

ACUTE APPENDICITIS: THE SIGNIFICANCE OF "POSITIVE" RECTAL EXAMINATION AND THE POSITION OF THE VERMIFORM APPENDIX

C P Chee
K Somasundaram

SYNOPSIS

A prospective study was carried out in the University Hospital, Kuala Lumpur, to determine the significance of positive signs on rectal examination in the diagnosis of acute appendicitis. A total of 370 patients were included. The positions of the appendices at operation were recorded giving rise to a distribution unique to the Malaysian population.

Positive rectal examinations were found in 44% of all cases of acute appendicitis. However, of significance, was the observation of positive findings in 52% of perforated appendicitis and in 56% of normal appendices. There was no statistical correlation between positive rectal examinations and the positions of the inflamed appendices.

The diagnosis of acute appendicitis should not be based primarily on the results of the rectal examination.

INTRODUCTION

The diagnosis of acute appendicitis depends mainly on the patient's history and the findings on the physical examination. Rectal examination has long been emphasized to be of vital importance in making a diagnosis because of the close proximity of the appendix to the rectum. The significance of positive rectal examination to date has not been determined with certainty; neither is the predisposition of the appendices at different positions to inflammation been evaluated.

We were able to analyse the data obtained in the protocols of the double blind controlled trial on prophylactic antibiotics in appendicectomy carried out in University Hospital between November 1978 and January 1980. The main aim of this study is to determine the significance of positive rectal examination in the clinical diagnosis of acute appendicitis of various degrees of severity and positions.

An attempt is also made to correlate the position of the vermiform appendix and the risk of inflammation.

University Hospital
Department of Surgery
Kuala Lumpur
Malaysia

C P Chee, MBBS, MRCS, LRCP,
Registrar

K Somasundaram, MBBS, FRCS, FRACS, FRCSE,
Professor.

MATERIAL AND METHOD

370 cases of clinically diagnosed acute appendicitis in the University Hospital, Kuala Lumpur, between November 1978 to January 1980 were included into this study. Only patients above 12 years old were included.

The age, sex, race, results of rectal examination, position of the appendix and the final diagnosis taken from the histopathological report were recorded in the protocols.

Rectal examinations were done by the operating surgeons who were medical officers or lecturers. All 370 cases were operated. Results of a rectal examination was defined as 'positive' when the examination caused pain localised in the right pelvic area and there was no evidence of gynaecologic or urologic disease.

The conventional classification of position of the appendices (pre-and post — ileal, pelvic, retrocecal and subcecal positions) illustrated by Wakeley (1) were used. The positions were later reclassified according to Maisel (2) into two main groups viz. anterior position comprising the ileal and pelvic appendices and posterior position comprising the retrocecal and subcecal appendices (Figure 1).

The degree of inflammation of the appendices were divided into 3 groups: suppurative, gangrenous and perforated based on histopathological reports.

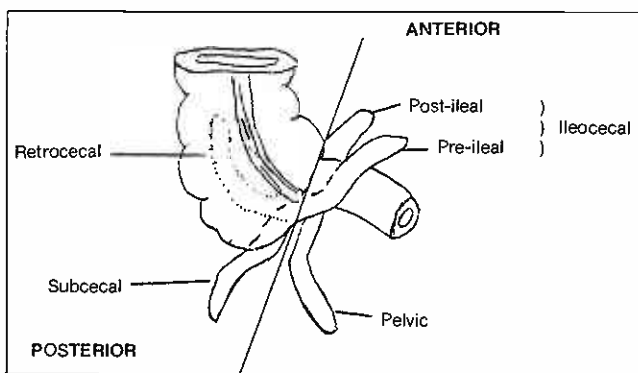


Figure 1: The various positions of vermiform appendix

Chi Square test for significance were used for statistical analysis of the data.

RESULTS

Patient distribution by age, sex, race:

The distribution of the patients by age is presented in Figure 2. The highest frequency fell in the age group 20 — 30 years old (50%).

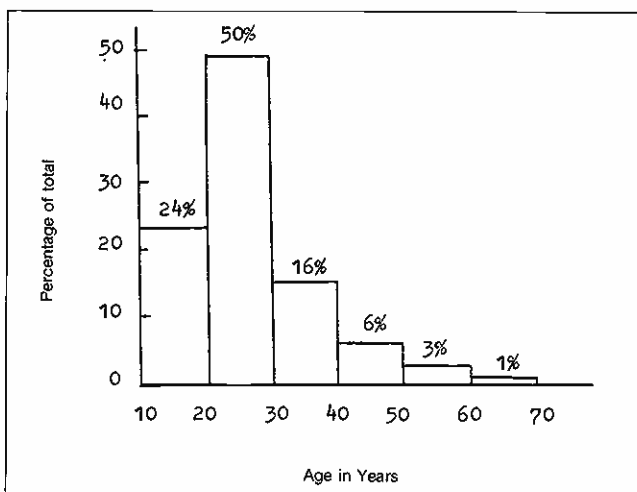


Figure 2: AGED DISTRIBUTION

There were 202 male and 168 female patients with male to female ratio of 5 : 4. 162 male patients (80.2%) and 108 female patients (64.3%) were confirmed to have appendicitis by histopathological examination. The diagnostic accuracy rate or both sexes was 73.0%.

