

**Original article:**

## Serum markers in liver diseases

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### Abstract:

Laboratory tests often referred to as liver function tests which are useful in the evaluation and management of patients with hepatic dysfunction. They provide a sensitive non invasive method of screening for the presence of liver dysfunction. Once the presence of liver dysfunction is recognized the pattern of laboratory test abnormalities may allow clinicians to recognize the general type of liver disorder. Serum assay of biochemical markers of liver diseases play an important role in the proper evaluation of liver and biliary tract disease. Serology is the science that deals with the characterization of serum, the non cellular component of blood. Serum contains many valuable proteins, nucleotides and other chemicals that aid the physiological functions of the body. Between 1900 and 1950, numerous scientific studies were performed to study the production of serum and its use in monitoring and controlling diseases. This period has been called the era of international serology

The most important Serum Markers present in the liver are Serum Glutamate Pyruvate Transaminase (SGPT), Serum Glutamate Oxaloacetate Transaminase (SGOT), Alkaline Phosphatase, Bilirubin, Gamma Glutamyl Transpeptidases, 5'Nucleotidase, Albumin, Prothrombin time. The levels of these markers gets elevated during liver diseases. The present study included 50 cases of liver diseases and 26 healthy individuals as control group in who serum ALT, AST, Alkaline phosphatase, serum bilirubin were estimated. Present study was categorized into 4 groups according to the diseases of the liver as per results obtained, discussed parameter wise.

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### Introduction:

Laboratory tests often referred to as liver function tests which are useful in the evaluation and management of patients with hepatic dysfunction. They provide a sensitive non invasive method of screening for the presence of liver dysfunction. Once the presence of liver dysfunction is recognized the

pattern of laboratory test abnormalities may allow clinicians to recognize the general type of liver disorder Serum assay of biochemical markers of liver diseases play an important role in the proper evaluation of liver and biliary tract disease. Serology is the science that deals with the characterization of

serum, the non cellular component of blood. Serum contains many valuable proteins, nucleotides and other chemicals that aid the physiological functions of the body. Between 1900 and 1950, numerous scientific studies were performed to study the production of serum and its use in monitoring and controlling diseases. This period has been called the era of international serology

Serum makers are the specific indicators found in the blood that identifies a disease. Serum markers are the substances that are soluble in serum and are present at high levels in association with specific diseases. Serum markers are used to distinguish specific diseases in individuals. These markers are valuable in detection of some cancers especially due to their potential in identifying the early stages of disease of disease, prior to the onset of symptoms. Serum markers have a great potential to be used in clinical practice including early detection of cancer because these markers are differently expressed and they vary between both people who are healthy and those that have certain disease. The most important Serum Markers present in the liver are Serum Glutamate Pyruvate Transaminase (SGPT), Serum Glutamate Oxaloacetate Transaminase (SGOT), Alkaline Phosphatase, Bilirubin, Gamma Glutamyl Transpeptidases, 5'Nucleotidase, Albumin, Prothrombin time. The levels of these markers gets elevated during liver diseases

#### **Materials and methods:**

Patients admitted in the Medical, Surgical and Gastroenterology wards and out patients jaundice, Drug induced jaundice were selected for this study,

fifty cases of above mentioned department of King George Hospital, Visakhapatnam, with a diagnosis of Vital Hepatitis, Liver Cirrhosis, Obstructive liver disorders with age ranging from 20-60 years were selected for the study. No specific selection was made with regard to sex.

The patients were categorized into following groups according to disease. Age and sex matched healthy, 26 persons were taken as control groups for this study

#### **Inclusion criteria:**

Patient population included adults aged from 20-60 years, patients clinically diagnosed as having different liver disorders, were selected for this study. The diagnosis of the cases confirmed by clinical features, serological tests and other image logical investigation

#### **Exclusion criteria:**

Patients with other liver disorders such as cardiovascular diseases, kidney diseases were excluded from the study.

#### **Sample collection:**

Venous samples were collected without anticoagulant from outpatients as well inpatients serum was separated for the liver function test.

#### **Results:**

Mean, S.D, SEM values were performed using a computer programme named graph pad calculator.

1. Estimation of sgpt & sgot by reitman and frankel method

2. Estimation of alkaline phosphatase by kind and armstrong method, 1954

3. Estimation of bilirubin by malloy and evelyn method 1937

**Table-1: Distribution of liver diseases:**

SNO	DIAGNOSIS	NUMBER OF PATIENTS	PERCENT
1	Acute hepatitis	11	22%
2	Liver cirrhosis	19	38%
3	Obstructive Jaundice	13	26%
4	Drug Induced Jaundice	7	14%
	<b>TOTAL</b>	50	

**Table-2: Statistical analysis--study of control group:**

Various parameter values Mean, S.D, S.E.M of control group

S.NO	VARIABLES	MEAN	SD	SEM
1	ALT	26.61	7.5951	1.489
2	AST	28.57	6.5187	.1.278
3	ALP	65.88	9.0700	1.778
4	BILIRUBIN	0.546	0.2731	0.535

The mean, SD, SEM, of Alanine Transaminase (ALT), Aspartate Transaminase(AST),Alkaline Phosphatase(ALP), Serum Bilirubin of control group are represented in table. They are within the normal limits.

