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General Surgery

A CLINICAL STUDY OF ACUTE APPENDICITIS IN RELATION TO POSITION AND SIZE

Dr. Prudvi Raj. S Senior Resident of General Surgery, Kurnool Medical College, Kurnool

Dr. Meghamsha G. S. L* Junior resident of General Surgery, Kurnool Medical College, Kurnool *Corresponding Author

KEYWORDS :

INTRODUCTION

Appendicitis is one of the most common surgical emergencies in contemporary medicine. Appendicitis is a common sometimes confusing, and treacherous cause of acute abdomen at all ages. The diagnosis of appendicitis can be difficult, occasionally taxing the skills of the most experienced clinician.

Anatomy is rightly called the father of surgery; this is made more evident in case of appendix as the variations in the positions of the appendix will lead to varied clinical presentation. The most common position of the appendix is still 'a topic of controversy'.

Left sided appendicitis may be confusing and is better evaluated by laparoscopy1.Two retrospective studies have established that the retrocaecal position of the appendix does not alter the clinical course of acute appendicitis 2,3.

Appendicitis in different positions may mimic various other diseases, like in **Retro-colic** = colitis, **Post-ileal** = Ureteric colic, **Pelvic** = enteric ileal perforation, Pelvic inflammatory disease, Torsion of ovarian cyst, Ruptured tubal gestation, **Sub- hepatic** = Hepatitis, Biliary colic. 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 complications in the various positions.

Our study is performed in clinical cases of acute appendicitis, the relationship between various positions of the appendix, their clinical presentation and complications and postoperative outcome is studied.

OBJECTIVES OF STUDY

- To study the various positions of the appendix in inflamed cases, as determined by the position of the appendix at laparotomy.
- To study the relation of the position to the clinical presentation and management of appendicitis .
- To study the correlation with various pathologies.
- To study the correlation with Post operative outcome

PATIENTS AND METHODS

- This is a clinical study comprising of 50 patients of suspected appendicitis who attended Surgical OPD and Emergency in Government General Hospital, Kurnool over a period of 2years (i.e.from October 2016 to October 2018).
- Patients with acute appendicitis with associated co morbidities like Diabetes Mellitus, Hypertension were excluded from the study
- Patients with symptomatology similar to acute appendicitis such as renal colic, ovarian pathologies and others were excluded after preliminary investigations.
- All cases were subjected to clinical assessment using signs, symptoms and laboratory criteria, 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 in doubtful cases.
- After admission to ward detailed history was taken regarding presenting complaints, their duration, severity, sequence of onset of symptoms, mode of onset, progression, change in the pattern at the time of presentation and any atypical symptoms.
- Enquiry was made into family history suggestive of appendicitis, menstrual and obstetric history and past history of appendicitis.
- A careful and detailed abdominal examination of each patient made including local temperature, guarding / rigidity, site of maximum tenderness any swelling or mass formation, rebound tenderness, Rovsing's sign, Psoas sign, Obturator sign, Baldwin's sign and also per rectal examination is made to look for pelvic tenderness or mass formation.
- 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 a 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 regarding the status of surrounding organs.
- After completion of the appendectomy the specimen was subjected to histopathological examination by a qualified pathologist.
- Only those cases, which were proved as, appendicitis by the histopathology were included in the study. Those with normal appendix on histopathology were excluded from the study.

OBSERVATIONS AND RESULTS

A total of 50 cases were studied. All the cases except 2 presented as acute appendicitis, which were either operated on emergency basis or electively, depending upon the severity of inflammation. Totally 20 cases (40%) were operated on an emergency basis and the rest as elective cases (60%). Two cases presented with generalized peritonitis (Case No 20 & 23). The position of appendix in these cases was retrocaecal and Post-ileal respectively. Two cases (Case No- 4 & 44) had previously presented with appendicular mass hence these were managed conservatively and subsequently underwent interval appendectomy.

In our series appendicitis was more common during the 3rd decade (50%), followed by the 2nd decade (30%). Appendicitis is slightly more common in males, M : F ratio is 2.3 : 1 in our series. 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 20 of the 50 cases (40%), the site of maximum pain was in the right iliac fossa in 42 of 50 cases. Only 8 cases had maximal pain at a site other than right iliac fossa.

Anorexia was seen in 72% of the cases, while nausea is less constant is seen in 48% of the cases. Vomiting is rarely seen (24%) and is of usually few episodes. 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 40 of 50 cases even though few had tenderness at other sites leading to difficulty in the diagnosis. Only 10 cases had maximal tenderness at a site other than right iliac fossa.

