination?

- A. jugular venous distention**
- B. bounding femoral artery pulse**
- C. hepatomegaly**
- D. heart murmur grade 3 to 4/6**

ECG = electrocardiography

continues

INSIGHTS FROM CLINICAL CASES . DISCUSSION

Correct Answer: D Heart murmur grade 3 to 4/6

Most elderly small-breed dogs with syncope have accompanying mitral regurgitation (Figure 1).

How to Proceed

1. The history is important in patients that present with collapse. Distinguishing syncope from seizure can be difficult. Features that often distinguish these two conditions are the precipitants of the episode, prodromal behavioral changes, clinical signs that occur during the episode, and subsequent events. An episode precipitated by exercise, stress, coughing, excessive barking, micturition, defecation, or pain is probably syncope as opposed to a seizure. Disorientation before or after the event and a prolonged recovery time are more suggestive of a seizure.

2. Acquire appropriate diagnostics. Other common causes for syncope in small-breed dogs must be ruled out (see **Common Causes of Syncope in Small-Breed Dogs**). The results of the complete blood count, serum chemistry profile, and urinalysis are necessary to rule out metabolic disorders. ECG is an important diagnostic aid to document heart rhythm or conduction disturbances. Echocardiography is necessary for

Common Causes of Syncope in Small-Breed Dogs

Mechanical or structural cardiac disease

- Outflow- or inflow-obstruction pulmonary valve stenosis, tricuspid dysplasia (rare) heart-worm disease, neoplasia
- Obstruction to right atrial filling (pericardial effusion)
- Pulmonary hypertension (chronic pulmonary disease, primary vascular disease, heart worm disease)

Electrical disease

- Sick sinus syndrome
- Advanced atrioventricular heart block
- Atrial fibrillation
- Paroxysmal ventricular tachycardia (rare)

Metabolic disorders

- Hypoglycemia
- Endocrine disease (Addison's)

Neurally mediated syncope; also known as neurocardiogenic, vasodepressor, vasovagal, or situation syncope

assessing cardiac structural and functional abnormalities.

Pathophysiology: Vasodepressor syncope

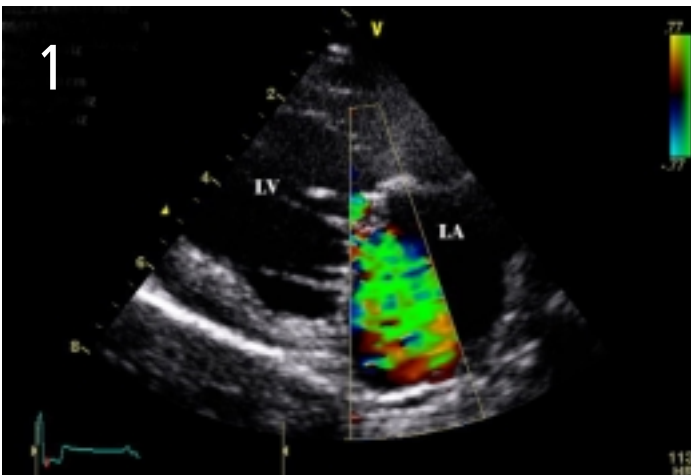
The mechanism of vasodepressor syncope is an incompletely understood adrenergic-stimulated vagal reflex. Sympathetic stimulation normally

leads to vasoconstriction, increased heart rate, and increased contractility, which help to maintain cardiac output and mean arterial pressure.

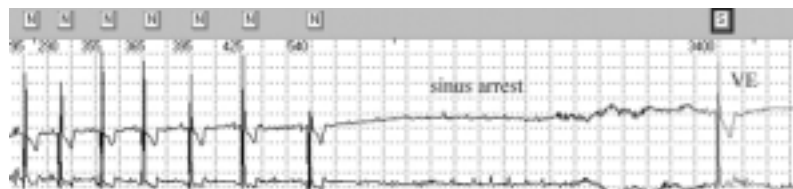
However, in the presence of a volume-depleted left ventricle (empty ventricle syndrome), reduction in preload stimulates ventricular mechanoreceptors, which causes paradoxical vasodilatation and bradycardia. The result is presyncope (decreased alertness, hind limb weakness, ataxia) or syncope.

