DOI: 10.53992/njns.v9i1.156 **NUST Journal of Natural Sciences, Vol. 9, Issue 1, 2024**

Assessment of Lipid Peroxidation and biochemical diagnosis in digestive tract diseases

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Abstract

In this research comparison of Oxidative stress, Lipid Profile, Electrolytes minerals were studied between Digestive tract diseases patients and normal. The subjects for this study include digestive patients (n=51) and normal or control group n=15. In Oxidative stress two parameters VIT C and CAT were studied. The value of VIT C and CAT was low as compared to normal group. Lipid profile different parameters like Cholesterol, TG, HDL, and LDL were studied. The value of Cholesterol and TG in digestive diseases were low as compared to normal while an increase was observed in the value of HDL and LDL as compared to normal at $p>0.05$. Electrolytes minerals parameters like Na, K, Cl and Bicarbonate were studied and increases of these values were observed. Hematological parameters like WBCs, RBCs, neutrophils, Eosinophil, Hematological, MCV and Platelets were also studied. An increase of Neutrophils, RBCs, Hemoglobin and MCV were observed at $p < 0.005$ and a decrease of WBCs, Eosinophil and platelets were observed during the study.

Keywords: Lipid Profile, Electrolyte Minerals, CAT, Digestive Tract Disease

Article History: **Received:** 07-01-2024, **Revised:** 07 May 2024, **Accepted**: 15 May 2024, **Published:** 30 May 2024.

Introduction

Digestion

It is a process in which the food is converted into nutrient or energy and this energy is used for the growth and cell repair needed to survive. Digestion is also the creation of waste and its elimination. Digestion consists of many parts like the mouth, throat, stomach, rectum, small intestine, large intestine, and anus. It also consists of salivary glands, liver, gall bladder, and the pancreas.

Main diseases related to digestion.

1) Gastro esophageal Reflux Disease [1]
2) Chronic Diarrhea [2].
3) Chronic Constipation [3].
4) Gastroenteritis [4].
5) Ulcers [5].
6) Hemorrhoids [6]

Gastro esophageal Reflux Disease (GERD)

Gastro esophageal Reflux Disease GERD is a disease in which Food move from mouth to the stomach by esophagus. GERD can irritate the food pipe and its symptoms are heart burn [1].

Chronic Diarrhea

In this disease there is a loose stool for at least four weeks. There are many causes of chronic diseases. The main cause is irritating bowel, syndrome, inflammatory bowel disease malabsorption, condition, and chronic infections. With the help of blood, stools, and urine we can find the symptoms and with the help of medicine it can be treated [2].

Chronic Constipation

It is one of the digestion diseases in which passage of the stool becomes difficult. There are many symptoms of chronic constipation. The main cause of this disease is the blockage in the rectum or problem with the nerves around the colon and rectum. By using the proper diet with low amount of fiber we can protect ourselves from this disease. We should drink plenty of fluids [3].

Gastroenteritis

It is a very common disease which causes diarrhea and vomiting. The causes of digestive disease are bacteria and viruses. Mostly the children suffer from this disease, and it is called Rota virus. It spread very easily and quickly .the main symptoms of this disease are sudden, liquid diarrhea, feeling very sick, Vomiting and a slight fever. It can be prevented by Use paracetamol for fever. Get plenty of rest, use frequently rehydration drink and use anti vomiting medicines.

Ulcers

Digestion disease that is present in inside living of stomach and upper portion of small intestine. There are the following types of ulcers.

Gastric Ulcer: It occurs inside the stomach. The main symptoms of the disease are burning of stomach, heart burn and nausea.

Duodenal ulcer: it occurs in the upper portion of intestine. The main symptoms of disease are burning pain in belly.

Symptoms of ulcer are burning stomach pain, feeling like fullness, or erupting, Heart burn and Nausea [7].

