**INTRODUCTION**

Diabetes mellitus, or “sugar diabetes,” is a metabolism disorder found most often in dogs. Diabetes occurs in dogs in two forms: type 1 and type 2. Type 1 or Insulin dependent diabetes occurs when the dog body cannot produce enough insulin. This happen when the pancreas is damaged or not functioning properly. This is the most common type of diabetes in dogs. Type 2 or noninsulin dependent diabetes occurs when the pancreas is producing some insulin, but body cannot utilize as it should. This type of diabetes can especially occur in old and obese dog. Gestational diabetes has not been reported in cats, but dogs appear to develop an equivalent form during diestrus. The genetic and environmental influences vary with species and the type of diabetes too. (JS Rand et.al, 2004).Female dogs are also prone to develop temporary insulin resistance while in heat or pregnant (American kennel club, 2016). Diabetes typically occurs in dogs between 5 to 12 years of age, and is uncommon under 3 years of age. Breeds predisposed to diabetes include the Samoyed, Tibetan Terrier and Cairn Terrier, while others such as the Boxer, spitz and German Shepherd Dog seem less susceptible (Catchpole et.al, 2005).Diabetes mellitus can be diagnosed by the presence of the typical clinical signs like excess thirst, excess urination, excess appetite, and weight loss. However, persistently high level of glucose in the blood and the presence of glucose in the urine can confirm the level of diabetes.

In dog normal blood glucose level is 80-120 mg/dl (4.4-6.6 mmol/L). It may rise to 250-300 mg/dl (13.6-16.5 mmol/L) following a large or high-calorie meal, but diabetes is the only reason that can raise blood glucose level to 400 mg/dl (22 mmol/L). Some diabetic dogs will have a glucose level as high as 700-800 mg/dl (44 mmol/L), but the most will be in the range of 400-600 mg/dl (22-33 mmol/L, VCA Animal hospital).In Bangladesh dog rearing is becoming popular day by day as a pet. Pet lovers are used to rear them non-scientific way. They may not maintain proper diet and diet chart in according to their age, sex, body weight and breed. They are not concern about its vaccination and deworming schedule too. This all factors may impact on dog health and may produce diabetes in their dog.

Considering the above mentioned facts, present study was designed to find out the status of diabetes in dogs admitted in SAQTVH, CVASU. Risk factors influencing blood glucose level in dogs were also investigated in this study.

**Objectives of the study:**

1. To find out the level of blood glucose in dogs in Chittagong.
2. To know the factors influencing the glucose level in dogs.
3. To find out the way of management of diabetes affected dog.

**MATERIALS AND METHODS**

**STUDY AREA AND PERIOD**

Present study was conducted at SAQTVH, CVASU for the period of April 2018 to June 2018.

**SAMPLE SIZE:**

A total of 25 dogs were selected to collect the blood samples. Among them 14 were males and 11 were females.

**DATA COLLECTION:**

Data were collected by a prescribed questionnaire survey from the owner brought the patient in SAQTVH. Age, feeding habit, exercise, disease, vaccination and deworming information were taken from the owner by direct questioning. Sex, breed and body weight information were collected from case information sheet of SAQTVH.

**PROCEDURE OF BLOOD GLUCOSE TEST**

At first battery, time, date, unit and species in the Woodley g-pet plus glucometer were fixed. The woodley g-pet plus test strip were very carefully inserted and meter turned on automatically. Blood were taken from dogs with insulin syringe and needle and putted one drop on the indicated sensor. Results were shown in 5 seconds on the screen and result was noted.