Leukocytosis or neutrophilia was present in 38 of the 50 cases, with an accuracy of 76%. Of the 20 cases, which were operated on an emergency basis, 8 (40%) were complicated by perforation, abscess or

gangrene, whereas among the 30 elective cases only 6 were complicated (20%).

The position of the appendix at laparotomy was variable with the most common position being retro-caecal (50%).

The length of the appendix is also quite variable, the smallest in our series being 3cm and the longest being 18cm with an average of 8.46cm. In our study females had a slightly longer appendix with an average of 9.26cm, and the males had smaller appendix with an average length of 7.94cm.

The position of the appendix influences the clinical presentation of the appendicitis with the retro-caecal position (44% of cases), para caecal position (60% of cases), and the Pelvic position (50% of cases) and in all the other positions (10% of cases) presented with atypical symptoms.

In case of retro-caecal position 91.66% of the fixed retro-caecal cases, which had got fixed, either because of the adhesions or the extra-peritoneal fixation of the appendix during development presented atypically and none of the cases with mobile appendix presented atypically. These patients presented with flank pain & tenderness and also symptoms of the upper urinary tract infection.

In para caecal position, the patients presented atypically in 3 cases (60% of para caecal cases) of which 1 case is having mobile appendix, forming 20 % of the total para caecal cases and all 2 cases of the fixed appendix, forming 40 % of the total para caecal cases.

In pelvic appendix the patients presented atypically in 2 of mobile and 3 cases of fixed appendix constituting 20% and 30% of the total pelvic cases respectively.

Baldwin test and Psoas sign were positive in 9 cases of retro-caecal appendicitis and in 2 case of sub-hepatic appendicitis, which were either fixed by adhesions or by its extra-peritoneal location. **Obturator test** was positive in 3 cases of pelvic appendicitis, which presented with complications, in uncomplicated cases this test is rarely could be elicited.

The complications like gangrene, perforation, abscess or mass formation or generalized peritonitis are seen in 54.54% of patients with retro-caecal and 60% of pelvic location of the appendix, who presented atypically, whereas in those with typical presentation only 14.28 % of the patients had complications. In paracaecal position none of the patients with typical presentation had any complications and 66.66% of the patients with atypical presentation had complications. In all of the other positions complications were not seen except in one case of post-ileal location of the appendix, which presented with atypical symptoms.

Two cases with abscess and two cases with generalized peritonitis had delayed recovery. One case with appendicular abscess developed fecal fistula, which subsided with conservative management in 2-week duration but had persistent purulent discharge from the wound for 2 weeks. The other case of abscess had persistent purulent Discharge. Those with generalized peritonitis, the oral intake was delayed for 5 days, and one patient developed wound infection, the other had uneventful recovery.

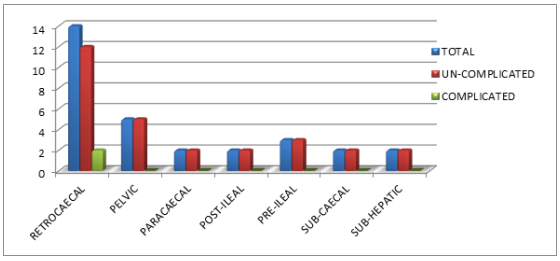
TABLE No – 1: Incidence of various positions of the appendix in present study

Position	Cases		
	Males	Females	Total
Retro-caecal	18	07	25
Pelvic	06	04	10
Para-caecal	03	02	05
Post-ileal	02	01	03
Pre-ileal	03	-	03
Sub-caecal	02	-	02
Sub-hepatic	01	01	02
Left sided	-	-	-
Promonteric	-	-	-
Total	35	15	50

TABLE No – 2: Relationship between fixity of the appendix and clinical presentation

Position	Typical Presentation		Atypical Presentation	
	Mobile	Fixed	Mobile	Fixed
Retro-caecal	13 (52%)	1 (4%)	0 (0%)	11 (44%)
Pelvic	5(50%)	0 (0%)	2 (20%)	3 (30%)
Para caecal	2(40%)	0 (0%)	1 (20%)	3(40%)

Graph -1: Typical Presentation Of Appendicitis



Graph – 2: Atypical Presentation Of Appendicitis

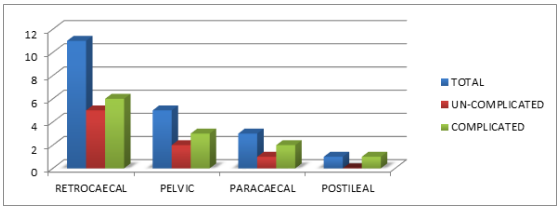


TABLE No – 3: Statistical comparison of position of appendix with clinical presentation & Complications

