

Free Radical Relations of Superoxide Dismutase (SOD) on Hemoroid Patients in Makassar

Warsinggih¹, Unggul²

¹²Departement of Surgery Faculty of Medicine,

¹²University of Hasanuddin Makassar

Abstract: Assessment of superoxide dismutase levels in hemorrhoids. This research was conducted by applied a cross sectional study to analyze the profile of free radical superoxide dismutase (SOD) with ELISA method in 80 hemorrhoids patients performed in Surgery Department of Faculty of Medicine, Hasanuddin University of Makassar, Wahidin Sudirohusodo Hospital and other network hospitals. Patients are aggregated and grouped by age, sex, criterion of smokers, drinking criteria, occupation, and diet. Superoxide Dismutase levels are elevated in grade III and IV hemorrhoids.

Keywords: Superoxide dismutase, hemorrhoids.

I. INTRODUCTION

The suffering caused by hemorrhoids has been known for a long time. Some of the world's cultural histories such as Babylonian, Hindu, Greek, Egyptian, and Hebrew have even described and recorded the various troubles and discomforts caused by hemorrhoids. Until now not many patients are seeking medical treatment for this disease medically. In the United States it is estimated that about half of individuals over 50 years experience symptoms of this disease and only about 500 thousand patients are seeking treatment. More than half of men and women aged 50 years and older will get symptoms of hemorrhoids during their lifetime [1-3].

Although hemorrhoids are not as deadly as heart disease, cancer, and stroke, but this disease is very potential to reduce the quality of life. Pain and discomfort from swelling of the anus can reduce a person's productivity. Therefore, the provision of initial hemorrhoids therapy is helpful to improve the quality of life and avoid complications. For grade III and IV degrees, if bleeding and prolapse has occurred, invasive action is the last resort.[4-6]

According to Merck manual the definition of a hemoroid is "Varicose veins of the hemorrhoid plexus, often complicated by inflammation, thrombosis, and bleeding". But the latest definition of hemorrhoids is a "vascular pillow, consisting of thick submucosa containing venous and arterial blood vessels", hemorrhoids are one of the most common digestive disorders involving physicians

[7,8]. Hemorrhoids have some treatment modalities and diagnoses [9-12]. In the early stages of conservative treatment can be applied, but during periods when the hemorrhoids become severe, the disease must be handled by some non-surgical treatments such as sclerotherapy, rubber band ligation, infrared photocoagulation, cryotherapy, bipolar diathermy, and electrochemical currents. When the hemorrhoids cannot be treated with non-surgical treatment, normal or alternative methods such as surgical methods are applied [13-20].

The current findings suggest that the contribution of free radicals is pathogenesis of varicose veins and hemorrhoids, it is said that widening of veins occurring around the rectum with antioxidant administration (vitamins C and E, flavoid) has a positive effect.

II. MATERIALS AND METHODS

a. Patient

Patients who are the subjects in this study were serum patient grade III-IV hemorrhoids in RS Wahidin Sudirohusodo and other network hospitals of 80 people. The inclusion criteria of the study subjects were patients with grade III-IV hemorrhoids diagnosis. Criteria of exclusion of study subjects were: patients with diagnosis of colorectal cancer, patients with diagnoses of irritable bowel disease and sufferers with diabetes mellitus, heart disease, liver tumors and gynecologic tumors.

b. Superoxide Dismutase

Superoide dismutase is a derivative radical of oxygen called oxygen reactive group. Assessment of SOD levels in hemorrhoids by taking blood samples of patients.

c. Hemorrhoids

Hemorrhoids are a disease that is diagnosed by subjects with grade III and IV hemorrhoids based on criteria that have been measured by anamnesis and rectal examination.

III. DATA ANALYSIS

The data in this study will be processed using SPSS 22. All test results will be presented in the form of tables and graphs. To test the hypothesis, data analysis using Mann Whitney test with a tolerance of 5%.

IV. RESEARCH RESULT

Characteristics of Respondents

During the study period, 80 samples were obtained, including 40 patient controls. Table 1 illustrates the characteristics of the overall research sample. Based on the distribution of research samples according to gender, the highest number of men were 40 people (50.0%), and 40 women (50.0%).

