

# Dilated Cardiomyopathy in a Pet Rabbit *Oryctolagus cuniculus*

Palmero Audrey\*

Department of Veterinary Medicine, Anidoc' Veterinary Clinic, Hautot Sur Mer, France

## ABOUT THE STUDY

A 6 year old unsterilized male rabbit (*Oryctolagus cuniculus*), weighing 1.58 kg (3.48 lbs.), was presented in emergency with respiratory distress. He has been suffering from dental disease for some years. He lives in total freedom and is fed hay, extruded food (Selective®) and daily greens [1]. On clinical examination, the rabbit is dyspneic but does not show any nasal discharge. The dyspnea is expiratory and the patient has occasional mouth breathing. Respiratory sounds are audible on auscultation of the right and left lung fields and the heart rate is decreased (HR=120 beats/min, (190-320 beats/min)). He is depressed and abdominal palpation is tense and painful.

Our diagnostic hypotheses concerning expiratory dyspnea were as follows: bronchial disease (bronchitis, foreign body), pulmonary parenchyma disease (bacterial, viral, or fungal pneumonia, abscess,

primary tumor or metastases, cardiogenic or non-cardiogenic edema) and pleural space disease (pleural effusion, neoplasia) [2-4].

The right lateral chest radiograph showed mild tracheal elevation, cardiomegaly (Vertebral Heart Score=8 (7.6 +/- 0.39), width of heart=3 intercostal spaces), diffused interstitial opacification, and loss of cardiac silhouette in the cranial region (Table 1) [5-8]. It was necessary to remain cautious about this interpretation given the presence of the thymus [9]. A was still suspected given the opacification on radiographs and the audible breath sounds on auscultation (Figure 1). The ventrodorsal and right lateral abdominal radiographs revealed a dilated stomach filled with air and dilated gas-filled sections of intestine and the ileocaecocolic complex [10-12]. This aortic dilatation of the stomach and digestive tract was probably a consequence of mouth breathing and anorexia (Figure 2).

Table 1: Buchanan Index in rabbit [13].

Right lateral thoracic radiograph	Left lateral thoracic radiograph
Vertebral Heart Score (VHS)=7.6 ± 0.39	Vertebral Heart Score (VHS)=7.94 ± 0.54

