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SGPT CHECK AND RISK FACTOR EVALUATION FOR EARLY LIVER DISEASE DETECTION (SCREEN REGISTRY)
A Multi-Center, Observational, Cross-Sectional Study

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ABSTRACT

Objective: **To determine the prevalence of asymptomatic ALT elevation among workers in identified industrial companies**

Methods: **The 1st 50 patients who registered for the Liver Lay Forum conducted by sanofi-aventis in different industrial companies were enrolled in the study. Demographic data and medical history including alcohol and drug intake were collected using data collection forms. Blood samples were collected from each subject and ALT levels were measured.**

Results: **6245 subjects were enrolled in the study. The prevalence of ALT elevation in this population was 32.79%, and the prevalence among males (41.31%) was almost twice that of females (23.59%). Among the risk factors associated with ALT elevation, the highest was with fatty liver disease (61.5%, odds ratio: 3.5), followed by diabetes (47.62%, odds ratio: 2.4), and hypertension (45.65%, odds ratio: 2.2), all significantly associated with ALT elevation at p <.001. Alcohol intake was significantly associated with an increased prevalence of ALT elevation (35.45%, odds ratio: 1.3, p <.001).**

Keywords: **SGPT: serum glutamine pyruvic acid transferase; ALT: alanine aminotransferase liver disease; SGPT/ALT elevation**

INTRODUCTION

Screening programs for liver diseases can detect asymptomatic conditions which might have better outcomes if diagnosed, and treated earlier. Abnormal liver function tests often, but not always, indicate hepatic pathology, and they can provide clues to the nature of the problem. The integrity of hepatocytes is best measured by the aminotransferases, SGPT (ALT) and SGOT (AST). The ALT is more specific for the liver while AST is also found in the heart, muscles, brain and kidneys. Elevated ALT is the most sensitive indicator of hepatocellular damage. An exclusive rise in ALT is generally of hepatocellular origin. Elevation of the ALT as a "screening enzyme" was demonstrated in 81% of 520 patients with very different liver diseases.[1] However, it is not possible to know the cause of hepatocellular damage or the chronicity of liver disease by ALT alone. Further tests need to be conducted to provide a comprehensive assessment of the liver function.

The hepatic cause of elevated ALT varies greatly depending on the population studied. But the causes of chronically elevated aminotransferase levels include alcohol abuse, certain medications, chronic viral hepatitis (B and C), autoimmune hepatitis, non-alcoholic steatosis or steatohepatitis, hemochromatosis, Wilson's Disease, and Alpha-1 antitrypsin deficiency. In addition, herbal preparations, and illicit drugs may cause elevation of the ALT levels.[2]

We conducted ALT screening as part of our liver disease awareness campaign in targeted industrial companies to assess the prevalence of asymptomatic elevated ALT level among the employees and to describe the association of elevated ALT with risk factors such as obesity, metabolic risks (diabetes and dyslipidemia), history of jaundice or liver disease, drug-induced toxicity, and alcohol consumption.

Study Objectives

The primary objective of this study was to assess the prevalence of asymptomatic elevated serum glutamine pyruvic acid transferase (SGPT/ALT level) among employees in identified industrial companies. The study also aimed to describe the association of elevated ALT level with risk factors such as age, sex, high alcohol consumption, obesity (high BMI, high waist circumference), diabetes, dyslipidemia, and drug intake.

MATERIALS AND METHODS

Study Population

The first 50 subjects aged 18 and above who

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registered in the Liver Lay Forum organized by sanofi-aventis in each identified industrial company and who signed the Data Release Consent form were enrolled in the study.

Companies were selected from a master list of industrial companies in the Philippines involved in technological, agricultural, manufacturing, financial, and industrial business. Some companies had several branches/locations and recruitment was also done on these satellite sites, but these were still counted as one company. In total, 59 companies participated in this study.

