SHORT COMMUNICATION
Open Access

Journal of Veterinary and Animal Sciences
ISSN (Print): 0971-0701, (Online): 2582-0605
https://doi.org/10.51966/jvas.2024.55.2.455-459

Transfusion reaction in a domestic short hair cat

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Citation: Veni, V., Habeeb, B.P., Pradeep, M., David, P.V., Unny, N.M. and Bipin, K.C. 2024. Transfusion reaction in a domestic short hair cat.
J. Vet. Anim. Sci. **55**(2):455-459
DOI: https://doi.org/10.51966/jvas.2024.55.2.455-459

Received: 27.10.2023 *Accepted: 30.01.2024* *Published: 30.06.2024*

Abstract

A one-year old male domestic short hair cat was presented to TVCC, Pookode, with severe anaemia. CBC revealed Hb 2.9 g/dL, VPRC 7.2 per cent, RBC 1.49 x10^6 /µL and platelet count 24 x 10^3/µL. Mycoplasmosis and Ctenocephalides felis infestation was confirmed. Compatible blood transfusion with type A blood along with Inj. enrofloxacin @ 10mg/kg o.d. subcutaneously for 3 days followed by tab. doxycycline @ 10 mg/kg o.d. for 14 days, selamectin 6 per cent spot on 0.5 mL., resulted in significant clinical improvement. The cat was presented again with diarrhoea and vomiting with recurrence of anaemia on the 15th day post initial transfusion. Feline panleucopaenia was confirmed. CBC on the 25th day showed Hb 3.7 g/dL, VPRC 10.3 per cent, RBC 2 x10^6 /µL and platelet count 12 x 10^3/µL. A typed and cross matched second blood transfusion from a different donor cat of blood type A was fixed on the 29th day. The recipient cat which was of blood type A showed acute transfusion reaction within two minutes after the onset of second transfusion and died on the table. Necropsy was done and observations recorded.

Keywords: *Anaemia, mycoplasmosis, feline panleucopaenia, blood transfusion reaction*

Blood transfusion therapy with whole blood or blood product collected from a suitable donor is a life-saving procedure in a critically anaemic cat (Shaheena *et al*., 2020). Immediate blood transfusion was recommended in cats showing severe anaemia with a VPRC less than 15 per cent

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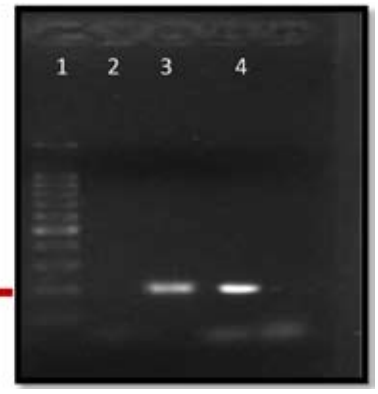
(Helm and Knottenbelt, 2010). The blood group system in cats consists of three blood types namely, A, B and AB based on the discovered RBC antigens (Thomovsky, 2016). Since cats have naturally occurring alloantibodies against other RBC antigens, prior blood typing and cross matching is mandatory for safe blood transfusions.

A one-year old domestic short hair cat was presented to the Teaching Veterinary Clinical Complex (TVCC), Pookode, Kerala with a history of anorexia, lethargy and weakness. The heart rate was 152 beats per minute with weak pulse, polypnoea, rectal temperature of 103.9^{0}F, icteric conjunctival mucous membranes, dehydration and *Ctenocephalides felis* infestation were observed. Haematological analysis was done using a three-part fully automated haematology analyser (Mindray BC30Vet). Polymerase chain reaction (PCR) targeting 16srRNA (198 bp) (Jensen *et al*., 2001) was done for diagnosing mycoplasmosis and rapid one step immuno-chromatographic test (ACCUVET, Vet Cetera Animal Health, Kochi) was done to diagnose feline panleukopaenia.

Severe anaemia was observed with a VPRC 7.2 per cent (Table 1). *Mycoplasma* spp. infection detected in blood smear was confirmed by PCR (Fig 1) (Tresamol and Vincy, 2023). Typed and cross matched homologous blood transfusion was done immediately (Fig 2). Prednisolone injection was given @ 2mg/kg body weight for first three days and then tapered to 0.5 mg/kg for next three days. Inj. enrofloxacin @ 10mg/kg o.d. subcutaneously for 3 days followed by tab. doxycycline @ 10 mg/kg o.d. for 14 days and selamectin 6 per cent spot-on 0.5 mL externally were also given and the cat showed clinical improvement but the mucous membrane remained icteric (Fig 3). On 15th day, the cat was presented with vomiting and haemorrhagic diarrhoea as sequelae of feline panleucopaenia. Leucopaenia with



L1:100bp ladder, L2: negative control,
L3: positive sample, L4: positive control

Fig. 1. Molecular detection of *Mycoplasma* spp

Table 1. Haematology of the patient on the day of presentation, on 15th and 25th day

Haematology	On the day of presentation	On 15th day after first transfusion	On 25th day after first transfusion
RBC (x10^6/µL)	**1.49**	4.66	**2.00**
Hb (g/dL)	**2.9**	8.0	**3.7**
VPRC (%)	**7.2**	23.2	**10.3**
RDW (%)	22.9	18.8	24.3
MCV(fL)	48.6	49.9	51.5
MCH (pg)	19.4	17.1	18.5
MCHC (g/dL)	40	34.4	35.9
TLC (x10^3/µL)	21.71	**1.9**	9.6
Gran (%)	57.2	26.3	20.9
Lymph (%)	33.4	68.5	72.6
Mon (%)	6.1	5.2	6.5
Platelet (x10^3/µL)	**24**	122	**12**

