CARDIOLOGY

Treatment of Congestive Heart Failure in Dogs

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Congestive heart failure (CHF) is a clinical syndrome resulting from failure of cardiac output to meet the body's demands at normal filling pressures.[1,2] The precise manifestation of CHF depends on the underlying cause. In dogs, left-sided CHF is characterized by pulmonary edema resulting from elevated left-heart filling pressures. Affected dogs typically present with tachypnea and dyspnea. Right-sided CHF is characterized by cavitary effusions and peripheral edema resulting from elevated right-heart filling pressures. In some cases, biventricular failure occurs and signs of left- and right-sided CHF are seen.

When dogs with suspected CHF are treated, the diagnosis should first be confirmed and patient stability should be assessed.[1] This can be done through physical examination and additional diagnostic tests, including radiography, point-of-care ultrasonography, and echocardiography.[1,2] Patient stability should not be sacrificed to obtain diagnostics. Thoracocentesis or abdominocentesis is recommended to relieve effusions deemed sufficient to impair ventilation.[1] If the patient fails to respond to initial stabilization, prioritization of imaging may be warranted to confirm the diagnosis.

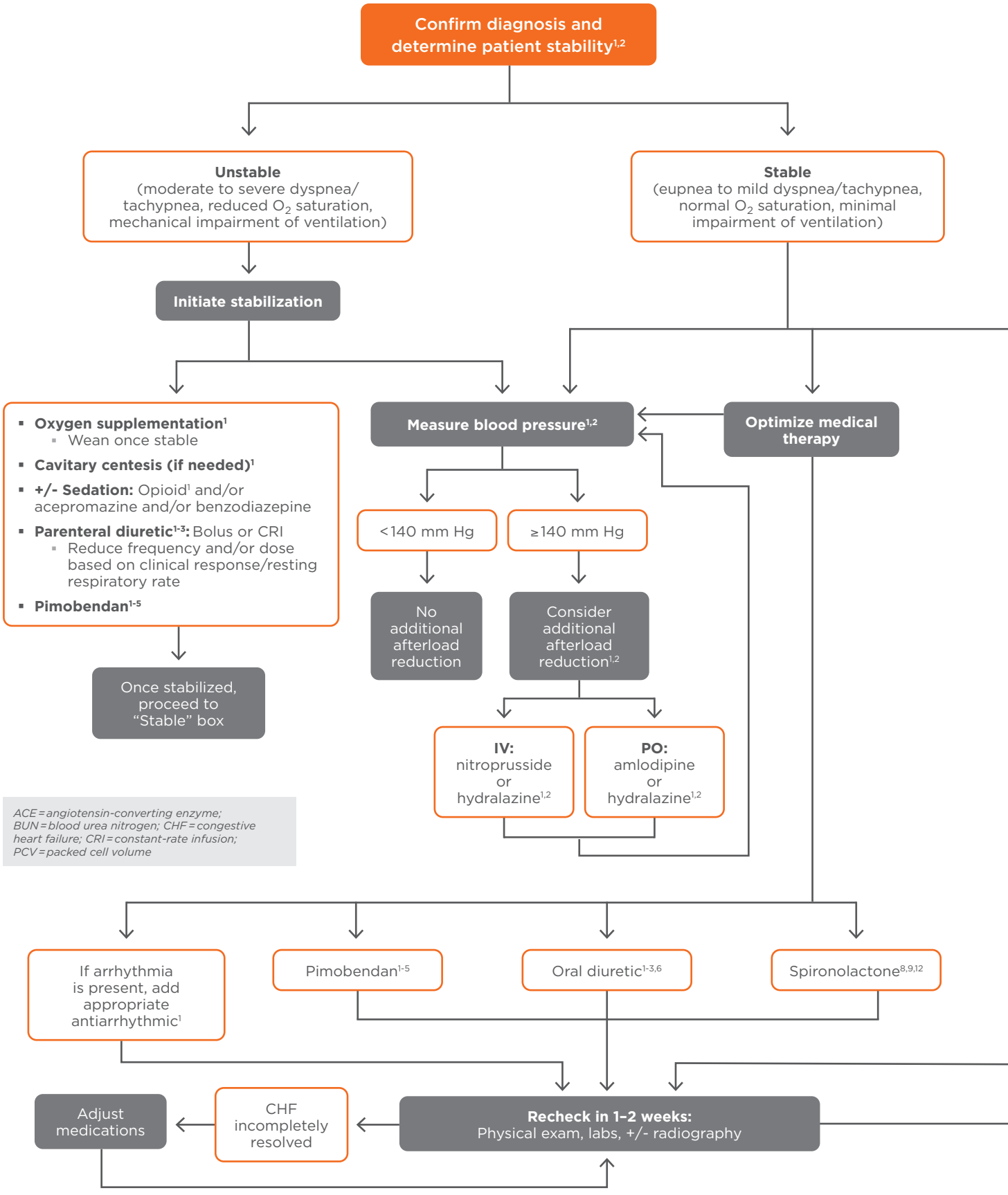
Dogs with acute CHF should receive supplemental oxygen in conjunction with parenteral administration of a loop diuretic, such as furosemide.[1-3] Acute stabilization is potentially more critical for left-sided CHF, as pulmonary edema will result in dyspnea.[2] Some dogs might benefit from low-dose sedatives to mitigate the effects of stress or anxiety on respiratory rate and effort.[1,2] Pimobendan is also recommended to help stabilize patients with acute CHF.[1-5] Measurement of systemic blood pressure is also helpful and might help guide decisions regarding afterload reduction.[2]

