

TABLE 15**Clinical, Radiographic, and Ultrasonographic Findings Associated with Fluid Overload**

Clinical Findings	Radiographic Findings	Ultrasonographic Findings
<ul style="list-style-type: none"> • Increased body weight (>10%) • Tissue edema (intermandibular area, limbs, paws, dependent regions, chemosis) • Serous nasal discharge • Serous discharge from endotracheal tube in anesthetized patients • Increased respiratory rate or effort • Reduced SPO₂ • Novel murmur, novel gallop sound • Gastrointestinal signs (abdominal distention, vomiting, diarrhea, inappetence, anorexia) • No change in blood pressure; hypertension rarely associated with fluid overload except in AKI/CKD.^{1,2} 	<ul style="list-style-type: none"> • Body wall edema • Pleural effusion • Pulmonary edema • Cardiomegaly • Enlarged pulmonary artery • Enlarged caudal vena cava • Enlarged pulmonary vein • Loss of serosal detail • Distended intestines 	<ul style="list-style-type: none"> • Subcutaneous edema • Pleural effusion • B-lines • Enlarged La:Ao • Enlarged caudal vena cava • Decreased caudal vena cava collapsibility index • Ascites • Intestinal wall thickening • Ileus • Hyperechoic mesentery and pancreas • Hepatic congestion • Gallbladder wall edema • Perirenal edema

AKI, acute kidney injury; Ao, aorta; CKD, chronic kidney disease; La, Left atrium; SpO₂, oxygen saturation

1. Cole LP, Jepson R, Dawson C, Humm K. Hypertension, retinopathy, and acute kidney injury in dogs: A prospective study [published correction appears in *J Vet Intern Med*. 2020 Nov;34(6):3168]. *J Vet Intern Med*. 2020;34(5):1940-1947.
2. Park S, Lee CJ, Lee M, et al. Differential effects of arterial stiffness and fluid overload on blood pressure according to renal function in patients at risk for cardiovascular disease. *Hypertens Res*. 2019;42:341–353.

The 2024 Fluid Therapy Guidelines for Dogs and Cats are available at aaha.org/fluid-therapy.

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