

## **Some aspects of the natural history of acute appendicitis**

**From the East Scotland Faculty of the Royal College of General Practitioners**

**T**HIS is a report of the first stage of a study designed to answer a simple question, "What happens to patients who have been sent into hospital with possible acute appendicitis and who are subsequently discharged without having an operation?"

Observation over a reasonable period should answer this question. However, the situation may be complicated by doubt about the diagnosis at the time of admission; the medico-legal implications of a missed diagnosis; or because of social pressure on the doctor by the patient's relatives.

Hence, in a follow-up study, the doctor's real, as distinct from his apparent, intentions at the time he sought admission for his patient need to be known. These intentions are determined partly by the age and sex of his patient. In consequence, base line information required for this study includes data additional to that required for follow-up alone.

We report those observations which are both prospective and practice orientated unlike most studies of appendicitis which are retrospective and hospital orientated. This is the first part of a longer study.

### **Method**

A study of acute appendicitis in general practice must be a combined study because individual practitioners do not see enough cases for a reasonable analysis in a practical observation period of one year's duration. All the doctors in the East Scotland Faculty area were invited each to contribute two consecutive patients only, so that accuracy in recording would be maintained. The invitation was extended to doctors who were not members of the College as well as to members and associates; 103 practitioners accepted.

When a patient was admitted to hospital the participating doctor completed the first part of the case note (figure 1). This form had two self-duplicated copies. One of those went with the patient to the surgical unit where it was completed, and the original was sent to the recorder in its incomplete state. The practitioner kept the third copy for his own records. The surgeon (or his junior) was asked to return his copy to the recorder. The recorder was able to check when the surgeon failed to return the form by using his incomplete copy.

### **Results**

During 13 months, 164 patients were admitted to the survey. There were 80 male and 84 female patients. In the age structure of the whole population the age distribution of the two sexes is similar. The incidence of confirmed cases in females is discussed below.

Table I indicates the final diagnosis. Most patients had acute appendicitis but there was no firm diagnosis for the second largest group. Various other conditions were found in smaller numbers of patients. Appendicectomy or an alternative operation on a different diseased viscus was completed in 128 cases. Only 20 of those did not have an inflamed appendix.

The practitioner was sure that the patient had acute appendicitis in 101 cases and

doubtful in 63. Some of the doubtful cases were later found to have acute appendicitis while some of the "sure" cases were not subsequently confirmed. The practitioner was sure of the diagnosis in 17 out of the 36 unoperated cases (just under one half) but against

<i>Case record</i>		
<i>Serial number</i>		
<i>To be completed by practitioner</i>		
Practitioner's name	.....	
Practitioner's address	.....	
Patient's name	.....	
Patient's address	.....	
Patient's job	.....	Patient's sex..... M/F
Diagnostic impression	..... sure/doubtful	
<i>To be completed by surgical staff</i>		
Surgeon's name	.....	Hospital.....
Ward	.....	
Operation findings: appendix inflamed/not inflamed/equivocal		
mesenteric glands inflamed/not inflamed/doubtful		
Pathologist's report: inflamed/not inflamed/doubtful/spirochaetosis		
Final diagnosis	.....	Appendicitis Yes/No
Date of admission	.....	Hospital unit no.....

Figure 1

this 44 of the 63 doubtful cases had an operation (rather more than two thirds). The best estimate of the general practitioner's prediction (table II) shows that there was an excess of proven cases among those patients in whom the practitioner felt sure of the diagnosis.

Not all patients who had an operation were shown to have acute appendicitis. There were 20 such patients and the appendix was definitely not inflamed in 19: in the twentieth the findings were equivocal and four had abdominal conditions which required surgical treatment (table III) while ten had mesenteric adenitis.

Although surgery is not strictly a therapeutic measure in this condition it may be necessary for diagnostic purposes.

There was no significant increase in the number in whom the practitioner's diagnosis was uncertain among those 20 patients, which suggests that the act of admission to hospital is in itself a factor influencing the surgeon's decision to operate. The study also had some negative results which are worth comment. Comparisons were made between the outcome of admission and the certainty of diagnosis between males and females and between adults and children. Contrary to expectation, neither age nor sex affected the certainty of the prediction or the later management.\*

However, since it is generally accepted that young women are more apt than other groups to present difficulties in the diagnosis of acute appendicitis, a special comparison

\*These tables have not been included in order to save space. There were four and in none was the level of probability less than 0.3.

concerning the prediction and the outcome of admission in the younger and older women was made. Once again none of the differences noted achieved statistical significance (tables IV and V).

