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Acute Appendicitis in Infant

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One hundred forty-four cases with acute appendicitis in infant were clinically analyzed. It is emphasized that acute appendicitis in infant is prone to perforate and surgical care tends to be delayed. Occurrence of the postoperative complications, furthermore, is associated with delayed surgery.

INTRODUCTION

Acute appendicitis occurs accidentally and more frequently in infant as acute abdomen. Since the treatments of antibiotics and fluid transplantation were in far advance, the surgical outcome for acute appendicitis has become quite satisfactory so far.[1)2)] However, appendectomy by chance enabled the surgeons to be anxious about the postoperative complications such as postoperative abdominal pain by unknown origin, abnormality of bowel habitus adhesive ileus, scar hernia of the abdominal wall and fecal fistula formation.

Appendectomy, therfore, should strictly be selected even though operative treatment might widely be available for the treatment of acute appendicitis.

In the present study, clinical evaluation was made in comparison with the treatments of perforated and non-perforated patients sufferring from acute appendicitis in infant under 5 years of age.[3)]

PATIENTS

Six hundred and sixty four patients under 15 years of age with acute abdomen were dealt with at The First Department of Surgery, Nagasaki University Hospital, during the 10 years

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as shown in Table 1. Among whom underwent urgent surgery in infant, the incidence of invagination was much more frequent in 433 (67.2%), followed by appendicitis in 142 (22.4 %), postoperative ileus in 28 (4.3%) and incarceration of inguinal hernia in 13 (2.0%) respectively. Such figures showed that acute appendicitis and invagination were mostly common in their occurrence. One hundred and forty-two of acute appendicitis, 68 of them had perforation and were subjected to this study. The main symptoms of perforated appendicitis were abdominal pain and nausea, althouth the complaints of nausea and fever were seen in one third of patients. The complaints of diarrhea and common cold signs were a few.

The complaints of fever and diarrhea in the perforated group were more freqnently seen rather than those in non-perforated group. In general, the clinical signs were much more severe and frequent in perforated patients rather than in non-perforated ones.

In view of age distribution, nausea and vomiting were frequently seen in older patients. In contrast, fever and diarrhea were frequent complaints in younger patients.

At surgery, the gross findings of perforation and phlegmonous inflammation of appendices were a hallmark at surgery under 15 years of age as shown in Fig. 1. On the contrary, perforation was characteristic of appendicitis in infant and appendicitis catarrhalis was also of that of 9~11 years of age, next to 5~7 and 7~9. And also the incidence of perforation was lessened in the age of 11~13.

The objective findings of the abdomen were manifest in 80% of patients with acute appendicitis as shown in Table 2. However, the incidence of defence musculare was low in non-perforated patients.

The time from onset to surgical operation was shown in Table 3. Most of them underwent laparotomy within 3 days, although operation was delayed over 7 days in 18%.

The patients tended to allow perforation of appendicitis when the surgical operation was delayed for 24 hours or more. From a practical standpoint of given antibacterial antibiotics, too many kinds of antibiotics tended to be prescribed. WBC varied with a wide

Table 1. Acute abdomen in infant

intestinal volvulus	433	68.0
acute appendicitis	142	22.2
postop. ileus	28	4.4
invagination of hernia	13	2.0
malrotation of the gut	7	1.1
perforation of digestive tract	8	1.2
bleeding from duod. ulcer	1	0.2
bleeding from Meckel diverticulum	3	0.5
Torsion of a tumors of ovary	2	0.3
volvulus of the intestine	1	0.2
abdominal trauma	6	0.9
	644	100

range, not showing a constant tendency in patients with perforated appendicitis as indicated in Table 4. Furthermore, WBC in the perforated group was not so much increased as compared with that in the non-perforated group. Such finding indicated that WBC was not consistent with the severity of the disease.

According to patient's age, WBC in infant showed varying variety, although those in childhood indicated much constancy and proportionated much more to the progression of the disease.