Hemorrhoids

It is a digestive disease in which a swollen is present in anus and lower rectum. The symptom of the disease is pain, dis comfortless, itching and swollen in the anus and bleeding are the signs of Hemorrhoids. Bleeding, pain and swelling around the anus are the main symptoms of this disease. The main causes of Hemorrhoids are Rinsing during bowel movement, long time sitting on the toilet having chronic diarrhea diseases, being fat, having anal eating a low fabric diet. It can be prevented by using high fiber food, drinking plenty of fluids and by taking exercise. We can get rid of this disease [8].

Material and Methods

Estimation of VIT C

A Di solution will be obtained by adding 0.042 gram of sodium carbonate in 100 ml distil water with 0.05 g Phenaphthaline in 100 ml distil water. A stock solution is prepared by adding 4g of oxalic acid in 100 ml distil water with 0.1 g of VIT C. Now we will add 1 ml blood serum sample, 1 ml stock solution and 1 ml di solution. The rate of decomposition of VIT

C is calculated and VIT C Curve will obtain on the analyzer.

Estimation of catalase

Aebi's method was used for this purpose. We took a test tube 1ml blood serum sample and added it in solution of 2ml of 50 ml phosphate buffer solution. When we added Hydrogen per oxide H_2O_2 reaction started. The rate of decomposition of hydrogen per oxide is calculated and estimated and CAT Curve will obtain on the analyzer, and it will compare with the standard curve. Activity of catalase is estimated in U/L of protein. In this way CAT activity will be observed.

Estimation of cholesterol

Cholesterol is an aqueous primary standard. Cholesterol plays a very important role because it makes cell membranes. It also makes hormones and VIT D in the body. In adults the normal range of cholesterol is less than 200 mg/dL.

Estimation of electrolyte mineral

Standard solution which contains a known concentration of the metal which we are going to study is put into burner and the atoms in this field will absorb the light proportional to their concentration in the fluid. The instrument will adjust, the unknown fluid is aspirated, and the electrolyte concentration will be obtained from the LCD display or digital display. This method can be used in the analysis of Na^+, K^+, Ca^{2+} and Mg^{2+} [9].

Estimation of complete blood count

We took 2ml Blood sample in a test tube. We took 2ml EDTA (Ethylene di amine tetra acetic acid) for complete blood picture. Now a 3ml blood sample is being collected for a kidney function test. We will take the result of urea, uric acid creatinine and liver function test like ALT, AST, and total protein. The sample is allowed to clot naturally and stored upright to the room temperature until it is stored in the laboratory for further processing. Then the sample is vortexed and centrifuged and stored in the freezer at – 70 ^{0} C until the data is analyzed.

Statistical Analysis

First, we selected 66 people for this research in which 51 people were digestive tract disease patients and 15 were normal people. An experiment was performed, and the UV absorbance values of VIT C and CAT values were obtained. We also calculated the value of Lipid profile parameters, hematological parameters, and electrolyte minerals test. All data was collected and in last we used the formula of one-way annova in SPSS programmed. We obtained (Mean ± S.D) value for normal and digestive tract disease patients.

Results and Discussion

In this research comparison of Oxidative stress, Lipid Profile, Electrolytes minerals and CBC report was study between Digestive tract diseases patients and normal. The subjects for this study include digestive patients (n=51) and normal or control group were n=15. In Oxidative stress two parameters VIT C and CAT were studied. The value of VIT C and CAT was low as Compared to normal group Catalase is enzyme which breaks the Hydrogen per oxide into water and oxygen. Low level of Catalase increases the toxic level and damages the soft tissue and leads to ulcer while decrease in VIT C led to break blood vessel and cause of bleeding.

Lipid profile different parameters like Cholesterol, TG, HDL, and LDL were studied. The value of Cholesterol and TG in digestive diseases were low as compared to normal while an increase was

observed in the value of HDL and LDL as compared to normal at p > 0.05. Low triglycerides show that you are lying under diseases condition. While high HDL protects cells from damage and an increase in LDL causes heart failure.

