

# Diagnosis and Treatment of Thrombocytopenic Purpura in A Dog

Chu Zhang

School of Shihezi University, Shihezi, China

## Abstract

A 10-year-old Chinese pastoral dog was clinically sent for examination. The main symptoms were loss of appetite, low spirits and purple spots. Through clinical examination, infectious disease examination and laboratory examination, a comprehensive diagnosis was made. Finally, the dog was diagnosed as thrombocytopenic purpura, and no obvious abnormal damage to internal organs was found. Through infusion, electrolyte supplement After blood transfusion and other symptomatic treatment, supportive treatment and professional nursing, the dog recovered and was discharged from the hospital. Purpura includes thrombocytopenic purpura and allergic purpura. Among them, Henoch Schonlein purpura is an allergic vasculitis that mainly invades the small arteries and capillaries of skin and other organs, but there is no thrombocytopenia, and the bleeding, coagulation time and blood clot contraction time are normal. It may be induced by upper respiratory tract infection, taking some drugs and eating some food, and the blood stasis points are mainly concentrated around the joints, It is bright red to crimson erythema, of different sizes, mostly symmetrical, and does not fade under pressure. Thrombocytopenic purpura is a common hemorrhagic disease in animal clinic. It is characterized by extensive bleeding of skin, mucosa and internal organs, thrombocytopenia, poor blood coagulation, prolonged pinhole coagulation time after drug injection, poor blood clot contraction, etc. its etiology is complex. Blood stasis points are mainly concentrated in limbs, head and face, mostly needle tip, Scattered on the skin surface, but also throughout the whole body, showing asymmetric distribution. Severe cases are accompanied by crises such as abdominal pain, vomiting and bloody stool. Clinically, according to the different pathogenesis, it can be divided into primary thrombocytopenic purpura and secondary thrombocytopenic purpura.

## Keywords

Canine purpura thrombocytopenic purpura; Diagnosis; Treatment.

## 1. Basic Information

### 1.1. Dog Information

Chinese garden dog, 10 years old, female, sterilized, fully immunized, weighing 13.3 kg, had been sterilized in our hospital three weeks before the disease due to uterine pus. Recently, due to the lack of food and red plaque near the surgical incision, the patient came to see a doctor on August 14, 2021.

### 1.2. Clinical Examination

The body temperature of the sick dog is 38.9 °C, the heart rate is 116 times / min, and the breathing rate is 34 times / min. the sick dog is depressed, the whole body is weak, unwilling to walk, and has shortness of breath; There are massive red ecchymosis spots on the ear, inside the forelimb, abdomen and inside the groin; The pinhole coagulation time was significantly prolonged after drug injection.



**Figure 1.** Red blood stasis on abdomen



**Figure 2.** Red blood stasis on back

### 1.3. Laboratory Inspection

#### 1.3.1 Blood routine examination

Take 1 ~ 2 ml of blood from the brachial head vein of the affected dog, put it into the EDTA anticoagulant tube, gently turn it upside down for several times to fully mix the blood and anticoagulant, and use the five classification blood cell analyzer for blood routine examination. The results are shown in Table 1.

**Table 1.** Blood routine examination results

item	result	reference range
WBC (10 <sup>9</sup> /L)	4.87↓	6.0-17.0
Lymph (10 <sup>9</sup> /L)	12.1	0.8-5.1
Mon (10 <sup>9</sup> /L)	7.0	0.15-1.35
RBC (10 <sup>12</sup> /L)	7.43	5.0-8.5
HGB (g/L)	179	120-180
HCT (%)	52.2	39.0-56.0
MCV (fL)	70.2	60.0-77.0
MCH (pg)	24.6	14.0-25.0
MCHC (g/L)	351	310-360
RDW (%)	14.2	14.0-19.0
PLT (10 <sup>9</sup> /L)	85↓	160-625
MPV (fL)	10.3	7.0-12.0
Eos% (%)	8.3	2.0-10

The results of blood routine examination showed that the number of WBC and PLT decreased.

**Table 2.** Results of blood biochemical indexes

item	result	reference range
ALB (g/L)	29.3	23-40
TP (g/L)	59.7	52.0—82.0
GLOB (g/L)	30.5	23.0-45.0
ALT (U/L)	121↑	10-100
ALP (U/L)	218↑	23-212
CREA (Umol/L)	80.7	44.0-159.0
BUN(μmol/L)	5.65	2.50—9.60
GLU(mmol/L)	6.16	4.11—7.94

### 1.3.2 Blood biochemical index examination

Take 2ml blood from the brachial head vein of the affected dog, put it into the heparin lithium anticoagulant tube, gently turn it upside down for several times to fully mix the blood and anticoagulant, centrifuge at 8000 R / min for 2 min, and take the plasma for detection in the special animal blood gas biochemical analyzer (xq-101). The results are shown in Table 2.

