**HEMATOBIOCHEMICAL PROFILE AND URINALYSIS OF CROSSBREED PREGNANT CATTLE**

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**This clinical report submitted as per approved style and content**

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# LIST OF ABBREVIATION AND SYMBOLS

|  |  |
| --- | --- |
| **Abbreviation and symbols** | **Elaboration** |
| % | Percent |
| -ve | Negative |
| > | Greater than |
| < | Less than |
| GDP | Gross Domestic Products |
| BLRI | Bangladesh Livestock Research Institiute |
| TLC | Total leukocyte count |
| DLC | Differential leukocyte count |
| TEC | Total erythrocyte count |
| PCV | Packed cell volume |
| Hb | Haemoglobin |

**HEMATOBIOCHEMICAL PROFILE AND URINALYSIS OF CROSSBREED PREGNANT CATTLE**

# ABSTRACT

The study was carried out at Military farm, Chittagong Cantonment in Chittagong to find out the haematobiochemical and urinary constituents of pregnant cows in different trimesters. The duration of study was two months (13 January, 2015 to 15 March, 2015). Thirty pregnant cows were selected to collect samples. The BCS of cows was 3-3.5. Age duration of animal was 4-12 years. Then the samples were taken in Physiology and Biochemistry laboratory of CVASU to test different parameters. Several haematobiochemical parameters observed in this study, such as Neutrophil, Eosinophil, Basophil, Moocyte, Hemoglobin, TLC, DLC, TEC etc. Many parameters also observed in urinalysis, such as Glucose, ketone, urobilinogen, HDL etc. It was demonstrated in this study that the mean values of the different parameters of haematological, biochemical and urinalysis showed significant changes during gestation. Monocyte, Total protein, Magnesium, Phosphorus, Urobilinogen level were significant in 1st, 2nd and 3rd trimesters of pregnancy as the value of p<0.05.

**Keywords:** Trimester, Pregnancy, Haematological, Biochemical, Monocyte

# CHAPTER –I

## INTRODUCTION

The economy of Bangladesh depends on agriculture. It is the single largest producing sector and comprises about 18.6% of the country’s Gross Domestic Products (GDP). Around 45% labors force employs on it (Central Intelligence Agency: Archived, 2011).

Livestock plays a very important role in the economy of Bangladesh. In Bangladesh, dairying is one of the prime components (Saadullah, 2001). About 14.1% of total GDP comes from milk and many small scale farmers get income through it (DLS, 2013). In Bangladesh daily requirements of milk is about 250 ml per person. The annual milk demand is 14.02 million tons. However, at present the country producing only 6.09 million tons of milk (DLS, 2013-14). There are 23.1 million cattle in the country (DLS, 2011-12). Among the population about 6 million are dairy cattle of which about 85-90% are indigenous and 10-15% are crossbreed.

Recent advances in the understanding of reproductive physiology of lactating dairy cows has led to the development of numerous management strategies and technologies aimed to improve overall reproductive efficiency of dairy herds (Thatcher et al., 2006).

Early identification of pregnant and non pregnant cows post breeding improves reproductive efficiency and pregnancy rate in cattle by decreasing the interval between services. Many new and old technologies are available to identify pregnant and non pregnant animals early post service and can play a key role in and overall reproductive management strategy to rapidly return these animals to the breeding program (Broaddus, 2005).

Highly significant negative correlation was seen between age and glucose, potassium, and phosphorus. Positive correlation was seen between age, globulin, total proteins, body weight/age ratio to glucose, total proteins and phosphorus (Bogin et al., 1988).

Some significant differences were also seen in the blood levels of various analytes in comparison to cattle in other countries, which were a result of genetic, climatic, nutritional and environmental conditions (Otto et al., 2010).

Hence, the biochemical values during different physiological situations should be known to set idea on changes in that time.

Urine analysis is not often part of a veterinary surgeon’s diagnostic armory but recent advances in interpretation of urinary pH and macromolecule content make it an available and interesting investigative tool (Husband, 2010).

Therefore the present study was performed with the following objectives:

1. To find out the hematobiochemical values in different trimesters.

2. To analysis various urinary constituents and level in pregnant cattle of different trimesters.

# CHAPTER –II

## MATERIALS AND METHODS

### 2.1 The study area

Military farm, Chittagong Cantonment in Chittagong was selected for the collection of sample.