Therapy

Therapy is aimed at managing the underlying disorder and minimizing or avoiding such precipitating factors as stress, excitement, or coughing whenever possible. If arrhythmia is the cause of syncope, antiarrhythmic medication or pacemaker therapy is indicated. In cases of



Color-flow Doppler echocardiogram showing moderate mitral regurgitation. The mitral valves are thickened and prolapsing (LV = left ventricle; LA = left atrium).



2 Holter recording of a syncopal event (two channels) demonstrating sinus rhythm followed by a period of sinus arrest. There is baseline artifact during the period of sinus arrest.

ECG = electrocardiography

significant heart failure, particularly due to advanced mitral valve degeneration, initiation or adjustment of cardiac medication is necessary (see Tx at a glance).

For detailed discussions of treatment of heart failure, refer to specific references. In the authors' experience, appropriate medical management of syncope associated with heart failure usually decreases the frequency but does not totally eliminate the syncope. The frequency of episodes can be further reduced by client education and avoidance of instigating activities to the extent possible. Common situations that precipitate vasodepressor syncope are listed below. ■

Common Precipitating Factors for Syncope

- Barking and jumping with excitement
- Grooming and bathing
- Running or frolicking
- Inactivity to sudden "normal" activity
- Physical restraint

See Aids & Resources, back page, for references, contacts, and appendices.

TAKE-HOME MESSAGES

- In patients with a normal in-hospital ECG in which an arrhythmogenic or neurally mediated cause for collapse is suspected, to capture an intermittent arrhythmia occurring during a collapse event, record the ECG using either a 24-hour Holter monitor or an "event monitor" (Figure 2).
- In neurally mediated syncope, the ECG from the Holter monitor may be within normal limits because vasodilatation with acute onset of hypotension may predominate.
- The "broad" diagnosis of neurally mediated syncope is usually presumptive and based on exertion-induced syncope with or without a documented ECG abnormality.
- Specific types of syncope and diagnostic associations are listed below.

Diagnostic Associations for Syncope

Type or Cause of Syncope	Diagnostic Associations
Tussive	Coughing
Vasodepressor	Precipitated by exertion or excitement Loud heart murmur Severe left atrial enlargement ECG normal or abnormal
Sick sinus syndrome	Breed predisposition: miniature schnauzers, American cocker spaniels ECG shows sinoatrial arrest, sinus bradycardia with or without periods of atrial tachycardia
Atrial fibrillation	ECG shows tachycardia due to atrial fibrillation
Heart block	ECG shows bradycardia due to advanced 2nd- or 3rd-degree atrioventricular block



...at a glance

Drug	Indication	Maintenance dose (mg/kg)	Frequency
Furosemide	Overt or impending CHF	1.0–2.0	Q 8–12 H
ACE inhibitor	Overt or impending CHF		
Enalapril		0.5	Q 12–24 H
Benazepril		0.25–0.5	Q 12–24 H
Spironolactone	Overt or impending CHF, electrolyte control	1.0–2.0	Q 12 H
Digoxin	Atrial fibrillation	0.005–0.011*	Q 12 H
Diltiazem	Atrial fibrillation	2.0–5.0 (Dilacor XR†) 0.5–1.5 (Cardizem CD‡)	Q 12 H Q 8 H
Amlodipine	Afterload reduction	0.2–0.4§	Q 12 H

ACE = angiotensin-converting enzyme; CHF = congestive heart failure

* In dogs weighing less than 20 kg

† Rhone-Poulenc Rorer, Collegeville, PA

‡ Hoechst Marion Roussel, Kansas City, MO

§ Initiate at 0.1 mg/kg and uptitrate weekly while monitoring blood pressure. Initiate therapy once ACE inhibitor maintenance therapy has been established.