

Assessment and Care of the Critically Ill Rabbit



Minh Huynh, DVM, DECZM (Avian)^{a,*}, Anaïs Boyeaux, DVM^b,
Charly Pignon, DVM, DECZM (Small Mammals)^c

KEYWORDS

• Rabbit • Critical care • Shock • Hypovolemia • Stress • Fluid therapy • Emergency

KEY POINTS

- Rabbits have the ability to hide their signs and often present in a state of decompensatory shock.
- Handling can increase susceptibility to stress-induced cardiomyopathy and specific hemodynamic changes.
- Careful monitoring with a specific reference range is important to detect early decompensation, change therapeutic plan in a timely manner, and assess prognostic indicators.
- Fluid requirements are higher in rabbits compared with other small domestic mammals and can be corrected both enterally and parenterally.
- Critical care in rabbits can be extrapolated to many hindgut fermenters, such as chinchillas and guinea pigs, but a specific reference range and dosage regimen need to be determined.

INTRODUCTION

Domestic rabbits are prey species and their medical management is particularly challenging because most clinical signs are hidden. Those subtle clinical signs make early recognition of illness and/or injury difficult for owners, resulting in them delaying while the health status deteriorates. For this reason, rabbit patients sometimes present in a critical stage. One other difficulty to consider is that rabbits are highly stress-sensitive animals, which must be kept in mind in an intensive care context whereby those patients may decompensate quickly during diagnostic procedures and examination. The physiology of shock in rabbits shares many common features with the other mammals, with a noticeable increased influence of stress and fear. Shock is defined by tissue hypoperfusion, decreased oxygen delivery, and insufficient cellular energy

^a Exotic Department, Centre Hospitalier Vétérinaire Frégis, 43 Avenue Aristide Briand, Arcueil 94110, France; ^b Department of Emergency and Critical Care, Centre Hospitalier Vétérinaire Frégis, 43 Avenue Aristide Briand, Arcueil 94110, France; ^c Exotics Medicine Service, Alfort National Veterinary School, 7 avenue du Général de Gaulle, Maisons-Alfort 94700, France

* Corresponding author.

E-mail address: nacologie@gmail.com

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production (See [Brian K. Roberts: Basic Shock Physiology and Critical Care](#) in this issue). There are several classifications of shock. A functional classification of shock usually includes cardiogenic, hypovolemic, distributive, and anaphylaxis.

The most common clinical types of shock in pet rabbits are hypovolemic and distributive shock. Maldistribution of fluid occurs in rabbits because of their digestive tract, which requires a lot of water and an adequate bacterial environment for normal function. The daily water intake of a rabbit ranges from 10% to 12% of the body weight, which is twice that of a small carnivore.¹ Rabbit digestion relies on hindgut fermentation and a well-established population of commensal microflora. When the normal balance of micro-organisms is disrupted, dysbiosis can occur, resulting in endotoxemia and bacterial translocation. This article mainly focuses on hypovolemic shock.

Cardiogenic shock is rarely seen because spontaneous primary heart disease is uncommon in pet rabbits, although reports of it have increased recently.^{2,3} However, stress-induced cardiomyopathy occurs more frequently, especially in a veterinary hospital setting, when the patients are in an unfamiliar environment and frequent handling is needed. Stress-induced cardiomyopathy or catecholamine cardiomyopathy is characterized by a high level of catecholamines, which causes coronary vasoconstriction and myocardial ischemia in rabbits.⁴ The endogenous release of catecholamines causes myocardial injury in a dose-dependent manner, which may have acute or delayed consequences.⁵ Consequently, cardiac output is reduced, which adds to the severity of shock.

Stress is a physiologic response based on catecholamine and cortisol release by adrenal glands. It redistributes blood flow from visceral structures to skeletal muscle, which occurs by catecholamine-induced increase in arterial pressure, central venous pressure, and hindquarters blood flow with concurrent mesenteric and renal vasoconstriction.^{6,7} Stress and epinephrine also have beneficial effects: stress increases glucose uptake from the small intestine and prevents hypotension in cases of severe blood loss.^{7,8} Rabbits seem to have 2 types of cardiovascular response when exposed to stress.⁶ In one study examining the effects of stress on rabbits, a model of acute threat was reproduced with an air jet. This study found a significant increase in heart rate and cardiac output. In the same study, rabbits were put in a box with oscillation reproducing an environmental stress, which noted a cardiac freezing response characterized by no increases in cardiac output or heart rate. In the hospital setting, both types of stimulus responses are expected and clinicians should try to minimize the stress.

Pet rabbits are expected to have better acceptance of handling than laboratory or wild rabbits. In laboratory animals, it has been shown that frequent contact increases compliance stress tolerance and reduces fear response.^{9,10} When rabbits are healthy, rabbit owners should be encouraged to handle their pet whenever possible. Nevertheless, minimizing handling and stressors in the environment should be a constant goal of exotic clinicians, especially with rabbits that are not used to being handled.

Initial Assessment

History

A brief history may orientate clinicians at presentation of the sick pet, but a more thorough history should be obtained once the patient is stabilized.

Four key points are evaluated:

- Signalment with breed, age, sex, neutered or entire.
- Record of recent trauma, outdoor exposure, potential toxin exposure.

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