### 2.2 Sample collection

Thirty crossbreed pregnant cattle of three trimesters (10 in each trimester) were selected for taking sample. Blood was collected from jugular vein and urine from mid stream of micturition. Vacutainer with and without anticoagulant and falcon tube was used to collect blood and urine sample respectively. After collection, the samples kept in ice box and transported to Physiology Laboratory of Chittagong Veterinary And Animal Sciences University (CVASU).

### 2.3 Sample preservation

Urine samples were preserved in–20ºC until analysis.

### 2.4 Hematological examination

The following hematological analysis were performed: Total erythrocyte count (TEC), total leukocyte count (TLC), packed cell volume (PCV), and erythrocyte sedimentation rate (ESR) was performed according to Disease Investigation and Animal Nutrition Research Laboratory. TEC and TLC were determined by hemocytometer. All differential counts of leukocytes were prepared as thin blood smear stained by Wright’s method. MCV, MCH and MCHC values were calculated from the result of TEC, Hb concentration and PCV.

### 2.5 Boichemical assay

Serum sample obtained from clotted blood was used for biochemical assay of Glucose, total protein, albumin, cholesterol, triglyceride, HDL, calcium, magnesium, phosphorus using automated biochemical analyzer (Humalyzer®-3000, Germany).

### 2.6 Chemical and physical examination of urine

For chemical and physical examination of urine test strip was used (model: Uric 10 CF). By observing the color change of the strip presence of chemical and physical change was detected. Glucose, Bilirubin, Ketone body, Specific gravity, Blood, pH Protein, Urobilinogen, Nitrite, Leucocytes was qualitatively test from urine. Different reading time was used for determination of the level.

### 2.7 Microscopic examination of urine

The samples were centrifuged at 3000 rpm for 30 minutes. Then supernatant was discarded. Sediment was mixed properly with vortex mixer. One drop of sediment was taken on a slide and using cover slip over the sample. Finally various constituents were identified at 10x, 40x magnifications.

### 2.8 Data analysis

All the recorded data was first stored, cleaned using Ms excel 2007. Data was analyzed using Stata-11. Result was expressed as mean±S.E of mean and P value.

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Fig 2: Microscopic examination of blood

 Fig 1: Urinalysis with dip strip

# CHAPTER –III

## RESULTS

### 3.1: Results of hematological parameter

**Table 1: Hematological parameter of cattle of different trimesters (N=30)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameters** | **1st Trimester (n=10)** | **2nd Semester (n=10)** | **3rd Semester (n=10)** | **p-value** |
| Neutrophil (%) | 26.5 ± 4.6  | 27.1 ± 8.8 | 29.9 ± 7.4 | 0.53 |
| Eosinophil (%) | 6.1 ± 3.6 | 9.8 ± 5.1 | 7.6 ± 2.9 | 0.13 |
| Basophil (%) | 0.6 ± 0.6 | 0.1 ± 0.3 | 0.7 ± 1.5 | 0.37 |
| Lymphocyte (%) | 65.3 ± 4.6 | 60.6 ± 11.1 | 59 ± 9.2 | 0.26 |
| Monocyte (%) | 1.5 ± 0.5 | 2.4 ± 1.1 | 2.8 ± 1.3 | 0.03 |
| TEC (mill/cu) | 5.4 ± 0.8 | 6.1 ± 1.5 | 5.4 ± 1.1 | 0.36 |
| TLC (thou/cu) | 8.4 ± 0.9 | 7.2 ± 3.8 | 6.8 ± 1.01 | 0.28 |
| Hb (g/dl) | 6.9 ± 0.3 | 7.9 ± 1.8 | 7.5 ± 0.7 | 0.18 |
| ESR (mm) | 0.6 ± 0.2 | 0.5 ± 0.4 | 0.4 ± 0.4 | 0.55 |
| PCV (%) | 34 ± 4.3 | 32.7 ± 6.3 | 32.1 ± 4.9 | 0.71 |
| MCV (fl) | 63.1 ± 11.6 | 59.1 ± 27.2 | 61.6 ± 16.9 | 0.89 |
| MCH (pg) | 12.9 ± 1.6 | 13.3 ± 2.6 | 14.4 ± 3.5 | 0.43 |
| MCHC (g/dl) | 207.6 ± 30.3 | 256.2 ± 92.3 | 239.1 ± 41.1 | 0.21 |

