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Research Article

A comparative study of different anatomical position, clinical presentation and USG findings with operative findings in patients of appendicitis

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ABSTRACT

Background: The objective was to find out and compare accuracy of USG findings with that of per-operative findings of location & status of appendix, to compare , evaluate & study the signs and symptoms in different varieties of appendicitis, to compare & study pre, per & post op follow up of patients with such different location of appendix undergoing appendicectomy and to study the type of appendicitis responsible for inflammation/infection by histopathological examination of different locations of appendix.
Methods: The present study was prospective, observational and longitudinal. Protocol of the procedure was formed along with Performa, Patient Information Sheet and Informed Consent Form. The present study was carried out in surgery department of C.U. Shah medical college, Surendranagar; Gujarat state. The study was carried out from 1st October 2010 till 31st September 2012. A total of 100 cases were subjected to clinical assessment using signs, symptoms and laboratory criteria, histopathology and also the position of the appendix, which were recorded in the proforma. All patients were subjected to ultrasound examination by a qualified radiologist to exclude any other associated pathology and also to confirm the diagnosis. At surgery the Position of the appendix was first identified before disturbing the structures and the position of the appendix. After completion of the appendectomy the specimen was subjected to histopathological examination by the qualified pathologist only those cases, which were proved as, appendicitis by the histopathology were included in the study.
Results: Out of 100 cases, a total of 62 cases presented with clinical features suggestive of retrocaecal appendicitis, out of which 51 had typical presentation & 11 had atypical presentation with overall sensitivity of 72.9%, followed by pelvic position which had a sensitivity of 15.29% in which 8 patients had typical presentation & 5 had atypical presentation. All modalities (clinical presentation + lab investigations + USG + intra operative + histopathology) patients were 47; with clinical presentation + lab investigations + USG + intra operative patients were 51; with clinical presentation + lab investigations + USG patients were 57; with clinical presentation + lab investigations patients were 69 and with only clinical presentation patients were 85.
Conclusions: A total of five modalities that were used for the diagnosis of position of appendix & appendicitis, i.e. clinical features, lab Ix, ultrasound, intraoperative findings & histopathology, only 47% of cases all the modalities were positive. So the diagnosis of position of appendix & appendicitis is a combination of all the modalities and not just dependent on one basis.

Keywords: Appendix, Clinical examination, USG, Laboratory investigations

INTRODUCTION

Appendicitis is a common sometimes confusing, and treacherous cause of acute abdomen at all ages. The appendix is regarded as a vestigial organ, useless to man, with no known important function, but can be a real nuisance at times, when it may become the seat of infection. The diagnosis of appendicitis can be difficult, occasionally taxing the skills of the most experienced clinician. The delays in the diagnosis arise from errors either from the patient or physicians. The most common position of the appendix is variously described by many authors Wakeley et al as retrocaecal (65.3%),[1] Collins et-al as pelvic (78.5%)[2] and Pickens G et al as postileal.[3] Guidry SP et al have concluded that anatomic variations of the location of appendix are often responsible for delays in the diagnosis of appendicitis.[4] Poole GV has stated that the paucity of symptoms and signs, in patients with hidden appendix, is responsible for the delayed diagnosis of appendicitis before perforation.[5] Varshney et al have concluded that the retrocaecal position of the appendix is less prone to infection,[6] whereas Collins et al have described higher incidence of perforation and serious complications in acute appendicitis,[7] other studies one prospective[8] and two retrospective studies have established that the retrocaecal position of the appendix does not alter the clinical course of acute appendicitis.[9,10] From the above information it is evident that there are lots of controversies regarding the various positions of appendix and also clinical presentation of appendicitis, in relation to different positions. Hence there is a need for the study of the various positions of appendix in patients with appendicitis and also the clinical picture and complication in the various positions.

Our study is performed in clinical cases representing the inflamed appendix group, in this group the relation between the various positions of the appendix, the clinical presentation, laboratory & radiology investigations, intra operative findings and histopathology is studied.