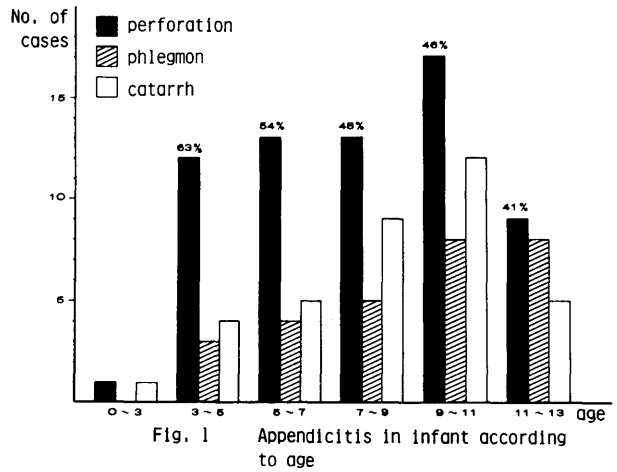

Fig. 1 Appendicitis in infant according to age

Fig. 1. Appendicitis in infant according to age

Table 2. Finding on palpation

perforation

	+	+	−	positive(%)
Defence	45	4	4	85
McBurney	26	1	4	84
Blumberg	20	1	5	77
Lanz	7		2	78
Rosenstein	5	1		83
Rovsing	3	2	1	50

non-perforation

	+	+	−	positive(%)
Defence	37	6	20	59
McBurney	34	1	5	85
Blumberg	19	3	14	53
Lanz	8		1	89
Rosenstein	7		1	88
Rovsing	8	1	1	80

Table 3. The time from onset to operation

age \ time	24 hrs	1-3 days	3-6 days	5-7 days	over 7 days
0- 3yrs					1(1)
3- 6	8(3)	15(10)	2(2)	3(2)	7(6)
6- 9	13(2)	13(11)	2	2	6(4)
9-12	12(1)	21(13)	6(3)	2(2)	6(3)
12-16	7(1)	9(3)	1		6(1)
	40(7)	58(37)	11(5)	7(4)	26(15)

( ) perforated cases

Table 4. WBC in acute appendicitis

WBC	$1x10^4$	$1\text{-}1.5x10^4$	$1.5\text{-}2.0x10^4$	$2.0\text{-}2.5x10^4$	$2.5x10^4$
Perforated	5	25	18	12	8
Non-perforated	18	28	17	7	4
Phlegmon	2	13	10	5	3
Catarrh	16	15	7	2	1
0- 3 yrs		2(1)			
3- 6	1(1)	10(8)	11(9)	6(4)	4(2)
6- 9	9(3)	13(7)	11(3)	5(2)	3(2)
9-12	8(1)	20(8)	7(3)	7(6)	4(3)
12-16	5	8(1)	6(3)	1	1(1)

DISCUSSION

It is generally accepted that appendicitis which underwent surgical treatment was predominant to women rather than to man (the ratio of 1 : 1.5). The patients with acute abdomen in infant were mostly suffering from intestinal invagination and/or acute appendicitis.[3)]

Clinical manifestation of acute appendicitis in infant was a complaint of abdominal pain as often seen in adult. However, the complaint of vomiting was followed. Complaints of fever and nausea were a few in occurrence. In contrast, those of vomiting and abnormal bowel movement in adult were common. Generally speaking, acute appendicitis in infant progersses rapidly and almost a half of the patients who underwent surgery in our clinic suffered from perforation of the appendix. The reasons for high incidence of perforation in infant are that the wall of the appendix in infant is so thin that it easily perforate at the begining of this disease and that the function of the omentum is immature and insufficient to prevent peritoneal inflammation from wide spreading.[4)]

As reported by many investigators, clinical manifestation of Blumberg's sign was marked in the perforated group. When the timing of operation was delayed, over 24 hours, from onset perforation tended to occur frequently, although a postoperative complication of perforarion was seen in a few cases operated within 24 hours frm onset.

Chemotherapy is needed for the treatment of acute appendicitis. In perforated patients, antibiotics were preoperatively given at the sufficient dosis. This indicated that chemotherapy failed to inhibit the inflammatory spreading but protected from developing sepsis. There was no grave postoperative complication in this series, although it had been known that postoperative complications occurred not infrequently in the perforated group, mainly wound infection, intraperitoneal abscess and ileus. It has been defined that wound infection is associated with intraoperative contamination,[5)] surgical technique and resistence of the host to infection and move likely to be seen in the perforated group as already reported. Chemotherapy was not necessarily effective to inhibit the spreading in the course

of appendicitis in this study, although the use of preoperative chemotherapy was of value to prevent postoperative infection. The bacterial organism was not detected in all cases, because microbiological examination was not available and an appropriate medium was not ready at the emergency cases as they were in most cases. It is well known that bacterial germs of appendicitis in infants are E. coli, Pneumococci, and Bacteroides fragilis.[6]

Recent development of antibacterial chemotherapy benefits by reducing septic complications of appendicitis.[7)~9)] Surgeons must pay an attention to the fact that appendicitis in infant is prone to perforate and early surgical treatment is needed whenever indicated to minimize the postoperative complications.

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