Eosinophil level was highest at 2nd trimester of pregnancy (9.8±5.1) %. Basophil level was lowest at 2nd trimester of pregnancy (0.1±0.3) %, Lymphocyte and TLC level ware highest at 1st trimester (65.3 ± 4.6) % and 8.4 ± 0.9, MCHC level was highest at 2nd trimester and lowest at 1st trimester. But these are not significant as p ˃0.05. Only the monocyte level was significant varied as p<0.05. The highest level of monocyte was 2.8 ± 1.3 at 3rd trimester and lowest at 1.5 ± 0.5 in 1st trimester.3.2: Results of biochemical parameter

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameters** | **1st trimester (n=5)** | **2nd trimester (n=5)** | **3rd trimester (n=5)** | **p-value** |
| Glucose (mg/dl) | 164.56±9.78 | 164.98±8.13 | 166.68±8.39 | 0.92 |
| Total protein (g/dl) | 14.92±0.81 | 15.78±0.60 | 14.3±0.79 | 0.03 |
| Albumin (g/l) | 6.66±0.36 | 6.76±0.31 | 6.8±0.57 | 0.87 |
| Cholesterol (mg/dl) | 424.24±27.29 | 438.9±26.76 | 410.46±16.42 | 0.21 |
| Triglyceride (mg/dl) | 472.54±18.79 | 471.60±13.73 | 465.90±19.05 | 0.81 |
| HDL (mg/dl)  | 190.62±53.45 | 159.38±35.90 | 135±16.91 | 0.11 |
| Calcium (mg/dl) | 7.78±1.45 | 8.06±1.11 | 7.60±0.94 | 0.83 |
| Magnesium (mg/dl) | 1.84±0.21 | 1.44±0.32 | 2.14±0.30 | 0.01 |
| Phosphorus (mg/dl) | 5.8±1.00 | 7.52±1.31 | 7.26±0.74 | 0.05 |

**Table 2: Biochemical parameter (N=15)**

Total protein level was highest at 2nd trimester of pregnancy (15.78±0.60) g/dl and lowest was at 3rd trimester of pregnancy (14.3±0.79) g/dl. It was significant as was p<0.05. Cholesterol level was highest at 2nd trimester (438.9±26.76) mg/dl and lowest level was 3rd trimester (410.46±16.42) mg/dl but not significant as p ˃0.05. Glucose level was highest at 3rd trimester but not significant. Calcium level was highest at 2nd trimester and lowest at 3rd trimester which were (8.06±1.11) and (7.60±0.94) mg/dl respectively. Magnesium was highest at 3rd trimester (2.14±0.30) mg/dl and lowest was 2nd trimester (1.44±0.32) mg/dl. It was significant as p<0.05. Phosphorus level was lowest at 1st trimester (5.8±1.00) mg/dl and highest at 2nd trimester (7.52±1.31) mg/dl. HDL was highest at 1st trimester (190.62±53.45) mg/dl and lowest was at 3rd trimester (135±16.91) mg/dl. Both phosphorus and Magnesium were significant as p<0.05.

### 3.3 Results of urinalysis

Thirty urine samples were tested with dip stick. Blood, sp. gravity, ketone body, bilirubin, leukocyte, protein, protein code, pH level was observed. From the test results we found different variations though they are not significant. Only urinobilinogen is significant as p-value <0.05. It goes pick level at 3rd trimester (Table 3 and table 4).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **1st trimester (n=10)** | **2nd trimester (n=10)** | **3rd trimester (n=10)** | **p-value** |
| Blood | 11.5±6.69 | 36.5±57.64 | 38±57.07 | 0.38 |
| Sp. Gravity | 1.006±.002 | 1.006±0.001 | 1.005±0.00 | 0.35 |
| Ketone | 5±5.77 | 9.5±5.99 | 12±11.35 | 0.16 |
| Bilirubin | 0 | 0.6±1.26 | 0.4±0.52 | 0.24 |
| Leukocyte | 16±20.25 | 7.5±7.91 | 13.5±4.74 | 0.32 |
| Protein | 109±134.70 | 151±131.27 | 198±133.40 | 0.34 |
| Protein code | 0.4±0.52 | 0.6±0.52 | 0.7±0.48 | 0.41 |
| pH  | 8.7±1.57 | 9.5±0.97 | 8.8±0.92 | 0.28 |

