

# Blood Transfusion with Canine Blood in Two Cats with Hypovolemic Anemia

Orsolya SÁRPATAKI<sup>1\*</sup>, Ioana BEDECEAN<sup>1</sup>, Răzvan CODEA<sup>2</sup>,  
Lucia BEL<sup>2</sup>, Raul CĂTANĂ<sup>3</sup>, Ioan MARCUS<sup>1</sup>, Bogdan SEVASTRE<sup>1</sup>

<sup>1</sup> Department of Pathophysiology

<sup>2</sup> Department of Anaesthesiology and Surgical Techniques.

<sup>3</sup> Veterinary Emergency Hospital, University of Agricultural Sciences and Veterinary Medicine, Cluj-Napoca, Romania

\* Corresponding author e-mail: [orsisarpataki@gmail.com](mailto:orsisarpataki@gmail.com)

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## Abstract

Blood transfusion is the main element in the supportive therapy of anemia. Xenotransfusion (the transfusion of blood from another species) of canine blood to cats is still performed nowadays in critically anemic cats when compatible feline blood cannot be obtained. Two European Shorthair cats were presented in our clinic with signs of severe anemia. Due to lack of compatible feline blood at that time and considering the critical condition of the patients we performed blood transfusion with fresh whole canine blood. Both cats received 20mls/kg of canine blood with constant monitoring of heart rate, respiratory frequency and body temperature during transfusion.

Complete blood count and basic metabolic panel were performed after two days, one week and one month. No acute adverse reactions were reported in these feline patients, receiving a single transfusion with canine whole blood. In both cases, blood transfusions were able to elevate the PCV and the hemoglobin levels, and to improve the clinical condition within hours. Plasma biochemistry performed after two days, one week and one month showed no significant changes.

In emergency cases, transfusion of canine blood may allow short-term stabilization of the anemic cat. Such a transfusion can support the patient until adequate bone marrow response occurs. Despite the fact that no obvious side effects were found, more clinical data are needed to conclude the benefit and the limits of blood xenotransfusion.

**Keywords:** *canine, blood, feline, xenotransfusion*

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**Introduction.** Blood transfusion is the main element in the supportive therapy of anemia. Best practice guidelines for blood transfusion in the feline species are well established and widely available. The AB blood system is the major feline blood antigen system, and consists of the 3 blood types A, B, and AB. All cats older than three months have naturally occurring alloantibodies against the other blood types, with the exception of type AB cats (Helm et al, 2010; Barfield et al, 2011). Xenotransfusion (the transfusion of blood from another species) of canine blood to cats is still performed nowadays in critically anemic cats when compatible feline blood cannot be obtained.

However, several side effects as massive hemolysis, anaphylactic reactions were also reported (Bovens et al. 2013).

**Aims and objectives.** The aim of the present study was to monitor the short and long term reactions after xenotransfusion with canine whole blood in cats with hypovolemic anemia.

**Materials and Methods.** Two European Shorthair cats were presented in our clinic with signs of severe anemia. Patient nr. 1, a 3 years old, male with penetrating abdominal trauma and patient nr. 2, a 7 weeks old, female stray cat with

massive flea infestation, both presenting signs of hypovolemic shock.

Due to lack of compatible feline blood at that time and considering the critical condition of the patients we performed blood transfusion with fresh whole canine blood, in addition to the specific treatment required. Both cats received 20mls/kg of canine blood with constant monitoring of heart rate, respiratory frequency and body temperature during transfusion. Complete blood count and basic metabolic panel (total protein, albumin, electrolytes, urea, creatinine, bilirubine) were performed after two days, one week and one month.

Complete blood count (CBC) was performed with Abacus Junior Vet automatic analyzer (Diatron Messtechnik, Hungary). Blood smears were stained using Diff Quick and Giemsa staining. For reticulocyte count Cresyl Blue stain was used.

Smears were examined for differential blood count and for erythrocyte morphology in the feathered region of the film, at high power (x100). Erythrocytes were measured using Quick Photo Micro 2.3 software.

**Results and Discussions.** No acute adverse reactions were reported in these feline patients, receiving a single transfusion with canine whole blood. In both cases, blood transfusions were able to elevate the PCV and the hemoglobin levels, and to improve the clinical condition within hours. Plasma biochemistry performed after two days, one week and one month showed no significant changes. Blood smears performed two days after transfusion showed erythrocytes of different sizes but no signs of erythrocyte destruction. Canine erythrocytes being larger than feline ones

could be the cause of this apparent anisocytosis. After seven days, small number of spherocytes were present on the smears, accompanied by the slightly elevated bilirubine level this might indicate extravascular hemolysis. Studies confirm that antibodies against canine red blood cells are produced within 4–7 days of the transfusion, this leads to the rapid destruction of the transfused canine red blood cells in a delayed haemolytic reaction. Any repeated transfusion with canine blood later than 6 days after the first transfusion can causes anaphylaxis (Boven *et al*, 2013). In delayed haemolytic transfusion reactions, the newly-formed antibodies adhere to the transfused red cells, which are prematurely removed from the circulation and undergo extravascular haemolysis. The clinical signs, including fever and sometimes jaundice, are usually mild and may be unnoticed (Bracker *et al*, 2005)

**Conclusion.** In emergency cases, transfusion of canine blood may allow short-term stabilization of the anemic cat. Such a transfusion can support the patient until adequate bone marrow response occurs. Despite the fact that no obvious side effects were found, more clinical data are needed to conclude the benefit and the limits of xenotransfusion.

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