

PAPERS AND ORIGINALS

Active observation in management of acute abdominal pain in childhood

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Summary

Out of 363 children admitted to a surgical unit with acute abdominal pain only 126 (35%) had an operation. Of these, 20 first underwent a period of "active observation." This procedure, used to help reach a diagnosis or decision in doubtful cases, is safe and useful and may be applied at home or in hospital.

Introduction

Acute abdominal pain in childhood is always a cause for concern, although the delay before parents call for medical advice may vary from a few hours to several days. Of the many possible causes of such pain about 70% are non-surgical.¹ The surgical conditions, however, are potentially serious and at times hard to recognise, not least because the child is often distressed and difficult to examine. Even with hospital investigations most of the problems in diagnosis have to be solved at the bedside through careful and often repeated clinical observation. In an attempt to provide a factual background I describe here all the cases of acute abdominal pain referred to the surgical wards of this hospital during August 1973 to July 1974.

The hospital serves children up to the age of 13 from a population of about 450 000. During the 12-month period information on each child admitted was recorded on a special form by the most senior person to examine and treat the child, usually the surgical registrar. In addition to a full record of history, examinations, and investigations the opinion of the examiner was recorded at the time of admission and whenever further examinations were performed. The methods of examination and terms used have been described.¹

Patients and methods

Out of 363 children with acute abdominal pain admitted during the study period 106 were submitted for operation after the initial examination (see fig). Of the remaining 257 children some were thought to have a medical condition but many could not be diagnosed with certainty, and so a policy of "active observation" was followed. This entails giving nothing by mouth and the nursing staff recording temperature and pulse hourly and observing the behaviour of the child. Urine is examined microscopically and chemically, and any other necessary investigations are made. In this series, if the child was too distressed to allow satisfactory abdominal examination he was sedated, usually with trimeprazine (Vallergan) 1 mg/kg intramuscularly. After two to three hours the surgeon who made the first examination re-examined the child. This resulted in a decision to operate in a further 19 cases. If necessary active observation may be continued for a further two to three hours, and after doing so in this series one further child was operated on. Table I shows the final diagnoses in the 126 children undergoing surgery.

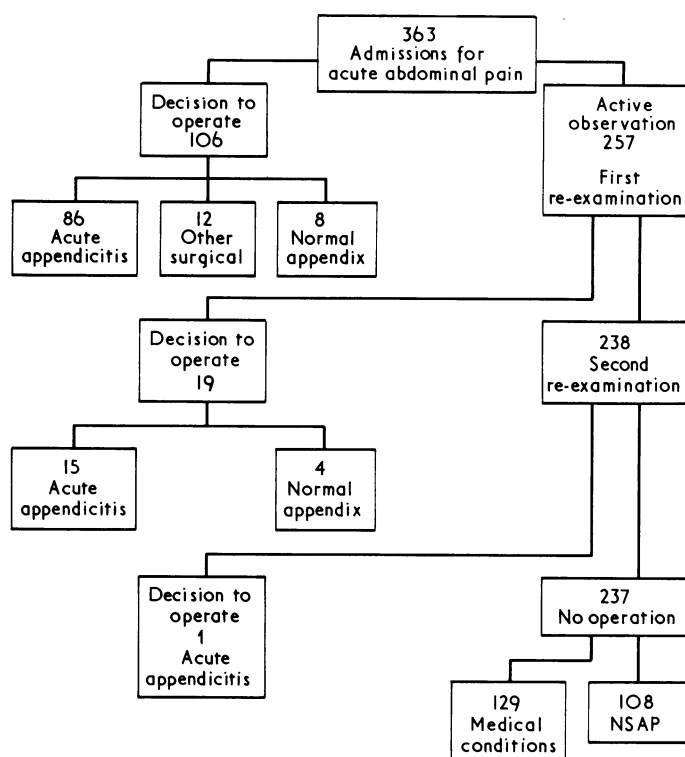
Medical causes of abdominal pain

A firm diagnosis either at the time of admission or during active observation was made on 129 of the 237 children who were not operated on. Table II lists these diagnoses but is not exhaustive—for example, in the three months after the survey ended three children were admitted with acute abdominal pain as the presenting symptom of unsuspected diabetic ketoacidosis,² and another child proved to have early meningitis.

Constipation was diagnosed in 40 children, all of whom had, in addition to vague abdominal tenderness, a loaded colon or rectum or both; symptoms were relieved after the passage of a large stool (usually after a suppository or enema). Nine of these children had suffered previous attacks of abdominal pain.

Upper respiratory tract infection (29 cases) was diagnosed when the child complained of a sore throat and this was associated with fever. Often cervical adenitis was also present. Eight children showed signs of acute tonsillitis, the throat swab yielding pathogenic bacteria. The other 21 children, with negative throat swabs, probably had an acute viral infection; there were two epidemics of influenza B³ in the area during the year.

