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Pre-operative prophylactic antibiotics for acute non-ruptured appendicitis in children.

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Objective : *To study the risk of wound infections for acute non-ruptured appendicitis in children who had not received preoperative prophylactic antibiotics.*

Setting : *Division of Pediatric Surgery, Department of Surgery, Chulalongkorn University Hospital, Bangkok 10330, Thailand.*

Research design : *Prospective clinical trial*

Patients & Method : *All children clinically diagnosed at our hospital with acute non-ruptured appendicitis between January 1993 and December 1996 were included in this study. These patients did not receive any prophylactic antibiotics pre-, intra - and postoperatively. Any wound infection were recorded and analysed along with the reports of other patients at the same institution during 1989-1992.*

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Results : *There were 535 children diagnosed with appendicitis in our study but 451 were clinically diagnosed with non-ruptured appendicitis and only 379 were included due to the protocol of no prophylactic antibiotics. Of the 379,5 revealed ruptures of the appendix during the operation, 26 had a normal appendix without other abnormal finding and 4 had other diagnoses with a normal appendix. Therefore,there were 344 patients who were confirmed by later pathological reports as having acute non-ruptured appendicitis and 26 patients with normal operative findings who did not receive any antibiotics. Of 370 children who underwent appendectomy without preoperative prophylactic antibiotics, 3 (0.81%) developed wound infections. The 0.81% wound infection rate is not significantly different from the 1.14% wound infection rate in acute non-ruptured appendicitis at the same institution during the period 1989-1992.*

Conclusion : *This study confirms that preoperative prophylactic antibiotics are not necessary in cases of acute non- ruptured appendicitis. Surgeons can confidently withhold unnecessary preoperative antibiotics so that the cost of antibiotics is not incurred and the problem of antibiotic-resistant organisms will be reduced.*

Key words : *Appendicitis, Prophylactic antibiotics,Wound infection.*

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ไพศาล เวชชพิพัฒน์, สุทธิพร จิตต์มิตรภาพ, พิทยา จันทรกมล. ความจำเป็นของการใช้ยาปฏิชีวนะแบบป้องกันในเด็กที่เป็นไส้ติ่งอักเสบเฉียบพลันชนิดไม่แตกทะลุ. จุฬาลงกรณ์-เวชสาร 2540 ก.พ;41(2): 141-8

วัตถุประสงค์ : *เพื่อศึกษาอัตราการเกิดการติดเชื้อของแผลผ่าตัดผู้ป่วยเด็กไส้ติ่งอักเสบเฉียบพลัน ที่ไม่ได้รับยาปฏิชีวนะก่อนผ่าตัด*

สถาบัน : *หน่วยกุมารศัลยศาสตร์ ภาควิชาศัลยศาสตร์ คณะแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย กรุงเทพมหานคร*

รูปแบบ : *เป็นการศึกษาไปข้างหน้าทางคลินิก*

ข้อมูลและการศึกษา : *ศึกษาจากผู้ป่วยเด็กที่ได้รับการวินิจฉัยว่าเป็นโรคไส้ติ่งอักเสบเฉียบพลันชนิดไม่แตกทะลุ ที่ได้รับการรักษาในโรงพยาบาลจุฬาลงกรณ์ ระหว่างปี พ.ศ. 2536 และ พ.ศ. 2539 กำหนดรูปแบบการศึกษาแบบไปข้างหน้า โดยผู้ป่วยดังกล่าวจะไม่ได้รับยาปฏิชีวนะทั้งก่อน ระหว่าง และหลังผ่าตัด และทำการบันทึกผลการรักษาว่ามีข้อแทรกซ้อนด้านการติดเชื้อของแผลผ่าตัดมากน้อยเพียงใด แล้วทำการวิเคราะห์เปรียบเทียบกับผู้ป่วยประเภทเดียวกันที่เข้ามารับการรักษาในระยะเวลาก่อนหน้าที่ได้รับยาปฏิชีวนะก่อนผ่าตัด*

