# A low level of ceruloplasmin is associated with an atherogenic profile and the presence of MASLD at a younger age

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## Introduction & study aim

- Ceruloplasmin (Cp) is a copper metabolism protein produced by the liver, known for its role as a copper transporter in the body.
- It is used as a marker for the diagnosis of Wilson's disease.
- Several studies have established a link between low ceruloplasminemia and the presence of metabolic dysfunction-associated steatotic liver disease (MASLD), but its significance within this hepatopathy is poorly understood**.**
- We recorded ceruloplasmin values in a population of MASLD patients < 50 years of age and studied patient characteristics according to this level (anthropometric data, severity of liver disease, diabetic status, insulin resistance, dyslipidemia).

## Patients & methods

Prospective bi-centric study in patients < 50 years of age with MASLD defined by the presence of steatosis and at least one cardiometabolic criterion, in whom a ceruloplasmin value was requested as part of the liver disease work-up.

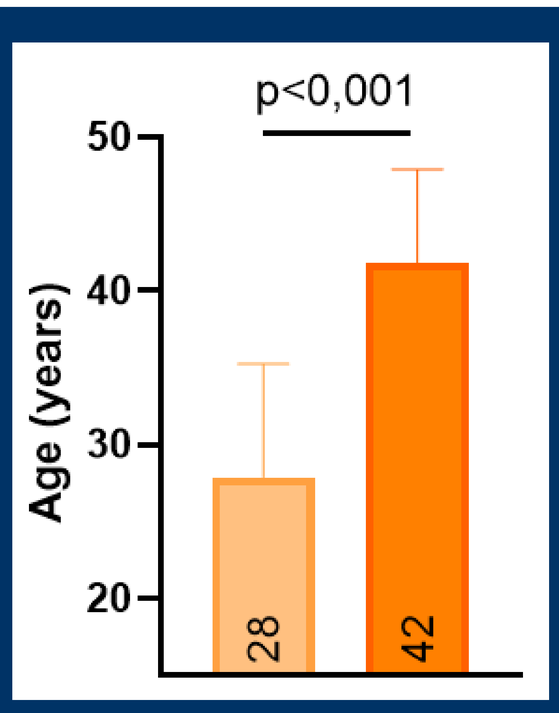
Patients with Wilson's disease proven by abnormal cupruria and alcohol-related liver disease (ALD) were excluded.

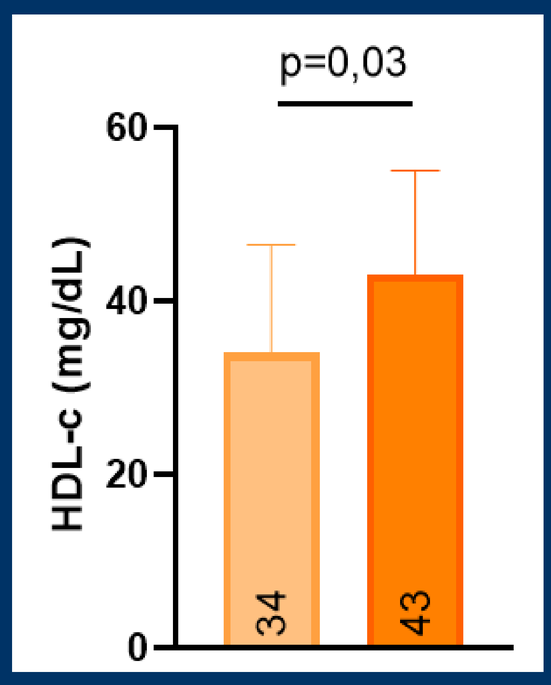
## Results

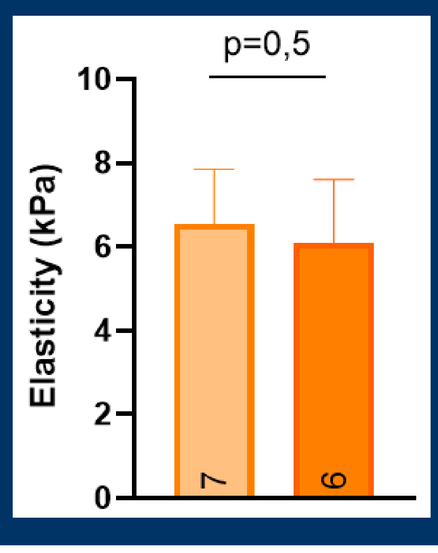
- No correlation was found between ceruloplasmin levels and elasticity, CAP, transaminases or other biological values such as ferritin or HOMA-IR.
- **We distinguished two groups of patients: low ceruloplasminemia ≤0.2 g/L (n=8) and normal-high ceruloplasminemia >0.2 g/L (n=47), which enabled us to highlight that patients with ceruloplasmin ≤0.2 g/L are significantly younger than patients with normal ceruloplasmin (28 ± 7 years vs. 42 ± 6 years) and that HDL-c was significantly lower in the population with lowered ceruloplasmin compared with patients with normal levels (34 ± 10 mg/dL vs. 43 ± 16 mg/dL).**
- On the other hand, their metabolic profile was similar, including BMI (31.6 kg/m² vs. 33.3 kg/m², p=0.41), abdominal perimeter (110 cm vs. 111 cm, p=0.8), HOMA-IR (4.9 vs. 4.3, p=0.69) and ferritin level (262 µg/L vs. 191 µg/L, p=0.26).
- Despite the younger age, elasticity (6.6 kPa vs. 6.1 kPa, p=0.5) and CAP (293 dB/m vs. 314 dB/m, p=0.40) were similar in both groups.

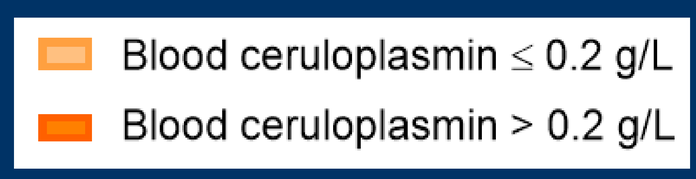
| POPULATION CARACTERISTICS | | |
|---|---|---|
| **55 patients recruited** | 63% women | |
| | 34% treated type 2 diabetes | |
| | 43% treated dyslipidemia | |
| **Age** | 40 years | 20 – 50y |
| **BMI** | 33 kg/m² | ± 5.5 kg/m² |
| **Abdominal circumference** | 111 cm | ±11 cm |
| **HOMA-IR** | 4.4 | ± 3.0 |
| **Blood ceruloplasmin** | 0.25 g/L | ± 0.05 g/L |
| **Ferritin** | 201 µg/L | ± 61 µg/L |
| **Total cholesterol** | 191 mg/dL | ± 42 mg/dL |
| **HDL-c cholesterol** | 42 mg/dL | 14-111 mg/dL |
| **ASAT** | 46 IU/L | ± 25 IU/L |
| **ALAT** | 68 IU/L | ± 34 IU/L |
| **Elasticity** | 6.3 kPa | 2.2 – 25.1 kPa |
| **CAP** | 312 dB/m | ± 58 dB/m |

Variables following a normal distribution are expressed as means (± standard deviation), others as medians (min-max).




## CONCLUSION

**In a MASLD population, a lower ceruloplasmin level is significantly associated with younger age and a riskier atherogenic profile (lower HDL-c), and may be explained by the protein's antioxidant properties. This justifies not using ceruloplasmin levels solely to exclude Wilson's disease, since its low level probably confers an increased cardiovascular risk in these patients.**

**This needs to be assessed in prospective follow-up studies.**