

# Influence of age on clinical presentation, diagnosis delay and outcome in preschool children with acute appendicitis

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## Introduction

Unusual clinical presentation of acute appendicitis in preschool children leads to misdiagnosis and complications. We aimed to analyze the influence of age on clinical presentation, laboratory findings and complications in preschool children with acute appendicitis.

## Patients and methods

29 children younger than 6 years of age (median 50 months) with acute appendicitis were enrolled in this retrospective study. Patients were grouped according to their age: group 1: <48 months (n=13); group 2: > 48 months (n=16), their clinical data, laboratory results and complications were compared.

## Results

In group 1, duration of nausea and vomiting was longer, alteration of general state was more frequent and pain in the right fossa iliaca less frequent than in group 2 (p=0.026, p=0.0001 and p=0.029, respectively). Heart rate and central temperature were higher in group 1 than in group 2 (p=0.012 and p=0.062, respectively). Leucocyte and polynuclear neutrophil counts were lower in group 1 than in group 2 (p=0.03 and 0.004, respectively) but C-reactive protein levels were not different between groups. In the whole cohort however, C-reactive protein values at admission correlated negatively with age (p=0.025). Alvarado- and the pediatric appendicitis score tested retrospectively were not discriminant for correct diagnosis in both groups. Abdominal ultrasound showed no difference between groups. Appendicular perforation was more frequent in group 1 than in group 2 (p=0.003). Perforation was also related to longer hospital stay (p=0.02). Peritonitis occurred in 21/29 (72%), post-operative ileus in 5/29 (17%) and sepsis in 4/29 (14%) patients without any difference between groups. In the whole cohort, hospital stay correlated negatively with age (p<0.0001). There was no mortality.

## Discussion

Our results show that in younger children, there was dissociation in the inflammatory response with significantly lower WBC- and PN counts in combination with higher CRP levels than in older children. This suggests age-related WBC and PN migration with impaired recruitment from the bone marrow into the circulation in younger children in spite of an important inflammatory response to the bacterial infection reflected by the induction of high levels of CRP in the liver. Less specific abdominal pain and dissociation of the inflammatory markers with lower leucocyte- and neutrophil counts and higher C-reactive protein levels in the younger may contribute to further diagnosis delay and higher rate of perforation in these patients. Lower WBC- and PN counts reported in pre-school children with appendicitis is another explanation for the lack of specificity of the Alvarado- and the PAS scores that can therefore hardly be helpful for the diagnosis of acute appendicitis in children, especially in the pre-school age. Abdominal ultrasound should, due to the possibility to easily repeat examinations, remain the first choice for the diagnosis of appendicitis in the pediatric population. Our results show that the youngest had the longest duration of clinical symptoms before diagnosis and treatment, more frequent alteration of the general state and higher central temperature at admission indicating systemic involvement of the disease and less frequent pain in the right fossa iliaca due to a preponderance of visceral abdominal pain in contrast to parietal abdominal pain.

## Conclusion

Among preschool children, those younger than 48 months present with longer duration of pre-admission symptoms indicating longer infection course than in older children. Altered general state and higher degree of tachycardia in the younger reflect higher systemic repercussions of the illness. Less specific abdominal pain and dissociation of the inflammatory markers with lower leucocyte- and neutrophil counts and higher C-reactive protein levels in the younger may contribute to further diagnosis delay and higher rate of perforation in these patients.