Fig. 2. Blood transfusion

Fig. 3. Clinical improvement

lymphocytosis was observed (Kolomak, 2023) (table 1). Significant elevation of ALT (252.91 IU/L) and total bilirubin (6.56 mg/dL) was observed due to mycoplasmosis (Amaldev and Tresamol, 2017) along with reduction in albumin (1.85 g/dL) as a result of panleucopaenia (Barrs, 2019). Anaemia recurred in this cat on the 25th day after initial consultation (Table 1). Mycoplasmosis and feline panleukopenia lead to severe haemolytic anaemia (Baumann *et al*., 2013) and haemorrhagic anaemia along with hypoproteinemia (Truyen *et al*., 2009) respectively in infected cats where a whole blood transfusion could restore oncotic pressure and control disseminated intravascular coagulation.

Hence, a second blood transfusion with type A blood was decided on the 29th day from a different donor cat. Major and minor cross matching did not reveal any agglutination reaction. When the blood transfusion was given, the cat exhibited immediate transfusion reaction with acute respiratory distress and signs of immune mediated anaphylaxis within two minutes and died on the table. Similar adverse reactions were reported in repeated transfusions in cats despite using a blood typed and cross-match compatible blood by Weingart *et al*. (2004). This could be due to the reaction of pre-existing recipient antibodies with other non-AB erythrocyte antigens (Weltman *et al*., 2014) of the second donor. Adverse reactions in repeated transfusions in cats could also be due to the presence of antibodies against leucocytes, thrombocytes or plasma proteins in the second donor blood as these reactions could not be detected by blood typing or cross matching in multiple transfused cats (Weingart *et al*., 2004).

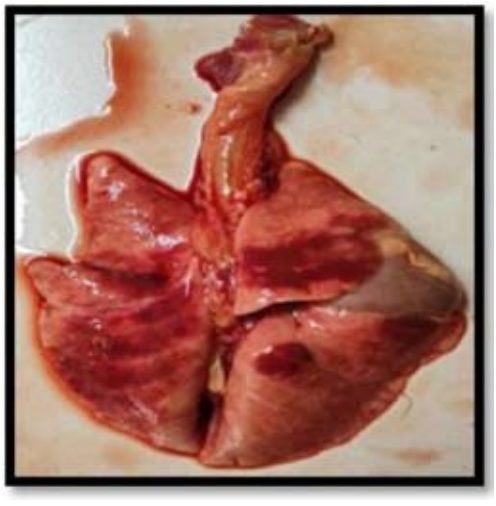


Fig. 4. Oedematous and congested lung

Necropsy was done at the department of Veterinary Pathology, CVAS Pookode which revealed gross lesions such as enlarged heart with bilateral ventricular dilatation as a compensatory mechanism to cope with severe anaemia (Wilson *et al*., 2010). Lung was

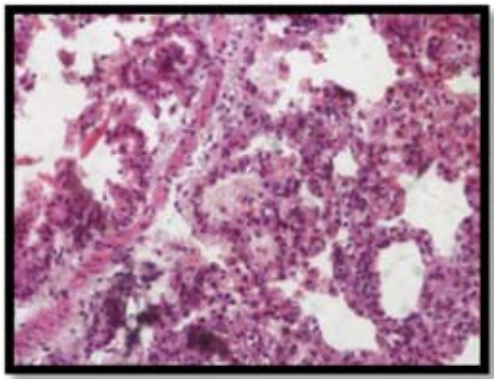


Fig. 5. Oedema and fibrin depositions in alveolar lumen

oedematous with random patches of congestion affecting all lobes (Fig. 4). Frothy fluid was found on the cut section of lung. Histopathology of the lungs revealed thickened alveolar wall with proliferation of pneumocytes, dilated alveolar capillaries and focal haemorrhages. Oedema and fibrin depositions in alveolar lumen were present (Fig. 5). Lung lesions indicated acute anaphylactic reaction followed by immunologic response against exposure to fatal antigens in the blood of the second donor. Lung and respiratory tract were affected in shock in cats during anaphylaxis (Shmuel and Cortes, 2013). Transfusion-related acute lung injury was recorded if the recipient developed acute respiratory distress within 24 hours of the transfusion (Humm and Chan, 2020).

Summary

In this study, severe anaemia due to mycoplasmosis, *Ctenocephalides felis* infestation and feline panleucopaenia was treated effectively with enrofloxacin, doxycycline, selamectin 6 per cent spot on 0.5 mL followed by amoxicillin and sulbactam combination @ 12.5 mg/kg body weight twice daily along with supportive therapy. Emergency blood transfusion with type A and cross matched homologous blood was given. Blood transfusion along with supportive care resulted in significant clinical improvement and recovery of the severely anaemic cat. Mycoplasma infection was cleared in the post treatment blood smear examination. A second transfusion with a type A, cross matched blood from a different donor cat on the 29th day after the initial transfusion caused acute transfusion reaction and death of

It was concluded that repeated blood transfusions in cats had a risk of transfusion reaction even though blood typing and cross-matching did not show any agglutination reaction *in vitro*. The existence of undiscovered non-AB blood type antigens might have caused fatal transfusion reactions in the recipient cat of this case.

Acknowledgements

The authors are thankful to the Dean, COVAS, Pookode, Head, TVCC and Professor and Head, Department of Veterinary Clinical Medicine, Ethics and Jurisprudence for providing requires facilities.

Conflict of interest

The authors declare that they have no conflict of interest.

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