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International Journal of Biological Technology (2012) 3(1): 28-31.
ISSN: 0976 – 4313

Original Article

Serumic Sialic Acid in Calves with Diarrhea syndrome

Hassanpour Ali[1], Bakhtiari Aram[2], Saeid Safarmashaei[3]

[1]Department of Clinical science, Faculty of Veterinary Medicine, Tabriz Branch, Islamic Azad University, Tabriz, Iran.
[2]Graduated from Veterinary Medicine, Faculty of Veterinary Medicine, Tabriz Branch, Islamic Azad University, Tabriz, Iran.
[3]Young Researchers Club, Tabriz Branch, Islamic Azad University, Tabriz, Iran.

*Corresponding author: a_hasanpour@iaut.ac.ir; alihassanpour2000@yahoo.com

Published: 15, April, 2012; Vol. No. 3(1):28-31; Online:www.ijbtjournal.com/documents/ijbt150412106.

Abstract

Diarrhea syndrome is one of the prevalent diseases in claves which makes much economical loses each year. The present study was conducted in order to examine serum sialic acid (total, lipid link and protein link sialic acid) concentrations as one of the inflammatory signs in calves suffering from diarrhea syndrome. 30 heads of calves suffering from diarrhea syndrome were recognized in domestic animals clinic of veterinary college of Tabriz Islamic Azad university and some of dairy cow pens of Tabriz suburb.25 heads of calves were sampled coincidently as a control group. Serum rates of mentioned parameters were measured. The average level of total, lipid link and protein link sialic acid in calves suffering from diarrhea syndrome were 4.02±0.70,2.08±0.57,2.05±0.64 mmol/lit, respectively and in healthy calves were 2.49±0.51,2.07±0.64,2.06±0.61 mmol/lit, respectively that the difference between two groups in first case was meaningful but in other cases was not meaningful (p=0.050,p=0.131,p=0.911,respectively) furthermore, it became clear that by increasing serum concentration of sialic acid, the total and protein link sialic acid has meaningful decreasing(r=-0.005,p=0.490)Final conclusion is that serum sialic acid concentration increasing in calves suffering from diarrhea syndrome can demonstrates properly the inflammatory development. Besides, measurement of this parameter can be useful in laboratory confirmation of diarrhea disease.

Key words: Diarrhea syndrome, Calf, Sialic acid, Serum concentration.

Introduction

Diarrhea syndrome is one the prevalent diseases in claves which makes much economical loses each year this disease changes biochemical and hematological logogram that this findings have been published in the previous research (Costab,2007; Ganheim, 2003; Gutzwillwer, 2002; Radostits, 2007). Neonatal diarrhea, or calf scours, is a major cause of mortality in calves less than one month of age. It's caused by various infectious organisms such as bacteria, virus, and protozoa but death is commonly the result of one thing: dehydration. Colostrum is a first line of defense against bovine diarrhea, offering nursing calves protection against infectious agents such as Rota virus, Corona virus, *Cryptosporidium parvum*, *E. coli* (K99 enterotoxigenic form) and *Salmonella*. Clinical symptoms are similar, regardless of the organism, so when sickness occurs effective management depends upon a combination of fecal testing to identify the causative organism and treatment that includes antibiotics to eliminate infection and fluids to combat dehydration and restore electrolytes. Sialic acid (SA), an acetylated derivative of neuroaminic acid, is widely distributed in mammals tissue. N-acetyl neuroaminic acid (NANA) is the most common form of sialic acid. Since SA is usually bound to glycoproteins, glycolipids, oligosaccharides and polyyasaccharides, small amount of it is free in the body. Moreover, SA is an important structural component of biological membrane. It was also widely found in bacteria and animal tissues Sialic acid concentration increases rapidly following the inflammatory and injury process. The mechanism inducing SA increase is not clearly understood. However, investigators have reported that SA localized at the end chain of many acute phase proteins can be used as marker for the determination acute phase protein concentrations, because serum acute phase