The results of blood biochemical indexes showed that the activity of alkaline phosphatase (alkp) and alanine aminotransferase (ALT) increased slightly. It was preliminarily suspected that the dog ate toxic substances by mistake.

### 1.3.3 Blood gas examination

Take 0.4 ml blood from the brachiocephalic vein of the affected dog and test it in the blood gas analyzer. The results are shown in Table 3.

The results of blood gas examination showed that the pH value of the dog was abnormal and the acid-base balance was unbalanced; The concentrations of Na +, K + and Cl - were abnormal.

### 1.3.4 Antibody test

Canine parvovirus (CPV), canine coronavirus (CCV), snap 4DX (canine Ehrlichia antibody, Lyme disease antibody, canine heartworm antigen, platelet / equine Ehrlichia antibody) and snap C pl (canine pancreatitis rapid detection reagent) were detected. The results showed that they were negative.

### 1.3.5 Blood smear test

Dip a small amount of anticoagulant whole blood with a cotton swab, gently touch the glass slide and apply half a drop of blood liquid to make a blood smear, which is stained by Jim SA and examined by microscope. The blood smear showed that the morphology and structure of red blood cells were normal, and no blood parasites were found. The number of platelets decreased significantly in a single field. Figure 1 blood smear.

## 2. Diagnostic results

According to the above examination results, it is suggested that the affected dog has total hemocytopenia, the number of platelets decreases significantly, and no blood parasites are found in the blood smear, which can eliminate the possibility of blood parasite infection and organ functional disorders. Combined with the clinical symptoms (purple spots, non fading pressure, vascula redema, vomiting, diarrhea, etc.), it is diagnosed as thrombocytopenic Pura.

## 3. Treatment

### 3.1. Drug Treatment

Because the dog has serious vomiting and diarrhea, can't stand up, doesn't eat, only drinks a small amount of water, has low spirit and extremely poor physical condition. The treatment is mainly infusion. Infusion can correct and prevent dehydration and adjust electrolyte disorder. At the same time, closely observe the micturition, defecation and vomiting of the affected dog.

The prescription is changed every day according to the treatment situation and treated symptomatically (1) Rehydration. 10% glucose injection 100 ml mixed vitamin C injection 0.5 g + coenzyme a 100 IU + disodium adenosine triphosphate injection 20 mg + creatinine injection 0.1 g intravenous infusion; Ringer's lactate injection 200 ml maintained electrolyte balance in the body (2) Anti inflammation. Normal saline 100 ml + amikacin sulfate injection 0.1 g intravenous infusion (3) Anti allergy. Subcutaneous injection of prednisone acetate, 18 mg / time, twice a day (4) Stop vomiting. Metoclopramide was injected subcutaneously, 5 mg / time,

once a day (5) Stop vomiting. Oral dexamethasone, half tablet / time, twice a day until diarrhea stops (6) Stop bleeding. Subcutaneous injection of adrenaline, 5 mg / time, twice a day (7) Boost platelets. Subcutaneous injection of l-glucagon, 4 ml / time, once a day (8) Liver protection. Oral danos, 225 mg / time, once a day. Because a large number of red blood cells are destroyed and anemia occurs, the bilirubin produced needs to be eliminated by liver metabolism, so it is easy to cause liver cell damage (9) Albumin supplement. Normal saline 50 ml + human serum albumin 10 ml intravenous infusion (10) Protect the gastrointestinal tract. Omeprazole 50mg + normal saline 20ml intravenous infusion (11) Increase vascular permeability and dilate blood vessels. Histamine 0.02ml + 20ml normal saline intravenous infusion (12) Liver protection. Intravenous infusion of reduced glutathione 50mg + 20ml normal saline.

Matters needing attention; Omeprazole is incompatible with reduced glutathione. White flocs are produced after mixing. It is reported that omeprazole is cool and transparent after compatibility, and no obvious abnormality is found. Because the dog in this case is older and the functional decline of cardiopulmonary function is serious, adrenaline was not used for hemostasis during treatment [2]

