

Abstract

Analysis of antibiotic administration in open appendectomies in pediatric patients

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Introduction and aims: Appendicitis represents the most frequent indication to a surgical abdominal intervention in population of paediatric patients. In case of complications, such as abscess, periappendicular infiltrate or perforation with peritonitis, it can even lead to a life-threatening condition. The aim of this study was to analyse antibiotic prophylaxis (AP) in paediatric patients undergoing open appendectomy, as well as antibiotic treatment of complicated appendicitis. Another aim was to compare the administration of antibiotics (ATB) before and after the implementation of recommended hospital procedures (RHP). Subsequently, to monitor the incidence of complications and length of hospital stay and their association with ATB administration and other risk factors.

Methods: An unicentric retrospective study was carried out. Patients aged ≤ 18 years who underwent an open appendectomy at the Department of Paediatric Surgery and Traumatology at the University Hospital in Hradec Králové between years 2014 and 2020 were included. Follow-up data on patients, ATB administered and surgical procedure were obtained from the medical documentation. Data collected on ATB prophylaxis (indication, choice and dose of ATB, timing of initial dose, length of infusion, repeat dose, prophylaxis overall) and treatment (indication, choice and dose of ATB, dose interval from prophylaxis, dose interval between doses, length of infusion, length of treatment, treatment overall) were then analysed in context with RHP and literature search (LS) using descriptive statistics. This was followed by comparison of results before and after the implementation of RHP using the Mann-Whitney test. Factors that influenced the incidence of complications and length of hospital stay were determined by Spearman correlation analysis.

Results: The overall number of patients included in the study was 95 – 30 girls and 65 boys. Their average age was 9.22 ± 3.46 years. Prophylaxis was administered to 79 patients (83%).

The most frequently administered ATB in prophylaxis was ampicillin/sulbactam (46%) and co-amoxicillin (19%). Complete and adequate prophylaxis was observed only in 2% of patients according to RHP and in 3% of patients according to LS. Sixty-nine percent of paediatric patients were treated with a total of 149 ATB. For treatment ampicillin/sulbactam (22%) and gentamicin (20%) were most commonly used. Complete and adequate treatment was observed only in 8% of patients according to RHP and in 16% of patients according to LS. After the introduction of RHP, there was a statistically significant improvement in selected factors. In terms of prophylaxis, the biggest deficiencies were observed in the timing of the initial dose. Treatment showed low adherence to reference standards (RS) in the dosing interval from prophylaxis. Preoperative c-reactive protein (CRP) levels and length of hospital stay were statistically significantly related to the incidence of complications. Preoperative CRP values, body temperature and leukocyte count were statistically significantly related to the length of hospitalization. Incidence of complications and length of hospitalization were also influenced by the correct administration of ATB.

Conclusion: The implementation of RHP led to an improvement in RS adherence rates. Adherence rates still remain worryingly low in the timing of the initial dose of ATB prophylaxis, in the dose interval of treatment from prophylaxis, and in the duration of treatment administration. Educational programmes, in which the clinical pharmacist can play an important role, may contribute to its improvement in the future.

Keywords: clinical pharmacy, antibiotics, paediatrics, appendicitis, appendectomy.