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The Role of Hematological Parameters in Transfusion Decision-Making in Small Animal Emergency Medicine

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Abstract:

Transfusion medicine represents an essential component of veterinary emergency and critical care, particularly in the management of small animal patients with acute blood loss, anemia, coagulopathies, or other life-threatening conditions. Hematological parameters play a central role in assessing the severity of hematological abnormalities and supporting clinical decisions regarding the indication, timing, and type of transfusion therapy. This article aims to review the relevance of routinely evaluated hematological parameters in transfusion decision-making in small animal emergency medicine, with particular emphasis on their interpretation in the context of acute blood loss, anemia, trauma, and critical illness. In addition, the limitations of relying solely on laboratory parameters are discussed, highlighting the importance of integrating hematological findings with the patient's clinical status, hemodynamic stability, and underlying disease when determining the need for transfusion.

Introduction

Blood transfusion is an important component of emergency and critical care in dogs and cats, particularly in patients with acute hemorrhage, severe anemia, or hemolysis. Hematocrit/packed cell volume and hemoglobin are the main hematological parameters used to assess erythrocyte mass and support transfusion decisions. However, transfusion should not be based on a single numerical threshold. Hematological findings should be interpreted together with the severity and progression of anemia, its underlying cause, and clinical indicators of impaired oxygen delivery. Serial hematological assessment is particularly important in acute blood loss, where initial Hct and Hb values may underestimate the severity of anemia. An individualized, multimodal approach is therefore essential for optimizing transfusion decisions in small animal emergency medicine.

Material and method

Relevant scientific literature published predominantly within the last 10 years was reviewed, with particular emphasis on veterinary transfusion medicine, emergency and critical care, hematological parameters, anemia, acute blood loss, hemolysis, and transfusion decision-making in dogs and cats. Original clinical studies, review articles, guidelines, and other relevant scientific publications were considered. The literature search was conducted using the PubMed, Google Scholar, and Web of Science databases.

Results and discussions

Hematological parameters play a central role in transfusion decision-making in small animal emergency medicine, with Hct/PCV and hemoglobin representing the primary indicators of anemia severity and erythrocyte mass. However, transfusion should not be based on isolated numerical thresholds, but on an individualized assessment integrating serial hematological changes, the severity and progression of anemia, its underlying cause, and the patient’s clinical status.

Conclusions

Overall, hematological parameters play a central role in transfusion decision-making in small animal emergency medicine, with Hct/PCV and Hb representing the primary indicators for assessing erythrocyte mass and anemia severity. However, transfusion decisions should not rely on isolated numerical thresholds, but should integrate serial hematological changes with additional laboratory parameters, including TPP, lactate, acid–base variables, and platelet count, together with the underlying cause of anemia, disease severity, clinical signs, and tissue perfusion. The available evidence therefore supports a multimodal and individualized approach in which the potential benefits of restoring oxygen-carrying capacity or hemostatic function are carefully balanced against transfusion-associated risks, with appropriate blood product selection and systematic monitoring further contributing to patient safety and optimal clinical outcome.