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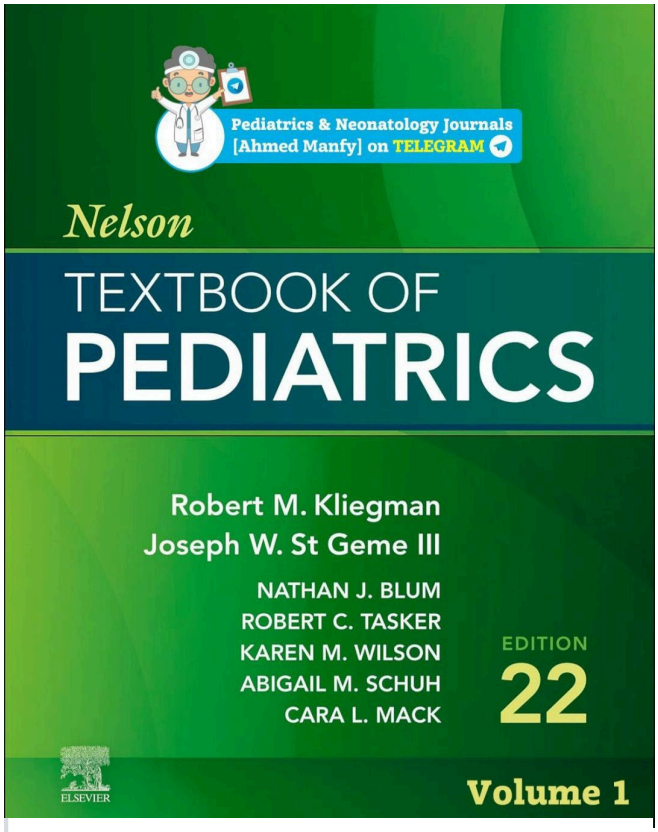

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The relationships between urinary glycosaminoglycan levels and phenotypes of mucopolysaccharidoses

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Abstract

Background: The aim of this study was to use the liquid chromatography/tandem mass spectrometry (LC-MS/MS) method to quantitate levels of three urinary glycosaminoglycans (GAGs; dermatan sulfate [DS], heparan sulfate [HS], and keratan sulfate [KS]) to help make a correct diagnosis of mucopolysaccharidosis (MPS).

Methods: We analyzed the relationships between phenotypes and levels of urinary GAGs of 79 patients with different types of MPS.

Results: The patients with mental retardation ($n = 21$) had significantly higher levels of HS than those without mental retardation ($n = 58$; 328.8 vs. 3.2 μg/ml, $p < 0.001$). The DS levels in the patients with hernia, hepatosplenomegaly, claw hands, coarse face, valvular heart disease, and joint stiffness were higher than those without. Twenty patients received enzyme replacement therapy (ERT) for 1–12.3 years. After ERT, the KS level decreased by 90% in the patients with MPS IVA compared to a 31% decrease in the change of dimethylmethylene blue (DMB) ratio. The DS level decreased by 79% after ERT in the patients with MPS VI compared to a 66% decrease in the change of DMB ratio.

Conclusions: The measurement of GAG fractionation biomarkers using the LC-MS/MS method is a more sensitive and reliable tool than the DMB ratio for MPS

Abbreviations: 2-D EP, two-dimensional electrophoresis; CS, chondroitin sulfate; DMB, dimethylmethylene blue; DS, dermatan sulfate; ERT, enzyme replacement therapy; GAGs, glycosaminoglycans; HS, heparan sulfate; KS, keratan sulfate; LC-MS/MS, liquid chromatography/tandem mass spectrometry; MPS, mucopolysaccharidosis.

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