METHODS

The study was carried out in surgery department of C.U Shah Medical College, Surendranagar; Gujarat state from 1st October 2010 till 30th September 2012. The study was prospective, observational and longitudinal. Study protocol of the procedure was formed along with Proforma, Patient Information Sheet and Informed Consent Form. A total of 100 cases were subjected to clinical assessment using signs, symptoms and laboratory criteria, histopathology and also the position of the appendix, which were recorded in the proforma. All patients were subjected to ultrasound examination by a qualified radiologist to exclude any other associated pathology and also to confirm the diagnosis. Surgery was done either under general anesthesia or spinal anesthesia. Abdomen was opened with Lanz or Mc Burney's, or right lower Para median incision. At surgery the Position of the appendix was first identified before disturbing the structures and the position of the appendix identified and recorded together with the length of the appendix and also weather it was fixed or freely mobile in the peritoneal cavity, peri-appendiceal collection, presence of perforation or other complications of appendicitis. Also a note was made of the status surrounding organs. After completion of the appendectomy the specimen was subjected to histopathological examination by the qualified pathologist only those cases, which were proved as, appendicitis by the histopathology were included in the study.

RESULTS

Out of 100 patients in the study; 57 were Male and 43 were Female.Appendicitis was more common during the 3rd decade (36%), followed by the 4th decade (23%). A total of 62 cases presented with clinical features suggestive of retrocaecal appendicitis, out of which 51 had typical presentation & 11 had atypical presentation with overall sensitivity of 72.9%, followed by pelvic position which had a sensitivity of 15.29% in which 8 patients had typical presentation & 5 had atypical presentation.

The clinical presentation of retrocaecal type has sensitivity of 87.09% as compared with the pelvic type which has sensitivity of 76.47% [P value >0.05, X^2=3.363]; as shown in table 1.

Table 1: comparison between position of appendix with clinical presentation and intra operative findings.

Position of appendix	Clinical presentation	Intra operative	Sensitivity
Retrocaecal	62	54	87.09
Paracaecal	3	5	100.0
Post- ileal	5	4	80.00
Pre-ileal	1	2	50.00
Pelvic	13	17	76.47
Sub-hepatic	0	1	00.00
Sub-caecal	1	2	50.00
Left sided	0	0	00.00
Total	85	85	

On comparing the position of appendix with USG and intra operative findings; USG has sensitivity of 88.88% in detection of pelvic type followed by 85.41% in retrocaecal type appendicitis [P value >0.05, X^2 = 4.681] as shown in table 2.

Table 2: Comparison between position of appendix with USG findings and intra operative finding.

Position of appendix	USG findings	Intra operative	Sensitivity
Retrocaecal	41	48	85.41
Paracaecal	2	4	50.00
Post- ileal	3	3	100.0
Pre-ileal	5	1	20.00
Pelvic	16	18	88.88
Sub-hepatic	1	2	50.00
Sub-caecal	1	3	33.33
Left sided	0	0	00.00
Total	69	69	100

On comparison of laboratory investigations (Ix) with clinical presentation; leukocytosis was present in 63 patients with acute presentation as compared with 5 patients of subacute and 10 patients of recurrent appendicitis, with neutrophils being predominantly elevated as shown in table 3.

Comparison of HPE with intra operative findings suggested that; out of 100 patients 74 were suspected to have acute appendicitis but histopathology showed 64 cases of acute type, 10 were suspected to have subacute appendicitis but histopathology revealed 25 cases &16 were suspected to have recurrent appendicitis but histopathology showed 11 [P value <0.05(0.017), X^2 = 8.079] as shown in table 4.

Table 3: Association between presentations of appendix with laboratory investigations.

Presentation of appendicitis	Laboratory investigations				
	TLC			DC*	
	Elevated	Normal	Total No.	Neutrophilia	Lymphocytosis
Acute	63	9	74	68	14
Subacute	5	7	10	5	8
Recurrent	10	6	16	10	4
Total	78	22	100	83	26

(* Multiple Response)

Table 4: Association between histopathology & intraoperative findings of appendicitis.

Type of appendicitis	Histopathology	Intraoperative	Sensitivity
Acute	64	74	86.68
Subacute	25	10	100
Recurrent	11	16	68.75
Total	100	100	

The following pie chart shows that; on the basis of individual modality 85% were suspected to have appendicitis on clinical presentation, 78% were suspected to have appendicitis on lab Ix, 69% were ultrasound proven appendicitis and histopathology proved appendicitis in all the cases (100%).