ผล : *จากจำนวนผู้ป่วยทั้งสิ้น 535 รายที่ได้รับการวินิจฉัยทางคลินิกว่าเป็นไส้ติ่งอักเสบ มีผู้ป่วยที่วินิจฉัยว่าไส้ติ่งอักเสบยังไม่แตกทะลุจำนวน 451 ราย ในจำนวนนี้มีผู้ป่วย 379 ราย ที่จัดเข้ากลุ่มศึกษาโดยไม่ได้รับยาปฏิชีวนะ ก่อนผ่าตัด จากจำนวนนี้มี 5 รายที่พบว่าไส้ติ่งแตกทะลุแล้ว ผู้ป่วยอีก 26 รายพบไส้ติ่งปกติ และ 4 รายมีพยาธิสภาพอื่นที่ไม่ใช่ไส้ติ่งอักเสบ ดังนั้นมีผู้ป่วยจำนวน 344 รายที่ได้รับการผ่าตัดไส้ติ่งโดยไม่ได้ให้ยาปฏิชีวนะใดๆ ทั้งก่อน ระหว่าง และหลังผ่าตัด และนำมาศึกษาต่อ ซึ่งพบมีการติดเชื้อของแผลผ่าตัด 3 ราย หรือเท่ากับร้อยละ 0.81 อัตราการติดเชื้อ 1.14% ในผู้ป่วยประเภทเดียวกันที่ได้รับยาปฏิชีวนะก่อนผ่าตัดที่ได้รับการรักษาในช่วง พ.ศ. 2532-2535*

สรุป : *การให้ยาปฏิชีวนะก่อนผ่าตัดในผู้ป่วยเด็กที่เป็นโรคไส้ติ่งอักเสบเฉียบพลันชนิดไม่แตกทะลุไม่มีความจำเป็น และไม่ช่วยลดอัตราการติดเชื้อของแผลผ่าตัดอย่างมีนัยสำคัญ ผลการศึกษาช่วยยืนยันให้ศัลยแพทย์มีความมั่นใจยิ่งขึ้น ในการหลีกเลี่ยงการใช้ยาปฏิชีวนะอย่างพร่ำเพรื่อ และมีผลช่วยลดปัญหาเชื้อโรคดื้อยาจากการให้ยาปฏิชีวนะเกินความจำเป็น*

Wound infection continues to be an important morbidity after surgery. Wound infection also remains the most comon cause of complications after appendectomy. Factors that increase the risk of wound infection include severity of the pathology,prolonged operative time, existence of necrotic tissue, tissue trauma and bacterial contamination.[1,2] Controversy still remains over the necessity of preoperative antibiotic prophylaxis. Therefore, a prospective clinical trial was launced to evaluate the risk of wound infection in children with acute non-ruptured appendicitis who did not receive preoperative antibiotic prophylaxis.

Materials and Methods

Five hundred and thirty five children clinically diagnosed with appendicitis in the Division of Pediatric Surgery, Department of Surgery, Faculty of Medicine, Chulalongkorn University Hospital between January 1993 and December 1996, were included in the study. Preoperatively, all of the children who had a presumptive diagnosis of acute non-ruptured appendicitis, and who could undergo the procedure within 3 hours of diagnosis, did not receive any prophylactic antibiotic. The children with acute non-ruptured appendicitis, who could not undergo the procedure within 3 hours of diagnosis received Gentamicin (1.5 mg/kg) and Metronidazole (7.5 mg/kg) preoperatively and were excluded from this study. Children who were clinically diagnosed with ruptured appendicitis received preoperative antibiotics for treatment. These were Gentamicin 5 mg/kg/day and Metronidazole 25 mg/kg/day for at least 3 days postoperatively. The operative technique was similar for all of the surgeons, who usually were rotating surgical residents. Skin preparation was with 10% povidone iodine or hibitane solution. Access to the abdomen was through a right lower-quadrant transverse incision. No skin or wound barriers were used. The appendix was removed and the stump was either doubly ligated or buried with a purse-string suture. No peritoneal irrigation was performed. The abdominal wall was closed layer by layer. Subcutaneous tissue was irrigated with a dilutional solution of povidone iodine. All patients underwent immediate primary wound closure in subcuticular or transdermal fashion with 5-0 traumatic vicryl sutures. The wound was dressed with a simple gauze which was removed on the second day after operation. Wound infection was defined as a wound with any dischange of serous or purulent material, or any evidence of intra-abdominal sepsis. During the hospital stay, wounds were examined daily for evidence of infection by an independent assessor. Almost all of the patients were followed up at 2 weeks. Patients without complete follow-up were excluded from the study.

Results

Emergency appendectomy was performed in 535 children over the 4-year period in which the protocol was prospectively followed. Of the 535 patients who were entered into the study, four hundred and twenty-one children were confirmed

by pathological reports as having acute non-ruptured appendicitis, 84 children had a ruptured appendicitis, and the histologic examination showed no signs of inflammation in 26 children (Table 1). The ages of the children with acute appendicitis ranged from 4 to 14 years.

Table 1. Final diagnosis of children presumptively diagnosed with appendicitis.

