Hair Copper Levels as Indicators of Copper Status for Hepatic Disorders

A. Erdem1,2, S.A. Akgür1, H. Ertas2,3, L. Elibol3, M. Baran4, S. Aydogdu4

1 Ege University, Institute of Drug Addiction, Toxicology and Pharmaceutical Sciences, İzmir, Turkey
2 Ege University, Faculty of Science, Department of Chemistry, Turkey
3 Ege University Center For Drug Research and Development and Pharmacokinetic Applications, İzmir, Turkey
4 Ege University, Faculty of Medicine, Pediatric Clinic, Department of Gastroenterology, Hepatology and Nutrition, İzmir, Turkey

asli.erdem@ege.edu.tr

Copper (Cu) is an essential trace element found in a variety of cells and tissues in all living organisms [1]. An inherited condition called Wilson’s disease (WD) is an autosomal recessive disorder characterized by the decreased biliary copper excretion and reduced incorporation into ceruloplasmin, leading to excessive copper accumulation in many organs, predominantly the liver, brain, and cornea [2]. The symptoms of patients with Wilson disease (WD) are nonspecific and make the early diagnosis difficult [3]. Although various diagnostic methods for Wilson disease are used, the systematic screening of individuals suspected of having WD is still troublesome [4]. In this study, the usefulness of hair as an indicator matrix was investigated as a suggestive data for patients suspected of suffering WD.

Sixteen patients undergoing hepatological examination in Ege University, Department of Pediatric Gastroenterology, Hepatology and Nutrition and fifteen healthy subjects were enrolled in this study. The ethical permission was taken from the hospital’s local ethic commission. The subjects were divided into three groups; Group 1: Wilson diagnosed patients, Group 2: Chronic hepatic disease patients and Group 3: Healthy subjects. The copper content in liver samples was found to be 549±88 μg g⁻¹ dry weight and 77±6 μg g⁻¹ dry weight for group 1 and group 2 patients, respectively. The copper value in the hair samples of patients was found to be 16±10 μg g⁻¹ and 18±10 μg g⁻¹ for group 1 and group 2 patients, respectively. The copper value in the hair samples of the control group was found to be 11±2 μg g⁻¹.

Hair and liver copper levels were found to be directly correlated, indicating that hair samples can be used to monitor the copper status in the human body. Thus using hair as the indicator matrix will allow the assessment of copper status reliably without the interference by the daily variations of the copper levels in the body fluids.

KEYWORDS: Wilson’s disease, copper, hair, liver

REFERENCES: