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Poster Abstract: Diagnostic

Identification and Quantification of the Biomarker Glucose Tetrasaccharide Glc_4 by Thin Layer Chromatography and High Performance Liquid Chromatography in Pompe Disease Patients

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Pompe disease (PD), a glycogen storage inborn error of metabolism (type II), is caused by the deficiency of acid α-glucosidase (GAA); it can manifest itself in two forms: infantile onset (IPD) and late-onset (LOPD). Clinical presentation of this disorder is variable, depending on age at onset, level of organ involvement, progression rate, and genotype. PD is classified as a glycogenosis; and, since individuals with this disorder excrete oligosaccharides in the urine, can be considered to be an oligosaccharidosis as well. Urinary tetraglucoside (Glc_4), considered to be a biomarker of the disease, could be an auxiliary tool in screening for PD in suspected cases. Urine samples from 24 known patients with IPD ($n=15$) and LOPD ($n=9$), and normal controls ($n=215$) were submitted to thin layer chromatography (TLC) analysis and high performance liquid chromatography (HPLC) quantification to evaluate urinary Glc_4. Analysis by TLC showed a characteristic Glc_4 band in all PD cases and quantification by HPLC revealed high Glc_4 levels in all PD patients when compared with healthy age-matched individuals. Urinary Glc_4 was further used in clinical follow-up of two PD patients submitted to long-term enzyme replacement therapy (ERT) with human recombinant GAA (Myozyme®). An inverse correlation of Glc_4 excretion with therapy duration was observed in both cases. Furthermore, systematic quantification of Glc_4 by HPLC showed that the reduction of Glc_4 levels in these two patients fluctuated according to clinical outcome complications or treatment interruption. Routine screening for PD can be performed by these two methods, and quantification of Glc_4 by HPLC proved to be a very useful and sensitive tool in monitoring patients on ERT.

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