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THE MONITORING AND RESPONSE OF TRANSFUSION REACTIONS TO GLUCOCORTICOID THERAPY

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Abstract

The transfusion reactions represents one of the major risks of transfusion therapy, regardless of the blood product used, whole blood, erythro-concentrate or frozen plasma.
This paper presents the evolution of transfusion reactions and treatment of 60 dogs during the period 2014-2016 monitored in the Clinics of the Faculty of Veterinary Medicine in Bucharest. The clinical signs, CBC, biochemistry were observed for all dogs as the animals came to the clinics.
The treatment provided has a base content of glucocorticoid mixture of drugs and complementary symptomatic therapy. The glucocorticoid therapy refers to the usage of hemi-succinate hydrocortisone at the beginning of each transfusion and at the administration of Prednisolone at the end.
The glucocorticoid combo therapy was used in all transfusions, regardless of the product or sub-product of blood being used. For 70% of the cases was used whole blood, for 20% erythro-concentrate and for 10% plasma.
The data processed using the parameters above shows a decreased number of transfusion reactions when used the glucocorticoid drug combo on the 50% of the case load in comparison to the other 50% which did not receive the glucocorticoid therapy prior to transfusion. This study shows that the glucocorticoid combo therapy might be helpful in a variety of cases in which the pathology presented allows the usage of glucocorticoid therapy.

Key words: transfusion, reactions, blood, glucocorticoid.

INTRODUCTION

Considering the risk and the necessity of the transfusion therapy, studying the transfusion reactions should be done more often covering as much details possible as well as monitoring the transfused patients.

According to BSAVA manual of Canine and Feline Haematology and Transfusion Medicine, transfusion reactions are divided in 2 large categories: immunological and non-immunological. The immunological reactions are of the most concern, especially the acute hemolytic reaction, as well as other sensitized allow-antibody's mediated incompatibilities. (Day et al., 2012). The acute hemolytic reaction refers to antigen-antibody, a type II, hypersensitivity reaction that usually manifests with a variety of clinical signs, fever, tachycardia, dyspnea, tremors, vomiting, shock, collapse and hemoglobinuria. (Day et al., 2012)

Non-immunological reaction is an anaphylactic type reaction with a various clinical signs such as edema, urticaria, pruritus, dyspnea, pulmonary edema. On this type of reaction, if not intervened, could express in the super-acute phase shock, hemolysis, even death, or they can evolve to 2-21 days and develop hemolytic syndromes. (Day et al., 2012).

This type of reactions are usually results of various modifications due to the patient's status, type of disease, infusion rate, blood quantity, hypokalemia, polycythemia, hyperproteinemia, hyperammonemia and hyperphosphatemia (Day et al., 2012). This type of reaction could be minimized in some cases with preventive measures such as the glucocorticoid combo (hydrocortisone hemi-succinate and prednisolone) and could ensure more efficacy and safety on the patient's transfusion.

According to the National Medicines Agency in Romania, hydrocortisone hemi-succinate is a systemic glucocorticoid being the ester group in the 21-position oxidril; it is a fast acting glucocorticoid with an half time of 90 minutes to intravenous administration and a therapeutic effect that could reach 8-12 hours.

The second glucocorticoid is prednisolone, also a systemic glucocorticoid, with an half time up to 3.6 hours to intravenous administration, and

prolonged to intramuscular or subcutaneous administration.
The glucocorticoid combo therapy was used prior and after the transfusion, hydrocortisone hemi-succinate pre-medicated at 15 to 30 minutes prior to transfusion and prednisolone at 4-6 hours from the start of the transfusion.

MATERIALS AND METHODS

In order to characterize the evolution of the transfusion reactions, the study was performed on 60 dogs, 30 received glucocorticoid combo therapy and 30 did not received (control group), and were monitored during the transfusion at 15, 30, 45 minutes, 1, 2, 4, 12, 24 and 48 hours.
All the dogs were measured for clinical indicators (temperature, blood pressure, heart rate, respiratory rate, mucous membrane color, capillary refill time, attitude, response to transfusion therapy) and para-clinical indicators: CBC (pre-transfusion, 24, 48 hour, 7 to 21 days), biochemistry (urea, creatinine, aspartate transaminase, alanine transaminase, total protein, plasma color).
All subjects of this study were tested for D.E.A. 1.1 group, with various manufacturer group test.
The cases that received the glucocorticoid combo therapy were not suffering from any condition that was incompatible with this type of treatment.
The results of these patients were cross-matched to the type of blood product received, glucocorticoid medication received and intensity of the transfusion reactions: minor (fever, tachycardia, dyspnea, tremors, vomiting, hypokalemia, polycythemia, hyperproteinemia, hyperammonemia, hyper-phosphatemia), medium (collapse, hemoglobinuria, edema, urticaria, pruritus, pulmonary edema) and severe (shock, hemolytic syndromes and all immunological reactions).
All the data collected had been processed and interpreted to evaluate the efficiency of the glucocorticoid combo therapy in reducing the transfusion side effects.