This was a regional study and it seemed worth while to exclude the possibility that

TABLE I  
FREQUENCY OF CONDITIONS CAUSING ADMISSION AS  
POSSIBLE ACUTE APPENDICITIS

<i>Final diagnosis</i>	<i>Number of cases</i>
Acute appendicitis .. ..	106
Vague and ill defined .. ..	34
Other diseases of intestines and peritoneum .. ..	15
Pyelonephritis .. ..	3
Oxyuriasis .. ..	2
Infective hepatitis .. ..	1
Diseases of CNS .. ..	1
Diseases of female genitalia .. ..	1
Abortion .. ..	1
TOTAL .. ..	164

TABLE II  
PROVEN ACUTE APPENDICITIS COMPARED WITH PRACTITIONER'S  
PREDICTION

	<i>Prediction (certainty of diagnosis)</i>		
	<i>Sure</i>	<i>Doubtful</i>	<i>Total</i>
Number with appendicitis .. ..	73	33	106
Number not appendicitis .. ..	28	30	58
TOTAL .. ..	101	63	164

$\chi^2=6.682$  degrees of freedom=1,  $P<0.01$

TABLE III  
ABDOMINAL CONDITIONS OTHER THAN APPENDICITIS  
REQUIRING LAPAROTOMY

<i>Condition</i>	<i>Number</i>
Mesenteric adenitis (doubtful) .. ..	10
Strangulated omentum .. ..	1
Crohn's disease .. ..	1
Meckel's diverticulitis .. ..	1
Obstruction of Meckel's diverticulum .. ..	1
TOTAL .. ..	14

TABLE IV  
COMPARISON BETWEEN AGE AND PREDICTION IN  
FEMALES

<i>Age</i>	<i>Prediction</i>		<i>Total</i>
	<i>Sure</i>	<i>Unsure</i>	
Under 20	27	24	51
20 and over	24	9	33
TOTAL	51	33	84

$\chi^2=3.269$ , degrees of freedom=1,  $P>0.05$   
not significant

TABLE V  
COMPARISON BETWEEN AGE AND MANAGEMENT IN  
FEMALES

<i>Age</i>	<i>Operation</i>	<i>No operation</i>	<i>Total</i>
Under 20	41	10	51
20 and over	27	6	33
TOTAL	68	16	84

$\chi^2=0.026$ , degrees of freedom=1,  $P>0.8$ ,  
not significant

the practitioners and surgeons in the different areas of the region handled these cases in different ways. No difference was found.

### Discussion

This study shows that the differential diagnosis of acute appendicitis differs from the descriptions in standard textbooks which do not stress adequately that the cause of the pain may *never be explained* (Beeson and McDermott 1969, Handfield-Jones and Porritt 1951, Rains and Capper 1965). This may be overlooked because of the surgeon's natural preoccupation with the possible variations in intra-abdominal pathology and the unusual presentation, in preference to the epidemiological approach to the problem. By the end of the survey 35.5 per cent of the patients were shown *not* to have acute appendicitis. On the other hand, the percentage of normal appendices found at operation was only 13.4 per cent. This compares favourably with a list of figures quoted by Jones in 1969. The point at issue for the general practitioner when faced with these statistics is whether he should be more stringent in his admission policy.

The general practitioner, working in isolation, and more exposed to the social consequences of a mistaken diagnosis, must play safe rather than wait until the diagnosis is clear if the latter course could conceivably endanger the patient's life or future health.

In this series 52.5 per cent of the doubtful cases were ultimately proved to be acute appendicitis. Against this the practitioner was sure of the diagnosis in almost half the cases who were eventually shown *not* to have acute appendicitis. Since most of these came to operation it would seem that practitioners and surgeons are in reasonable agreement about the assessment of the clinical situation.

It has been shown that the risks of operation are less than the risks of conservative treatment at least as far as morbidity is concerned (Howie, 1968 a, b and c). The position concerning mortality is not so clear. Although there is good evidence that the mortality of operation is less than the mortality of conservative treatment (Campaigne, 1968), Howie (1968c) argues that the avoidable mortality of the radical and conservative approaches is similar. On balance, the radical approach still appears the better and the practitioner is wise to admit patients on suspicion; but in doing so he should state clearly his degree of certainty and the action which he expects the surgeon to take since this is likely to help the surgeon. The doctor should try to make his provisional diagnosis as accurate as possible.

Surgeons are greatly concerned with aids to accurate diagnosis. These can be divided into clinical aids in which special syndromes are used as pointers (Smith, 1965) and laboratory aids (Ferguson and Pirrung 1969, Wright 1969). General practitioners use probability as an aid in all diagnosis (Crombie, 1963). Probability diagnosis by the general practitioner requires the recognition of epidemiological patterns. Such patterns are lacking in appendicitis. For example, although appendicitis is a disease of young people it appears sufficiently often in older people to make age alone unreliable as a pointer (Roy *et al.*, 1969, Oliver 1960). The results reported here support this.

