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ACUTE TRANSFUSION REACTIONS AFTER THE ADMINISTRATION OF WHOLE BLOOD AND BLOOD COMPONENTS IN DOGS - 96

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Introduction
The transfusion medicine is a relatively new area in the Veterinary Medicine especially when it regards the use of blood components. There is an agreement among the authors about the advantages of the use of blood components in relation to whole blood because of the more specific treatment that the first one provides. (Kert & Hohenhaus 1993, Callan 2002). However, there are few studies in relation to the documentation of the adverse reactions of transfusion in dogs in consequence of the administration of blood products (Kert & Hohenhaus 1993, Harrell et al. 1997, Assaraskorn & Niwetpathomwat 2006) especially when it regards to the use of platelet concentrates in dogs (Abrams-Ogg et al. 1993, Gonçalves 2002). The transfusion reactions are classified in immune and non-immune that can be divided into acute and delayed (Abrams-Ogg 2000). An acute transfusion reaction occurs in minutes from the beginning of the transfusion to 48 hours in relation to its end (Harrel et al. 1997). The purpose of this study is to document the acute adverse effects after the transfusion of whole blood and blood components in dogs.

Materials and Methods
In the period from 2006 to 2008, 186 transfusions were held, divided in: 129 with erythrocyte concentrate (or packed red blood), 37 with platelet concentrate and 20 transfusions with whole blood. The criteria for indication of whole blood or packed red blood were: hemoglobin lower than 7 g/dL associated to the signals and symptoms: tachycardia, tachypnea, prostration, pale mucosa and weak pulse. The compatibility test was held before the administration of the red blood cells. The dogs which received erythrocyte concentrate or whole blood were monitored for 3 to 4 hours regarding the variation of the body temperature, heart rate and breathing. The platelet transfusions were held in a therapy way being indicated in cases of platelets count below 50,000 platelets/μL with evidence of active bleeding. The platelet concentrates were administered during 1 hour with monitoring of the same parameters referred to the erythrocytes transfusions. There was no previous application of corticosteroids or antihistaminics. The analysis of the data was held in a descriptive way.

Results
Most of the transfused dogs was more than 5 years old (76.69%), with defined breed (72%) consisting of 42% males and 58% females. The acute adverse reactions was documented in 28.49% (53/186) of the cases transfused, with the following distribution: 20.93% (27/129) of the transfusions with erythrocyte concentrate, 45.94% (17/37) of the transfusions with platelet concentrates and 45% (9/20) of the cases in which whole blood was administered. The adverse effects reported during the transfusion of erythrocyte concentrate were: emesis 59.2% (16/27), angioedema 18.5% (5/27), hyperthermia 11.1% (3/27), dyspnea 11.1% (3/27), erythema 3.7% (1/27) and tremors 3.7% (1/27). The main reactions observed with the administration of the platelet concentrates were: angioedema 76.4% (13/17), emesis 23.5% (4/17), urticaria 17.6% (3/17) and erythema 5.8% (1/17). The whole blood transfusion was characterized by: emesis 66.6% (6/9), angioedema 11.1% (1/9), hyperthermia 11.1% (1/9) and urticaria 11.1% (1/9). There was one register (1/27) of hemolytic reaction after 24 hours in relation to the end of the erythrocyte concentrate transfusion leading this animal to death. The other dogs who showed reactions were medicated with dexamethasone (0.5 to 1.0 mg/kg/subcutaneous) with complete remission of the signals and symptoms.

Discussion and Conclusion
The main acute immune transfusion reactions are: red blood cell incompatibility (hemolysis), acute hypersensitivity and the nonhemolytic febrile transfusion reaction (Hohenhaus 2000). The frequency of the acute adverse reactions due to transfusions varies between the authors: 3 to 8% according to Abrams-Ogg 2000, 7.6% according to Kerl & Hohenhaus 1993.3% as documented by Harrel et al. 1997 and Callan et al.1996 and 4.18% according to Assaraskorn & Niwetpathomwat 2006. However, it differs from the findings of our study in which the registered occurrence was 28.49%. The low occurrence of reactions found by Harrel et al. 1997 might be justified by the previous application of diphenhydramine in most of the dogs of his study, contributing this way to a decrease of inflammatory reactions. The main documented side effects on packed red blood transfusions in our study were: emesis (59.2%) followed by angioedema (18.5%). Hyperthermia and emesis were the main findings documented by Callan et al. 1996. But Kerl & Hohenhaus 1993 quote that 10 of the 131 dogs (7.6%) that received erythrocyte concentrate showed acute reactions characterized by emesis, hemolysis, hematuria and jaundice. Harrel et al. 1997 report the hyperthermia and emesis as the main clinical manifestations agreeing with Callan et al. 1996. The difference between these two studies is that Callan et al. 1996 evaluate only the erythrocyte concentrate transfusions while Harrel et al. 1997 include in their study: plasma products (56%), whole blood (3.2%) besides the erythrocyte concentrates (40.8%). The clinical studies about platelet concentrates transfusions are scarce in literature (Gonçalves 2002). Our study indicated a high frequency of reactions after platelet transfusions: 45.94% differing from the results of Gonçalves 2002 in which the percentage of reactions was 35.7%. Abrams-Ogg et al. 1993 documented the occurrence of 17% of reactions; however, this study is experimental, not clinical. The transfusion reactions due to the administration of platelet concentrates are well reported in human beings, occurring in 20 to 30% of the cases. (Clumbers et al. 1990, Heddle et al. 1993). The hyperthermia, with no signals of hemolysis, is the most common complication referred in human. There are also reports of chills, allergic reactions characterized by urticaria, pruritus, erythema, flushing, hypotension and, less frequently, complications such as hemolysis, acute lung injury related to transfusion (TRALI), sepsis due to bacteria contamination, anaphylaxis, circulatory overload and metabolic complications (Heddle et al. 1999). Angioedema (76.4%) followed by emesis (23.5%) were the two most common clinical manifestations witnessed during platelet concentrate transfusions in the current study. These findings differ from Gonçalves 2002 that reports the gastrointestinal manifestations as the most common, followed by the inflammatory ones. But Abrams – Ogg et al. 1993 report the hyperthermia as the main adverse reaction in their study in agreement with the main manifestation reported in humans (Heddle et al. 1999) differing from the few clinical studies in veterinary medicine (Gonçalves 2002). Angioedema (66.6%) followed by emesis (11.1%) were the main adverse reactions after the whole blood administration whose transfusion occurred in minor proportion in this period due to the preference for the use of blood components if available. Harrel et al.
1997 record the striking elevation of transfusions with blood components and the consequent decrease of the use of whole blood. There was an occurrence of an hemolytic reaction after 24 hours related with the end of the transfusion (3.7%). This animal showed an immune-mediated hemolytic anemia status. It was not possible to establish if the cause of the hemolysis was in consequence of the immune-mediated hemolytic anemia or of a transfusion reaction. Harrel et al. 1997 described the occurrence of similar proportion (3.2%). However, Kerl & Hohenhaus 1993 report a higher proportion (7.6%). Can be concluded that the percentage of transfusional reaction was significant in this study, especially when it regards to the platelets concentrate transfusion. However, most of the occurrences were lenient, not preventing the procedure and providing more benefits than risks to the patient.

References

Keywords: transfusion reactions, platelet concentrate, packed red blood, erythrocyte concentrate, canine, dog