



## Study of lipid peroxide levels and status of antioxidant enzymes in alcoholic hepatitis patients

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### Abstract

**Background:** *The real status of pro-oxidant and antioxidant in alcoholic hepatitis is still not clear.*

**Material & Methods:** *This study was conducted in Department of Biochemistry, Santosh medical college & Hospital. 40 alcoholic hepatitis patients were subjected to detailed clinical examination and laboratory investigations and the results were compared with 40 controls. Blood samples were collected for oxidative stress parameters. It was observed that there was a significant increase in activities of SOD, MDA and Catalase activity in patients with alcoholic hepatitis when compared to controls.*

**Results:** *Result of this study depict higher oxygen free radical production, evidenced by elevated levels of MDA and decreased levels of Catalase activity, supporting the evidence of oxidative stress in alcoholic hepatitis patients. Increased activities of antioxidant enzymes might be a compensatory regulation of body in response to increased oxidative stress.*

**Conclusion:** *Data of this study represent that antioxidant defense mechanisms might be impaired in patients with alcoholic hepatitis. These findings also provide a theoretical basis for development of novel therapeutic strategies, such as antioxidant supplementation.*

**Keywords:** *Superoxide dismutase (SOD), Catalase, Alcoholic Hepatitis (AH).*

### Introduction

A subset of patients with ALD will develop severe alcoholic hepatitis (AH), which has a substantially worse short-term prognosis.<sup>1</sup> AH also represents a spectrum of disease, ranging from mild injury to severe, life-threatening injury, and often presents acutely against a background of chronic liver disease.<sup>2,3</sup> The true prevalence is unknown, but histologic studies of patients with ALD suggest

that AH may be present in as many as 10%-35% of hospitalized alcoholic patients.<sup>4,5</sup> The disease is often progressive and is considered to be a major cause of morbidity and mortality. In recent years, oxidative stress has been implicated in the path physiology of a large number of disease or disorders which are initiated and /or exacerbated by pro-oxidants such as various drugs including alcohol and food additives. Besides, ingested

alcohol produces striking metabolic imbalances in the liver. It leads to the formation of reactive oxygen species (ROS). Inadequate removal of ROS may cause cell damage by attacking membrane lipids, proteins and inactivating enzymes thus mediating several forms of tissue damage. At present, except for the abstinence of alcohol abuse, there is no effective modality of either prevention or treatment. The incidence of Alcohol Hepatitis is increasing day by day specially in the developing countries including India. This study was planned with the objectives to investigate the oxidative damage and the efficiency of antioxidant defense system in patients of alcoholic hepatitis in the socioeconomic belt of Srinagar, Garhwal, Uttarakhand.

### Materials and Methods

Fourty clinically, pathologically proven fresh cases of alcoholic hepatitis (group A; age: 21-45 years) and fourty clinically healthy volunteers of either sex (group B; age: 17-40 years) were included in this study. Only minimal and moderately advanced patients of alcoholic hepatitis were included in the present study. All subjects took their usual (although not identical) meals three times daily; breakfast around 8:30 a.m., lunch around 13:30 p.m. and dinner around 20:30 p.m., without any change in their usual fluid intake. The burden of environmental temperature and pollution, if any, was common to all participants. Prior to the blood sample collection, the participants refrain from taking any drugs/preparation that would affect or alter the oxidative stress, its defensive mechanism, level and rhythm. Six millilitres of blood was collected from each subject at fixed time in plain and sterile vials containing heparin as anticoagulant. The plasma was separated and analyzed for lipid peroxides in terms of malondialdehyde (MDA) <sup>(7)</sup>. The haemolysate was prepared from the red cells and used for the measurement of the activities of enzymes superoxide dismutase (SOD), catalase (CAT) <sup>(8,9)</sup>.

### Results & Observations

**Table-1** Distribution of patients of Alcoholic hepatitis according to groups

Group	Number of Participants
A	40
B	40
Total	80

**Table-2** Serum Superoxide Dismutase (SOD), Malondialdehyde (MDA), and Catalase levels amongst normal healthy individuals and patients of alcoholic hepatitis

Parameters	Control (n=40)	Patients (n=40)
SOD	21.91±0.05	17.05±0.09
MDA	2.50±0.03	3.05±0.03
Catalase	16.55±0.04	13.18±0.08

\*P<0.001

### Discussion

These data reveal that antioxidant defense mechanisms might be impaired in patients with alcoholic hepatitis. These findings also provide a theoretical basis for development of novel therapeutic strategies, such as antioxidant supplementation.

A marked plasma MDA level was recorded in healthy Indians and alcoholic hepatitis patients. The plasma MDA levels elevated in patients in comparison to healthy controls. There are no reports regarding circulating lipid peroxides in alcoholic hepatitis patients under tropical conditions. A statistically significant status was recorded in SOD, CAT concentrations in clinically healthy subjects and alcoholic hepatitis patients. SOD activity was found to be maximum in patients. Moreover, the activity was noticed to be decreased at all sampling hours during a 24-hour sleep-awake period in patients in comparison to their healthy counterparts. The CAT activity was also noticed to be reduced in patients. The decreased concentration of measured antioxidant enzymes in alcoholic hepatitis patients could probably be associated with oxidative stress and/or decreased antioxidant defense mechanism. clearly exhibited an imbalance between oxidant and antioxidant defensive systems in the human body under such pathological situations.

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