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Factors affecting GGT elevation in patients with severe alcohol use disorders in Majha belt of Punjab

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Abstract

Objective: A specific and sensitive marker of alcohol abuse is serum γ-glutamyl transferase (GGT). A wide range of changes is met even between heavy drinkers. Through this work we wanted to see the variation of GGT according to age and alcohol consumption in patients with severe Alcohol Use disorders (AUD). We wanted also to evaluate the lower amount of alcohol, causing GGT elevation.

Method: This is a retrospective study performed in Govt. Medical College, Amritsar during the period 2017-2019. Serum GGT values were measured in 125patients diagnosed with severe AUD according to Diagnostic and Statistical Manual of Mental Disorders 5 edition (DSM-5). They were all males with mean age 42±4.9years old, who presented voluntary in the hospital for alcohol detoxification. They were divided in subgroups according to age and alcohol amount consumption. Values are expressed as mean ±SD. Comparisons were made by logistic correlation. A P-value <0.05 was considered statistically significant.

Results: We found a statistically significant correlation between GGT and ethanol intake (P<0.0001), (r=0.7) and a positive correlation between GGT and age. Normal mean values of GGT are found in the group of patients who consumed less than 10drinks/day. 5-10 drinks/day was the limit to induce GGT elevation in our sample.

Conclusion: Our findings show that GGT activities respond to ethanol intake and are age-dependent in patients with severe AUD. Early detection is associated to less complication and can lead to a better outcome.

Keywords: alcohol use disorders, γ-glutamyl transferase, age, drink/day, cardiomyopathy

Abbreviations: GGT, γ-glutamyl transferase; AUD, alcohol use disorders; DSM, diagnostic and statistical manual; AASLD

Introduction

Alcohol Use Disorders (DSM-5) and the related complications have a high prevalence throughout the world.[1] People can go from one disorder to another, without even noticing any changes, except of the higher dosages of alcohol. When alcohol consumption is part of tradition, as in our country Albania,[2] first drink can be met in very young people, especially males. Sometimes it is encouraged even from the familiars. Besides this, many patients consider heavy alcohol use as social drinking, leading to a late clinical diagnosis and more complications.[3,4] American Association for the Study of Liver Disease (AASLD) guidelines define as significant alcohol consumption, amounts of more than 21 drinks per week for males and 14 drinks per week for females.[5,6] In severe AUD the amount of alcohol largely exceeds these limits, causing important

changes in laboratory findings and biomarkers. A specific and sensitive marker of alcohol abuse is serum γ-glutamyl transferase (GGT).[7] It is a very sensitive marker not only to diagnose the alcohol misuse but also to follow the changes during the treatment.[8,9] Levels of GGT generally rise after heavy alcohol intake for several weeks, and decrease after 2-6weeks of abstinence and treatment. GGT seems to be more specific marker for continuous than episodic heavy drinking.[10] But it can elevate even in obesity, dyslipidemia, hypertension or diabetes.[11] Even if several studies report a positive correlation between ethanol intake and serum GGT in abstainer, moderate or heavy drinkers, notable variation in GGT values are seen even between heavy drinkers.[12,13] Many studies highlight the possible age-related or amount related effects on serum GGT activities in heavy drinkers.[14,15]

Aim

Through this work we wanted to have an overview of the age related and amount related variation of GGT in heavy drinkers in Albania. We wanted also to evaluate the lower amount of alcohol, causing GGT elevation.

Methods

This is a retrospective study performed in Govt. Medical College, Amritsar. Serum GGT values were measured in 125 heavy drinkers (more than 20 drinks/week, usual number of drinks per occasion ≥five), all males, Albanian nationality, mean age 42±4.9years, range 25-66years old, who had been admitted in our hospital for alcohol detoxification and relapse prevention treatment. They presented voluntary in the hospital to begin the treatment procedures. The diagnosis of severe Alcohol Use Disorders was made using AUDIT, CAGE questionnaires and DSM-5 criteria. The patients who were blood donors 3months prior to hospitalization, or had used any prescription drugs during the preceding 2weeks, were not included in the study. Moderate or binge drinkers, patients with other known diseases as, cardiomyopathy, nephropathies, cancer, diabetes or other metabolic syndromes, obese patients (Body Mass Index BMI≥29.9) were excluded from the study. Any female was presented to our department for AUD treatment. All patients had a history of chronic ethanol consumption in average amounts of 11.6±5.6 drinks/day (range 3-50 drinks/day). One drink is equal to 8gms of pure alcohol. The patients sample was divided according to age as follows: less than 35years: 33%; 36-45years: 27%; 46-55years: 20%; more than 56years: 20%. While according to alcohol consumption the subgroups were up to 10 drinks/day-58%; 11-20 drinks/day-22%; 21-30 drinks/day-12%; more than 30 drinks/day-8%. All patients had used alcohol 24hours prior to sampling. Normal range of GGT was considered 8-61UI/L.

