BLOOD LEVELS OF TOXIC METALS ASSOCIATED WITH CHRONIC LIVER DISEASE AND LIVER INJURY

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INTRODUCTION

Data from model systems link exposure to toxic metals such as cadmium (Cd) and arsenic (As) to liver injury and chronic liver disease (CLD); however, human data are inconsistent.

The aim of this study was to examine the association between toxic metal blood levels, liver enzyme levels, and CLD using data from the Southern Liver Health Study (STRIVE).

METHODS

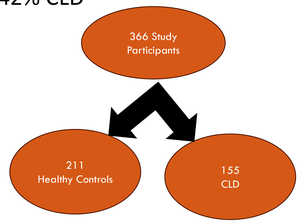
- STRIVE is NIH-funded, multi-institution, longitudinal study to determine the role of environmental exposures on liver disease. Study participants included CLD cases and healthy controls residing in NC or GA, between 2021-22.
- We measured toxic metal levels in whole blood collected from participants aged 40-75 years enrolled in STRIVE.
- Using Inductively Coupled Plasma-Mass Spectrometry (ICP-MS), we measured toxic metals As, lead (Pb), gadolinium (Gd) and Cd.
- We used regression models to determine if toxic metal concentrations were associated with CLD and/or levels of alanine aminotransferase (ALT), aspartate aminotransferase (AST), and triglycerides (TG).

RESULTS

Study Participant Characteristics:

- Majority female (64%)
- 25% NHB, 3% Hispanic
- Mostly urban residents (86%)
- Majority nonsmokers (54%)

- 46% BMI >30 (obese range)
- 42% CLD



Sex and Race Differences in Mean Concentrations of Blood Cd and Gd Levels

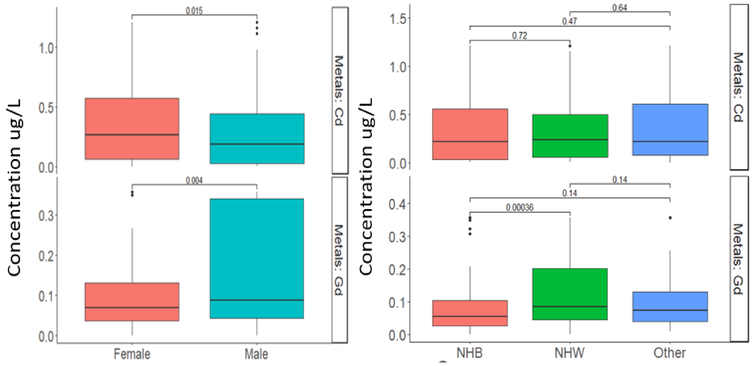
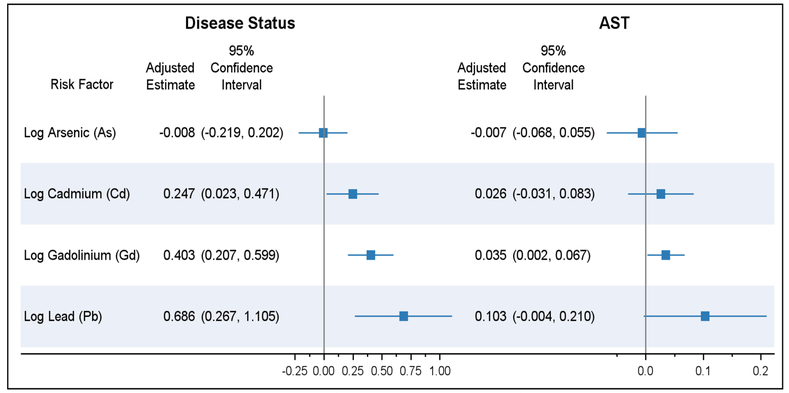


Figure 1. Box plot comparing mean blood metal concentrations of males and females (left panel), and Non-Hispanic Blacks (NHB), Non-Hispanic Whites (NHW), and Others (Hispanic, Asian, Native American, and unknown races) (right panel)

Associations Between CLD, Liver Injury, and Toxic Metals



These models are adjusted for sex, BMI, smoking, and age

Figure 2. Association between elevated blood metals and CLD risk (left) and AST levels (right).

CONCLUSIONS

We found that elevated blood Cd, Gd, and Pb levels are associated with CLD, and liver injury.

This is the first evidence that we know of linking elevated blood Gd to CLD risk in humans.

Our findings also contribute to recent evidence linking Pb and Cd to CLD.

REFERENCES

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