Based on the distribution of the sample by age group, the highest number of samples were aged 40-49 years old, 20 persons (25.0%), followed by the age group of 20-29 years, 18 people (22.5%), followed by age group 50-59 and 60 - 69 years old are 12 persons (15.0%), followed by age group > 70 years of 8 people (10.5%), followed by age group 30-39 years 6 (7.5%) and the smallest group is <20 years age group 4 people (5.0%).

Table 1. Distribution of respondent base on the characteristics

Karakteristik Sampel	n	%
Jenis kelamin		
Laki-laki	40	50,0
Perempuan	40	50,0
Usia		
<20 thn	4	5,0
20-29 thn	18	22,5
30-39 thn	6	7,5
40-49 thn	20	25,0
40-49 thn	12	15,0
60-69 thn	12	15,0
>70 thn	8	10,0
SOD		
<164 U/m L	29	36,2
164-240 U/m L	20	25,0
> 240 U / m L	31	38,8
Kriteria Perokok		
Merokok	28	35,0
Tidak Merokok	52	65,0
Kriteria Peminum		
Alkohol	23	28,8
Non-alkohol	57	71,2
Kriteria Makan Sayur		
Makan sayur	8	10,0
Tidak Makan Sayur	72	90,0
Kriteria Pekerjaan		
Duduk lama	23	28,8
Tidak duduk lama	57	71,2

SOD samples were high (> 240 U / mL) of 31 people (38.8%), normal SOD levels (164 - 240 U / mL) of 20 (25.0%), and low SOD (<164 U / mL a total of 29 people (36.2%).

Based on the distribution of research samples that smoked a

number of 28 people (35.0%), and who did not smoke a number of 52 people (65.0%). Based on the distribution of research samples that alcohol drinkers amounted to 23 people (28.8%), and non-alcohol drinkers a total of 57 people (71.2%). Based on the distribution of research samples that ate vegetables of 8 people (10.0%), and those who did not eat vegetables were 72 (90.0%).

Table2. SOD value distribution base on the Smoking criteria

	Merokok		Total
	Merokok	Tidak Merokok	
Tinggi (>240U/ml)	16(20,0%)	15(18,8%)	31(38,8%)
SOD Normal(164-240U/ml)	8(10,0%)	12(15,0%)	20(25,0%)
Rendah (<164U/ml)	4(5,0%)	25(31,2%)	29(36,2%)
Total	28(35,0%)	52(65,0%)	80(100,0%)

Based on the distribution of research samples with 23 years old working (28.8%), and those who did not sit were 57 (71.2%). Mann Whitney test in both hemorrhoids and control patients was found to be a significant result where the 2-tailed value was 0.000.

Table 3. SOD value distribution base on the Alcohol consumption

	Alkohol		Total
	Minum alkohol	Tidak Minum Alkohol	
Tinggi (>240U/ml)	15(18,8%)	16(20,0%)	31(38,8%)
SOD Normal(164-240U/ml)	6(7,5%)	14(17,5%)	20(25,0%)
Rendah (<164U/ml)	2(2,5%)	27(33,8%)	29(36,2%)
Total	23(28,8%)	57(71,2%)	80(100,0%)

According to table 3, the total value of the long-term hemorrhoids hearing patient rating is 1560.00 and the control is 1680.00. Using a comparative test of long sitting employment using Mann Whitney Test in both hemorrhoids and control patients was found to be a non-significant result in which the 2-tailed score was 0.461. Similarly, for those who ate vegetables compared to hemorrhoids and controls, using Mann Whitney's Test, there was no meaningful result where the 2-tailed value was 0.139.

Frequency of SOD Against Smoking Criteria

SOD study sample is divided into three categories, high if SOD > 240 U / mL, normal if SOD 164 - 240 U / mL and low when <164 U / mL. From table 2, the distribution of SOD values based on smoking and non-smoking criteria found that the number of patients with high SOD was found to be higher in the smoking group than non-smokers [16 (20.0%) vs 15 (18.8%)]. many in non-smokers compared with those who smoked [12 (15.0%) vs 8 (10.0%)]. Likewise for the low SOD category was found more in patients who did not smoke [25 (31.2%) vs 4 (5.0%)].