International Journal of Biological Technology

www.ijbtjournal.com
International Journal of Biological Technology (2012) 3(1): 28-31.
ISSN: 0976 – 4313

proteins, especially α1 acid glycoprotein, are sialyted glycoproteins. Therefore the detection of SA particularly LBSA levels may be a valuable indicator for diagnosis and prognosis of inflammatory diseases (Karapehlivan, 2007; Ekin, 2003). Purpose of this research was a comparision of sialic acid in normal cavlves with infectious groups. That this research showed this factor was in of position inflammatory proteins and also was determined total acid level, sialic acid binding lipid and protein level in the serum.

Material and Method

We recognized 30 head of infected calves by diarrhea syndrome in large animal clinic, faculty of veterinary, Islamic Azad University, Tabriz branch and some dairy farms in the surrounding of the Tabriz. We recognize this disease based on clinical sings. We gathered 10cc blood sample from jugular vein by vein by venoject tube. Blood sample sent to laboratory other coagulation and then was freezed after blood free serum by centrifuge. Contemporary we gathered sample from 25 head of normal calves in place of control group. From serum samples, total sialic acid, sialic acid binding protein and lipid was measured by sydow, katopodis method.

Statistical analysis

SPSS statistical soft ware (18 edition) and T test statistical methods was used for average contrast between control groups and infected groups and also correlation was used between parameters.

Results

Mean level of sialic acid in control group and infected group was 2.49±0.51mmol/l and 4.02±0.70mmol/li in serum regularly.

Results showed a significant difference between two groups (P=0.050). Statistical analyze signed non significant correlation about sialic acid binding lipid between two groups was2.08±0.57and 2.07±0.64mmol/l (P=0.131) and also sialic acid binding protein level of serum in infected group was less than of the controlled group that this findings impress nonsignificant difference. (2.06±0.61 and 2.05±0.64mmol/l) (P=0.911).

According to the results, it is not found significant relationship between total level of sialic acid in the serum with sialic acid binding lipid level in the serum and also thisfindings acquired from correlation between sialic acid total levels with cialic acid binding protein level in serum.

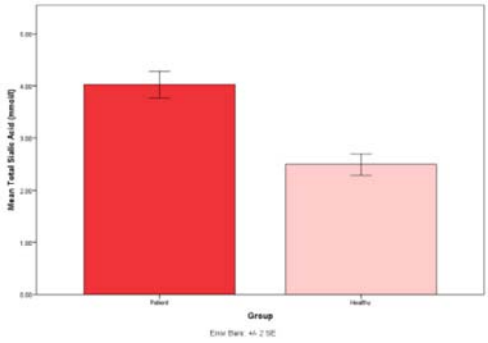

Fig. 1: Mean serum total Sialic acid inpatients and healthy calves

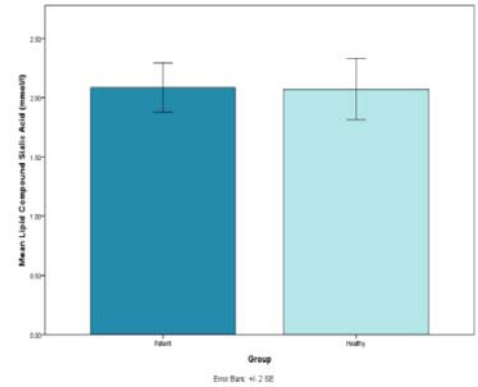

Fig.2: Mean serum lipid compound sialic in patients group and healthy

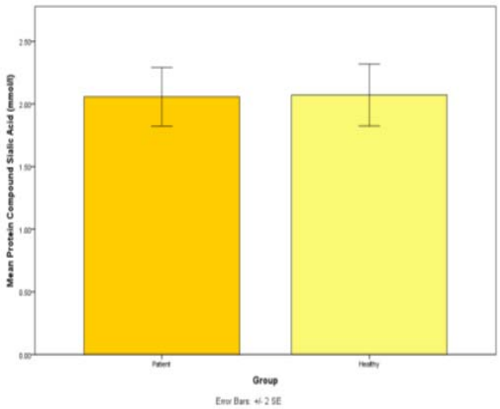

Fig.3: Mean serum protein compound sialic acid in patients and healthy

Table-1: Comparison of mean serum levels of sialic acid lipid compound sialic acid and protein compound sialic inpatient groups and healthy

