



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; SP-11(7): 801-802
© 2022 TPI
www.thepharmajournal.com

Received: 01-05-2022
Accepted: 05-06-2022

RC Sundararajan

Department of Veterinary Medicine,
Veterinary College and Research
Institute, (TANUVAS) Tamil Nadu
Veterinary and Animal Sciences
University, Chennai, Tamil Nadu,
India

M Thamizhpriya

Department of Veterinary Medicine,
Veterinary College and Research
Institute, (TANUVAS) Tamil Nadu
Veterinary and Animal Sciences
University, Chennai, Tamil Nadu,
India

Pavithra Pugal

Department of Veterinary Medicine,
Veterinary College and Research
Institute, Tirunelveli, (TANUVAS)
Tamil Nadu Veterinary and Animal
Sciences University

V Vijayanand

Department of Veterinary Medicine,
Veterinary College and Research
Institute, (TANUVAS) Tamil Nadu
Veterinary and Animal Sciences
University, Chennai, Tamil Nadu,
India

V Kumar

Department of Veterinary Medicine,
Veterinary College and Research
Institute, (TANUVAS) Tamil Nadu
Veterinary and Animal Sciences
University, Chennai, Tamil Nadu,
India

S Saravanan

Department of Veterinary Medicine,
Veterinary College and Research
Institute, (TANUVAS) Tamil Nadu
Veterinary and Animal Sciences
University, Chennai, Tamil Nadu,
India

M Balagangatharathilagar

Department of Veterinary Medicine,
Veterinary College and Research
Institute, (TANUVAS) Tamil Nadu
Veterinary and Animal Sciences
University, Chennai, Tamil Nadu,
India

Corresponding Author

RC Sundararajan

Department of Veterinary Medicine,
Veterinary College and Research
Institute, (TANUVAS) Tamil Nadu
Veterinary and Animal Sciences
University, Chennai, Tamil Nadu,
India

Medical management of diabetes mellitus in a pug: A case report

RC Sundararajan, M Thamizhpriya, Pavithra Pugal, V Vijayanand, V Kumar, S Saravanan and M Balagangatharathilagar

Abstract

A 3 years old male pug was presented to Veterinary Clinical Complex, Veterinary College and Research Institute, Tirunelveli with a history of decreased appetite, weight loss, polyuria, hair loss and occasional vomiting. Clinical examination of the animal revealed severely congested conjunctival mucous membrane and all the other parameters were normal. Serum biochemical analysis revealed elevated Glucose, Blood Urea Nitrogen, Alkaline Phosphatase while all other parameters were normal. Urinalysis revealed Glycosuria. The case had a Serum Glycated hemoglobin (HbA1C) of 2.7%. Hence the case was diagnosed as Diabetes Mellitus. The animal was treated with intravenous fluids, antibiotics and insulin. The details of the case will be discussed.

Keywords: Diabetes mellitus, humulin, glycosuria, glycated hemoglobin

Introduction

Diabetes mellitus is an endocrine disorder in which hyperglycemia occurs due to insufficient insulin production or function [1], commonly present in middle to old aged dogs [3]. Genetic factors (specific genes and inheritance patterns), Immune factors (destruction of islet cells, pancreatitis) and Environmental factors (Obesity, diet, exposure to toxicants or drugs) contribute for the development of diabetes mellitus [2]. It is classified into two types as Insulin Dependent Diabetes Mellitus (Type 1) and Non-Insulin Dependent Diabetes Mellitus (Type 2). In Type 1 Diabetes mellitus, absolute insulin deficiency occurs due to destruction of pancreatic beta cells and loss of insulin secretion. Etiology for beta cell destruction and beta cell deficiency is due to Immune mediated beta cell destruction, Congenital beta cell hypoplasia, and beta cell loss due to exocrine pancreatic disease [5]. In Type 2 diabetes mellitus, insulin resistance along with beta cell dysfunction is also present [2]. The reasons for insulin resistance diabetes mellitus include diestrus, hyperadrenocorticism, acromegaly and synthetic glucocorticoids [2]. Clinical signs of DM include polyuria, polydipsia, polyphagia, weight loss and glycosuria. Other signs include hepatomegaly, lethargy and cataract formation [2]. Diabetic ketoacidosis, dehydration, vomiting, depression, coma can be noted in long-standing cases of diabetes mellitus [2].

Case history and observation

A 3 years old male pug was presented to Veterinary Clinical Complex, Veterinary College and Research Institute, Tirunelveli with a history of decreased appetite, weight loss, polyuria and hair loss. Voiding habit was normal. Clinical examination revealed severely congested conjunctival mucous membrane. Serum biochemistry revealed elevated level of Glucose, Blood Urea Nitrogen, Alkaline Phosphatase while other parameters were normal, depicted in Table no.1. Urinalysis revealed presence of Glucose (+++ 28mmol/L) and urine sediment revealed presence of cocci. Serum glycated hemoglobin (HbA1C) was 2.7%.

Table 1: Hematology and biochemistry values depicting elevated BUN, Glucose and ALP.