Electrolytes minerals parameters like Na, K, Cl and Bicarbonate were studied and increases of these values were observed. Na maintains the balance of minerals and water. High level Na is called Hypernatremia which causes dehydration and leads to imbalance value of minerals in body. Potassium maintains the level of minerals inside the cells and high value of K called Hyperkalemia, which lead to death. High levels of Chlorine are called hyper chloremia. High levels of minerals cause diarrhea, constipation, and hemorrhoids.

Hematological parameters WBCs, RBCs, neutrophils, Eosinophil, Hemoglobin, MCV and Platelets were also studied. Increases of Neutrophils, RBCs, Hemoglobin and MCV were observed at p<0.005 and a decrease of WBCs, Eosinophil and platelets were observed during the study.

Table 1: Anthropometric and biochemical parameters of control subjects and patients with fatty liver disease

Anthropometric parameter /Biochemical parameters	Control subjects	Patients with disease
Subject number	15	51
VIT C	1.10 ± 0.50	0.07 ±0.01
CAT	3.90 ± 0.33	0.15 ± 0.022
Cholesterol	184.80 ±24.60	172.88± 31.27
TG	178.80 ±64.90	154.94± 51.84
HDL	45.47 ±6.52	58.88 ± 35.08
LDL	83.53 ± 25.87	94.20 ± 39.68
Na	117.80±13.86	135.51±5.81
K	3.42±0.698	4.02±0.95
Cl	99.80±4.32	101.41±5.24
WBCs	8813.33±791.80	8289.80±1475.84
Neutrophil	52.00±9.61	58.32±6.75
Eosinophil	4.60±1.24	4.25±1.99
RBCs	4.45±0.53	4.96±0.59
Hemoglobin	12.33±1.91	14.43±1.43
MCV	79.60±5.15	84.90±4.59
Platelets	3.06E5±32348.2	2.90E5±57781.76

We have seen that there is a significant decrease in the level of VIT C and CAT. The value (Mean ± S.D) of VIT C in normal peoples was 1.10 ± 0.50 and the value of VIT C in patients was 0.07 ± 0.01, which was less than normal values. CAT value was also calculated. The normal value (Mean ± S. D) of CAT was 3.90 ± 0.33 and in the patients these values was 0.15 ± 0.022 and this value was lower than normal values it was due to Poor diet and bile salt absorption.

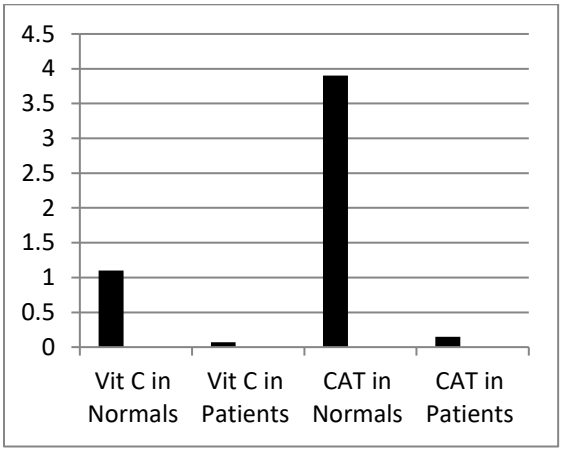

Figure 1. Graph showing comparison of Vit C and CAT in both control and patient.

We calculate the amount of cholesterol, triglyceride, HDL, LDL values in our research study we have seen that there was high value of HDL is observed during the disease of duodenal ulcer. In this research increase of LDL is also observed it was due to Alcoholism, Fatty diet, smoking and over-weight which increases the HDL and LDL cholesterol.

During this assessment the of triglyceride is also calculated in digestive tract diseases patients the normal value (Mean ± S.D) was 178.80 ± 64.90 and in this study the value in digestive tract diseases patients was about 154.94 ± 51.84 p > 0.05. It was also due to soluble fiber like beans, apples, citrus fruits etc. Bile salt also absorbs

cholesterol and decreases the level of cholesterol and triglyceride.