The racial distribution consists of Chinese 49%, Malay 28%, Indian 2% and other races 2%. There was no significant differences when it was compared with the racial breakdown of hospital attendance (3).

Positions of appendices:

The positions of appendices in 17 cases (4.5%) were not recorded. The distribution of the positions of the appendices by sex is shown in Table 1. Chi Square test demonstrated no significant differences in the distribution of positions of appendices in both sexes ($\chi = 1.92$).

Position	Male	Female	Total (%)
Pelvic	41	29	70 (19.8)
Retrocecal	91	86	177 (50.1)
Ileocecal	55	47	102 (28.9)
Subcecal	3	1	4 (1.1)
All	190	163	353 (99.9)

Table 1: Distribution of positions of the appendices by sex

Significance of positive rectal examination:

There were positive rectal examinations in 44.4% of appendicitis and 56.0% of normal appendices. In female patients, results of the rectal examination were positive in 42 cases (38.9%) of proven appendicitis and 38 cases (63.3%) with normal appendices. The high frequency of positive rectal examinations in the female patients with normal appendices were contributed partly by the presence of gynaecological diseases (6 ovarian cysts, 2 salpingitis and 1 endometriosis).

The results were summarised in Table 2.

Sex	State of Appendix	
	Inflamed	Normal
Male	42 (38.9%)	38 (63.3%)
Female	78 (48.1%)	18 (45.0%)
All	120 (44.4%)	56 (56.0%)

Table 2: Positive rectal examination results.

When the degrees of inflammation of the appendices were considered (Table 3), there was no significant association between positive rectal examination and degree of inflammation ($\chi^2 = 3.51$). There were positive rectal examination in 52.2% of cases with perforated appendicitis.

There was no significant association between the position of inflamed appendix and positive rectal examination (Table 4, $\chi^2 = 1.10$).

Risk of inflammation versus position of the appendix:

The proportions of inflamed to normal appendices were compared among the various positions of the vermiform appendices (Table 5).

There was no one particular position of the appendix which predisposed to inflammation ($\chi^2 + 5.11$).

State of appendix	Rectal examination	
	Positive (%)	Negative
Suppurative	100 (45.2)	121
Gangrenous	8 (30.8)	18
Perforated	12 (52.2)	11

Table 3: Results of rectal examinations, correlation with the degree of inflammation of the appendices

Position	Positive rectal examination	
	Number	Percentage
Pelvic	18	37.5
Retrocecal	63	45.6
Ileocecal	34	47.2
Subcecal	1	33.3

Table 4: Positive rectal examination results: correlation with the positions of inflamed appendices.

Position of appendix	State of Appendix	
	Inflamed	Normal
Pelvic	48	22
Retrocecal	138	39
Ileocecal	72	30
Subcecal	3	1
Total:	261	92

Table 5: Position of appendix, correlation with the state of appendix.

DISCUSSION

According to Wakeley (1), the most common position of the appendix is retrocecal (65%) with the pelvic position the next most common (31%) and ileocecal position the most uncommon (1%). Our study on local population however showed marked differences in that although retrocecal appendix is still the most common, it only formed 50% of our series. The second most common position is ileocecal (29%) with pelvic position the third (20%). Subcecal position is very uncommon in our series (1%).

Review of the various papers (1, 2, 4, 5, 6, 7, 8, 9, 10) revealed wide variation in the distribution of position of the appendix in different population groups. In fact, when comparison was made with those of ten other countries (Table 6), the distribution of position of the appendices in our Malaysian series were found to be unique by itself. There has not been any other study on the position of vermiform appendix in the Malaysian population.

Shah and Shah (8) stated that retrocecal appendices were found more frequently in patients diagnosed to have appendicitis requiring operation. It has also been suggested that the retrocecal position predisposes to inflammation. This is not confirmed by our study. There was no statistical association between the position of the appendix and the risk of inflammation.

Most authorities still believe that rectal examination is of major importance in establishing a diagnosis of acute appendices although William Osler (11) has pointed out that in the early stages of appendicitis, the rectal examination rarely provides any valuable information. Yet, few reports document this correlation (Table 7).

In these series, positive correlation ranges between 3 to 72 per cent. Our results showed 52% positive rectal examination compared to 23% in Ackerman's report for perforated appendicitis. However, there was no statistical difference when we compared the frequency of positive results of our perforated group to those of our unperforated groups. Positive examination was found in 56% of our normal appendices.