Urinary tract infection (25 cases) was diagnosed when a midstream urine specimen grew more than 100×10^6 pathogenic bacteria per litre (100 000/ml) and the symptoms settled with antibiotics. Eight



Management and outcome in 363 cases of children with acute abdominal pain admitted to surgical wards. NSAP=Non-specific abdominal pain.

TABLE I—Diagnoses in the 126 children undergoing surgery. Percentages are proportions of total group (363)

	No of children
Acute appendicitis	102 (28%)
Normal appendix	4
Normal appendix and mesenteric adenitis	8
Meckel's diverticulitis	2
Adhesive band	1
Caecal volvulus	1
Intussusception	3
Strangulated inguinal hernia	2
Ruptured liver	1
Ruptured kidney	1
Torsion of testicle	1
	116 (32%)*
	7†
	2‡

*Operated on for suspected acute appendicitis.

†Operated on for intestinal obstruction.

‡Operated on after abdominal injury.

TABLE II—Diagnoses in the 237 children not undergoing surgery. Percentages are proportions of total group (363)

	No of children
Constipation	40 (11%)
Upper respiratory tract infection	29
Urinary infection	25
Gastroenteritis	13
Bronchopneumonia	8
Colic (fruit)	3
Infectious hepatitis (incubating)	2
Abdominal wall injury	2
Adhesive intestinal obstruction	1
Faecal impaction	1
Acute glomerulonephritis	1
Haematemesis from duodenal ulcer	1
Renal calculus	1
Acute otitis media	1
Acute pancreatitis	1
Non-specific abdominal pain	108 (30%)

children presented with the clinical picture of acute pyelonephritis (in two cases with severe abdominal tenderness and guarding), and three of these later required surgery for ureteric reflux.

Gastroenteritis was diagnosed in 13 children after a period of observation and rehydration. Such a period of observation is essential because the first thought with a child who has diarrhoea and vomiting and who also has abdominal pain must be the possibility of acute appendicitis.

Acute pancreatitis occurred in a girl of 18 months who had swallowed a glassful of neat lime juice.

Non-specific acute abdominal pain¹ is the term attached to the remaining 108 children in whom no specific cause for the pain could be found and in whom it settled within 48 hours without treatment. This syndrome seems to be an entity because it has consistently appeared in this hospital⁴ and is also seen in adults.⁵ It may be defined as an episode of acute abdominal pain, usually with vomiting, that initially bears a strong resemblance to acute appendicitis but in which symptoms and signs begin to improve within hours and have usually subsided in 24 hours. Such children are often tender in the right iliac fossa at the beginning of the illness, and it is this feature that results in their admission to hospital. By the time the 108 patients who were later assigned to this group arrived at hospital, however, one third had already lost any sign of abdominal tenderness. This is shown in table III, which also highlights the value of abdominal muscle guarding in differentiating the syndrome from acute appendicitis.

TABLE III—Distribution of symptoms and signs in children with acute appendicitis and non-specific acute abdominal pain. Results expressed as proportion of patients

	Acute appendicitis (n=102)		Non-specific acute abdominal pain (n=108)	
	No	%	No	%
Shift of pain	51	50	21	19
Tenderness	102	100	64	59
Guarding	96	94	10*	9
Rebound tenderness	77	75	4†	4

*Guarding was only slight in 9 cases (8%).

†Rebound tenderness was only slight in these cases.

Thirteen of the 108 children had a history of recurring attacks of abdominal pain (three had previously been admitted to the hospital for a similar episode), and the present admission was probably an episode in the course of this recurrent problem.

Acute appendicitis

Of the 116 children operated on for suspected acute appendicitis (table I) 102 (58 boys, 44 girls) were found to have an acutely inflamed appendix. This was removed and the diagnosis confirmed histologically. In most of the 102 children the diagnosis was readily made. Fifty-one had noticed a shift of pain from the umbilical area to the right iliac fossa, 60 had been woken from sleep by pain or been unable to sleep, and 81 had noticed that the pain was aggravated by movement. Unexpected findings were that 25 had not vomited, 16 still felt hungry, 21 had urinary frequency or dysuria, and 13 had diarrhoea.

Only 33 children had a temperature above 38°C and only four above 39°C. In 36 cases the tongue was clean and moist. In every case there was tenderness over the appendix, and this varied in position from the right flank and right subcostal area to the suprapubic region. In 20 cases the appendix was found lying in the pelvis, and in 17 of these there was pronounced rectal tenderness. Abdominal muscle guarding was present in 96 cases (table III) and absent in only five; in these five cases the appendix lay in the retrocaecal or retroileal position, and each showed the characteristic development of deep tenderness as pressure was increased over the appendix. Rebound tenderness was present in 77 cases and absent in 22. A white cell count was done in 15 of these children but it was over $10 \times 10^9/l$ ($10\,000/mm^3$) in only nine.