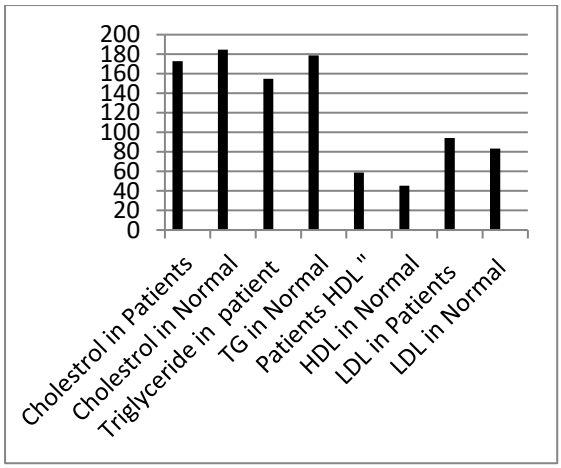

Fig 2: Comparative analysis of lipid profile both control and patient.

Normal value (Mean ± S.D) of Na was 117.80 ± 13.86 and Na value in patients was 135.51 ± 5.80. Increase in the value of sodium is observed than normal values. The increase in the level of Sodium was due to the use of too much salt in the diet which increased the level of Na.

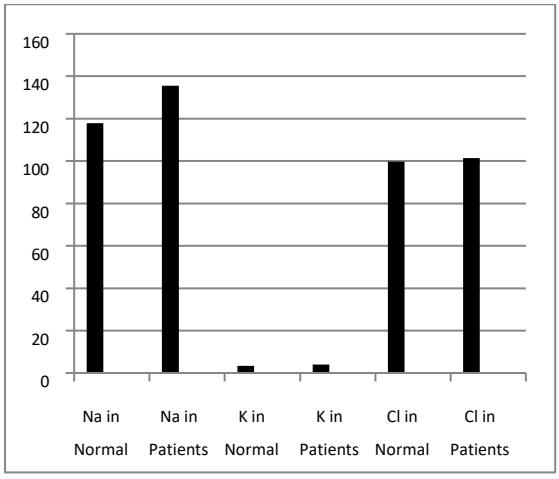

Fig 3. Comparative analysis of electrolytes in both control and patient.

Value of K Potassium was also measured the value of K in normal was 3.427 ±0.698 and in patients this value was 4.027 ± 0.9540 at $p < 0.027$. In this comparison the value of "K" was high in patients. Increase in the value of K was due to use off too many drugs like alcoholism and some diets like beet, banana, and dried fruits. Due to which an increase of K is observed. The value of Cl in Normal 99.80 ± 4.329 was observed and in patients this value was 101.41 ± 5.24 which was high at $p < 0.028$. Increases in the values of Cl were due to the use of too much salt in the diet.

WBCs and Eosinophil level were calculated the level (Mean ± S.D) of WBCs in normal was 8813.33 ± 791.80 and in patients this value was 8289.80 ± 1475.84 which was low than normal values. A decrease in the value of WBCs was due to diseases of gastritis in which stomach. Stomach suffers inflammation due to which WBCs and platelets' decreases.

