

# Aetiology of Asymptomatic Raised Serum Alanine Aminotransferase Level in Hospitalized Type 2 Diabetic Patients

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# Introduction

- Abnormal liver function test in routine blood examination is a common condition in general population
- Frequently overlooked and inadequately investigated
- May be an indicator of significant liver disease

# Background

- NAFLD 34-70% in general population
- 50% are diabetic
- 76% are obese
- Among diabetic patients, 90% are T2DM, majority are obese
- NAFLD → NASH → cirrhosis
- Related to uncontrolled blood glucose, insulin resistance and abnormal lipids
- In several studies- association between chronic hepatitis C infection and DM
- Raised ALT is often a marker for hepatitis B and C infection

# Aims and objectives

- To see the prevalence of raised ALT in hospitalized T2DM patients
- To find out the aetiology of raised ALT in T2DM
- To see any correlation between raised ALT and BMI of patients
- To see any correlation between raised ALT and glycaemic control of patients
- To see any correlation between raised ALT and lipid level of patients

# Materials and methods

- Study design: Cross-sectional observational study
- Study period: July 2011 – December 2011
- Study place: Department of Internal Medicine, BIRDEM General Hospital
- Study population: 53 (6.4% of total hospital admission of T<sub>2</sub>DM patients)

# Inclusion criteria

- Hospitalized adult T2DM patient
- Having raised ALT
- Willing to be included in study

# Exclusion criteria

- Having primary hepatic pathology like acute viral hepatitis or chronic liver disease
- Those in whom hepatic involvement is likely e.g. dengue syndrome
- Alcoholics and those who are not willing to be included in study

# Results

- Total number of patients were 53, male 39, female 14 (M:F ratio 2.8:1)
- 6.4% hospitalized T2DM patient had raised ALT
- Mean age  $49.2 \pm 7.9$  years
- Mean BMI was  $25.5 \pm 4.0$  kg/m<sup>2</sup>



# Results

- 29 (55%) patients had hypertension
- Mean FBS  $9.2 \pm 5.7$  mmol/L
- Mean HbA<sub>1c</sub>  $9.7 \pm 3.9$  %
- Mean ALT was  $123.82 \pm 44.46$  iu/L

# Results

- Mean total cholesterol  $196.25 \pm 44.96$  mg/dl
- Mean TG  $187.96 \pm 99.94$  mg/dl
- Mean HDL  $36.81 \pm 8.22$  mg/dl
- Mean LDL  $125.81 \pm 36.64$  mg/dl

# Distribution of patients according to ALT level

ALT	< 2 UNL	2-5 UNL	> 5 UNL
Number	7	41	5
%	13.2	77.4	9.4

# Relation of raised ALT with BMI

BMI kg/m <sup>2</sup>	Number (%)	Mean ALT (IU/L)
< 18.5	0 (0%)	-
18.5-24.9	12 (22.6%)	96.62 ± 13.52
25-29.9	25 (47.2)	102.53 ± 29.37
≥ 30	16 (30.2)	129.86 ± 29.34

# Relation of raised ALT with FBS

ALT	FBS mmol/L
< 2 UNL	8.2 ± 2.3
2-5 UNL	11.3 ± 3.4
>5 UNL	13.6 ± 5.8

# Relation of raised ALT with HbA1C

ALT	HbA <sub>1</sub> C (%)
< 2 UNL	7.9 ± 1.8
2-5 UNL	8.4 ± 2.9
> 5 UNL	10.2 ± 3.7

# Relation of raised ALT with TG

ALT	TG (mg/dl)
< 2 UNL	154.33 ± 47.54
2-5 UNL	159.76 ± 67.76
> 5 UNL	189.23 ± 75.32

# Distribution of patients according to aetiology of raised ALT

Aetiology	Number	%
NAFLD	37	69.8
Hepatitis B infection	7	13.2
Hepatitis C infection	5	9.4
Others	4	7.5



# Association of raised ALT with fatty liver

USG	ALT < 2 UNL	2-5 UNL	> 5 UNL
Fatty liver	1	35	1
Normal	6	6	4

# Limitations of the study

- Study population was small
- Short study period
- Fibro-scan and liver biopsy was not done routinely (fatty liver was diagnosed by USG only)

# Conclusion

- Fatty liver is the commonest cause
- If ALT rise is  $>5$  times, serious pathology is likely
- Elevated level of ALT has positive relation with BMI, glycaemic status and dyslipidaemia

*Thank you all*

