Emergency Management of Concurrent Diabetic Ketoacidosis and Leptospirosis in a Spitz

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Diabetic ketoacidosis (DKA) is a severe, life threatening culmination of diabetes mellitus, characterized by hyperglycemia, ketosis, acidosis, severe dehydration, shock and possibly death (Greco, 2010). Concurrent illness with leptospirosis is common in animals with DKA and the mortality rate with DKA is 30-40% (Schermerhorn, 2005). A case of diabetic ketoacidosis in concurrence with leptospirosis is placed on record.

Case History and Observations

A six year old male Spitz was brought with the history of inappetance for the last ten days, losing body condition, vomiting and high coloured urine. The dog was treated by a local veterinarian previously for polyuria and polydipsia and had rapid weight loss in spite of its ravenous appetite. Clinical examination revealed fruity odor of acetone in the breath, lethargy, depression, dehydration, unkempt hair coat, and muscle wasting. Close examination showed a rectal temperature of 39.7°C, heart rate of 174 beats per min, respiratory rate of 48 min, severe icterus of conjunctival and oral mucosa, loss of skin turgor, sunken eye balls, capillary refill time of more than 3 seconds and moderate pain on palpation of abdomen.

Haematology showed normal values (Hb 12.5 g%, PCV 32.7%, RBC 5.16 x 10⁶/cmm, WBC 15,600/cmm) on the first day but showed a decreasing trend on the fifth day of therapy (Hb 4.8 g%, PCV 14.1%, RBC 1.77 x 10⁶/cmm) except elevated WBC count (30,600/cmm). Serum chemistry showed blood glucose 412 mg/dl, total and direct bilirubin 5.75 mg/dl and 3.45 mg/dl respectively, Alanineamino Transferase (ALT) 255.8 U/L, Serum Alkaline Phophatase (SAP) 1539 U/L and triglycerides 983.2 mg/dl. Serum creatinine and blood urea nitrogen were within normal limits.

Serum for microscopic agglutination test revealed reacting Leptospira serovar (1 in 800) for Leptospira australis. Routine urinalysis revealed ketone bodies (+++) and glucose (+++) on the first day, but ketone bodies were found absent after start of treatment on day two. Serum osmolality was within limits (299 mOsm/L). Bicarbonate value was 17.8 mmol/L with a decreased blood pH of 7.18. There was a mild increase in anion gap of 17.3 mmol/L with a mild decrease in sodium (129 mmol/L), potassium (3.16 mmol/L) and phosphorus (2.17 mg/dl).

Treatment and Discussion

The dog was treated with normal saline @ 70 ml/kg bw i/v along with inj. Regular Insulin@ the initial loading dose of 0.2 U/kg bw with followup doses of 0.1 U/kg bw from the next day, inj. Amoxicillin- Cloxacillin @ 20 mg/kg bw i/v twice daily and pottassium chloride liquid 5 ml orally once daily for three days. Even after rigorous therapy the animal succumbed on the fifth day of treatment with no decline in blood glucose, serum bilirubin levels and with development of severe anemia.

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Decreased insulin concentration coupled with increased counter regulatory hormone concentrations (glucagon, cortisol, catecholamines and growth hormone) because of concurrent disease (leptospirosis in the present case) contributes to the development of DKA (Nelson, 2000 and Hume et al., 2006).

Increased values of ALT in the present case might be due to hypovolemia, decreased hepatic blood flow and subsequent hepatocellular damage (Crenshaw and Peterson, 1996). Further, increase in SAP and serum bilirubin might be due to intrahepatic cholestasis and severe hepatocellular injury probably due to concurrent leptospirosis (Levett, 2001). Decreased serum sodium, potassium and phosphorus are usually associated with diabetic ketoacidosis (Schmerhorn, loc. cit). Triglycerides get elevated secondary to derangement of lipid metabolism with decreased insulin levels (Nichols and Crenshaw, 1995). Anemia and icterus develop due to complicating factors of hemolysis/hepatic lipidosis (Greco, loc. cit). In spite of insulin therapy, the dog succumbed as it suffered with concurrent infection of leptospirosis. Hume et al. (loc. cit) stated that high mortality rates of DKA are usually associated with underlying infections.

Summary

A case of diabetic ketoacidosis with concurrent leptospirosis and development of severe anemia with icterus in a male Spitz was investigated. The clinical signs and biochemical findings were characteristic. The conventional treatment (Injection Insulin) with supportive therapy (fluids and antibiotics) could not save the dog.

References

Greco, D.S. (2010) 82nd Western Veterinary Conference. Nestle Purina Petcare, St. Louis, MO, USA.