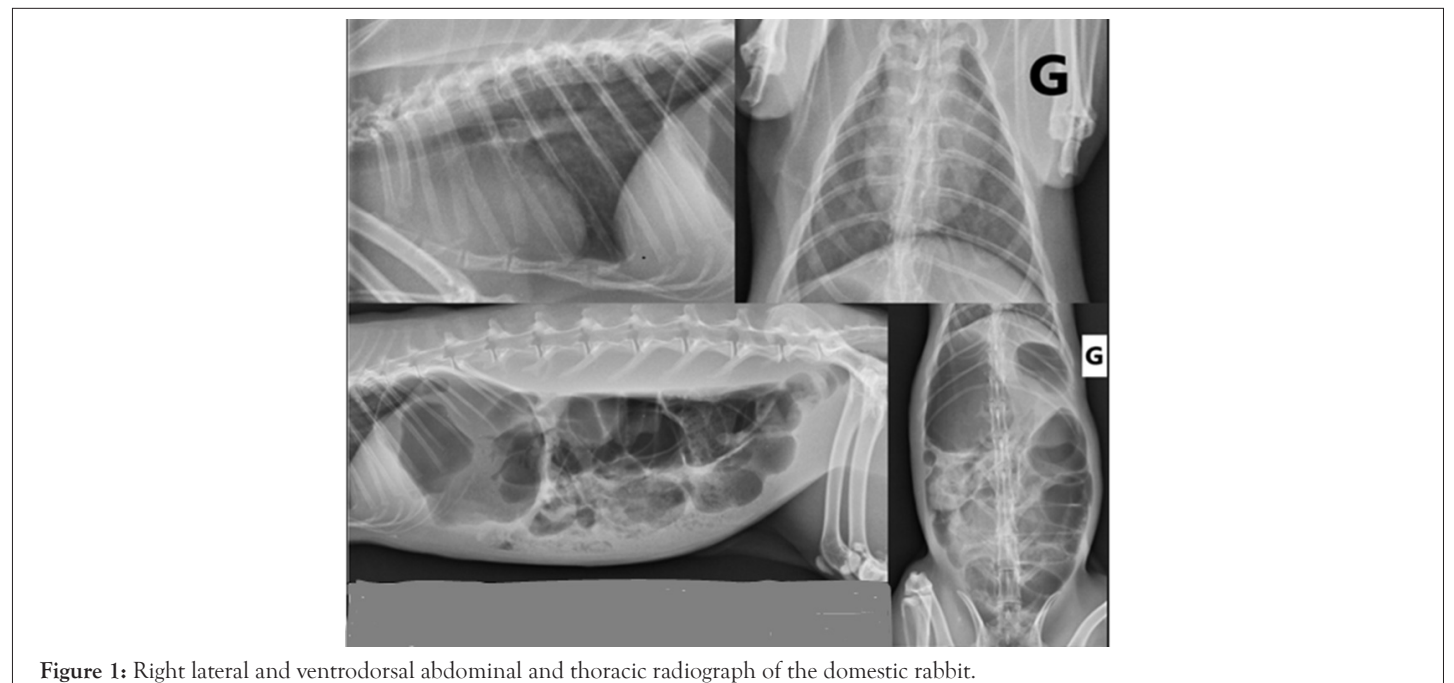


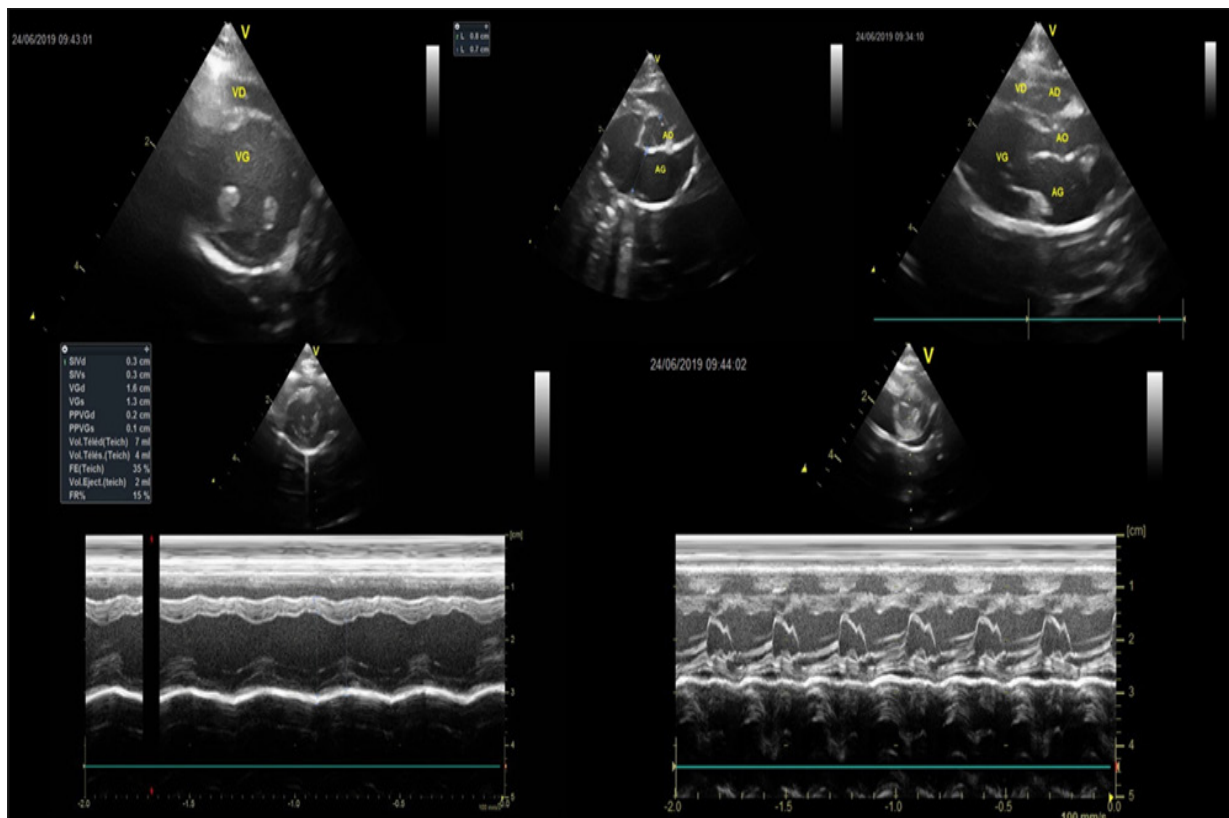
Figure 1: Right lateral and ventrodorsal abdominal and thoracic radiograph of the domestic rabbit.

