Diagnosis and Treatment of Acute Renal Failure Caused by a Case of Garfield Diabetes

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Abstract

Diabetes of cat is a common metabolic disease in clinical, refers to a variety of factors lead to insufficient insulin secretion or β-cell insulin sensitivity decreased, caused by glucose, protein and fat metabolism disorders, and other concurrent diseases, including diabetes complicated with renal failure is the most common complication. This article introduces some experience about diagnosis and treatment of acute renal failure caused by a case of Garfield diabetes which can be referred by peers.

Keywords — *cat; diabetes; acute renal failure; diagnosis and treatment*

I. INTRODUCTION

The cat diabetes is a common endocrine disease in pet clinic, the average age of the sick cat is 10 years old, male cat, especially the castrated cat is more prone to female cat [1]. Cat diabetes can be classified into type I diabetes (insulin-dependent diabetes) and type II diabetes (non insulin dependent diabetes), the type II diabetes is the majority [2]. The disease is mainly due to a decrease in the sensitivity of beta cells to insulin. When the blood glucose concentration rises, the insulin secretion of beta cells is excessive, resulting in the failure of beta cells and the elevation of blood sugar. This disease is characterized by polydipsia, polyuria, polyphagia and weight loss and increase of blood and urine glucose. This article detailed introduces some experience about diagnosis and treatment of acute renal failure caused by a case of Garfield diabetes. Through the injection of protein zinc, insulin control blood sugar and infusion, adjust the water, electrolyte and acid-base balance disorders, for treatment purposes, for peer experts reference.

II. CASE SITUATION

March 2, 2017, Garfield named Dan, 13 years old, 3.8kg (5.2kg before the disease), male, no castration, not immune, insect repellent. The main explanation is that the cat had a urinary stone, after surgery has been eating urine prescription diet. 2 months before coming to the hospital, the appetite for appetite increased, the number of urination increased, and the weight loss. In recent days, the cat has been suffering from depression, bad breath, often vomiting. Examination found that the cat body temperature 37.2 degrees, respiratory rate 19 times /min, heart rate 69 times /min, the hair disorderly and dull, abdominal palpation accumulation, loose, oral mucosa yellowish, mental weakness, general weakness.

III. LABORATORY TESTS

A. Routine Blood Test and Result

The results of routine blood test were as follows: RBC 4.3 * 1012/L, HGB 54 g/L, HCT 13.5%, the results were lower than normal values.

B. Blood Biochemical Tests and Results

Blood biochemical tests, the results are as follows: ALKP (alkaline phosphatase) 449U / L, BUN (urea nitrogen) 24mg / dL, CREA (creatinine) 462mmol / L, GLU (blood sugar) 28.1mmol / L, TBIL (total bile) 23umol / L, compared with the normal were increased; PH = 7.2, decreased.

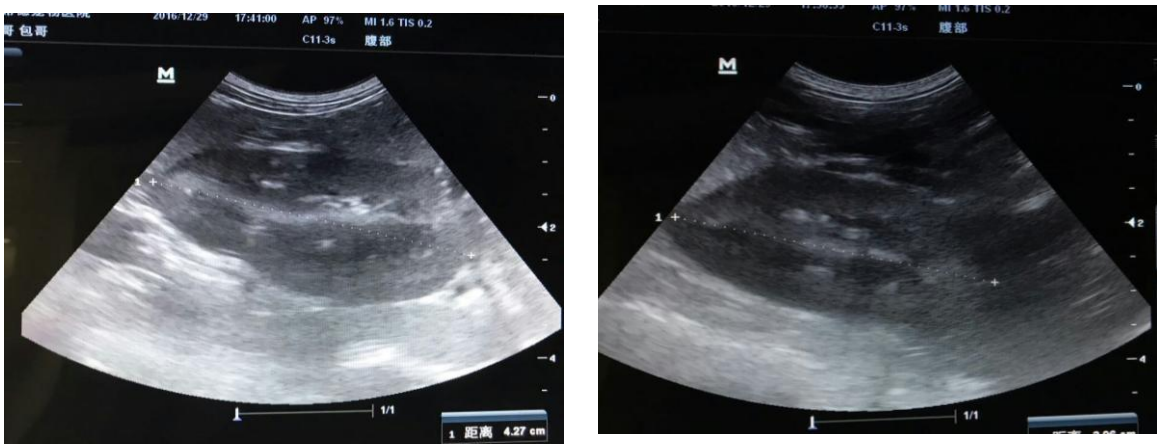
C. Urine Tests and Results

Urine routine examination, the results were as follows: glucose was positive, ketone bodies were positive, the proportion of urine <1.005.

D. B- Ultrasonic Examination and Results

B- ultrasonic examination revealed renal profile was poor, corticomedullary differentiation is not clear, the cortex echo and bladder equivalent, left kidney length of about 4.27cm, the right kidney length of about 3.96cm

(see Figure 1). (0-4kg cat reference range 3.0-3.3cm)



Left Kidney **Right Kidney**

Figure 1 Image of Kidney B Ultrasound

IV. DIAGNOSES

According to history, clinical symptoms, laboratory examination (blood glucose, urea nitrogen, creatinine, urine (elevated) positive urine) and B-ultrasound examination results, the initial diagnosis of cats with diabetes complicated with acute kidney damage.