Study Procedures

Data were collected using paper data collection forms (DCF) through the assistance of the company physicians or nurse. Instructions on how to properly fill in the DCFs were given during training by the doctor conducting the lay forum. The following data were collected: data release consent, demographics (age, sex, civil status, educational attainment), anthropometric data (height, weight, waist circumference), history of medical conditions (diabetes, hypertension, dyslipidemia, cancer, previous liver diseases [history of jaundice, hepatomegaly, fatty liver, hepatitis]), current or past medications, and alcohol intake.

Waist circumference was measured according to a standardized method according to Depres, *et al*.[3] The waist was measured at the midpoint between the lower rib margin and iliac crest, with the abdominal muscles completely relaxed. All metric tapes were provided by the sponsor.

After completion of the DCFs, blood samples were collected from all enroleed subjects through venipuncture. Blood collection was done by licensed personnel from a central laboratory to which all blood samples were sent and analyzed for ALT levels. All measurements were done using Roche System Reagents on a Hitachi 912 machine.

The DCFs were collected by the sponsor and sent to in-house data management. All statistical tests carried out were 2-sided, with 0.05-level of significance, using SAS V.9 software.

Endpoint Measurement

The primary endpoint of the study is the prevalence of elevated ALT in the study population, calculated as the proportion of subjects with elevated ALT. Prevalence of ALT elevation among different subgroups (secondary endpoint) defined by age, sex, marital status, body mass index, abdominal circumference, and the presence of risk factors in the medical history was also computed.

The cut-off values for normal ALT were obtained according to the Roche System Reagent Insert and these were >41 IU/L for males and >31 IU/L for females.[4]

RESULTS

Six thousand two hundred forty five subjects were enrolled in the study. Patient distribution according to sex was equal, with a male to female ratio of 1.08:1. Majority of the subjects were married (69.48%), and attained college-level education (83.91%). More than half the study population (67.27%) were aged 45 years old and below, and the mean age was 39 years old.

The total prevalence of ALT elevation was 32.79%, and the prevalence among males (41.31%) was almost twice that of females (23.59%) (odds ratio: 2.28) [Table I]. The other demographic factors associated with a high prevalence of ALT elevation were age >40 years (35.45%, odds ratio: 1.24) and married status (36.28%, odds ratio: 1.72). These factors all had significant association with ALT elevation at p values of <.0001. [Fig. 1]

Table II lists the most common medical conditions seen in the study population.

The prevalence of elevated BMI and increased abdominal circumference was 39.17% and 31.24% respectively. Forty eight point twenty four percent of those with BMI >25 kg/m^2 had elevated ALT (odds ratio: 3.1) while ALT prevalence in subjects with increased abdominal circumference was 46.85% (odds ratio: 2.5), both significant with p values of <.0001.

Among the risk factors associated with ALT elevation, the highest was with fatty liver diasease (61.5%, odds ratio: 3.5), followed by diabetes (47.62%, odds ratio: 2.4), and hypertension (45.65%, odds ratio: 2.2), all significantly associated with ALT elevation at p <.001. [Fig. 2]

Alcohol intake, defined as >1 drink/day for women and >2 drinks/day for men (1 drink = 1.2 oz of regular beer or 5 oz of wine or 1.5 oz of 80-proof distilled spirits), was present in majority of the subjects (54.72%), and this was more prevalent among males compared to females (75.68% vs. 15.40%). Alcohol intake was significantly associated with an increased prevalence of ALT elevation (35.45%, odds ratio: 1.3, p<.001).

A special analysis on statin usage was done due to the propensity of these drugs to cause liver damage, but statin usage was not associated with an increase in the odds of developing ALT elevation.