Parameter	Group	Number	Mean	SD	P value
Total Sialic Acid (mmol/l)	Patient	30	4.02	0.70	0.050
	Healthy	25	2.49	0.51	
Lipid Compound Sialic Acid (mmol/l)	Patient	30	2.08	0.57	0.131
	Healthy	25	2.07	0.64	
Protein Compound Sialic Acid (mmol/l)	Patient	30	2.05	0.64	0.911
	Healthy	25	2.06	0.061	

Table -2: The correlation of total sialic acid with lipid compound sialic acid and protein compound sialic acid in patient group

The correlation of total sialic acid with	Pearson Correlation (r)	P value
Lipid Compound Sialic Acid	0.131	0.245
Protein Compound Sialic Acid	-0/005	0.911

Discussion

Measure of this acid level in serum is important to diagnosis and to prevent of inflammatory and cancer disease. Serum level of sialic acid has changed in variable disease for example: nephritic syndrome arthritic romatoid, (Schauer 1982; Stefenelli, 1985) chronic Tuberculosis, (Carter, 1962) infectious menangit, (Harma,1967) Trypanosoma (Eslevo,1982) Bovine Enzootic Hemathuria (Singh,1980) distemper (Altintas, 1989; Engen, 1971) Anaplasmosis (Ertekin,2000) and leptospirosis in bovine (Altintas,1989). Diarrhea is a common disease in this region that causes different effect in serum level consistency.

Based on the results, Diarrhea has a inflammatory process. Increase in serum level this acid showed inflammatory process in this study, salic acid total consistency (Acid attached to lipid and protein) is considered to determine inflammatory process. In this study, it is determined, total acid and acid attached to lipid in infected calves if more than of normal calves in serum, but acid attached to protein is less than of normal calves in serum. The results of this study is compatibile with other researchers (Abramjan,1968; Ertekin,2000; Keles,2000; Sydow, 1988; Tsolov, 1973). Based on the results, it is considered that tissue damage causes sialic acid increase in serum that this process elevate release of globulins in the first of inflammatory reaction and injury process, increase acid consistency rapidly, but the method of this elevation is unknown (p=0.050). Also concentration of the acid in serum lipids and associated proteins in calves Sialic transplant patients found non significant difference with healthy calves respectively (p=0.131and p=0.911).Increase of sialic acid attached to protein relatethe elevation of inflammatory acute phase (Haq,1993; Stefenelli,1988). It is possible relationship between WBC cell reactions with increase in sialic acid level. On the other hand, the damage tissues release sialic acid from cell membranes, because sialic acids exist in all cell membranes abundantly. Based on the study by Citil, In cows with TRP, sialic acid level total and sialic acid attached to protein and lipid in serum were 1.163, 0.615 and 0.548 gr/l (Citil, 2004).

Also in study of infected cows with subclinical and clinical mastitis. By Nazifi, amount of these levels were (3.20mmol/l, 1.64, 1.63) more than of normal cows (Nazifi, 2011) The result found increase in total sialic acid elevate sialic acid binding to lipid . Level in serum but it is not found significant correlation between amount of total sialic acid level with this acid binding to lipid, in infected calves by diarrhea syndrome (p=0.245 and r=0.131) also in infected group has non significants negative correlation between total sialic acid and sialic acid binding to protein (p= 0.911 and r= -0.005). In conclusion, these results showed increase in sialic acid level in serum is a good progenosis for inflammatory process in this disease.

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Manuscript Progress Date

Received : 01.12.2011
Revised : 28.03.2012
Accepted : 29.03.2012