Non-operative treatment of children with simple appendicitis: long-term follow-up (5 years) in a prospective cohort study

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Dear Editor

Pilot studies have shown that non-operative treatment with antibiotics (NOT) has a high initial success rate in children with simple appendicitis.²,³ However, few data exist on the long-term outcomes, which are particularly relevant as patients may over time undergo delayed appendicectomy for recurrent appendicitis or abdominal complaints. After 1 year, it is estimated that approximately three of four children with NOT for simple appendicitis have avoided an appendicectomy.¹

Here, the authors re-evaluated 49 children who previously received NOT for acute simple appendicitis in a feasibility study for the APAC (Antibiotics versus Primary Appendectomy in Children) trial, an ongoing randomized trial comparing NOT with appendicectomy in children with simple appendicitis; its methods, short- and medium-term results were published in 2015² and 2018³. Children aged 7–17 years with ultrasound-confirmed simple appendicitis without a faecolith were treated with intravenous antibiotics for 48–72 h, continued orally at home for 5 days. In the event of clinical deterioration, insufficient recovery or recurrent appendicitis, appendicectomy was performed. To assess long-term outcomes after NOT, data on delayed appendicectomies and complications were collected during telephone follow-up interviews (October 2019); in addition, electronic health records, including histopathological reports, were investigated. All events were scored separately by three authors according to type, severity, and relationship to appendicitis or its treatment, using preset definitions.

In total, 47 of 49 children could be contacted for follow-up at a median of 5.4 (range 3.9–7.1) years after initial treatment. Appendicectomy had not been performed in 33 of 47 children (70 (95 per cent c.i. 56 to 81) per cent) (Fig. 1). Of the 14 children who did undergo appendicectomy, four (9 (3 to 20) per cent) were classified as non-responders (failure of NOT within 7 days after start of treatment), and 10 (21 (12 to 35) per cent) as having delayed appendicectomy. Histopathological examination after the delayed appendicectomies showed simple appendicitis (7), non-inflamed appendices (2), and chronic inflammation with fibrosis (1). In none of the children who had delayed appendicectomies was complex appendicitis diagnosed. No complications occurred past 1 year, including children who underwent delayed appendicectomy.

The long-term rates of delayed appendicectomy are similar to those in two²,³ of three studies that reported long-term outcomes after NOT in children. A third study, a 5-year follow-up of a pilot RCT, reported a higher total appendicectomy rate, with 11 of 24 children randomized to NOT undergoing appendicectomy. However, histopathological examination showed acute appendicitis in only four of the 24 children randomized to NOT. The authors suggested that this could be the result of the novelty of NOT resulting in more liberal indications for surgery. They are currently awaiting the results of several ongoing RCTs for definitive evidence on the medium-term (1 year) efficacy of NOT compared with surgery, including other relevant outcomes, such as quality of life, disability days, and costs. From the results of the present study it can be concluded that the long-term

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results after NOT for children with simple appendicitis seem promising, possibly avoiding appendicectomy in 70 per cent of children after a median follow-up of 5 years.

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References

1. Huang L, Yin Y, Yang L, Wang C, Li Y, Zhou Z. Comparison of antibiotic therapy and appendectomy for acute uncomplicated appendicitis in children. JAMA Pediatr 2017;171:426
2. Gorter RR, van der Lee JH, Cense HA, Kneepkens CM, Wijnen MH, In ‘t Hof KH et al. Initial antibiotic treatment for acute simple appendicitis in children is safe: short-term results from a multicenter, prospective cohort study. Surgery 2015;157:916–923
3. Gorter RR, van der Lee JH, Heijsters FACJ, Cense HA, Bakx R, Kneepkens CMF et al. Outcome of initially nonoperative treatment for acute simple appendicitis in children. J Pediatr Surg 2018;53:1849–1854
4. Kaneko K, Tsuda M. Ultrasound-based decision making in the treatment of acute appendicitis in children. J Pediatr Surg 2004;39:1316–1320
5. Tanaka Y, Uchida H, Kawashima H, Fujiogi M, Takazawa S, Deie K et al. Long-term outcomes of operative versus nonoperative treatment for uncomplicated appendicitis. J Pediatr Surg 2015;50:1893–1897
6. Patkova B, Svenningsson A, Almström M, Eaton S, Wester T, Svensson JF. Nonoperative treatment versus appendectomy for acute nonperforated appendicitis in children. Ann Surg 2020;271:1030–1035