Position	Typical Presentation		Atypical Presentation		Total	
	Uncomplicated	Complicated	Uncomplicated	Complicated	Uncomplicated	Complicated
Retro-caecal	12	2	5	6	17	8
Pelvic	5	0	2	3	7	3
Para-caecal	2	0	1	2	3	2
Post-ileal	2	0	0	1	2	1
Pre-ileal	3	0	0	0	3	0
Sub-caecal	2	0	0	0	2	0
Sub-hepatic	2	0	0	0	2	0
Total	28	2	8	12	36	14

The level of significance was calculated using ANOVA table (Analysis of variance)
F1 = 6.24
F2 = 14.06
Ftable for (6,6) d.f = 0.233
Ftable for (1,6) d.f = 0.0043

The value of F1 & F2 is greater than the Ftable value; hence the value is significant; hence the difference in the complications and clinical presentation with regard to position is significant.

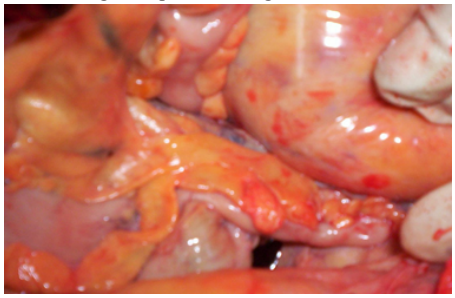


FIG -1 SUB-CAECAL POSITION OF APPENDIX (Appendix going down towards the mid-inguinal point)

FIG – 2 RETRO-CAECAL POSITION OF APPENDIX (Appendix is lying behind the caecum)

DISCUSSION

Acute appendicitis is the most common cause of an 'acute abdomen' in young adults and as such the associated symptoms and signs have become a paradigm for clinical teaching. Appendiceal disease is a frequent reason for emergency hospital admission, and appendectomy is one of the most common emergency procedures performed in contemporary medicine.

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 problem is further compounded by variations in the position of the appendix and the associated varied clinical picture of the appendicitis.

In our study all the cases were evaluated with clinical features at presentation, position of appendix at laparotomy and also the associated complications. All the parameters like age and sex incidences, length of appendix, position of appendix, operative outcomes were compared with standard studies.

No comprehensive statistics are available to know the exact incidence of Acute Appendicitis. But generally, it is felt that the incidence is lower in India than in the west and there is a difference between the incidences in North India and South India. A few studies are available from some parts of the country viz., Kini et al, Ramachandra Rao and Ramachandra Rao (1950).

In our study out of the 50 cases studied there are 35 male and 15 female patients, having a ratio of 2.3:1. Also the male preponderance is noted in each age group individually with the highest in third decade (18:7) i.e., 2.57:1.

Kini et al (1950) gave an incidence of 4.21 : 1 ratio of males to females, as suffering from acute appendicitis. Western authors place the incidence of acute appendicitis as about twice as common in the males as in the females. An analysis of 1,030 cases from the K.R.Hospital, Mysore shows 3.72:1 males to females suffering from Acute Appendicitis and the sex ratio is of the order of 19:5. In Shepherd series, the ratio was 163:122. In Somi et al series (1969) it was 66:34. Robert E Condon series states that the ratio is 3:2.

In this series male to female ratio is 2.3:1 i.e., there is male preponderance. The difference hence observed between our study and the other standard studies is minimal with an overall male preponderance in all of the studies mentioned above. Boyd (1961) discussing the cause for the greater incidence among males put it as probably male sex being subject to stress and strain and his diet being richer in proteins than that of the female sex.

Our study found appendicitis to be more common in 3rd decade followed by 2nd decade, which constituted to be 50% and 30% respectively. The average mean age of presentation was found to be 25.46 years. Lewis et al4 (1975) in their study found that the 2nd and 3rd decade were the most common age groups for acute appendicitis.

The age distribution as compared to different studies is similar with few minor variations. However in every study most common age of presentation is third decade and second decade. For any age group there is a higher incidence of males to females. In this study, there is a higher incidence in the age group 20-29 yrs, followed by a fall after the age of 40 yrs and above. The maximum incidence is in the age group of 10-29 yrs i.e., prime of youth. In this study, the mean age of incidence is 25.46 yrs with the youngest being 11 yrs and the oldest being 56 yrs.

In this study, pain was present in all the patients which coincides with the figures of Hubbel, Barter, Solomon(1960) .44 out of 50 patients had a history of pain abdomen situated in the Right Iliac Fossa. 2 each had pain in Right Lumbar Right Flank Others (Diffuse). It was also observed that the type of pain was colicky in 38 patients, dull aching in 7 cases and pricking in 5 cases.