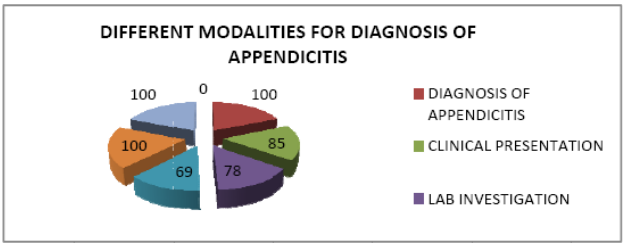

Figure 1: Various modalities that are used for diagnosis of appendicitis.

When different modalities are combined for the diagnosis of appendicitis; the diagnosis becomes more accurate and specific as in our study; on combination of all five modalities 47 patients had all the modalities suggestive of appendicitis which can be judged from the table 5.

Table 5: Association between different modalities that are used for diagnosis of appendicitis.

Diagnosis of appendicitis on basis of various modalities	No. of cases
All modalities (clinical presentation + lab ix + USG + intra operative + histopathology)	47
Clinical presentation + lab ix + USG + intra operative	51
Clinical presentation + lab ix + USG	57
Clinical presentation + lab ix	69
Only clinical presentation	85

DISCUSSION

Although surgeons have been confronting acute appendicitis as a clinical entity for over a hundred years, an accurate preoperative diagnosis remains a challenge because of the various other conditions, which mimic appendicitis. The problem is further compounded by the variations in the position of the appendix and the associated varied clinical picture of the appendicitis.

In our series appendicitis was more common during the 3rd decade (36%), followed by the 4th decade (23%). Appendicitis is slightly more common in males, (57%) in our series. Lewis et al[11] (1975) in their study found that the 2nd and 3rd decades to be the most common age groups for acute appendicitis. Men outnumbered women in our study, men are believed to suffer from appendicitis more often because, probably the male is being subjected to more stress and strain, as highlighted by Boyd (1961). Addis et al & Korner et al, have reported a slight male preponderance (with male to female ratio of 1.2 to 1.3:1).[12,13]

All the patients with acute appendicitis had pain and most of the patients had pain in the right iliac fossa. Even though many of the patients presented with atypical symptoms 35 of the 100 cases (35%). The site of maximum pain was in the right iliac fossa in 89 of 100 cases. Only 11 cases had maximal pain at a site other than right iliac fossa. In pelvic appendix patients had supra-pubic pain, in retro-caecal appendix patient had pain in the right lumbar region or right flank, in sub- hepatic position the patients had pain in the right hypochondriac region. Atypical pain was more common in cases of fixed retro-caecal appendix and in cases of pelvic appendicitis.

Anorexia was seen in 66% of the cases, while nausea is less constant is seen in 46% of the cases. Vomiting is seen in (41%) and is usually few episodes. Incidence and severity of vomiting is more in patients with complicated appendicitis as compared to simple acute appendicitis. Vomiting usually does not relieve pain. Lewis et al,[11] in his analysis, found anorexia, nausea or vomiting to be present in 66% of the cases. Fever is commonly encountered among patients in our study, being present in 52% of our patients; the fever was usually mild degree except in cases of abscess and generalized peritonitis. Berry et al[14] in 1984 have in their analysis; found that temperature elevation is rarely more than 2°C. Changes of greater magnitude suggest complication.

Tenderness in the right iliac fossa is a constant feature in all the cases of appendicitis. The site of maximum tenderness was in the right iliac fossa in 89 of 100 cases even though few had tenderness at other sites leading to difficulty in the diagnosis. Only 11 cases had maximal tenderness at a site other than right iliac fossa. In retro-caecal position tenderness may be present in the right flank or in the right lumbar region more so if the appendix is fixed either by the adhesions or because of its extra-peritoneal location (in these cases tenderness will be more in this region rather than right iliac fossa). In case of pelvic position tenderness may be present in the suprapubic region or the patient may have rectal tenderness. In sub-hepatic position patient may have tenderness in the right hypochondriac region.