Results

We found a statistically significant correlation between GGT and ethanol intake ($P<0.0001$, $r= 0.72$). Same conclusions were found also when the patients were divided in subgroups according to age (Table 1) with 'p' value respectively $P<0.005$ in less than 35 years old ($r=0.6$) and 46-55 years old group ($r=0.7$); $P<0.0001$ in 36-45 years old ($r=0.8$) and $P<0.05$ in more than 56 years old patients ($r=0.7$). When we measured the mean GGT in different age groups, we observed a progressive elevation of this value with aging from 106.1 UI/L in the youngest age group, to 342 UI/L to the oldest age group (Figure 1), proving a positive correlation between GGT and age, even if not statistically significant.

Table 1 GGT and Alcohol consumption in different age groups.

Age (years)	Less than 35	36-45	46-55	More than 56
GGT Mean±SD UI/L	106.1	177	286	342
Alcohol drinks	7.7	10	15	17

An interesting finding was the variation of GGT in the group of patients younger than 35 years old. All the normal GGT values were found in patients younger than 30 years. Only 11% of the latter one had elevated GGT values (Figure 2). On the other hand, we found that the mean alcohol

consumption increased progressively with aging, going from 7.7 drinks to17 drinks/day (Figure 3). When we sub grouped our patients according to amount consumption, to study the correlation between GGT and age, we observed that the average GGT activity increased with increasing alcohol amount (Table 2). A More notable difference was observed with dose increasing from 0-10 drinks/day group to 11-20 drinks/day groups. With higher alcohol amounts, the difference was not so pronounced (Figure 4). Normal mean± SD GGT values were found in patients who consumed 0-10 drinks/day. The mean ± SD number of drinks in the latter group was 5 drinks, and 70% of patients took ≤ drinks/day.

Table 2 GGT values (mean ±SD) in groups classified according to alcohol consumption.

Alcohol drinks	0-10	20-Nov	21-30	More than 30
GGT mean ±SD in UI/L	59	317	545	783

Discussion

In our study 60%of the patients were less than 45years old. Larger study made in Albania in[6] for similar topics; state that service users for narcotics and alcohol are mainly young persons.[2] Similar findings had Liberto, Karlamangla et al.[7] In their studies they show that with age, there are a decrease in alcohol consumption and alcohol-related problems among heavy drinkers.[7,8] Lower income, higher risk for complication and comorbidities, can influence in this reduction rate. In our country stigma may be another important factor.[2] Even if more exposed to risky lifestyle and multi substance abuse,[9] younger ages are more informed about hazardous drinking. They are more open minded and can easier address to a healthcare facility. The present work shows that GGT values are influenced significantly from ethanol intake. The differences are more pronounced with dose increasing, especially in amounts more than 10drinks/day. What we found interesting in our study was the normal mean average values of GGT in the group who consumed less than 10U alcohol/day. About 70% of these patients consumed less than 5drinks/day and the mean ± SD alcohol consumption was 5drinks/day. This may be considered as a threshold to cause more sensitive liver induction in our sample. These findings lead us to the conclusion that 5-10 drinks/day was enough to raise the GGT levels in regular drinkers with a long drinking history. So, it is important detecting patients at this level of abuse. Similar conclusions are seen in other countries and in larger population. When John P Allen et al.[2] studies the liver tests variation in heavy drinking,[2]he found that GGT raise after several week consumption of 10 drink/day. Sillanauke et al.[1] had same findings in another large work.[21] Age is another important factor in drug misuse.[14] Younger males may be more resistant to the harmful effects of alcohol showing lower GGT activities than expected. Conigrave et al.[12] states that markers are more likely to be elevated in those aged more than 30years. On the other hand, some other studies highlight the low specify of GGT in adults younger than 30years old,[22] even when they meet the criteria for alcohol dependence.[3]

Similar findings had our study. We found lower alcohol abuse and normal GGT mean values in patients younger than 30years old. With aging we observed increasing alcohol abuse, related also to tolerance development. With higher amounts and accumulative toxicity, we found more liver damages and progressive elevation of GGT. Some studies[8]have found lower alcohol abuse in ages higher than 65-70 and as a consequence lower GGT activities. We couldn't investigate for similar findings as the patients included in the study were up to 65years old. Sex differences[4,7,] are observed in a lot of studies. Females seemed to be more vulnerable to alcohol toxicity explained from the metabolism of ethanol and glutathione. We couldn't share any experience as till now, stigma is an important factor impeaching woman seeking medical help for alcohol abuse. In our study we didn't find important changes in BMI, another important factor affecting liver function.[11]

Conclusion

Our study helped us to have some highlights of GGT activity in heavy alcohol abusers in Albania. Our findings showed that GGT activities respond to ethanol intake and are age-dependent in patients with severe AUD. Larger studies need to be done to strengthen our findings.

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