Once the patient is stable, diuretic administration can be transitioned from parenteral to oral and chronic treatment can begin. The 2019 American College of Veterinary Internal Medicine consensus statement guidelines and various separate studies support the use of diuretics,[1,3,6] pimobendan,[1,4,5] angiotensin-converting enzyme inhibitors,[7-11] and spironolactone[8,9,12] to treat dogs with chronic CHF. If arrhythmias are present, antiarrhythmic drugs may be indicated. Serum biochemical and electrolyte measurements can provide additional information, particularly on renal function, and can help guide and optimize individual therapy.[1]

Regular monitoring of the dog's condition is crucial. This includes monitoring respiratory rate and effort, especially when reducing the dose of furosemide, and is especially important in patients with left-sided CHF. Dogs receiving chronic CHF therapy should also be routinely monitored for the development of significant azotemia or electrolyte derangements, which might prompt adjustments to therapy.[1] Additional diagnostics such as radiography might help confirm or refute resolution of CHF and guide adjustments to therapy.

Once the patient's clinical status has stabilized and no further adjustments to therapy are necessary, the frequency of diagnostic testing can be reduced. Owners should monitor respiratory rate and effort at home daily, and repeated resting respiratory rates greater than 35 breaths/min or gradual upward trending from the dog's baseline rates should prompt reassessment.[1,13]

In certain specific circumstances (e.g., patent ductus arteriosus, valvular pulmonic stenosis, myxomatous mitral valve disease), surgical or minimally invasive interventions might also be considered.[14-20]


Confirm diagnosis and determine patient stability[1,2]
Unstable (moderate to severe dyspnea/ tachypnea, reduced O_2 saturation, mechanical impairment of ventilation)
Stable (eupnea to mild dyspnea/tachypnea, normal O_2 saturation, minimal impairment of ventilation)
Initiate stabilization
Oxygen supplementation[1]
Wean once stable
Cavitary centesis (if needed)[1]
+/- Sedation: Opioid[1] and/or acepromazine and/or benzodiazepine
Parenteral diuretic[1-3]: Bolus or CRI
Reduce frequency and/or dose based on clinical response/resting respiratory rate
Pimobendan[1-5]
Once stabilized, proceed to "Stable" box
Measure blood pressure[1,2]
Optimize medical therapy
<140 mm Hg
≥140 mm Hg
No additional afterload reduction
Consider additional afterload reduction[1,2]
IV: nitroprusside or hydralazine[1,2]
PO: amlodipine or hydralazine[1,2]
ACE = angiotensin-converting enzyme; BUN = blood urea nitrogen; CHF = congestive heart failure; CRI = constant-rate infusion; PCV = packed cell volume
If arrhythmia is present, add appropriate antiarrhythmic[1]
Pimobendan[1-5]
Oral diuretic[1-3,6]
Spironolactone[8,9,12]
Adjust medications
CHF incompletely resolved
Recheck in 1–2 weeks: Physical exam, labs, +/- radiography

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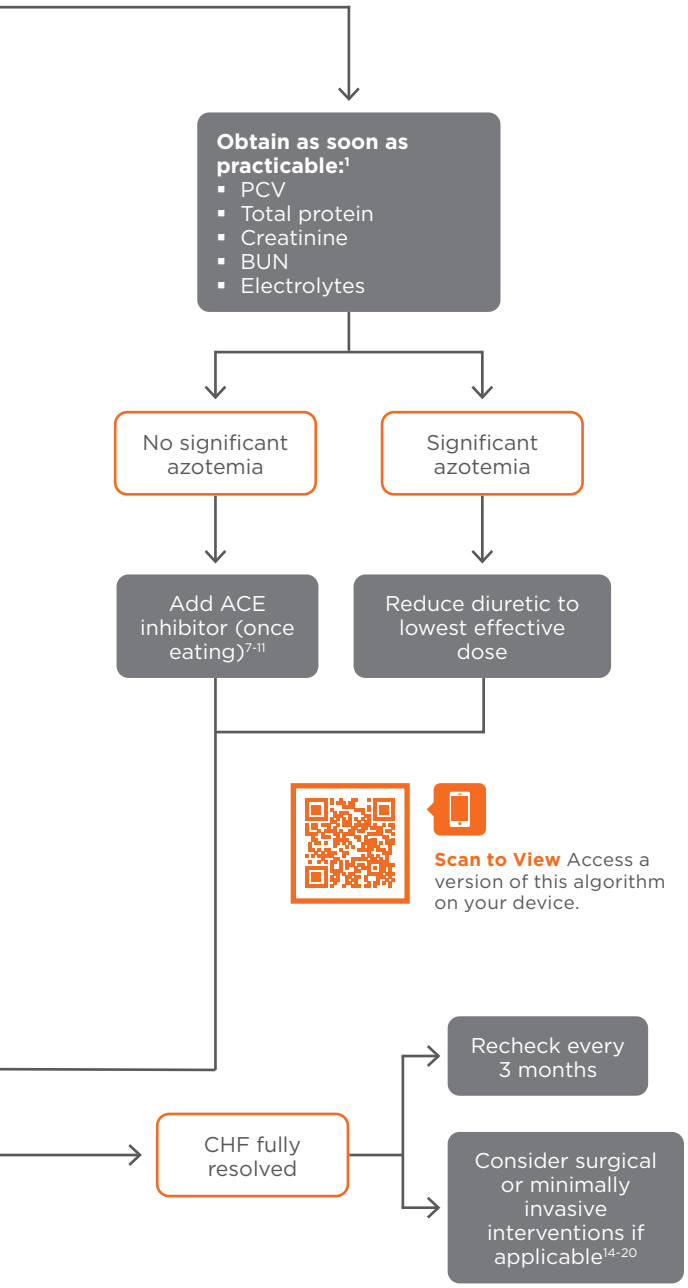

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