There are also considerable variations in the sex ratios reported in a number of studies (Roy *et al.*, 1969, Smith 1965, Harding 1962). It has been suggested that errors in diagnosis are commoner in adolescent girls than in other groups (Lee 1961, Harding 1962). These figures, based on retrospective studies, may, however, be of limited value. The figures in this study indicate that the diagnosis is equally difficult in both sexes. Although table IV shows that the practitioners were less sure of the diagnosis in adolescent girls this was statistically significant and the difference was completely lost by the time of the decision whether to operate or not. Nor was there any significant difference in the number of unproven cases among adolescent girls. This suggests that such epidemiological

differences in appendicitis when young women are compared with the rest of the community should not be over emphasized.

### Summary

This report describes the first stage of an investigation designed to see whether patients discharged from hospital without operation after admission as possible acute appendicitis eventually come to operation or not.

The age incidence of the patients are similar to other reports. If a doctor is sure of his diagnosis the surgeon is more likely to operate immediately and the diagnosis is more likely to be accurate. The diagnostic accuracy in this series is similar to the hospital assessments reported in other series.

This prospective study did not confirm the findings of previous reports that the diagnosis of appendicitis is mistaken more often in adolescent girls.

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### ADDENDUM

#### *Participating practitioners*

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N. Morison, Dunkeld; B. G. Norrie, Dundee; W. M. Patterson, Dundee; D. D. Pennie, Forfar; J. L. Pennie, Crieff; N. M. Piercy, Montrose; S. Piercy, Montrose; A. J. Pitkeathly, Perth; A. F. Pringle, Methil; F. B. Proudfoot, Dundee; A. G. Reid, Aucterarder; P. J. H. Reid, Aucterarder; J. Roberts, Dundee; L. R. Roden, Leven; J. Rose, Dundee; A. M. Runcie, Kirkcaldy; K. D. Saggat, Dundee; J. Scott, Alyth; I. M. Simpson, Broughty Ferry; J. Simpson, Perth; T. S. Little, Perth; J. M. Sinclair, Leven; E. A. C. Skinner, Buckhaven; L. F. Slade, Dundee; R. M. and R. W. Smith, Burntisland; W. D. Smith, Dundee; I. Stuart, Arbroath; J. E. Taylor, Monifieth; P. Taylor, Arbroath; P. E. Turnbull, Dundee; A. Wattison, Anstruther; D. T. Williams, Perth; J. Winton, Dundee; W. W. Yellowlees, Aberfeldy.

*Principal surgeons of participating surgical units*

Royal Infirmary, Dundee; Professor D. M. Douglas, J. Grieve, W. F. Walker, S. F. Soutar, A. F. Pringle, W. Weaver, J. Curt. Maryfield Hospital, Dundee; W. G. Campbell, J. S. Kinnear. Stracathro Hospital, Brechin; J. Clark. Royal Infirmary, Perth; Conal Charleston, M. J. Fallon. Bridge of Earn Hospital; A. I. L. Maitland, A. J. M. Mathieson. Victoria Hospital, Kirkcaldy; W. Drummond, J. M. Sutherland.

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### RATES FOR COLLEGE ACCOMMODATION

Rates for College accommodation, including breakfast, will be charged as follows from 1 January 1972:

Single room .. .. .	£3 per night
Double room .. .. .	£5 per night
Flatlet (Bed-sitting room for two, bathroom and dressing room) .. .. .	£7 per night, or £40 per week
Self-contained flat (Double bedroom, sitting room, half kitchen and bathroom) .. .. .	£8 per night, or £45 per week

Members are reminded that children under the age of 12 years cannot be admitted, and dogs are not allowed.

Members and associates may, subject to approval, hire the reception rooms for meetings and social functions. The charges for these are:

Long room (will seat 100) .. .. .	£30 for each occasion
Damask room (will seat 50) .. .. .	£20 for each occasion
Common room and terrace .. .. .	£20 for each occasion
Dining room and kitchen .. .. .	£10 for each occasion

A service charge of ten per cent is added to all accounts to cover gratuities to domestic staff.

For the convenience of members, four car-ports, outside 14 Princes Gate, have been rented by the College and may be hired at a cost of 50p per 24 hours.

Enquiries should be addressed to **The Royal College of General Practitioners, 14 Princes Gate, Hyde Park, London, S.W.7 IPU.** (Tel. 01-584-6262). Whenever possible bookings should be made well in advance.