Correspondence to: Palmero Audrey, Department of Veterinary Medicine, Anidoc' Veterinary Clinic, Hautot Sur Mer, France, E-mail: Audrey.palmero@vetanidoc.com

Received: 10-Oct-2023, Manuscript No. JCEC-23-27454; Editor assigned: 12-Oct-2023, Pre QC No. JCEC-23-27454 (PQ); Reviewed: 26-Oct-2023, QC No. JCEC-23-27454; Revised: 02-Nov-2023, Manuscript No. JCEC-23-27454 (R); Published: 09-Nov-2023, DOI:10.35248/2155-9880.23.14.847

Citation: Audrey P (2023) Dilated Cardiomyopathy in a Pet Rabbit *Oryctolagus cuniculus*. J Clin Exp Cardiol.14:847.

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**Figure 2:** Echocardiography of the patient, right parasternal transverse section, transaortic section, right longitudinal section, 5 cavities, percentage left ventricular fractional shortening measure and transmitral section.

After two hours of oxygen and diuretics (2 mg/kg IV q6h), the patient's electrocardiogram showed sinus bradycardia (Table 2). Echocardiography diagnosed dilated cardiomyopathy [13-16]. We noted an enlargement of the left ventricle (Table 3), an enlargement of the left atrium and a decrease in the thickness and contractility of the heart walls (shortening fraction=15% ( $34.5 \pm 4.9$ )) (Table 3). A blood pressure measurement would have been ideal in order to adapt a fluid therapy. The biochemical and electrolyte assessment was necessary to specify the medical treatment. However, for budgetary reasons, we had to select our complementary examinations.

We chose not to perfuse the patient despite the signs of digestive ileus on the abdominal radiograph for fear of increasing the cardiac overload. The patient remained in the intensive care unit on oxygen therapy. He received the following treatment: furosemide (2 mg/kg IV) every 12 hours, buprenorphine (0.05 mg/kg SC) every 6 hours, glyceryl trinitrate spray on oral mucosa every 12 hours to reduce congestion, ranitidine (3.5 mg/kg SC) every 12 hours, dimeticone (100 mg/kg PO) every 8 hours and Emeraid IC herbivore® feeding (20 ml/kg PO) every 12 hours [17]. After 48 hours of intensive care, the patient breathed normally and began eating on his own. On follow-up chest radiographs, the cardiac silhouette was more visible in the cranial region on the right lateral view but interstitial opacification was still present (Figure 3). The follow-up abdominal X-rays showed a decrease in the digestive ileus with the presence of gas only in the stomach.

After 48 hours of intensive care, the patient was discharged on benazepril (0.25 mg/kg PO) every 24 hours, furosemide (0.5 mg/kg PO) every 12 hours, pimobendan (0.1 mg/kg PO) every 12 hours, and Emeraid IC herbivore® feeding (10 ml/kg PO) three

times a day [18]. At one month, all was well. The patient was eating normally and had no respiratory problems. The cardiac medical treatment and the diuretic were maintained, and feeding was no longer necessary [19].

Three months later, the patient was admitted to the emergency room in shock following a trauma caused by a cat. He died on admission. Histopathological analysis (VetDiagnostics France Laboratory®) of his heart confirmed the presence of a dilated cardiomyopathy. No infectious or toxic process was detected during the histopathological analysis [20]. Vitamin E was not measured in our patient. Nevertheless, he was fed a diet supplemented with good quality extrudates daily.