Table I. Total Prevalence of ALT Elevation

Sex/Gender	No. of Subjects	Elevated* n	Elevated* %	ALT LEVEL >2X ULN n	ALT LEVEL >2X ULN %	>3X ULN n	>3X ULN %
Male	3244	1340	41.31	296	9.12	84	2.59
Female	3001	708	23.59	162	5.40	48	1.60
Total	6245	2048	32.79	458	7.33	132	2.11

*Elevated ALT: >31 U/L for Females; >41 U/L for Males

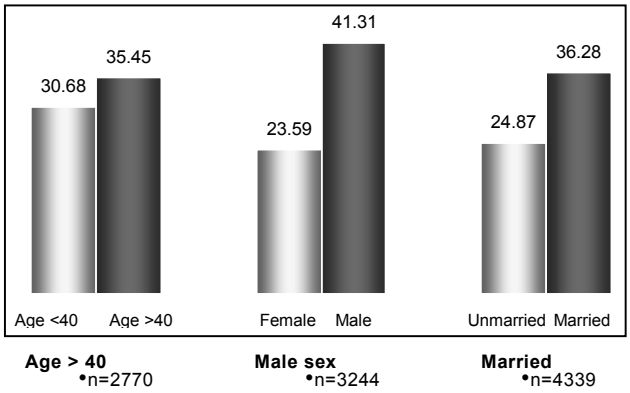

Fig 1. Prevalence of ALT Elevation According to Age, Gender and Married Status

Table II. Most Common Medical Conditions

	Frequency	Percent
Hypertension	379	6.07
Cancer	39	0.62
Diabetes	357	5.72
Elevated cholesterol and/or triglycerides	765	12.25
Fatty liver	426	6.82
Alcoholic liver disease	18	0.29
Hepatitis	204	3.27
Diabetes	357	5.72
Enlargement of the liver	28	0.45
Yellowish discoloration of the skin and eyes	144	2.31

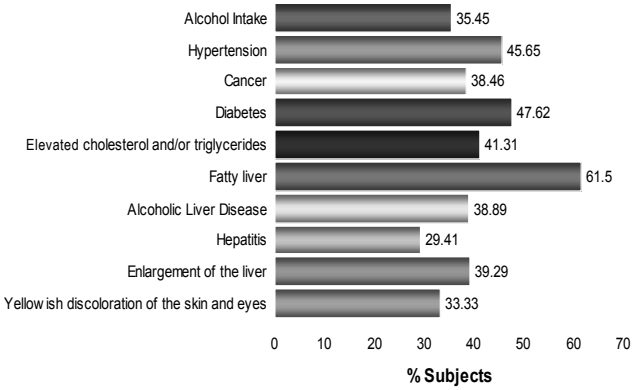

Fig 2. Proportion of Patients with Elevated ALT per Risk Factor

DISCUSSION

The results of this registry were based on a specific subgroup of the Philippine population, i.e. working individuals, and hence this study population can not be said to be a representative sample of the general population. Further studies on the general population should still be done to gain a more accurate picture of the prevalence of ALT elevation. Another limitation of this study is that the medical history was obtained through the knowledge of the patients regarding their medical conditions, and no objective evidence such as laboratory findings and medical records were presented or obtained. Also, there is no follow-up measurement of ALT to differentiate those transient ALT elevations from persistent ones. The cases of true liver pathology therefore cannot be established.

CONCLUSION

The prevalence of ALT elevation in this particular group of Filipino subjects is 32.79%, higher than those results found in the US NHANES Study (4.9%), and studies done in Taiwan[5] (11.4%) and Iran[6] (7.9%). As seen with other studies, fatty liver disease remains to be a major factor associated with ALT elevation. Though only 41% of patients with dyslipidemia had elevated ALT, this result may be clinically significant as there were more dyslipidemic patients (12%) in the total population. One finding in this study is that increasing age is associated with increased odds of developing ALT-elevation – opposite that of the result found in the US NHANES Study. All other factors such as alcohol intake, increasing BMI and waist circumference, and male sex were all associated with ALT elevation in both studies.

In another study, ALT may also predict new-onset diabetes in men whose ALT level remains normal but within the top quartile versus those within the bottom quartile. Mean ALT was 18% higher in those who subsequently developed diabetes.[7]

The importance of screening for ALT elevation is in the premise that early detection will lead to early intervention. Measure such as lifestyle modification, i.e. proper nutrition and alcohol abstinence, often lead to beneficial effects in survival and disease progression.[8,9]

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