In 16 of the children who proved to have acute appendicitis it was not possible to decide at the first examination that they needed an operation, so they were actively observed. Pain and tenderness became more noticeable, in one 2-year-old a mass became palpable after sedation, and in eight guarding was found on re-examination. Only one of the 16 children was found to have a perforated appendix, and in no case was it felt that recovery had been prejudiced by the delay.

ACUTE APPENDICITIS IN CHILDREN UNDER 6

Twelve children with acute appendicitis were aged under 6, and of these, nine had a gangrenous or perforated appendix, and only three reached hospital within 24 hours. Seven showed clear signs of acute

appendicitis on admission. A girl aged 2 with a seven-day history of pain was very distressed and refused abdominal examination, but after trimeprazine 25 mg intramuscularly she quietened and a tender mass could be felt in the right iliac fossa; a perforated appendix was removed from an abscess cavity. The remaining four children, aged 1½, 2, 2½, and 5 years, were all admitted with abdominal pain for more than 24 hours. All had noticeable tachypnoea and two were thought to have a respiratory infection. Chest x-ray pictures were normal, however, and, in fact, each child had a distended and tender abdomen; three had general peritonitis, and the fourth child had a perforated appendix with local peritonitis. Young children inspire with their diaphragms, and when peritonitis makes breathing painful they take shorter, quicker breaths.

Everyone concerned with the care of these infants should read Howard Williams's excellent paper.⁶

Other surgical conditions

No special problems were met in diagnosing intestinal obstruction. The two children with a strangulated inguinal hernia (table I) and the boy with torsion of the testicle were all sent to hospital as cases of acute abdominal pain and are an important reminder that palpation of the groins and scrotum is an essential part of abdominal examination.

Discussion

The surgeon who cares for children with acute abdominal pain is in the peculiar position of dealing with a symptom that is predominantly non-surgical in origin, for only one-third of the group will need emergency surgery. Table II is a reminder of the importance of conducting a general medical examination and of testing the urine.

This paper is not intended to discourage an immediate decision to operate when the diagnosis is clear, but a useful fact to emerge is the value and safety of active observation. This is a simple regimen that may be applied at home or in hospital. None of the children in this series died. To give this widely used system a name and a place in management is likely to help both doctors and patients, because it recognises that some acute abdomens require thoughtful investigation. There is no dishonour in waiting a short time and re-examining these patients. It is also a reminder that it is useless to press on with abdominal examination in a distressed infant who does not respond to patience and distraction. A sedative should be given, and then one and a half to two hours later gentle abdominal examination, when the child is dozing, will allow local tenderness and guarding, or a mass, to be clearly defined. This was done usefully and safely on four occasions. It is equally important to remember that some children tolerate painful abdominal examination with great stoicism: if this should mislead the examiner into underestimating the condition at the first examination this is likely to be corrected on re-examination.

Our experience of active observation during and before this survey shows that harmful delay in diagnosis need not occur. On the other hand, a period of observation is essential for many patients because non-specific abdominal pain is so common, and these patients can be safely assigned to this group only when their complaints have been seen to settle.

It is impossible to achieve complete accuracy of diagnosis, and the surgeon must steer the best course he can between the hazards of overlooking the obscure, acutely inflamed appendix and removing numerous normal organs. In this series, in which a period of observation was used when appropriate and particular use was made of abdominal muscle guarding as a discriminatory physical sign (table III), 116 patients were operated on for suspected acute appendicitis, and 104 had acute surgical disease (table I). Of the remaining 12, signs of acute mesenteric adenitis were found in eight but no abnormality could be found in four. Nine of these 12 children, however, showed both tenderness and guarding in the right iliac fossa. Most of the decisions to operate on these children were made by registrars in training, and to have overlooked these signs would have been unwise. These 12 operations make up 10% of all the appendicectomies, which is comparable with the figure of 14% among children in Edinburgh,⁷ Columbus,⁸ and Aberdeen.⁴ It is an appreciably lower figure than those quoted for adults treated in Leeds (20%),⁵ Reading (22%),⁹ and Salt Lake City (18%).¹⁰

The ever-present worry for the doctor faced with a child with acute abdominal pain is the "difficult" appendix—which may be retroileal, retrocaecal, or lying just over the pelvic brim. Half the battle is to remember these sites and their unusual areas of tenderness and never to exclude the possibility of acute appendicitis in very young children. Active observation in these difficult cases appears to be safe; it allows the less-experienced surgeon to feel that he can think about and review the doubtful case and results in a reasonably high level of diagnostic accuracy.

The essentials in caring for a child with an acutely painful abdomen do not differ from those required for older people—a seat at the bedside, an unhurried approach, careful history-taking, patience and warm hands, rectal examination whenever abdominal examination is inconclusive, invariable examination of the urine, and a willingness to reconsider the doubtful case—but each item is, if possible, a little more important and indispensable.

This survey would not have been possible without the ready help of the surgical registrars concerned: Messrs R B Chesney, A Gatenby, W Macsween, A B Mathieson, D J Stewart, and D Valerio. Miss M Fordyce was responsible for the daily documentation and supervision of the survey.

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