Frequency of SOD Against Alcohol Drinking Criteria

From table 3, the distribution of SOD values based on the criterion of alcohol drinkers found that the number of patients with high SOD was found to be higher in the non-alcoholic group than those who drank alcohol (16 (20.0%) vs 15 (18.8%)). The normal SOD category was obtained more in patients who did not drink alcohol than those who drank alcohol [14 (17.5%) vs 6 (7.5%)]. Likewise for the low SOD category was found more in patients who did not drink alcohol [27 (33.8%) vs 2 (2.5%)].

Table 4. SOD Values Distribution base on the Sitting duration work

	Lama Duduk		Total
	Duduk	Duduk Tidak	
	Lama	Lama	
Tinggi (>240 U/ml)	10 (12.5%)	21 (26.2%)	31 (38.8%)
SOD Normal (164-240 U/ml)	6 (7.5%)	14 (17.5%)	20 (25.0%)
Rendah (<164 U/ml)	7 (8.8%)	22 (27.5%)	29 (36.2%)
Total	23 (28.8%)	57 (71.2%)	80 (100.0%)

Frequency of SOD Against Job Criteria

From table 4, the distribution of SOD values based on the long-term criteria was found that the number of patients with high SOD was found to be higher in the non-sitting group compared with the older working group (21.26.2 vs 10 (12.5%)). normal is more prevalent in patients who do not sit longer than those who sit long [14 (17.5%) vs 6 (7.5%)]. Likewise, for low SOD categories, more were found in patients who did not work long [22 (27.5%) vs 7 (8.8%)].

Frequency of SOD Against Vegetable Eating Criteria

Table 5. SOD Value distribution base on vegetable consumption

	Lama Duduk		Total
	Duduk	Duduk Tidak	
	Lama	Lama	
Tinggi (>240 U/ml)	3 (3.8%)	28 (35.0%)	31 (38.8%)
SOD Normal (164-240 U/ml)	4 (5.0%)	16 (20.0%)	20 (25.0%)
Rendah (<164 U/ml)	1 (1.2%)	28 (35.0%)	29 (36.2%)
Total	8 (10.0%)	72 (90.0%)	80 (100.0%)

From table 5 the distribution of SOD value based on vegetable eating criteria was obtained that the number of patients with high SOD was found to be higher in the group (28.0%) vs 3 (3.8%). The normal SOD category was found to be higher in patients who did not eat vegetables than those who ate vegetables [16 (20.0%) vs 4 (5.0%)]. Likewise for the lower SOD category was found more in patients who did not eat vegetables [28 (35.0%) vs 1 (1.2%)].

SOD Comparative Test In Hemoroid Patients

Table 6. Man Whitney test SOD on Hemoroid Patients

	SOD Kategori Merokok	Alkohol	Pekerjaan Lama Duduk	Makan Sayur
Mann-Whitney U	49.500	480.000	420.000	740.000
Wilcoxon W	869.500	1300.000	1240.000	1560.000
Z	-7.704	-3.727	-4.664	-.736
Asymp. Sig. (2-tailed)	.000	.000	.000	.461

From table 6 it was found that the rank value for hemorrhoids was 869.50 while the non-hemorrhoids were 2370.50. Using a SOD comparison test using Mann Whitney's Test on hemorrhoids and control patients, there were significant results where the 2-tailed value was 0.000.

The number of hemorrhoids rated by smokers is 1300.00 and the control is 1940.00. Using a smoking comparison test using Mann Whitney Test in both hemorrhoids and control patients, there was a significant result where the 2-tailed score was 0.000.

The total value of hemorrhoids patients who drank alcohol was 1240.00 and the control was 2000.00. Using a comparative test of drinking alcohol using the Mann

Whitney Test in both the hemorrhoids and control patients, there was a significant result where the 2-tailed value was 0.000.

One-Sample Kolmogorov-Smirnov Test

		SOD
N		40
Normal Parameters ^a	Mean	2.1229E2
	Std. Deviation	7.27350E1
Most Extreme Differences	Absolute	.152
	Positive	.116
	Negative	-.152
Kolmogorov-Smirnov Z		.961
Asymp. Sig. (2-tailed)		.314

Based on table 6, the total value of the long-term hemorrhoids hearing patient rating is 1560.00 and the control is 1680.00. Using a comparative test of long sitting employment using Mann Whitney Test in both hemorrhoids and control patients was found to be a non-significant result in which the 2-tailed score was 0.461. Similarly, for those who ate vegetables compared to hemorrhoids and controls, using Mann Whitney's Test, there was no meaningful result where the 2-tailed value was 0.139.