Platelets In Normal and Patients

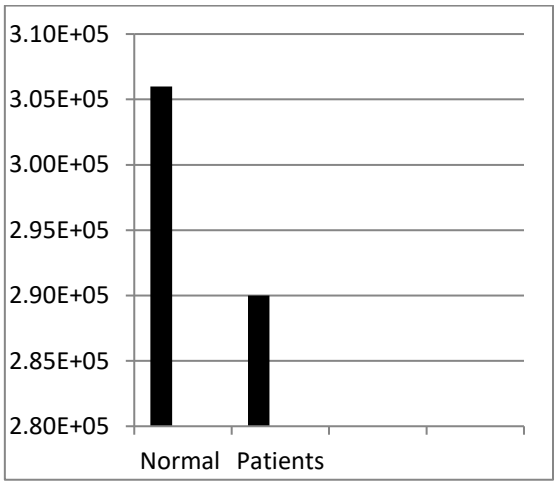

Fig 4. Comparative analysis of Platelets

WBCs in normal and in patients

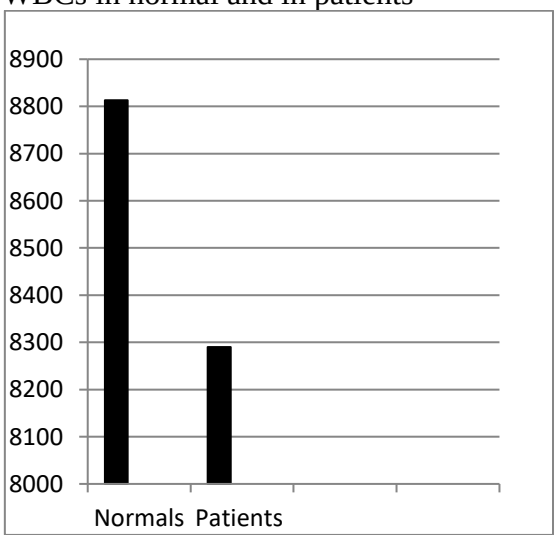

Fig 4. Comparative analysis of WBCs

While the value (Mean ± S.D) of Neutrophil was 52.00 ± 9.61and in patient this value was 58.32 ± 6.75 at p <0.05. An increase of neutrophils was observed during study and this increase in neutrophils was due to infection in digestive tract due to hook warm which led to increase in the value of neutrophils.

The next parameter was Hemoglobin its value was in normal was 12.33 ± 1.91 while in the digestive tract disease patients this value was 14.43 ± 1.43 which was high than normal value. High in the value of hemoglobin was due to dehydration which leads to increases in the value of hemoglobin.

RBCs In Normal and Patients

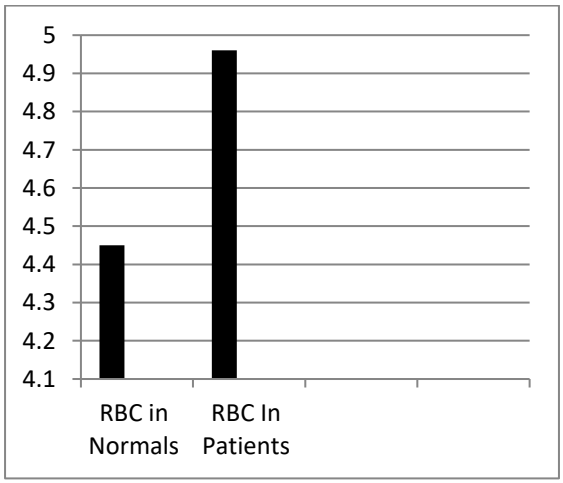

Fig 5. Comparative analysis of RBC

Eosinophil In Normal and Patients

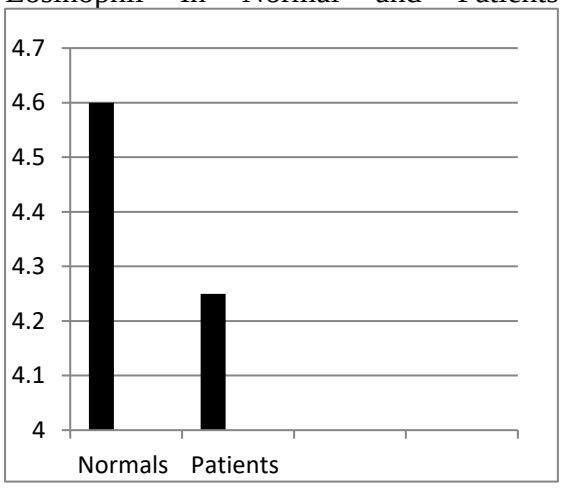

Fig 5 Comparative analysis of Eosinophil.

Eosinophil level (Mean ± S.D) was 4.60 ± 1.242 in normal while in patient its value was 4.25 ± 1.99. This value was lower than normal. RBCs in normal was 4.45 ± 0.53 and in the digestive tract diseases patients its value was 4.96 ± 0.59. Which was high than normal values at p < 0.05 Increases in the value of RBCs was due to increase of acidity which led to stomach ulcer and due to which red blood cells increases.

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