

THE EFFECT OF INVERSION OR NON INVERSION OF THE STUMP ON POSTOPERATIVE COMPLICATIONS IN CHILDHOOD APPENDICITIS

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SUMMARY : *Appendicitis is the most common cause of acute surgical abdomen in childhood, especially after 2 years of age. In appendectomy, the technique of ligation with inversion of the stump is common. Simple ligation in appendectomy requires less manipulation and provides a faster method. This procedure may therefore be regarded as an alternative to the technique of ligation with inversion of the stump. A prospective randomized trial of 118 patients between 2 and 15 years of age admitted in to Ankara Numune Hospital, Pediatric Surgery Clinic, was carried out to compare the postoperative complications of simple ligation with invagination of the appendix stump. As surgical techniques have developed, various procedures have become simpler in recent years. Since the results of both techniques were not significantly different, we recommend simple ligation of the appendix stump as a safe procedure.*

Key Words : *Appendectomy, Simple Ligation, Invagination of The Appendix Stump.*

INTRODUCTION

Appendicitis is the most common cause of acute surgical abdomen in children over 2 years of age. Under 14 years, the incidence is 0.94 % (11). In spite of recent advances in surgery, anesthesiology and antibiotic therapy; appendicitis is still causing mortality and prolonged morbidity.

Over the years, three main methods of dealing with the appendiceal stump have evolved. Probably the most common is to crush and ligate the stump and then invaginate it into the caecal wall by means of a pursestring suture (2, 4). However some surgeons prefer to omit the step of invagination, while others omit the ligation and merely invaginate the unligated stump. However the simple ligation technique is faster and needs less manipulation.

This paper compared the postoperative compli-

cations of simple ligation and invagination of the appendiceal stump; then results were compared with the literature.

MATERIALS AND METHODS

In Ankara Numune Hospital Pediatric Surgery Clinic, 118 patients between 2 and 15 years were operated on for acute and perforated appendicitis between 1982 and 1992.

The hospital records of the patients over a 3 year period who had undergone appendectomy from 1982 to 1992 inclusive have been examined. While 15.2 % of the patients were under 5 years old in our series this was found to be 1-8 % in the literature. The diagnosis in 80 % of the patients was delayed because they had been seen by a physician earlier during their illness and treated with antibiotics, anti-

Age (year)	Male	Female	Total	%
2-5	10	8	18	15.2
5-10	60	10	70	59.4
10-15	18	12	30	25.4
Toal	88	30	118	100

Table 1 : Patients according to age and sex.

histamines or antipyretics and the inflammation had progressed.

In our retrospective study, it was found that surgery was carried out for acute appendicitis in 30 patients and for perforated appendicitis in 88 patients. When the diagnosis of acute appendicitis had been established, the patient was kept under observation preoperatively for between 4 and 8 hours and a physical examination was repeated under i.v therapy. Patients to be operated on for acute appendicitis were given a standard dose of Biteral (20 mgr/kg twice daily) during induction. Patients operated on for perforated appendicitis were given a combination of Penicillin G (200.000 IU/kg six doses daily) + Nebscin (5 mgr/kg twice daily) + Biteral (20 mgr/kg twice daily) including those who were already receiving antibiotics and this regimen was continued for 5 days postoperatively. These patients were operated on after 4-6 hours of fluid replacement treatment. The Rocky-Davis incision was routinely made in acute and perforated appendicitis operations and with both techniques a 0.2-0.3 cm stump was left. The stump was double tied with 2/0 silk and in accordance with the burried stump technique, the stump was burried using pursestring sutures-with 3/0 atraumatic silk-placed 0.5-1 cm distal to the appendix. In all of the perforated cases, a

penrose drain with two legs, extending to the Douglas poche (extravesical space) and right paracolic gutter region was placed in the appendix site.

RESULTS

Simple ligation without invagination of the stump was carried out in 10 of the 30 cases with acute appendicitis and in 35 of the 88 cases with perforated appendicitis (Table 2).

Comparison of the two groups showed that the acute appendicitis patients in whom the invagination technique had been performed were discharged in 5.2 days, while the patients who had no invagination were discharged in 3.7 days. The perforated appendicitis cases treated with the invagination technique were discharged in 8.1 days (Table 3). It is seen that acute appendicitis patients with burried appendix stumps stayed for an average of 1.5 days longer in hospital, while patients with perforated appendicitis treated with the invagination technique stayed 3 days longer.

Since no postoperative complications were encountered in acute appendicitis cases, only postoperative complications of perforated appendicitis invagination and simple ligation cases were compared (Table 4).

	Stump No	Invagination %	Simple No	Ligation %	Total
Acute appendicitis	20	66.6	10	33.4	30
Perforated appendicitis	53	60.2	35	39.8	88
Total	73	61.8	45	38.2	118

Table 2 : Patients with stump invagination and simple ligation groups.

Duration of Hospitalization	Acute appendicitis Stump invagination		Perforated appendicitis Stump invagination	
	(+)	(-)	(+)	(-)
5		5		
1-5	18	5		
5-10	2		47	35
15			6	
TOTAL	20	10	53	35

Table 3 : Duration of hospitalization in stump invagination and simple ligation groups.

Perforated appendicitis Complications	N = 53		N = 35		N = 88
	Stump Invagination		Simple Ligation		Total
	No	%	No	%	%
Wound infection	11	20.7	5	14.2	18.1
Wound disruption	2	3.7	3	8.5	5.6
Pleural effusion	-		2	5.7	2.2
Adhesions	5	9.4	3	8.5	9.0

Table 4 : Postoperative complications in the stump invagination and simple ligation groups in perforated appendicitis.

DISCUSSION

Classically, in descriptions of appendicectomy techniques, invagination of the stump into the caecum is included (2, 6, 9). However some authors don't advise invagination in cases where the caecum is very oedematous (1). The main reasons for defending the invagination of the stump into the caecum after appendicectomy are; guaranteed hemostasis of the stump, closing of the caecum wall with a secondary layer, prevention of postoperative adhesions by removing the exposed surface, and prevention of peritoneal contamination by the infected stump (8). However, invagination of the stump with pursestring sutures into the seromuscular layer of the caecum can cause certain complications. These range from subserosal hematoma to perforation and necrosis (2). An abscess developing in the invaginated stump can not only cause an abscess in the caecal wall but can also lead to complications such as perforation, peritonitis and pelvic abscess (2, 4). Caecocolic invagination is a rare complication related to invagination of the stump. It has been reported to occur from 2 weeks to 6 years postoperatively (2, 5, 7). In addition, the invaginated stump appears as a filling defect in obtained later caecum radiographs and can cause difficulty in radiographic evaluation. In our cases the complication rate was lower than those reported in the literature (2, 3, 10).

Postoperative complications such as; pelvic abscesses, intraabdominal abscesses, stump abscesses, pylephlebitis and hepatic abscesses were not seen in our patients. In patients with invagination of the stump, subcutaneous infection was seen in 20.7 %, while this was 14.2 % in cases with simple ligation. The difference between these rates is statistically insignificant. However in larger series in the literature, this type of complication has been reported as being more frequent in invaginated stumps (3, 10).

Suturing of the caecum is an additional operative procedure and, together with related complications, it lengthens the duration of anesthesia. In recent years several operative procedures have been simplified. Due to complications related to invagination of the stump following appendicectomy and the lack of difference between the complication rates in the two groups; it has been concluded that invagination of the stump is not an absolutely essential procedure.

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