Prevalence of heart disease in rabbits is low (2, 6%) according to recent study. Dilated cardiomyopathy can be idiopathic, age or breed related (giant breed), infectious or toxic. A link between severe stress and catecholamine action is also described in favour of ischaemic dilated cardiomyopathy [21]. The clinical signs of this cardiomyopathy are variable and often nonspecific: abatement, anorexia, weight loss, coughing, hind leg weakness, caudal paralysis, slowed movement, dyspnea, tachypnea, mouth-breathing, sudden death, cachexia or exercise intolerance [22]. Cardiac auscultation is sometimes normal, and a murmur or bradycardia is sometimes audible. In right heart failure, jugular distension, retrograde pulse, abdominal distension with flutter sign, hepatomegaly, subcutaneous edema, and/or exophthalmos (in case of chest mass) should be sought. In the case of left heart failure, it will be a tachypnea, a restrictive dyspnea, discordance or an orthopnea. If the patient has a cardiac pathology, clinical signs of hypotension such as mucosal color, degree of dehydration and recoloration time should be assessed. And sometimes the rabbit will have no clinical signs at all.

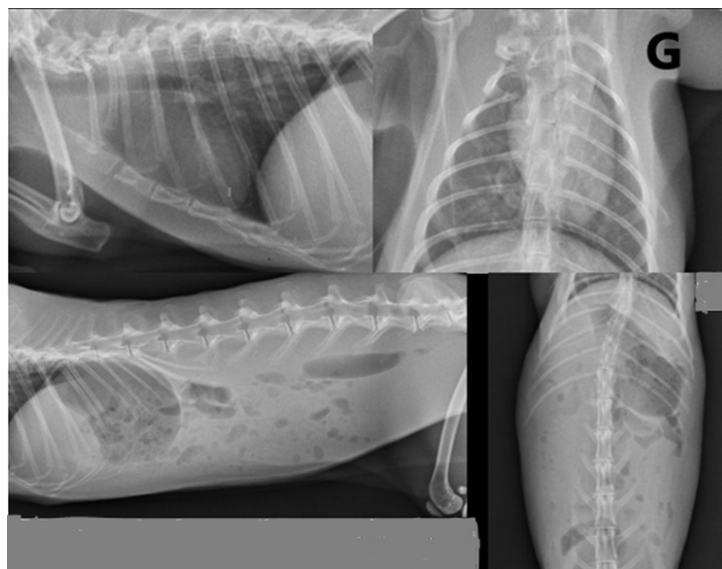
**Table 2:** Blood pressure in rabbit [17].

Enlargement, thickness and contractility	
	Pas=93-135 mmHg
	Pad=64-75 mmHg
	Pam=80-91 mmHg

**Table 3:** Echocardiographic parameters in the domestic rabbit and in normal unsexed New Zealand white rabbits.

Parameters	The domestic Rabbit	Unsexed (n=20) (Stypmann et al., 2007)
Age	6 years old	16 weeks old
Bodyweight (kg)	1.58 kg	2.92 kg
Interventricular septal thickness at end of diastol (cm)	0.3	0.271 ± 0.056
Left ventricular posterior wall thickness at end of diastol (cm)	0.2	0.274 ± 0.041
Left ventricular end-diastolic dimension (cm)	1.6	1.54 ± 0.112
Left ventricular end-systolic dimension (cm)	1.3	1.009 ± 0.091

**Note:** Values are mean ± SD.

**Figure 3:** Right lateral and ventrodorsal abdominal and thoracic view after 48 hours of intensive care.

## CONCLUSION

The treatment of dilated cardiomyopathy is similar to that of domestic carnivores. However, in rabbits, the difficulty is to suspect cardiac pathology. With the thymus, interpretation of chest X-rays is not always easy. The practitioner may be assisted by measurement of blood pressure, electrocardiogram and assessment of the Buchanan index. Thoracic lesions such as cardiogenic edema or pleural effusion are more likely to appear on a CT scan. However, echocardiography remains the preferred examination for a definite diagnosis. To avoid emergency decompensation of the patient, medical stabilization is necessary before further examinations are carried out.

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