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CASE REPORT

A rare cause for elevated serum aspartate aminotransferase

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Introduction

Increased serum aspartate aminotransferase (AST) may be due to several conditions, such as viral hepatitis, alcohol-related liver disease, cirrhosis, cholestatic syndromes, cardiac, renal, or muscular diseases, drug or alcohol consumption, and haemolytic anaemia.[1,2]

Asymptomatic elevation of AST alone is uncommon. A rare cause can be an increase in the presence of macro-AST, a macro enzyme. These are high molecular mass complexes containing enzymes, immunoglobulins (mainly IgG and IgM) or other plasma components and form due to immune dysregulation.[3]

Case description

A healthy 54-year-old Caucasian male initially presented in 2014 when his life insurance application was declined due to an isolated raised serum AST, with the rest of his liver enzymes being within normal ranges. Subsequent bloods showed persistence in the elevated AST. He was referred to gastroenterology in 2024 for this problem. There was no significant alcohol history, and the only drug history was that of a statin, which was stopped for several months with no improvement. There was no relevant family history.

The patient's clinical examination was unremarkable, and he had no stigmata of chronic liver disease. His ultrasound revealed a normal liver and spleen, and his additional workup, including viral hepatitis studies and a screen for autoimmune hepatitis, haemochromatosis, Wilson's disease, haemolysis, and rhabdomyolysis, were all normal.

Table I: Chronological AST levels

Date	AST (U/L)
21/08/2014	483
06/02/2017	367
16/03/2018	319
26/09/2020	455
06/07/2021	240
01/03/2023	226
09/03/2023	226
21/09/2023	227
07/06/2024	233
30/08/2024	301
10/09/2024	266

AST – aspartate aminotransferase, U/L – units per litre

Given the isolated elevated AST with a normal workup, macro-AST was suspected. The patient's serum was precipitated with a 25% polyethylene glycol (PEG) solution at a ratio of 1:1. It was subsequently centrifuged, determining the AST recovery activity in the supernatant at 7.6% with the AST level initially being 266 U/L and 20 U/L post-PEG. A recovery of < 40% indicates the presence of macro-AST.[1]

Discussion

AST is found in several organs, such as the liver, kidneys, brain, muscles, and erythrocytes. Thus, an elevated serum AST can be a sign of injury.[4] Evaluation for liver disease should be done, and common conditions such as viral hepatitis, autoimmune hepatitis, hemochromatosis, Wilson's disease, and drug-induced liver injury should be excluded. Extrahepatic causes, such as haemolysis, should be evaluated when liver pathology has been excluded.

Macro-AST is a rare cause of an elevated AST, with only a few cases reported, and is considered benign. It is a diagnosis of exclusion. Detection of macro-enzymes can be done using several methods, including the precipitation of complexes of macro-enzymes with PEG, ultracentrifugation, and gel filtration chromatography, the first of which is easily accessible and cost-effective.[2,5] Once diagnosed, there is no need for further investigation or workup.

Conclusion

This case report illustrates the need for clinicians to be aware of this rare entity, to avoid unnecessary and often invasive investigations, and to address patient concerns.

Conflict of interest

The authors declare no conflict of interest.

Informed consent

Informed consent has been obtained.

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