**Table 3: Table for urinalysis (n=30)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Category** | **Prevalence % (No. of positive)** | **χ2- value** | **P- value** |
| Nitrite | 1st trimester | 10%  | 0.00 | 1.00 |
| 2nd trimester | 10% |
| 3rd trimester | 10% |
| Urobilinogen | 1st trimester | 20% | 12.34 | 0.002 |
| 2nd trimester | 10% |
| 3rd trimester | 80% |
| Glucose | 1st trimester | 0% | 0 | 0 |
| 2nd trimester | 0% |
| 3rd trimester | 0% |

**Table 4: Urine analysis table**

# CHAPTER IV

## DISCUSSION

### 4.1 Discussion on Biochemical analysis

Glucose level found in 1st, 2nd and 3rd trimester was (164.56±9.78) mg/dl, (164.98±8.13) mg/dl, (166.68±8.39) respectively was insignificant and higher than Roy et al. (2010). Biochemical changes of glucose in different trimester were (128.6±10.2) mg/dl, (129.8.±2.6) mg/dl and (127.6±34) mg/dl respectively (Roy et al., 2010).

Total Protein level found in pregnant cattle of 1st, 2nd and 3rd trimester was 14.92±0.81 (gm/l) and 15.78±0.60 (gm/l) and (14.3±0.79) gm/l respectively. It was significant and slightly increases from other author. Total protein level was increasing for optimize the gonadotropin release factor and other hormone for culmination of pregnancy (Yadav et al., 2006).

Phosphorus level of three trimesters was (5.8±1.00) mg/dl, (7.52±1.31) and (7.26±0.74) mg/dl. It was significant and this study is slightly similar to Roy et al. (2010).

Calcium level in my study of different trimester was (7.78±1.45) mg/dl, (8.06±1.11) and (7.60±0.94) mg/dl respectively. Roy et al. (2010) stated his study that the calcium level was (9.39±0.63) mg/dl, (9.52±0.30) mg/dl and (9.48±0.27) mg/dl respectively. This is somewhat similar to my study.

### 4.2 Discussion on Urinalysis

Specific gravity of cattle urine in different trimesters was somewhat similar to each other. In 1st and 2nd trimester it was 1.006±0.002 and 1.006±0.001 respectively. In 3rd trimester it was 1.005±0.00 what was similar to Kannan et al. (2010) who stated that the range of specific gravity of urine in normal cattle is 1.025-1.045 with an average of 1.035 and (Braun, 2006); also has shown in obstructive urolithiasis it ranges from 1.008 to 1.025.

pH level found at 1st, 2nd and 3rd trimesters was respectively 8.7±1.57, 9.5±0.97 and 8.8±0.92; Similar result was described by (Mavangira et., 2010). On the other hand Seifi et al. (2004) stated that pH ˃8.25 in the 48 hours prior to calving accurately predict that those cows will get clinical milk fever. So 2nd trimesters cow may affected with milk fever.

The Prevalence of Urobilinogen was 80% at 3rd trimester which was more higher than other trimesters and it was significant (P< 0.05) which support the result of Kimling (2008) who stated that higher percentage of Urobilinogen found at 3rd trimester.

Trace amount of protein found in this study. Siv-Aina et al.(2010) stated that low level of protein in urine are normal. Hohenberger and Kimling (2008) stated that ketone body level in urine 0 (-Ve), 25 (+), 100 (++) and 300 (+++) mg/dl. The presence of ketone body in three trimesters was less than 15 mg/dl which indicate animal was not suffered by abnormal charbohydrate metabolism.

No evidence of glucose was detected in thirty samples. Schultz et al (1993) reported that in pregnant cows glucose requirement increase due to fetal development and very trace amount of glucose may found in urine.

# CHAPTER V

## CONCLUTION

The haematobiochemical and urinalysis in pregnant cattle of different trimesters we found many alterations. We also found some significant changes in parameters. In haematological test we found monocyte level, in biochemical test total protein, magnesium and phosphorus levels are significant. In case of urinanalysis only the urinobilinogen are significant which goes pick level at 3rd trimester.

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# CHAPTER –VI

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# BIOGRAPHY

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