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Polyclonal IgG glycosylation in Patients with Pediatric Appendicitis

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Abstract : Background: Appendicitis is a common acute inflammatory condition in both children and adults, but current laboratory markers such as C-reactive protein (CRP), white blood cell count (WBC), absolute neutrophil count (ANC), and red blood cell count (RNC) lack specificity in detecting appendicitis-related inflammation. N-glycosylation, an asparagine-linked glycosylation process, plays a vital role in cellular interactions, angiogenesis, immune response, and effector functions. Altered N-glycosylation impacts tumor growth and both acute and chronic inflammatory processes. IgG, the second most abundant glycoprotein in serum, shows altered glycosylation patterns during inflammation, suggesting that IgG glycan modifications may serve as potential biomarkers for appendicitis. Specifically, increased levels of agalactosylated IgG glycans are a known feature of various inflammatory conditions, potentially including appendicitis. Identifying pediatric appendicitis remains challenging due to the absence of specific biomarkers, which makes diagnosis reliant on clinical symptoms, imaging such as ultrasound, and nonspecific lab indicators (e.g., CRP, WBC, ANC). In this study, we analyzed the IgG derived N-glycome in pediatric patients with appendicitis compared with healthy controls. Methodology: The N-glycome was analyzed by high-performance liquid-chromatography combined with mass spectrometry. IgG was isolated from serum samples by Protein G column. The IgG derived glycans were released by enzymatic deglycosylation and fluorescent tags were attached to each glycan moiety, which made necessitates the sample clean-up for further reliable quantitation. Overall, 38 controls and 40 serum samples diagnosed with pediatric appendicitis were analyzed by HILIC-MS methods. Multivariate statistical tests were performed with area percentage under the peak data derived from the integrated peaks, which were obtained from the chromatograms. Conclusions: Our results represented the altered N-glycome of IgG in pediatric appendicitis is similar with other observations. The glycosylation pattern reported so far for IgG is characterized by decreased galactosylation and sialylation, and an increase in fucosylation.

Keywords : N-glycosylation, liquid chromatography, mass spectrometry, inflammation, appendicitis, immunoglobulin G
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