# Evaluation of Alkaline Phosphatase and Catalase Activitites in Hemorrhoid Patients

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## Abstract

This study determines the alkaline phosphatase (ALP) and catalase activities in sera of hemorrhoid patients compared with healthy controls. The design of the project includes (12) hemorrhoid patients (males only) and (12) healthy males. The results shown significant decrease in alkaline phosphatase activity in hemorrhoid patients compared with healthy controls(P= 0.0002). Catalase activity significantly increased in hemorrhoid patients compared with healthy(P=0.0000) .The time effectual on catalase activity was study and shown significantly decrease.

## الخلاصة

في هذه الدراسة تم تقدير فعالية إنزيم الفوسفاتيز القاعدي وفعالية إنزيم الكاتليز في أمصال المرضى المصابين بمرض البواسير الشرجية.أجريت الدراسة على 12 شخص مصاب من الذكور فقط مقارنة مع 12 شخصا صحيحا كمجموعة سيطرة. أوضحت النتائج نقصانا معنويا في مستوى الفوسفاتيز القاعدي لدى المرضى مقارنة بالأصحاء وارتفاعا معنويا في مستوى الكاتليز لدى المرضى مقارنة بالأصحاء(P=0.0002، P=0.000).

تم دراسة تأثير الزمن على فعالية الكاتليز وقد تبين حدوث نقصانا معنويا بمرور الزمن.

## Introduction

Hemorrhoids are enlarged, painful veins in the rectum ,it is developed from two different places, there are two sets of veins that drain the blood from the lower rectum and anus[1]. Hemorrhoids are caused by too much pressure put on the veins in the rectum forcing blood to stretch and bulge the walls of the veins, sometimes rupturing them, Other causes of hemorrhoids are pregnancy, significant overweight, overeating, heavy lifting, acid/alkaline imbalance, fatigue liver and vitamin B-6 deficiency [2]. Sitting or standing in one position for long periods of time and lack of exercise can contribute to the development of hemorrhoid[3]. In some cases hemorrhoid can be caused by other diseases, such as liver cirrhosis, studies suggest an association between elevated serum alkaline phosphatase (AP) and increased disorders hemorrhoid patients [4]. Alkaline phosphatase (AP) activity is present in most human tissues, the highest concentrations are found in the intestines, liver, bone, spleen, placenta and kidney [5]. The specific location of the enzyme within

these tissues accounts for the more predominant elevations in certain disorders[6]. A major approach to a safe and effective treatment for both varicose veins and hemorrhoids is represented by the use of botanical products and nutrients[7]. Antioxidant activity showing increased levels of catalase (CAT), catalase like all enzymes has an optimum temperature and pH at which it works best, it is produced by most tissues in order to broken down $H_2O_2$ that result from in a Haber-Weiss reaction and thereby produce free radicals (including the hydroxyl radical) which would lead to damage[8,9]. Catalase catalyses conversion of hydrogen peroxide, a powerful and potentially harmful oxidizing agent, to water and molecular oxygen(10).

$$H_2O_2 + 1/2\ O_2 \xrightarrow{CAT} H_2O + O_2$$

## Material And Methods

### Patients

12 hemorrhoid patients( men) have aged 35-45 years and 12 men have aged 35-45 years, as a controls group, blood samples were collected from men with patients and control were collected. After clotting, serum was separated by centrifugation, the analytical determinations described below were either performed immediately, or serum was stored at 20°C and used within 72 hours.

### Determination of alkaline phosphatase (ALP) activity

Alkaline phosphatase activity is colormetrically determined according to the following methods . Phenol is measured in the presence of amino anti-pyrine and potassium ferricyanide ,the presence of sodium arsenate in the reagent to stop the enzymatic reaction for the more of color change was estimated at 510 nm. [12,13].

### Determination of catalase (CAT) activity

Catalase activity is determine by the rate of consumption in H2O2with time. The reaction of mixture contained water, buffer solution (pH7.2, 50 mmole/L), Catalase ,hydrogen peroxide(10 mmole/L) ,magnesium chloride(0.1 mole/L) potassium permanganate (2 mmole/L) and hydrochloric acid(5 mmole/L)[11].

### Statistical analysis

All results are expressed as a mean ± SD(standard deviation), comparison between patients and controls were preformed by the student's t- test. Person's correlations were used to determine relationship between parameters studied. A value of $p \leq 0.05$ was considered statistically significant.

## Results and Discussion

A significant difference (p=0.0002) between hemorrhoid patients and healthy control in alkaline phosphatase activity show in table (1).

**Table 1** Alkaline phosphatase (ALP) levels (U/dl) in hemorrhoid patients compared with control groups.

| Subject | Mean(U/dl) | SD | P-value | Sign. |
|---|---|---|---|---|
| Patients | 4.28 | 1.57 | 0.0002 | Sign. |
| Control | 8.23 | 2.26 | ------ | ----- |

When additional pressure brought on by lifting or the like causes excessive resistance to flow in the rectal area, the smaller veins begin to stretch and stretch, like tiny balloons. Sometimes they lose their elastic property and become engorged with blood, gradually forming hemorrhoids over a period of time, when the hemorrhoids are formed, bleeding often follows and a painful, pressure on these veins causing hemorrhoid, liver disease can also cause increased pressure in the veins and hemorrhoids therefore ALP level is decreased[14].

**Effect of catalase (CAT) activity**

Hydrogen peroxide acts as a conduit to transmit free radical induced damage across cell compartments and between cells. Catalase is used hydrogen Peroxide to oxidise toxins including Phenols, Formic Acid, Formaldehyde and Alcohols, significant decrease passing through the time due to one of the factor effectual on catalase activity and H2O2 is not stable(11). The results shown a significant increase in catalase activity of hemorrhoid patients compared with healthy control (P=0.000),and this activity decreasing with time shown in table (2).

**Table 2** Effect of time on catalase (CAT) activity(µmole/ml) in hemorrhoid patients and compared with control groups:

| Subject | Mean(µmole/ml) | SD | Time(min.) | P-value | Sign. |
|---|---|---|---|---|---|
| Control | 17 | 6.41 | 3 | 0.000 | |
| Patients | 37.4 | 9.65 | | | Sign. |
| Control | 22.7 | 9.28 | 6 | 0.000 | |
| Patients | 47.75 | 12.91 | | | Sign. |
| Control | 10.26 | 2.79 | 9 | 0.004 | |
| Patients | 22.45 | 11.32 | | | Sign. |
| Control | 7.24 | 1.27 | 12 | 0.001 | |
| Patients | 12.25 | 4.18 | | | Sign. |
| Control | 14.03 | 5.08 | 15 | 0.15 | |
| Patients | 21.25 | 14.49 | | | No sign. |

## Conclusions

1.Catalase activity(CAT) increased in hemorrhoid patients compared with healthy control.

2. Alkaline phosphatase (ALP) levels decreased in hemorrhoid patients compared with healthy control.

3.The time effect on catalase activity and shown significantly decrease.

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