**Table-3: Statistical analysis of cases of acute hepatitis (n = 11):**

SNO	VARIABLES	MEAN	SD	SEM	P-VALUE
1	ALT	99.818	51.26	15.4	0.0212
2	AST	75.36	20.20	6.090	0.0110
3	ALP	163.45	149.28	45.0	0.0013
4	BILURUBIN	4.218	3.352	1.010	<0.0001

**Table-4: Statistical analysis of cases of cirrhosis of liver (n=19):**

SNO	VARIABLES	MEAN	SD	SEM	P-VALUE
1	ALT	66.05	20.12	4.61	0.0020
2	AST	64.73	13.87	3.18	<0.001
3	ALP	142.05	68.05	15.6	0.0003
4	BILIRUBIN	2.63	2.10	0.48	<0.0005

**Table-5: Statistical analysis of cases of obstructive jaundice (n=13):**

SNO	VARIABLES	MEAN	SD	SEM	P-VALUE
1	ALT	105.46	62.84	17.4	<0.0001
2	AST	80.30	36.60	10.15	<0.0001
3	ALP	187.15	138.75	38.48	<0.0001
4	BILIRUBIN	6.876	5.5141	1.52	<0.0001

**Table-6: Statistical analysis of cases of drug induced jaundice (n=7):**

SNO	VARIABLES	MEAN	SD	SEM	P-VALUE
1	ALT	166	36.51	13.7	<0.0001
2	AST	70.42	20.40	7.7	<0.0001
3	ALP	124.28	23.59	8.91	0.0001
4	BILIRUBIN	4.74	2.63	0.0001	0.0001

**Discussion:**

The present study included 50 cases of liver diseases and 26 healthy individuals as control group in who serum ALT,AST,Alkaline phosphatase, serum bilirubin were estimated. Present study was categorized into 4 groups according to the diseases of the liver as per results obtained, discussed parameter wise.

**Acute Hepatitis (N+11)**

Alanine transaminase levels showed significant elevation (p value=0.01212) with a mean value of 99.818±51.26, compared to controls 26.61±7.59 . Aspartate transaminase values also showed significant elevation (p value =0.0110) with a mean value of 75.36±20.20, compared to controls 28.57±6.51 . Alkaline phosphatase vlevels showed significant elevation (p value=0.0013) with a mean value of 163.47±149.2, compared to controls 65.88±9.07

These finding are in agreement with past studies of Ahmed Kalkan etal1999,K.Pratibha etal 2004, Selcuk Kaya etal 2007 . Serum Total Bilirubin values showed highly significant elevation (p value<0.0001)

with a mean value of 4.218±3.35, compared to controls 0.54±0.2731

**Cirrhosis of Liver (N=19)**

Alanine transaminase levels showed significant elevation (p value=0.0020) with a mean value of 66.05±20.12 compared to controls 28.57±7.59 . Aspartate transaminase levels showed significant elevation (p value < 0.0001) with a mean value of 64.73±13.87 compared to controls 28.57±7.59 . Alkaline phosphatase levels showed significant elevation (p value=0.0003) with a mean value of 142.05±68.05,compared to controls 65.88±6.51. These findings are in agreement with past studies of D.M Goldberg etal 1965, pace Mc Dotta etal 1990, Shelia Sherlock and J Dooley 1993 and Sanjiv chopra etal 1985 . Serum Total Bilirubin values show highly significant elevation (p value <0.0005) with a mean value of 2.63±2.10, compared to controls 0.546±0.2731

**Drug Induced Jaundice: (N=7)**

Alanine transaminase levels showed significant elevation (p value<0.0001) with a mean value of 166=36.5, compared to controls 26.61±7.59 .

Aspartate transaminase values also showed significant elevation (p value <0.0001) with a mean value of  $70.42 \pm 20.40$ , compared to controls  $28.57 \pm 6.51$ . Alkaline phosphatase levels showed no statistical significance (p value=0.3546) with a mean value of  $124.28 \pm 23.59$ , compared to controls  $65.88 \pm 9.07$

These findings of my present study were compared with past study of D.M Goldberg et al 1966B. Serum Total Bilirubin values showed significant elevation (p value=0.0010) with a mean value of  $4.74 \pm 2.63$ , compared to controls  $0.546 \pm 0.2731$

#### **Obstructive Jaundice (N=13)**

Alanine transaminase levels showed significant elevation (p value < 0.0001) with a mean value of

$105.46 \pm 62.84$ , compared to controls  $26.61 \pm 7.59$ .

Aspartate transaminase values also showed significant elevation (p value <0.0001) with a mean value of  $80.30 \pm 36.6$ , compared to controls  $28.5 \pm 6.51$ . Alkaline phosphatase levels showed significant elevation (p value < 0.001) with a mean value of  $187.1 \pm 138.7$ , compared to controls  $65.88 \pm 9.070$

These findings are in agreement with past studies of D.M Goldberg et al 1965, Seila Sherlock and J Dooley 1993, Sanjiv Chopra et al 1985. Serum Total Bilirubin values also showed highly significant elevation (p value <0.0001) with a mean value of  $6.87 \pm 5.51$ , compared to controls  $0.546 \pm 0.2731$

#### **Conclusion:**

- A Total number of 50 cases with various liver disorders were investigated in this study.
- Cases of Jaundice and Liver Cirrhosis were included in the present study
- 26 subjects without previous and present history of liver disease are selected as control group
- Serum amino Transferases (LT and AST) activity is estimated in all the cases and controls by sensitive Colorimetric method of Reitman and Frankel.
- Serum Alkaline Phosphatase activity is estimated in all controls and cases by Colorimetric method of King Armstrong method
- Serum Bilirubin is estimated in all controls and cases by colorimetric method of Method of Malloy and Evelyn, 1937
- Alkaline phosphatase levels gets elevated in case of obstructive jaundice

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