Leukocytosis or neutrophilia was present in 78 of the 100 cases, with an accuracy of 78%.

The position of the appendix and its relation to the clinical presentation and course of acute appendicitis has been a subject of controversy with various authors giving various results and conclusions.

A total of 62 cases presented with clinical features suggestive of retrocaecal appendicitis, out of which 51 had typical presentation & 11 had atypical presentation with overall sensitivity of 72.9%, followed by pelvic position which had a sensitivity of 15.29% in which 8 patients had typical presentation & 5 had atypical presentation. The clinical presentation of retrocaecal type when compared with intraoperative has sensitivity of 87.09% as compared with the pelvic type which has sensitivity of 76.47% in our series. P value >0.05, X^2 =3.363

Varshney et al[6] have described that advanced appendicitis (perforation or gangrene) is more common in those with retro-caecal appendicitis. They have given the explanation that some early cases may have been misdiagnosed, as urinary tract infection, leading to delay in the diagnosis, and increased incidence of complications. In Collins[7] series of 751 patients with retro-caecal appendicitis, only 19% had typical symptoms, 18% had non-localizing pain, 28% had right flank pain and 12% had right shoulder pain. In his series 53% of the cases were perforated. Guidry S et al[4] in 1994, have concluded that the patients with gangrene and perforation were more likely to have pain and tenderness at a site other than right lower quadrant. The appendix was in hidden location (retro-caecal, retro-ileal, pelvic

and extra-peritoneal) in 15% of the patients with simple appendicitis as compared with 68% of the patients with gangrenous or perforated appendicitis (P<0.001).

Out of 100 cases; 69 patients had ultrasound proven appendicitis, out of which 41 were retrocaecal, 16 were pelvic, 5 pre-ileal, 3 post-ileal, 2 paracaecal and one each for subhepatic & subcaecal. On comparison with intraoperative findings Ultrasound has sensitivity of 88.88% in detection of pelvic type followed by 85.41% in retrocaecal type appendicitis [P value >0.05, $X^2 = 4.681$].

All these patients who underwent appendicectomy the specimen was sent for histopathology examination for conformation of the type of appendicitis. Out of 100 patients 74 were suspected to have acute appendicitis but histopathology showed 64 cases of acute type (86.68%), 10 were suspected to have subacute appendicitis but histopathology revealed 25 cases (sensitivity >100) &16 were suspected to have recurrent but histopathology showed 11 (68.75%) [P value <0.05(0.017), $X^2 = 8.079$].

On the basis of individual modality 85% were suspected to have appendicitis on clinical presentation, 78% were suspected to have appendicitis on lab Ix, 69% were ultrasound proven appendicitis and histopathology proved appendicitis in all the cases (100%).

In our study the Retrocaecal appendix was found to be most common (63%) position followed by pelvic (18%), post-ileal (7%), paracaecal (5%), subcaecal (3%), pre-ileal (2%) & sub-hepatic (2%) when seen intraoperatively.

In our study a total of five modalities are used for the diagnosis and confirmation of appendicitis. Out of which 85% were suspected to have appendicitis based on clinical presentation. 69% were suspected to have appendicitis on combining clinical presentation with laboratory investigations. On combining clinical presentation, lab Ix and USG 57% were suspected to have appendicitis. On combination of clinical presentation, lab Ix, USG with intraoperative findings 51% had appendicitis. And on combination of above mentioned four modalities with histopathology only 47% had appendicitis i.e. all five modalities were suggestive of appendicitis.

CONCLUSION

Appendicitis is a very common surgical entity with a wide of complications and post appendicectomy symptoms. The accurate diagnosis of appendicitis still remains a challenge for the surgeon and the rate of negative appendicectomy with post appendicectomy symptoms are increasing due to inaccurate diagnosis. In our study we used a total of five modalities for the diagnosis of position of appendix & appendicitis, i.e. clinical features, lab Ix, ultrasound, intraoperative findings & histopathology, only 47% of cases all the modalities were positive. So the accurate diagnosis of position of appendix & appendicitis is a combination of all the modalities and not just dependent on one basis in order to prevent post appendicectomy complications and symptoms.

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