	Number of patients	Percent
acute appendicitis	421	78.69
Normal appendix	26	4.86
Miscellaneous*	4*	0.74
Ruptured appendicitis	84	15.71
Total	535	100.00

* Twisted ovarian cyst (1), ruptured corpus luteum (1), chronic appendicitis (1) and periappendicitis (1)

Misdiagnosis of appendicitis arose in 5.60% (30/535) of the cases. In 4 children there was another pathological diagnosis accounting for the clinical presentation. These were twisted ovarian cyst (1), ruptured corpus luteum (1), chronic appendicitis (1) and periappendicitis (1). Most of the children with acute non-ruptured appendicitis were discharged from the hospital on the third day following the appendectomy. There was no mortality in this study.

Of the 451 children with non-ruptured appendixes, there were 379 children who did not receive preoperative prophylactic antibiotics. Of these 379,5 had ruptures of the appendix during the operation and 4 had other diagnoses and received antibiotics during or after the operation. Therefore, there were 344 patients who were confirmed by later pathological reports was having acute non-ruptured appendicitis and 26 patients with normal operative findings who did not receive any antibiotics and were included in the study group. Of the 370 children who underwent appendectomy without preoperative prophylactic antibiotics, postoperative wound infections occured in 3 (0.81%) patients with acute non-ruptured appendicitis. Wound infection was detected on the fourth day after appendectomy in two children and while they were still in the hospital. Both children required opening of the wound for daily dressing until the wound healed. Another child returned to the surgeon on the seventh day after discharge because of fever and pain at the incision site. That child was treated by opening the wound and daily dressing as OPD case. None of these children received intravenous antibiotics and their wounds healed without further complication

In the group with a ruptured appendicitis, 15 of the 83 children did not receive preoperative antibiotics because of iatrogenic rupture of the appendix intraoperatively and 5 were misdiagnosed as being non-ruptured. However, these children received postoperative antibiotcs and did not experience any wound complication.

In all patients,the wound infections ran a benign course. The overall incidence of wound infection in the study group with acute non-ruptured appendicitis who did not receive preoperative prophylactic antibiotics was 0.81%. No child required reoperation for drainage or debridement. There were no cases of systemic sepsis, necrotizing fascitis, or other synergistic infection. There were no deaths in the series.

The rate of wound infection in acute non-ruptured appendicitis cases at the same institution during the period 1989-1992 for patients who did not receive preoperative prophylactic antibiotics was 1.14%. That wound infection rate is not significantly different ($p < 0.01$) from our recent study results.

Discussion

Acute appendicitis is the most common indication for abdominal surgery in Thai children. The usual rupture rate is 10 - 30%.[3,4] Most recent series use protocols of early appendectomy, preoperative antibiotics with aerobic and anaerobic coverage,measures to minimize operative contamination, avoidance of peritoneal drainage except for appendiceal abscess, and continuation of antibiotics postoperatively for complicated appendicitis.[5,6]

However, most of the articles on this subject dealt with adults. Although it is the most common urgent surgical condition in children, there are few publications dealing with children. Therefore, the appropriateness of antibiotic prophylaxis, which may be reasonable in adults, has not heretofore been thoroughly evaluated for uncomplicated appendicitis in children.

Appendectomy wounds for acute appendictis has been defined as a cleaned contaminated wound in which the rate of wound infection is 2-5%.[7] Until now, it has been believed that preoperative antibiotic prophylaxis for uncomplicated appendicitis was necessary.[8] But with the results of this study and a report by Kizilcan et al,[9] the necessity of preoperative antibiotic prophylaxis is in question. Perhaps the case of passing through the thin abdominal wall with minimal tissue results in minimal contamination. In our study, the rate of wound infection in children with acute non-ruptured appendicitis who did not receive preoperative antibiotic prophylaxis was only 0.81%. Since none of the patients with iatrogenic appendicitis rupture who did not receive antibiotic preoperatively had infectious complications and because of the risk of antibiotic anaphylaxis, we recommend that if an uncomplicated appendicitis is clinically diagnosed, the use of antibiotics for prophylaxis is not required.

Conclusions

Although many pediatric and general surgeons today commonly use preoperative prophylatic antibiotics for acute non-ruptured appendicitis,[10-15] it is apparent from our study that appendectomy for uncomplicated appendicitis in children without antibiotic prophylaxis carries a minimal risk of wound infection. Also,

there are few reports which, have recommended antibiotic prophylaxis.[1-3,7,8,10-15] Therefore, surgeons can confidently withhold unnecessary preoperative antibiotics. Thus the cost of antibiotics to the patient will not be incurred and the problem of antibiotic-resistant organisms will be reduced.

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