Different ultrastructural patterns of early-stage Wilson's disease

Pance Zdravkovski[1], Janevska V.[1], Petrusevska G.[1]

[1] Institute of Pathology, Medical Faculty, University "Ss. Cyril and Methodius", Skopje, Republic of Macedonia

OBJECTIVES

Wilson's disease is an autosomal recessive genetic disorder of copper metabolism.
Electron microscopy is a worthwhile and valuable diagnostic tool, especially in the early stages of this disease. We report two different ultrastructural patterns in patients that have similar clinical and histological features.

METHODS

Two seven-year old female patients were admitted at the Pediatric Clinic because of abdominal pain and mild jaundice. Laboratory results showed elevated aminotransferases, low serum ceruloplasmin levels and negative serology for hepatotropic viruses. Liver biopsy was done and the biopsy specimens were fixed in glutaraldehyde and embedded in Durcupan resin. Semi-thin sections dyed with Toluidine blue and ultra-thin sections treated with uranyl acetate and lead citrate were made.

RESULTS

Light-microscopic analysis of the semi-thin sections of both cases showed early-stage cirrhosis presented by steatohepatitis and fibrosis with focal piece-meal necrosis. Electron-microscopic analysis of the ultra-thin sections in both cases showed hepatocytes` cytoplasm with a variable increase in the number of enlarged, pleomorphic mitochondria and peroxisomes, dilatation of smooth and rough endoplasmic reticulum and presence of neutral lipid vacuoles. We found two different patterns of cytoplasmic copper accumulation: electron densities with cribriform appearance (Figures 1-4) and discrete, diffusely dispersed electron-dense material, especially in the perinuclear and paranuclear regions (Figure 5-8), as well as in some artificially degenerated mitochondria (Figure 8).

Pattern 1

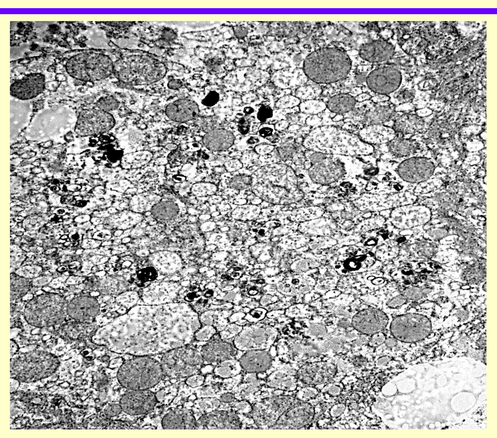

Figure 1. Electronmicrograph of hepatocyte cytoplasm with increased number of mitochondria and peroxisomes (x6000).

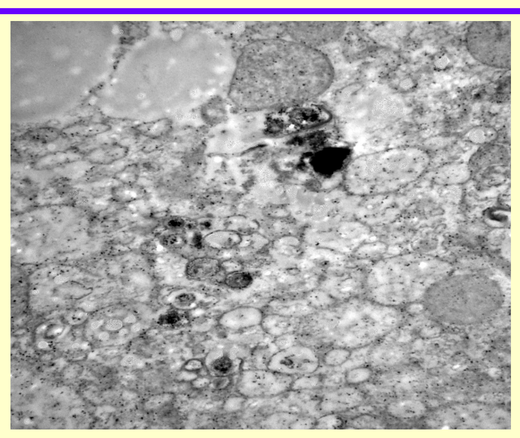

Figure 2. Electronmicrograph of hepatocyte cytoplasm with plexiform electron-dense material (x8000).

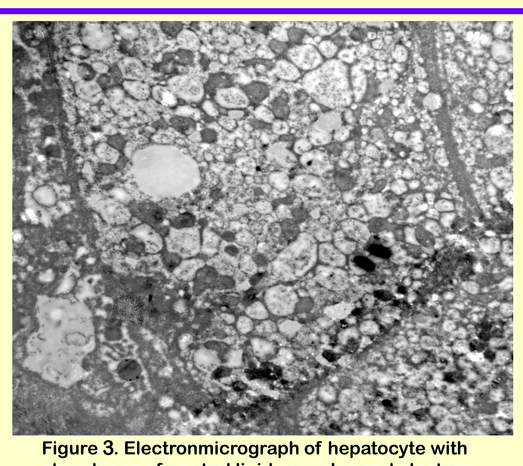

Figure 3. Electronmicrograph of hepatocyte with abundance of neutral lipid vacuoles and electron-dense material located close to the cell membrane (x15000).

