Usefulness of electronic microscopy in the early diagnosis of Wilson's disease. Ultrastructural images of liver tissue.
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SUMMARY

Introduction: Wilson's disease (WD) is an autonomic recessive disorder caused by mutations in the ATP7B gene, characterized by dramatic hepatic accumulations of hepatic copper, with subsequent hepatic and neurological abnormalities (1-6). Electron microscopy has been decisive for Wilson's disease precocious diagnosis. Three stages have been morphologically identified depending on mitochondrial and lisosomal damage (1, 2).

Wilson's disease early diagnosis is very important because it enables the application of an adequate therapy and avoids fatal outcomes.

Objective: To study the fine structure of WD hepatic tissue in order to improve the morphologic criteria for early diagnosis.

Materials and methods: Samples of hepatic biopsies from 18 adult patients (males and females) clinically suspicious of WD were studied. Biopsies were obtained by laparoscopy and divided into three fragments: for optical and electron microscopy and for tissue determination of copper. Tissue copper concentrations as well as serum and urinary copper were determined by atomic absorption spectrometry.

Results: In all cases the liver copper content was increased and WD was confirmed clinically. At electronic microscope 12 of 18 showed ultrastructural features typical of WD (Figures 1- A to F). At optical microscope 10 out of the 18 cases showed morphological alterations compatible with WD; The other 8 were diagnosed as normal under the optical microscope, but 6 of them presented outstanding mitochondrial alterations, among them the three typical kinds of intramitochondrial inclusions (Figure 1, A- E) . The latter was determinant for the early diagnosis of WD.

Conclusions: Electron microscopy is highly valuable for Wilson's disease early diagnosis, especially for those patients whose biopsies do not show histological alterations visible at the optical microscope.

References:
(4) Amorín Díaz M. ENFERMEDAD DE WILSON.htm (10/05/01) Hospital Central de Asturias. Oviedo.
Figure 1- A. A panoramic view from an hepatocyte with abnormal mitochondria showing paracrystalline inclusions, Type 1 (large arrow), x 7,000 and osmiophilic inclusions, type 3 (small arrow), B. many abnormal mitochondria with paracrystalline inclusions, x 9,000, C. These mitochondria show type 2 inclusions, lookinglike parallel stacks of coins, resulted from tight coiling filaments x 9,000 D. Mitochondria showing cross sections of paracrystalline filamentous inclusions, orderly arrangement of dot-like, lipid vacuole x 9,000, E. irregular inter crystal spaces (white arrow), glycogenic intranuclear inclusion (large black arrow) and lipofuscin granules (small black arrow), The endoplasmic reticulum is very vacuolated, x 7,000, F. collagen bundles (arrow) intra and inter hepatocytes x5,000.