Complex Clinical, Biological and Microbiological Analysis of Acute Complicated and Uncomplicated Appendicitis in Children

Mohits Kakars [1, 2], ***Arnis Eņģelis*** [1, 2], ***Juta Kroiča*** [3], ***Amulya K. Saxena*** [4], ***Aigars Reinis*** [3], ***Aigars Pētersons*** [2]

[1] *Rīga Stradiņš University, Department of Paediatric Surgery, Latvia*
[2] *University Children's Hospital, Department of Paediatric Surgery, Latvia*
[3] *Rīga Stradiņš University, Department of Biology and Microbiology, Latvia*
[4] *Chelsea Children's and Westminster Hospital, Imperial College London, the United Kingdom*

Introduction. Although non-surgical treatment is proven successful especially in cases of acute uncomplicated appendicitis (AnA) in children, one of the major emerging problems in paediatric emergency is differentiation of AnA from acute complicated appendicitis (AkA) in early stages of the disease. At University Children's Hospital, last statistical review reveals tendencies of the total amount of yearly operated acute appendicitis (AA) cases remains unchanged, however the number of AkA cases is increasing (Kakars *et al.,* 2016). Prevention of delayed diagnosis and late onset of proper treatment is of major concern in avoiding complications. New emerging biomarkers NGAL (Neutrophil gelatinase associated lipocal) (*Bakal et al.,* 2016) and LRG (leucine-rich alpha glycoprotein-1) (*Rainer et al.*, 2016) in blood serum and urine may allow early diagnosis in AkA. Recent studies also suggest that the microbiota of the appendix plays a major role in its etiopathogenesis (*Giunane et al*., 2013). *Yersenia enterocolitica* infection is rare but mimic acute appendicitis in clinical presentation which may sometimes lead to false appendectomies.

Aim, Materials and Methods. The aim of the study was to establish new criteria for the early diagnosis of AkA and AnA and provide knowledge contributing to the etiopathogenesis of said conditions.

This prospective single centred randomised, controlled study is planned from early 2018–2020. Three patient groups with 30 patients each, surgically treated AkA, surgically treated AnA and control group. Based on surgical findings patients are divided into two study groups AkA and AnA. We will determine the levels of biomarkers NGAL and LRG in blood serum, and LRG in urine sample for all groups. Patients in both study groups will be continually screened for biomarker NGAL and LRG on second and fourth or fifth post-operative day. Furthermore, microbiological cultures will be obtained during surgery to check for microbiome analysis of the appendix in AnA and AkA patient groups. Bacteriological blood cultures were also performed in these groups. In all patient groups blood serum antibody levels of *Yersinia enterocolitica* will be performed. Results will be analysed by statistical means.

Results. Currently, the study is in its preliminary stage so it is hard to come up with any primary results. Samples are being obtained presently in this long-term study.

Conclusions. Research into the microbiota of the appendix and the new blood serum: NGAL (Neutrophil gelatinase-associated lipocal) and LRG (leucine-rich alpha glycoprotein-1), and urine (LRG) biomarkers could achieve a better understanding of the complicated acute appendicitis in the comprehension of etiopathogenesis and early diagnostic accuracy, as well as timely diagnosis of the severity of the disease and the disease's possible prognosis. It also allows reduction in post-operative complications of surgically treated acute appendicitis. It should be emphasised that the results of the study in Latvia could improve the quality of medical care in the relatively low socio-economic situation in the country.