V. DISCUSSION

From Result of this research it can be shown that distribution of SOD score based on smoking and non-smoking criteria found that the number of patients with high SOD was found to be higher in the smoking group than non-smokers [16 (20.0%) vs 15 (18.8%)]. Unlike the case in Table 3, high SOD was found to be higher in the non-alcoholic group than those who drank alcohol [16 (20.0%) vs 15 (18.8%)]. This indicates that cigarettes can increase SOD levels but not so with alcoholic beverages [19-25].

Similarly, in Table 4, the high SOD score was found to be higher in the long-acting group than the older working group (21 (26.2%) vs 10 (12.5%)). Similarly, high SOD was found in the non-vegetable group compared to those who ate vegetables [28 (35.0%) vs 3 (3.8%)]. This means that eating vegetables can lower SOD levels [26-32].

VI. CONCLUSIONS AND RECOMMENDATIONS

From the results of research conducted in the city of Makassar about the relationship of Superoxide Dismutase to 80 pagoda Hemoroid concluded that Superoxide Dismutase levels increased in patients with hemorrhoids and superoxide dismutase levels can be used as a reference for research antioxidant therapy.

Suggestions for further investigators are the need for further research with more and more diverse samples and if there is evidence of a SOD relationship as a cause or that affects the hemorrhoids it is advisable to intervene by providing antioxidants.

REFERENCES

- [1]. Berkow R (ed) (1992), The Merck Manual of Diagnosis and Therapy. 16th ed. Rahway, NJ: Merck; 855-856.
- [2]. Garni, B. (2011) HEMORRHOIDS - A COMMON AILMENT AMONG ADULTS, CAUSES & TREATMENT: A REVIEW. *IntJPharm Sci.* 3:5-12
- [3]. Akhmedova EV, (2011), [Antioxidant therapy for acute thrombosis of hemorrhoidal nodes], *Vesta Khir Im* 11 Grek.;170(2):29-30.
- [4]. Vertuani et all, (2004), ANTIOXIDANT HERBAL SUPPLEMENTS for HEMORRHOIDS developing a new formula. *Sutrafood* 3 (3) 19-26
- [5]. Han W, Wang ZJ, Zhao B, Yang XQ, Wang D, Wang JP, Tang XY, Zhao F, Hung YT. (2005). Pathologic change of elastic fibers with difference of microvessel density and expression of angiogenesis-related proteins in internal hemorrhoid tissues]. *Zhonghua Weichang Waike Zazhi.* Pubmed 8: 56-59
- [6]. Mahmoud A. Wali,1 FRCSI, Suleiman A. Suleiman,2 PhD, Osama F. Kadoumi, MS, and Mohamed A. Nasr, MS (2002), Superoxide Radical Concentration and Superoxide Dismutase, (SOD) Enzyme Activity in Varicose Veins, (*Ann Thorac Cardiovasc Surg* ; 8: 286-90)
- [7]. Sohretoglu D, Sabuncuoglu S, Harput US. (2011). Evaluation of antioxidative, protective effect against H(2)O(2) induced cytotoxicity, and cytotoxic activities of three different Quercus species. Hacettepe University, Faculty of Pharmacy, Department of Pharmacognosy, TR-06100 Ankara, Turkey, *Pub Med.*
- [8]. Varut Lohsiriwat, 2009, Hemorrhoids: From Basic pathophysiology to clinical management, *World of Journal of Gastroenterology*, 18 (17) 2009-2017.
- [9]. Seok-Gyu Song et al, 2011, Optimal Treatment of Symptomatic Hemorrhoids, *Journal of the Korean Society of Coloproctology*, 27(6):277-281.
- [10]. Barnett JL 2003. Anorectal Disease. In: Yamada T, Alpers DH, Kaplowitz N, Laine L, Owyang C, Powell DW, editors. *Textbook of Gastroenterology*. 4th ed. Philadelphia. Lippincott Williams & Wilkins, p.1991-5.
- [11]. Chung YC, Hou YC, Pan AC, 2004, Endoglin (CD105) expression in the development of haemorrhoids, *Hsin-Chu General Hospital, Taiwan. Eur J Clin Invest*, 34(2): 107-12.
- [12]. Andra, Diosmin-Hesperidin, Angin Segar untuk Pasien Hemoroid, Available at : http://www.haemorrhoid/one_news_print.asp.htm