When the positions of the inflamed appendices were considered, our results showed that positive rectal exami-

Material	Country	Total no.	Anterior		Posterior		Anterior	Posterior
			Pelvic	Ileo-cecal	Retrocecal	Subcecal		
							Collins	U.S.A.
Peterson	Finland	373	42.2	26.8	31.0	—	69.0	31.0
Maisel	South Africa	300	58.0	10.2	26.7	5.0	68.2	31.7
Shah & Shan (autopsy)	India	186	34.9	28.0	30.1	7.0	62.9	37.1
Lietz	Germany	2092	41.2	13.9	35.0	9.0	56.0	44.0
B & K	Russia	93	44.1	11.8	44.1	0.0	55.9	44.1
Waas	Ceylon	266	24.1	28.6	35.3	12.0	52.7	47.3
Solanke	Nigeria	125	31.2	29.2	38.4	11.2	50.4	49.6
Chee & Soma	Malaysia	353	19.8	28.9	50.1	1.1	48.7	51.2
B & K	Denmark	141	33.4	7.8	56.7	2.1	41.2	58.8
Shah & Shah (operation)	India	405	8.2	26.9	61.2	3.7	35.1	64.9
Wakeley	Great Britain	10000	31.0	.4	65.3	2.3	32.4	67.6

B & K = Buschard and Kjaeldgaard

Table 6: Survey of the position of the appendix, in percent in various materials.

Reference	Year	Number	% Positive Rectal Examination Results	
			Appendicitis	Normal Appendix
Hudson and Chamberlain (12)	1939	744	62**	—
Smith (13)	1965	100	58	33
Magee et al (14)	1967	381	72	63
Kazarian et al (15)	1970	495	33/32*	16
Ackerman (16)	1974	53	23*	—
Lewis et al (17)	1975	1000	45-60	45 — 60
Owens and Hamit (18)	1978	68	2.9***	—
Bonello (19)	1978	495	46	53
Chee & Soma	1982	370	44/52*	56

* Perforated appendicitis
 ** Children only
 *** Elderly patients

Table 7: Experience with rectal examinations in Nine Reported Series

nations were not associated with any particular position of the appendices.

Hence it would appear from these data that the diagnosis of acute appendicitis should not be based primarily on the results of a rectal examination, nor should the diagnosis be discarded when results of such examination are negative. The result of rectal examination instead should be considered together with the patient's symptoms and other positive physical findings.

REFERENCES

1. Wakeley C P G: The position of the vermiform appendix as ascertained by an analysis of 10,000 cases. *J Anat* 1933; 67: 277-83.
2. Maisel H: The position of the human vermiform appendix in fetal and adult age groups. *Anat Rec* 1960; 136: 385-91.
3. Monthly Statistical Bulletin of West Malaysia, Pg. 4, Department of Statistics, Malaysia, Kuala Lumpur, December 1976.
4. Buschard K, Kjaeldgaard A: Investigation and analysis of the position, fixation, length and embryology of the vermiform appendix. *Acta Chir Scand* 1973; 139: 293-8.
5. Collins D C: The length and position of the vermiform appendix. *Am Surg* 1932; 96: 1044-8.
6. Liertz R: Uber die Lage des Wurmfortsatzes. *Arch Klin Chir* 1919; 89: 55-96.
7. Peterson L: Beitrag zur Kenntnis des Ilium Terminale Fixatum und Ileus Ilei Terminalis Fixati. *Acta Chir Scand* 1934; 32: 105-16.

8. Shah M A, Shah M: The position of the vermiform appendix. *Ind Med Gaz* 1945; 80: 494-5.
9. Solanke T F: The position, length and content of the vermiform appendix in Nigerians. *Brit J Surg* 1970; 57: 100-2.
10. Waas M J: The position of the vermiform appendix. *Med Press*; 1959; 242/19: 382-3.
11. Osler W: The Principles and Practices of Medicine designed for the use of Practitioners and Students of Medicine, Ed 4, New York, D Appleton and Company 1901, p. 525.
12. Hudson H W Jr, Chamberlain J W: Acute appendicitis in childhood: A statistical study of 848 cases from the Children's Hospital, Boston. *J Pediatr* 1939; 15: 408-25.
13. Smith P H: The diagnosis of appendicitis. *Postgrad Med J* 1965; 41: 2-5.
14. Magee R B: Stowel J M, MacDuffee R C: Appendicitis: An analysis of 2117 cases treated surgically in a community hospital during a period of twenty years. *Pa Med* 1967; 70: 47-9.
15. Kazarian K K, Roeder W J, Mersheimer W L: Decreasing mortality and increasing morbidity from acute appendicitis. *Am J Surg* 1970; 119: 681-5.
16. Ackerman N B: The continuing problems of perforate appendicitis. *Surg Gynecol Obstet* 1974; 139: 29-32.
17. Lewis F R, Holcroft J W, Boey J et al: Appendicitis: A critical review of diagnosis and treatment in 1000 cases. *Arch Surg* 1975; 110: 677-82.
18. Owens B J, Hamit H F: Appendicitis in the elderly. *Ann Surg* 1978; 187: 392-6.
19. Bonello J C, Abrams J S: The significance of a 'positive' rectal examination in acute appendicitis. *Dis Colon and Rectum* 1979; 22: 97-101