V. TREATMENTS

Treatment principle: 1. Use insulin to control blood sugar concentration; two, liquid therapy corrects the disturbance of water, electrolyte and acid-base balance, and restores kidney function.

A. Control Blood Sugar

The protamine zinc insulin (PZI) was injected subcutaneously, takes the 0.5U/kg dose 1 hour before breakfast and dinner, and measure the blood sugar concentration every 2 hours and makes the blood sugar curve. Adjust the daily dose and blood glucose curve to adjust the amount of insulin sooner or later according to the average blood glucose level. The adjustment method is as follows: increase or decrease daily demands by 0.05U/kg according to the average daily blood glucose level, adjust the proportion of morning and evening medication according to postprandial blood sugar concentration. Continuous adjustment for several days to determine the morning and evening use of insulin 0.65U / kg, the blood glucose fluctuations in the normal range. Continuous adjustment for several days to determine the morning and evening use of insulin 0.65U / kg, the blood glucose fluctuations in the normal range.

B. Renal Failure Treatments

Infusion of Ringer lactate Ringer's solution and physiological saline at the rate of 40 ml/kg and 15ml/h. Oral kidney rehabilitation drug (0.2g/kg), Meanwhile, subcutaneous injection of 0.1ml/kg and ranitidine (150mg/kg) control the infection, and treated for two weeks.

After two weeks of the above treatment, the cat mental state compared with the early onset was improved. Make re-examination of the blood routine, blood biochemistry and urine routine. The test results are as follows, the fasting blood glucose level of 8.33 mmol/L, 11.25 mg/dL, urea nitrogen, creatinine 156 mmol/L; urine sugar was negative, urine ketone negative; blood routine laboratory values were within the normal range. The results showed that the urea nitrogen and creatinine has been restored to the normal range, the symptoms of non diabetic blood appear, although the blood glucose is still a little high, but also in the controllable range; the urine test results showed that the cat caused by diabetes symptoms of ketoacidosis has disappeared, urine ketone has dropped to negative.

VI. DISCUSSIONS AND ANALYSIS

A. Analysis of the Causes of Cat Diabetes Complicated with Acute Renal Failure

Diabetes complicated with acute renal failure is one of the complications of diabetes, especially blood glucose for a long time without control. When the cat had diabetes, insulin secretion, reduces the body's ability to break down glucose, elevated blood glucose concentrations, resulting in increased plasma colloid osmotic pressure, Increase glomerular

permeability and promote glomerulosclerosis. On the other hand, due to increased plasma osmolality, increased glomerular filtration rate and enlargement of the kidney, increased renal function damage, [3]. Therefore, if the blood sugar has not been effectively controlled for a long time, it may lead to acute renal failure in diabetes.

B. Cat Diabetes Glycemic Control

When the cat is diagnosed with diabetes, the acarbose, glipizide and other oral hypoglycemic drugs should be used firstly [2], and most of the cat belong to type-2 diabetes. When the oral hypoglycemic drug the concentration of blood glucose is still greater than 17 mmol / L, only choose to inject insulin. The cat will be injecting insulin above a glucose blood concentration of 17 mmol/L, when the oral hypoglycemic agent is taken. One of the most basic principles of insulin injections is the determination of the amount of insulin [4] is based on the level of blood sugar measured. The treatment of diabetic cats is preferred Zinc protamine insulin as long-acting insulin as result of ,firstly of that its amino acids sequence is closest to cat's insulin molecules which is the best choice for cat [3] diabetes theoretically, secondly of that it have strong resemblance with cat's feed-habit, sooner or later. In this case, Zinc protamine insulin was selected to reduce blood sugar, and it's efficacy in controlling feline diabetes was confirmed. When using zinc protamine insulin, the blood sugar concentration should be measured every 2 hours and the blood sugar curve be drawn. Dosage should be adapted to average daily blood sugar level by 0.05U/Kg. When the same dose (0.65U/Kg) was injected in the morning and evening, the blood glucose was controlled within (3.3-8.83, mmol/L) range, and there was little difference in blood sugar after breakfast and dinner, which may be related to the same interval between the two meals.

The feeding time in the morning and evening should be determined before using protamine zinc insulin, because the onset time of protamine zinc insulin is for 1.5-4h,and the injection should be with 1hour,preventing hypoglycemic events.

C. Diagnosis and Treatment of Diabetes Complicated with Renal Failure

In cats, the typical symptoms of acute renal failure are oliguria and anuria, but this case of renal failure complicated with diabetes, so there is no apparent absence of urine or oliguria, and this may be the cause of the serum potassium not elevated. The principle of treating acute renal failure is to eliminate renal hemodynamic disorders and regulation of water, electrolyte imbalance, for the recovery of kidney units for time [6]. In the treatment of renal failure, as far as possible to reduce the use of diuretics, prevent the appearance of elevated blood sugar, leading to the wrong use of insulin dosage. Cat diabetes complicated with acute renal failure should be detected early and treated early.

VII. CONCLUSION

In the course of the treatment for Garfield, a complete set of control program should be developed, which should correct the damage of the kidney by detecting the change of the concentration of creatinine and urea nitrogen, and also control the blood sugar and reduce the degree of kidney damage caused by hyperglycemia.

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