- [13]. Keighley MRB, William NS. Haemorrhoidal Disease. In Surgery of the Anus, Rectum, and Colon. 2nd ed. London. WB Saunders, p.352-422
- [14]. Corman ML, Allison SI, Kuehne JP. Handbook of Colon & Rectal Surgery. 4th ed. New York. Lippincott William & Wilkins Publisher. 1998. p.83-136
- [15]. Lusikooy RE. Pengobatan Hemoroid Secara Konvensional. Makalah dalam Simposium Penatalaksanaan Hemoroid. Makassar Mei 2004
- [16]. Rauf M. Anatomi, Patofisiologi, dan Gambarab Klinik Hemoroid. Makalah dalam Simposium Penatalaksanaan Hemoroid. Makassar Mei 2004
- [17]. Thornton S. Haemorrhoids. Available at : <http://www.emedicine.com>.
- [18]. Fry RD. Benign Diseases of the Anorectum. In : Zinner MJ, Schwartz SI, Ellis H, editors. Maingot's Abdominal Operation. 10th ed. London. Prentice Hall International Inc. 1997. p.1437-54
- [19]. Schwarts SI, Shires GT, Spencer FC. Principles of Surgery. 7th ed. New York. McGrawHill. 1999. p.1295-9
- [20]. Shimoda S, Silverstein F, Saunders DR. Colon, the gut course (hubio551): online syllabus. Unyversity of Washington Division of Gastroenterology. Arce DA, Ermocilla CA, Costa H. Evaluation of Constipation. New York. Am Fam Physician. 2002
- [21]. Ganong WF. Regulation of Gastrointestinal Function. In : Review of Medical Physiology. 20th ed. San Fransisco. Lange Medical Book. 1999. p.464-95
- [22]. Lacy BE, Cole MS. Constipation in the Older Adult. In : Clinical Geriatrics. Vol 12 - Issue 11 Nov 2004. p.44-54
- [23]. Dimmer C, Martin B, Reeves N, Sullivan F. Squatting for the prevention of Haemorrhoids?. Australia. Published in Townsend Letter for Doctors & Patients. Issue No. 159, Oct 1996. p.66-70
- [24]. Scott RB. Chronic constipation, encopresis, and soiling. Chapter 15. Available at : <http://www.gastroenterologychapter15childhooddisease.htm>
- [25]. Berardi RR. Clinical update on the treatment of constipation in adult. Available at: <http://www.pharmacytimes.htm>
- [26]. Lembo A, Camilleri M. Chronic Constipation. The New England Journal of Medicine. Vol 349:1360-8, No 14. Oct 2,2003
- [27]. Droge W. Free radicals in the physiological control of cell function. *Physiol Rev.* 82;2002:47-95.
- [28]. Proctor PH, Reynolds ES. Free radicals and disease in man. *Physiol Chem Phys Med.* 16;1984:175-95.
- [29]. Araujo V, Amal C, Boronat M, et al. Oxidant-anti oxidant imbalance in blood of children with juvenile rheumatoid arthritis. *Bio Factor.* 8; 1998:155-59.
- [30]. Inoue M. Protective mechanisms against reactive oxygen species. In: Arias IM The liver biology and pathobiology Lippincott Williams and Wilkins 4th-ed. Philadelphia. 2001:281-90.
- [31]. Abate C, Patel L, Raucher FJ III, et al. Redox regulation of fos and jun DNA- binding activity in vitro. *Science.* 249;1990:1157-61.
- [32]. Albina JE, Reichner JS. Role of nitric oxide in mediation of macrophage cytotoxicity and apoptosis. *Cancer Metatasis Rev.* 17; 1998:38-53.