Step 1: Insert the test strips



Step 2: Apply blood



Step 3: Result in 6 seconds

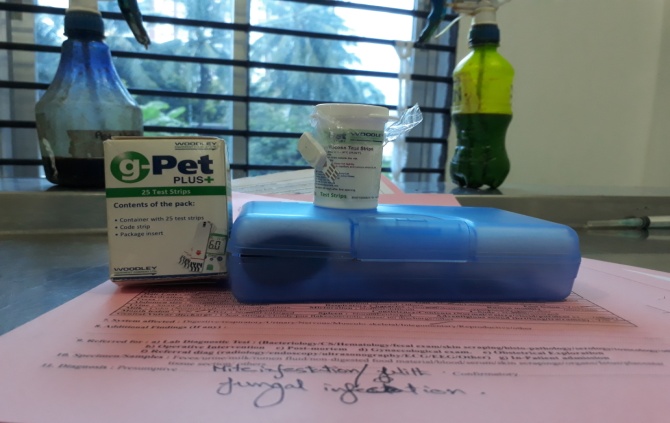


Figure 4: Strips setting

Figure 2: Blood collectionl

Figure 5: Observation of blood glucose level

Figure 3: Glucometer set

PHOTO GALLERY

Figure 1: Observation of animal

**STATISTICAL ANALYSIS**

The obtained information was imported, stored and coded accordingly using Microsoft Excel–2007 and transfer to STATA/IC-11.0 (Stata Corporation College Station) for analysis. Prevalence was determined by total number of positive animal / total number of animal examined and multiplied by 100 to expresses in percentage. The association between the independent factors such as age, sex, breed, body weight and exercise were evaluated using the chi-square test and p-value was considered as significant when p<0.05.

**RESULT**

The results of the study are show in the table 1, 2 and 3.

In table 1, total cases (N=25) were recorded of them 14(56%) were male and 11(44%) were female. Age, breed, sex, body weight and feed (5 variables) are shown with fasting and after feeding glucose levels. No diabetic dogs were found except some changes of glucose level.

In table 2, the prevalence of diabetes was calculated with different variable and categories. The prevalence of diabetes of the study is 0.

In table 3, glucose levels before and after feeding and the influences of the different risk factors on blood glucose levels in dogs are shown. In case of male dogs blood glucose levels are higher than the female one. Blood glucose level comparatively high in old dogs which are greater than 48 month than young dogs. Besides, local breeds are in normal blood glucose level than others. Golden retriever shows high glucose in blood. Feed habit influences the level of glucose in blood strongly. High carbohydrate feeded dogs found high blood glucose than low carbohydrate feeded dogs.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Sl. No. | Breed | Age  (month) | Sex | B.wt (kg) | Food | Result  1  mmol/L | Result  2  mmol/L |
| 1 | L | 18 | F | 25 | Meat, veg. | 6.7 | 8.6 |
| 2 | GR | 54 | M | 40 | Meat,khichuri,pedigree | 9.8 | 13.2 |
| 3 | L | 36 | M | 30 | Meat, bread | 7.1 | 8.9 |
| 4 | L | 30 | M | 28 | Meat, biscuits | 4.6 | 8.2 |
| 5 | GS | 36 | M | 28 | Meat, veg. | 7.5 | 8.4 |
| 6 | L | 36 | F | 32 | Bread, pedigree | 7.1 | 8.9 |
| 7 | GS | 36 | M | 35 | Rice, veg, meat | 7.8 | 9.5 |
| 8 | GS | 36 | M | 34 | Meat, veb | 8.0 | 9.6 |
| 9 | L | 30 | M | 30 | Meat, biscuits | 6.7 | 9.0 |
| 10 | L | 30 | F | 26 | Meat, bread, veg | 7.1 | 8.8 |
| 11 | L | 30 | F | 24 | Rice, meat | 6.9 | 8.8 |
| 12 | GS | 48 | M | 38 | Canned food, meat | 7.9 | 9.3 |
| 13 | GS | 42 | M | 45 | Meat, pedigree | 7.6 | 8.6 |
| 14 | GR | 40 | M | 40 | Meat, biscuits | 6.9 | 8.8 |
| 15 | GR | 42 | M | 36 | Meat, bread, biscuits | 7.8 | 8.9 |
| 16 | L | 41 | M | 30 | Rice, veg, meat | 7.0 | 8.6 |
| 17 | L | 48 | M | 38 | Rice, meat | 6.5 | 8.6 |
| 18 | SPITZ | 28 | F | 22 | Meat, biscuits | 7.8 | 9.2 |
| 19 | SPITZ | 20 | F | 22 | Meat,biscuits, bread | 6.7 | 8.1 |
| 20 | L | 36 | F | 28 | Rice, meat | 7.1 | 8.2 |
| 21 | L | 36 | F | 27 | Veg, meat | 6.5 | 8.4 |
| 22 | GR | 52 | M | 38 | Meat, pedigree, bread | 8.1 | 11.8 |
| 23 | L | 65 | M | 25 | Meat, veg | 6.2 | 8.5 |
| 24 | L | 30 | F | 25 | Meat,rice | 6.6 | 8.6 |
| 25 | L | 25 | F | 23 | Meat, rice, veg | 6.3 | 8.7 |