RESULTS AND DISCUSSIONS

The usage of the glucocorticoid combo therapy on the 30 dogs used in the study shows that the number of transfusion reactions diminished considerably. From these dogs, 70% of them (21 dogs) had no transfusion reaction, as to 30% (9 dogs) of these that had a type of transfusion reaction, 8 dogs had a minor reaction, one medium reaction, but no severe reaction observed (Figure 1).

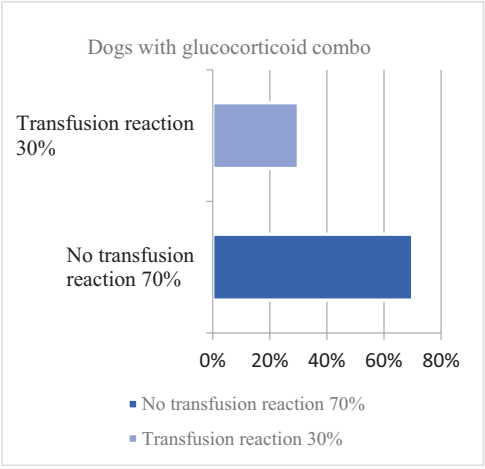

Figure 1. Percentage of transfusion reactions on dogs with glucocorticoid combo therapy

The other 30 dogs, the control group, showed a different balance 46.66% (14 dogs) had no transfusion reaction, as to 53.33% (16 dogs) that showed all of the intensity grades.
From the 16 dogs that had reactions, 10 of them had minor reactions, 5 of them with medium reaction and one severe reaction (Figure 2).

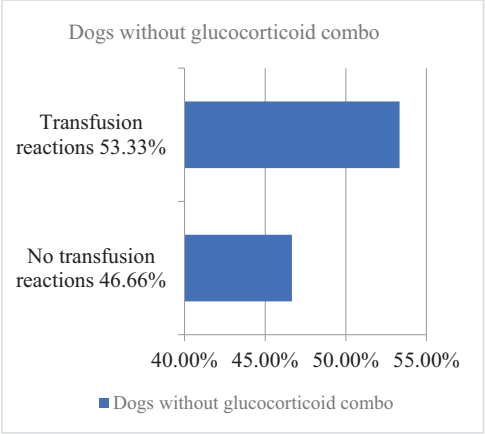

Figure 2. Percentage of transfusion reactions in dogs without glucocorticoid combo therapy

Another important factor in this study is the blood product used. The cross-match between the blood product and the transfusion reactions showed that from the total of 60 dogs, 58.3% (35 dogs) were non-reactive, and 41.6% (25 dogs) had a type of transfusion reaction.
The cross-match between transfusion reactions intensity and the blood product showed that 40% (10 dogs) had a minor reaction when whole blood was transfused, 8% (2 dogs) to frozen plasma and 24% (6 dogs) to erythro-concentrate.
The medium intensity reactions showed a diminished number, 12% (3dogs) to whole blood, 4% (1 dog) to frozen plasma and 8% (2 dogs) to erythro-concentrate.
There was only one dog (4%) with severe reaction to whole blood.
This cross-match of the reactions shows that an enlarged number of transfusion reactions were to whole blood 56% (14) dogs, 32% (8 dogs) to erythro-concentrate and 12% (3 dogs) to frozen plasma (Figure 3).

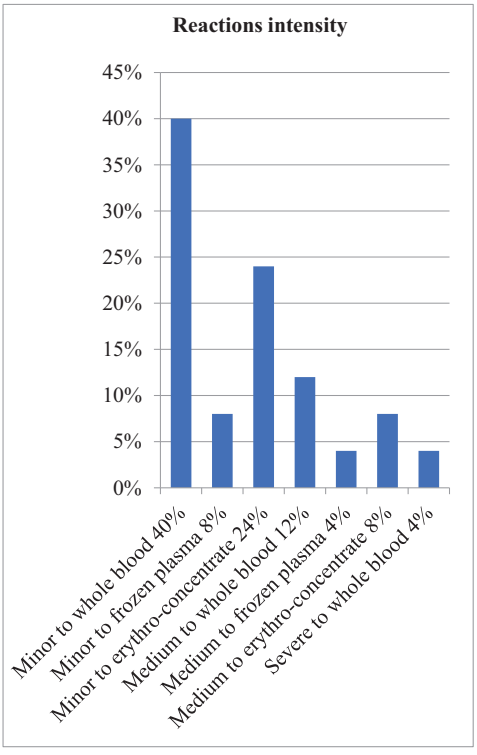

Figure 3. Percentage of transfusion reactions cross-matched to blood product

CONCLUSIONS

The percentage of transfusion reactions in dogs that received the glucocorticoid combo therapy decreased by 24% in comparison to the control group.
Due to the glucocorticoid combo therapy, the transfusion reactions were less severe, the dogs that received it had only minor or medium reactions compared to the control group, which also presented severe reactions presented.
In conclusion, the usage of the glucocorticoid combo therapy in the cases where the pathology allows it, Hydrocortisone Hemi-succinate and Prednisolone, could be easily used in transfusion therapy and could be a real advantage to the patient and his evolution after transfusion.

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