### 3.2. Blood Transfusion Treatment

Blood transfusion can effectively expand blood volume, increase oxygen carrying capacity, enhance bone marrow hematopoietic function, and timely supplement the blood lost in sick dogs. It is the first choice for rescuing some critical cases, especially excessive blood loss caused by trauma, massive internal bleeding caused by some diseases, poor coagulation, various types of anemia, etc [3] Cross matching test must be carried out before blood transfusion, which can prevent adverse reactions after blood transfusion in blood receiving animals. Select healthy dog blood source, keep fresh whole blood or citrate anticoagulant plasma rich in platelets. On August 16-18, the curative effect of prednisone treatment for several days was not significant. Diarrhea, watery blood feces and sharp decline in the number of platelets occurred frequently, resulting in gradual loss of coagulation function, skin blood overflow and bloody stool. The condition was relatively serious. It was decided to conduct animal cross matching test on the same day. After successful blood matching, blood transfusion treatment was taken immediately, and 100 ml fresh blood was injected intravenously [4]

**Table 3.** Blood transfusion appliances

item	result	reference range
WBC ( $10^9/L$ )	7.61	6.0-17.0
Lymph ( $10^9/L$ )	24.6	0.8-5.1
Mon ( $10^9/L$ )	4.6	0.15-1.35
RBC ( $10^{12}/L$ )	8.65	5.0-8.5
HGB (g/L)	219 $\uparrow$	120-180
HCT (%)	63.2 $\uparrow$	39.0-56.0
MCV (fL)	73.0	60.0-77.0
MCH (pg)	25.3 $\uparrow$	14.0-25.0
MCHC (g/L)	346	310-360
RDW (%)	16.6 $\uparrow$	14.0-19.0
PLT ( $10^9/L$ )	177	160-625
MPV (fL)	10.1	7.0-12.0
Eos% (%)	4.0	2.0-10

item	result	reference range
ALB (g/L)	38.2	23-40
TP (g/L)	60.2	52.0—82.0
GLOB (g/L)	36.1	23.0-45.0
ALT (U/L)	60.3	10-100
ALP (U/L)	162	23-212
CREA(Umol/L)	87	44.0-159.0
BUN( $\mu$ mol/L)	3.45	2.50—9.60
GLU(mmol/L)	6.06	4.11—7.94

At the beginning of treatment, the number of red blood cells (RBC), hemoglobin concentration (Hgb) and hematocrit (HCT) decreased, showing progressive anemia. The decrease of platelet count (PTL) indicates that the body has hemagglutination dysfunction, and the increase of eosinophil percentage (EOS%) may be related to allergy.

The increase of leukocyte count (WBC) in the middle stage of treatment is an immune response caused by prednisone. The sharp decrease of platelet count (PLT) leads to the gradual loss of coagulation function. After blood transfusion, all blood cells recovered significantly, and all indexes tended to be normal. There were no adverse reactions after blood transfusion. After that, nutritional support and symptomatic treatment were adopted [5]

After treatment, the mental status and clinical symptoms of the affected dog were improved, and he was discharged home 2 weeks later. Feed high-energy and easily digestible dog food at home to ensure the energy needs of dogs. At the same time, take oral Victor nutrition ointment, Vita blood tonic oral liquid and Baili.

#### 4. Conclusion

Thrombocytopenic purpura can be cured after appropriate and reasonable treatment, but it does not rule out the possibility of coma, convulsions and other crises in the process of treatment, especially fever reaction, hemolytic reaction and allergic reaction after blood transfusion, which must be paid attention to and symptomatic treatment must be taken. In addition, the etiology of primary thrombocytopenic Pura may be related to autoimmune state, There is a risk of recurrence, and regular examination is recommended.

#### Acknowledgments

Natural Science Foundation.

#### References

- [1] Xiao Feng; Yang Lingchen. Diagnosis and treatment of a case of thrombocytopenia in Teddy dog [J]. Hunan animal husbandry and veterinary, 2021, (01): 34-40.
- [2] Chen Hongbo; Wang Xuyang; Wang Shanshan; Wang Hua. Diagnosis and treatment of a case of canine thrombocytopenic purpura [J]. Heilongjiang Animal Husbandry and veterinary, 2017, (20): 129-132 + 295.

- [3] Wang JiangHao; Li Siyuan; Qin Jianhui; Xiao Xiao; Dai Feiyan. Clinical application of blood transfusion therapy in canine disease [J]. Heilongjiang Animal Husbandry and veterinary, 2014, (10): 48-51.
- [4] Du Zhiguo; Yang Zongtong; Jiang Shihao; Guo Ying; Yin Yanbo. Blood transfusion therapy and blood transfusion reaction in dogs [J]. Chinese Journal of veterinary medicine, 2019, (09): 54-57.
- [5] Wang Wenli; Zhang Yuxian; Liu Mingrong; Li Peng; Yu Zhiqun; Zhang Lei. Diagnosis and treatment of a case of canine immune-mediated thrombocytopenia [J]. Chinese Journal of veterinary medicine, 2018, (01): 83-85 + 69.