



Tikrit Journal of Pure Science

ISSN: 1813 – 1662 (Print) --- E-ISSN: 2415 – 1726 (Online)

Journal Homepage: <http://tjps.tu.edu.iq/index.php/j>



Evaluation of some biochemical and Hematological parameters for Changes Associated with Diarrhea in Calves

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DOI: <http://dx.doi.org/10.25130/tjps.25.2020.002>

ARTICLE INFO.

Article history:

-Received: 30 / 9 / 2019

-Accepted: 12 / 11 / 2019

-Available online: / / 2019

Keywords: Calves diarrhea, Electrolytes, Hematology.

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ABSTRACT

This study aimed to identify the serological and hematological changes which were associated with diarrhea in calves. The study conducts on 62 calves their age range from 1 month to 6 months. The experiment started from September 2018 to March 2019. The samples consist of 42 calves with diarrhea and 20 healthy for comparison. Blood samples were taken for blood components and biochemical determination. The study showed a significant increase ($p \leq 0.05$) in hemoglobin, PCV and white blood cells ($p \leq 0.01$). The biochemical tests showed a significant increase ($p \leq 0.05$) in globulin, potassium and phosphorus ions. Significant decrease ($p \leq 0.05$) was occurred in albumin and sodium, and no significant changes in total protein level and chloride ions concentration.

Introduction

Diarrhea is an intestinal secretion that interferes with digestion and absorption which is leading to loss of water and electrolytes from the whole body fluids through the intestine; leading to dehydration, many other complicated and in some cases lead to death [1,2]. Diarrhea is also known as gastroenteritis associated with several pathogens that can be infectious or non- infectious. However, diarrhea remains a major problem around the world because of major economic losses associated with the cost of treatment, diagnosis, veterinary intervention and decreasing in livestock is due to delayed growth or mortality, knowledge of causative agents is necessary to avoid the problem and find appropriate solutions [3,4]. Regardless of the cause of diarrhea, the changes associated with it include loss of water and electrolytes, as well as a lack of milk intake, which are intervention with acidity of blood, electrolytes imbalance and a decline in the balance of energy and low level of glucose that relate to disorders of absorption in carbohydrates, fats and amino acids[5,6].

The type of diarrhea depends on the causative agent, which may be microorganisms such as bacteria, viruses, parasites, environmental factors such as cold or very hot weather, management factors such as poor health care, overcrowding and the immune state of animals, especially in the first postpartum period. The

calf sensitivity is due to the weakness of mother-to-fetus transmission, either because of the immune system passes through the placenta or colostrum insufficiently also it may be due to the lack of immune system development to eliminate opportunistic pathogens. Moreover, there are nutritional factors associated with an increase in the quantity or quality of given colostrum to calve. Corruption or contamination of the feed material[7,8]. This study focuses on biochemical and hematological changes such as total protein, white blood cell (WBC), hemoglobin (Hb) concentration, packed cell volume (PCV), and electrolyte changes relate to dehydration associated with diarrhea in small calves.

Materials and Methods

Forty-two samples of calves suffer from diarrhea were collected. Their age ranged from 1-6 months, the cases were collected from veterinary clinics in Salah al-Din Governorate and Anbar Governorate during the period from September 2018 to March 2019. A 7 ml of blood samples were collected with 10 ml syringes from jugular vein and divided into two parts 2 ml were put in tubes supplied with anticoagulant (EDTA) for doing blood picture and 5 ml in plain tube to get serum for the chemical tests and left the samples for 20 minutes at room temperature until the clotting occurred and then separated by centrifuge. In addition, 20 blood

samples of healthy animals were collected in the same manner for the purpose of comparing healthy and infected animals. The blood serum test was used for measuring sodium, potassium, phosphorus, globulin, total protein and albumin by using a spectrophotometer and special kits. Tests were carried out in chemistry laboratory at the College of Veterinary Medicine-University of Tikrit. While blood tests, used the Hememocytometer for WBCs count, Sahli hematometer to measure the Hb concentration, And hematocrit reader to estimate PCV.

Results and discussion

The study showed that there was a significant increase ($p \leq 0.05$) in hemoglobin, blood cell volume, white blood cells, phosphorus and potassium and a significant decrease ($p \leq 0.05$) in albumin and sodium level were occurred, and no significant changes in chloride concentration and total protein, as shown in Table (1). The results of increasing the concentration of Hb and PCV agrees with [9]. The increasing in blood concentration was due to dehydration and loss of fluid. While increasing of white blood cells may occur due to normal reflux of body defense mechanisms against infections this result is agreement with [10]. Increasing in globulin may occurred as a result of acute inflammation caused by various pathogens in the intestines the

result agrees with [11]. The reduction of albumin, which corresponds with [12], may be due to depletion of it by kidney. Results also showed an increase in the level of potassium (K^+) and this is in agreement with [13] related to the retention of K^+ ions in the kidneys and re-absorption by renal tubules in response to increase acidity and cell damage, which increases the movement of potassium from intracellular fluid to the outside [14]. Also a significant increase in phosphorus levels agrees with [15] The increase may be due to dehydration that is leading to renal disturbances. The low sodium level agrees with [13]. This occurred from excessive secretion of sodium ions due to weakness of sodium intestinal absorption or increased intestinal motility.

Table (1): Haemato- biochemical changes in healthy and diarrhoeic calves

Parameters	Healthy calves N=20	Diarrheal calves N=42
Hemoglobin (g%)	9.13	11.14**
Pcv (%)	28.30	34.50**
WBC (cell/ μ L)	8,619	10,775*
Phosphorous (mg/dL)	1.71	4.84**
Potassium (mmol/L)	5.16	6.26**
Chloride (mmol/L)	90.8	86.3
Sodium (mmol/L)	149.45	140.9**
total protein (g/dL)	6.030	5.950
Globulin (g/dL)	2.51	3.212*
Albumin (g/dL)	3.525	2.738**

* Significant at $p < 0.05$, ** Significant at $p < 0.01$

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تقييم بعض المعايير الكيميوحيوية والدموية للتغيرات المرافقة للإسهال في العجول

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الملخص

هدفت الدراسة الى التعرف على التغيرات الكيميوحيوية والدموية التي ترافق الإسهال في العجول. اجريت هذه الدراسة على 62 عجل تتراوح اعمارهم من شهر 1 إلى 6 شهور. بدأت التجربة من أيلول 2018 إلى آذار 2019. العينة تشتمل 42 عجل مصاب بالإسهال و 20 عجل سليم للمقارنة. جمعت عينات الدم للاختبارات الدموية و الكيميوحيوية. اظهرت الدراسة زيادة معنوية عند ($p \leq 0.05$) في الهيموغلوبين وحجم خلايا الدم المرصوفة بينما خلايا دم البيض عند مستوى احتمالية ($p \leq 0.01$). الاختبارات الكيميوحيوية اظهرت زيادة معنوية عند ($p \leq 0.05$) في الغلوبولين، بوتاسيوم والفسفور. و انخفاض معنوي ($p \leq 0.05$) في الالبومين والصوديوم، ولا توجد تغيرات معنوية في مستوى الكلوريد والبروتين الكلي.