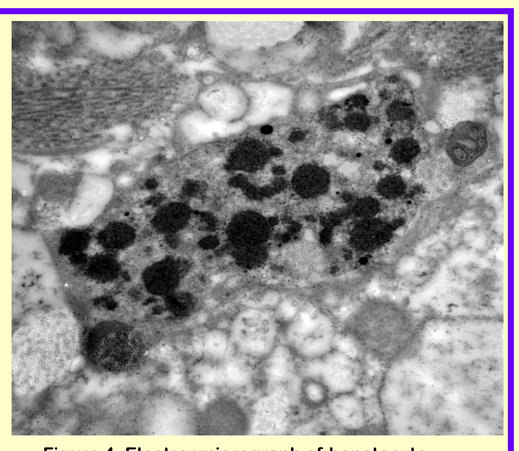

Figure 4. Electronmicrograph of hepatocyte cytoplasm with plexiform electron-dense copper deposits. (x40000).

Pattern 2

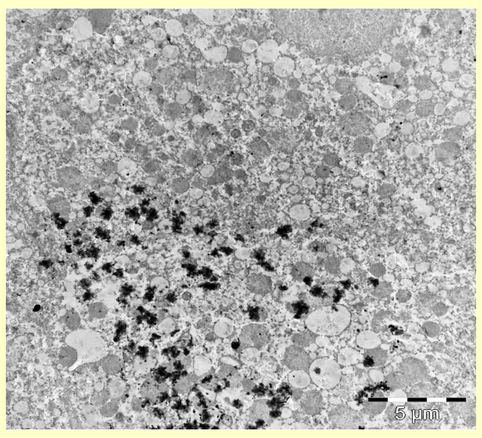

Figure 5. Electronmicrograph of hepatocyte cytoplasm with difuselly dispersed electron-dense material (x6000).

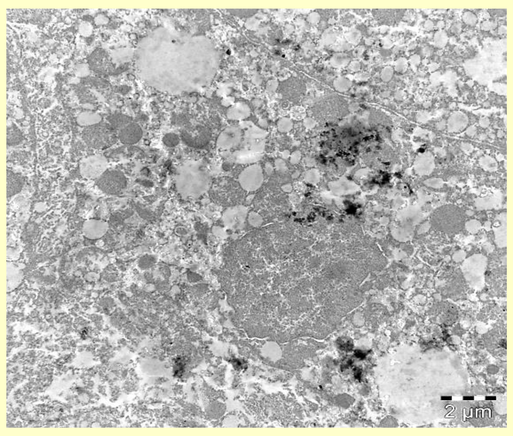

Figure 6. Electronmicrograph of hepatocyte with perinuclear and paranuclear electron-dense deposits (x8000).

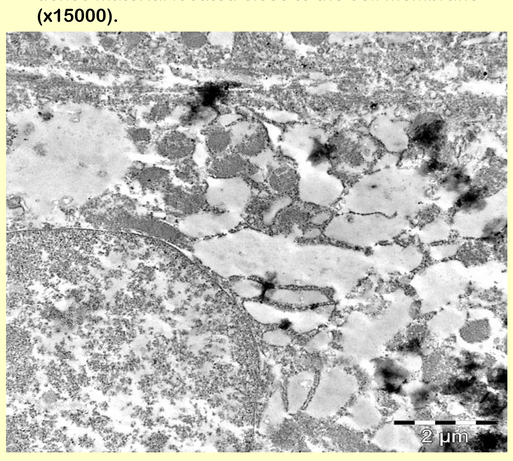

Figure 7. Electronmicrograph of hepatocyte cytoplasm with discrete paranuclear electron-dense deposits (x15000).

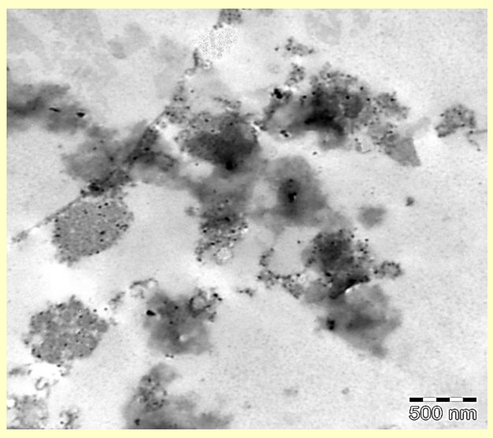

Figure 8. Electronmicrograph of artificially degenerated mitochondria with discrete electron-dense material (x40000).

CONCLUSIONS

Although these two cases have relatively similar clinical, laboratory and histological findings, they present very different and distinctive ultrastructural features, which from a diagnostic point of view can be subtle and non-specific in the early stages of this disease.

Conflict of Interest: Authors have no conflict of interest to declare.

PS-06-10

2nd Macedonian Congress of Pathology
1-4 September, 2016, Ohrid, Macedonia