Table 1: General description of the sampling dogs.

|  |  |  |  |
| --- | --- | --- | --- |
| Categories | Categories level | Result | Prevalence (%) |
| Sex | Male (14)  Female (11) | Negative  Negative | 0  0 |
| Age | <30 month  31–48 month  >48 month | Negative  Negative  Negative | 0  0  0 |
| Body wt. | 20-30 kg  31-45 kg | Negative  Negative | 0  0 |
| Breed | Local  GR  GS  Spitz | Negative  Negative  Negative  Negative | 0  0  0  0 |

Table 2: Shows the prevalence of diabetes in SAQTVH area with different variable.

|  |  |  |
| --- | --- | --- |
| Categories | Categories level | Average glucose level  Fasting After Feeding |
| Sex | Male (14)  Female (11) | 7.78 9.98  6.26 8.53 |
| Age | <30 month  31–48 month  >48 month | 6.61 8.66  7.31 8.82  7.26 10.28 |
| Body wt. | 20-30 kg  31-45 kg | 6.95 8.90  7.69 9.95 |
| Breed | Local  GR  GS  Spitz | 6.33 8.58  7.95 10.67  7.72 9.10  7.25 8.65 |
| Feed | High calore  Low calore | 7.75 10.05  6.83 8.43 |

Table 3: Shows the influence of different categories of variable in blood glucose level.

**DISCUSSION:**

Blood glucose level and diabetes of dogs is an important parameter of their general health condition. So the current study was designed to see the status of diabetes in dogs and know the factors influencing the levels of glucose of dogs in Chittagong. This study found no diabetic dog admitted in SAQTVH, CVASU. Prevalence may be influenced by different bias, method of selection, sampling area and sample size (Agrawal RP *et al.*, 2006). In our study, we selected animals randomly but the population size was not enough to get the real prevalence. Moreover, study area was only Chittagong metropolitan and samples were collected from the patient brought to the hospital which may influence the findings of the study. Generally, diabetes mellitus in dogs is influenced by the variables like age, sex, breed, weight, neutering, drug treatment, physical inactivity, high carbohydrate diet (J.S. Rand *et al.*, 2004) and seasons (Atkins CE *et al.*, 1987). Local (indigenous) and German shepherd are found at significantly decreased risk (Marmor M *et al.*, 1982) and Golden retriever and spitz at low risk (Wikipedia). Diabetes typically occurs in dogs between 5 and 12 years of age, and is uncommon under 3 years of age (B. Catchpole *et al.*, 2005).

However, this study showed that, blood glucose level typically changes in different age, sex, breed and feed intake. Blood glucose level of male in fasting was 7.78 and after feeding 9.98) found to be higher than the female (fasting 6.26 and after feeding 8.53) though this result does not match with the findings reported by (Guptill L *et al.*, 1970-1999). Blood glucose level also varies with ages. Young dogs showed lower level of glucose than aged dogs. Diet has direct effect on blood glucose level in dogs. High carbohydrate diet increasing blood glucose level than low carbohydrate diet and this result supported by the findings of previous study (J.S. Rand *et al.*, 2004; Guptill L *et al.*, 1970-1999).

**CONCLUSION:**

It is believed that 99 percent of health problems in dogs can control with proper management, which includes good sanitation, feeding high quality feed, taking time daily to clean and fill water and feed bowls, providing adequate room, cleaning sitting boards, cleaning ears and checking teeth and continually providing protection from cola, heat, wind and rain. Daily exercise and routine deworming also are very important for controlling diabetic in dog. Proper diet and regular check-up can make the dog healthy. The result from this study may boost up the importance of proper diet, regular exercise and check-up of the dog.

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**BIOGRAPHY**

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