S. No.	Hematological parameters	
1.	Haemoglobin(g/dl)	16.4
2.	RBC (m/cmm)	6.91
3.	PCV (%)	50.7
4.	WBC (/cmm)	12,600
5.	Platelets (/cmm)	4,13,000
Serum biochemistry		
6.	Glucose (mg/dl)	948
7.	Blood Urea Nitrogen (BUN)(mg/dl)	91.36
8.	Creatinine (mg/dl)	1.2
9.	Total proteins (g/dl)	5.7
10.	Albumin (g/dl)	2.7
11.	Alanine Transaminase (ALT)(IU/dl)	11
12.	Alkaline Phosphatase (ALP) (IU/dl)	178
13.	Calcium (mmol/dl)	16.3
14.	Phosphorus (mmol/dl)	3.2
15.	Magnesium (mmol/dl)	2.4
16.	Sodium (mmol/dl)	166.02
17.	Potassium (mmol/dl)	5.12

Treatment and Discussion

Based on history, clinical signs and diagnostic test analysis, the case was diagnosed as diabetes mellitus. The animal was treated with Inj. Normal saline @10 ml/kg b.wt I/V, Inj. Ceftriaxone+ Tazobactam @10 mg/kg b.wt I/V, Inj. Pantoprazole @ 1mg/kg b.wt I/V . The case was advised with Inj. Humulin N (NPH insulin) @0.25 IU/kg. b.wt, bid . Insulin therapy was instituted to stabilize the blood glucose level to near normal level. Diets which contain fibres were recommended for slow absorption of glucose from the intestines and reduce the postprandial blood glucose fluctuation [2]. The case was advised to lose weight by taking the animal for walking and exercises.

Rand, *et al.*, 2020 reported that the normal blood glucose value in dogs is 80-120 mg/dl, (4.4-6.6 mmol/l) while in hyperglycemic condition, it may rise upto 250-300 mg/dl [4] which agreed with the present case in which the blood glucose value was 948 mg/dl. In dogs, the renal threshold value for glucose is 200mg/dl [1]. Qadri *et al.*, 2015 observed that, when blood sugar value reaches above 180 mg/dl, the excess glucose will be excreted through urine and glycosuria occurs [4]. The present case exhibited polyuria which was concurrent with Rand *et al.*, 2020 who stated that polyuria might be due to osmotic diuresis induced by glycosuria [1]. In addition to that, polydipsia observed in the case might have occurred because of activation of thirst mechanism resulting in excessive water loss as observed by Rand *et al.*, 2020 [1]. Weight loss observed in the present case might be due to imperfect digestion of nutrients, malabsorption from the gut and loss of glucose and amino acids through urine as observed by Rand *et al.*, 2020 [1]. Elevated level of alkaline phosphatase in this case might be due to fatty changes in liver as reported by Davison *et al.*, 2018 [5]. In the present case, the dog had hair loss which agreed with Shabnam Sidhu *et al.*, 2019 who reported that diabetic dogs might be prone to bacterial and fungal infections with recurrent infections like cystitis, prostatitis, bronchopneumonia and dermatitis [2]. Presence of cocci in the case might be due to glycosuria which might be the reason of urinary tract infection [5]. Serum glycated hemoglobin value can be used for monitoring long term glycemic conditions. The present case has a HbA1C value of 2.7% which is in concordance with Araceli Loste *et al.*, who observed that HbA1C for Euglycemic dogs is 1.4±0.3%,

where as in hyperglycemic dogs, it is 3.4±2.4% [6].

**Fig 1:** Diabetic mellitus dog

Conclusion

To concur that, Diabetes mellitus is a common endocrinological disorder that affects middle to old aged dogs. Diagnosis can be done based on hyperglycemia, polyuria, polydipsia, glycosuria, sweet odor and increased specific gravity of the urine and in long standing cases, weight loss can be noticed. Bed side glucose strip test is a common test to identify the condition. However, Serum fructosamine and glycated hemoglobin tests should be utilized to get a broader period of assessment of Glucose - Protein and Glucose - RBC bond ranging from 2 weeks to 2 months respectively, so as to eliminate false positive diabetes mellitus cases in dogs. Though the treatment is life long, physical activity and diet restriction are the key ways to keep the dog in tight glycaemic control.

References

1. Rand Jacquie S. Diabetes Mellitus in Dogs and Cats. Clinical Small Animal Internal Medicine, 2020, 93-102.
2. Shabnam Sidhu, Swaran Singh Randhawa. A Review on Diagnosis and management of Diabetes Mellitus in Dogs. Int. J Curr. Microbiol. App. Sci. 2019;8(06):10-16.
3. Diabetes Heeley AM, O'Neill DG, Davison LJ, Church DB, Corless EK, Brodbelt DC. Diabetes mellitus in dogs attending UK primary-care practices: frequency, risk factors and survival. Canine Medicine and Genetics. 2020;7(1):1-19.
4. Qadri Kausar, Subha Ganguly, Praveen Kumar Praveen, Rajesh Wakchaure. Diabetes mellitus in dogs and its associated complications: A review. Int. J Rec. Biotech. 2015;3(4):18-22.
5. Davison L. Diabetes mellitus in dogs. In Practice. 2018;40(3):82-92.
6. Araceli LOSTE, Carmen MARCA M. Fructosamine and glycated hemoglobin in the assessment of glycaemic control in dogs. Vet. Res. 2001;32:55-62.