Sir.Z.Cope has said that nausea and vomiting depend upon the amount of distension of the inflamed appendix and secondly, the reflex nervous susceptibility of the patient. The severity and frequency of the vomiting, at the onset of an attack of appendicitis indicates the immediate risk of perforation of the appendix. The figures of Hubbel, Barter, Solomon (1960) are compared with this study. In our study vomiting is seen in 24% of patients

Anorexia was seen in 72% of the cases, while nausea was present in 48% of the cases. **Lewis et al** (4) in his analysis, found anorexia, nausea or vomiting to be present in 66% of the cases. Fever is uncommonly encountered among patients in our study, being present in 44%of our patients, the fever was usually mild in degree except in cases of abscess and generalized peritonitis. **Berry et al** (5) in 194 have in their analysis; found that temperature elevation is rarely more than 10c(1.80F). Changes of greater magnitude indicate that the complication has occurred or some other diagnosis should be considered.

POSITION AND IT'S IMPLICATIONS:

Varshney et al(6),have come to conclusion that the retro-caecal position is less prone to infection, by comparing the incidence of retro - caecal appendix in operated cases with previous autopsy studies. He hypothesized that the retro-caecal position of the appendix advantageous because, gravity aided drainage of the appendicular lumen may reduce the episode of luminal obstruction, which reduce the incidence of appendicitis. Shen GK et al (7) Williamson WA et al (8), has established that the retro caecal position does not alter the clinical course of appendicitis .

In our study there is an increased incidence in the complications in case of retro-caecal position 16.66% with typical & 54.54% with atypical presentation, in para caecal position 0% with typical and 66.66% with atypical presentation, and in pelvic position 0% with typical & 60% with atypical presentation had complications. In all the other positions the number of complications are very less. The difference obtained is significant as the p value is 0.05 as obtained by the ANOVA table.

In case of retro- caecal position, the fixed appendix is associated with more complications (58.33%) as opposed to (7.69%) of cases with mobile appendix. In other positions fixity and complications is not significant, but the difference in complications in relation to typical or atypical is significant as obtained by ANOVA table as described above.

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 diagnosis and increased incidence of complications.

Graph – 3: Comparison Of Incidence Of Various Positions Of Appendix With Other Studies

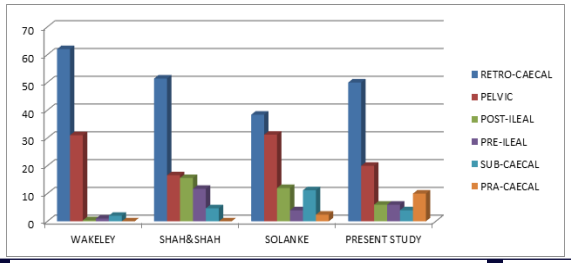


Table No – 3 :Comparison of the various positions according to different authors.

Author	No. Of Specimens	Percentage occurrence of various positions of appendix.					
		Retro-caecal	Pelvic	Post-ileal	Pre-ileal	Sub-caecal	Para-Caecal
Wakeley 1933	10,000 Autopsy	62	31	0.4	1	2	-
Shah &Shah, 1942	591 Autopsy & operative	51.4	16.6	15.6	11.7	4.7	-
Solanke TF. 1970	125 Autopsy	38.4	31.2	12	4	11.2	2.4
Varshney S. 1996	600 Operative	19	53	1	2	7	18
Golalipour MJ. 2003	117 Operative	32.4	33.3	2.6	18.8	12.8	-
Present study	50 operative	50	20	6	6	4	10

MANAGEMENT

Out of the 50 patients in our study 30 underwent elective appendectomy and 20 underwent emergency appendectomy. Laparoscopy was done in 18 of the 50 cases. But all of them were done in elective setting only. The incisions used were Lanz, Mc Burney's, Rutherford Morrisons. No difference in the incisions used in either emergency or elective except for a Lower Midline incision used twice in the setting of Generalized Peritonitis.Mc Burney's was used more in an emergency setting for its versatility in extension if necessary. In an elective setting Lanz is used more often to preserver cosmesis. Rutherford Morrisons and Lower Midline were of rare use.

The advantages like better visualization, precise handling, minimal trauma, and decreased hospital stay, early recovery, early ambulation were obvious with laparoscopy and the results in our study are comparable with meta-analytic studies of Wei (2011), Lui (2010), Li (2010), Markides (2010), Bennet (2007), Temple (1999), Garbutt (1999), Sauerland (1998), Golub (1998).

SUMMARY

This study was conducted from Oct 2016 to Oct 2018, for a period of 25 months in Government General Hospital, Kurnool. There were 50 cases included in this study. Appendicitis is commonest during the 3rd decade (50%) followed by the 2nd decade (30%) .Appendicitis is slightly more common in males than females (2.3:1). Most common position of appendix found in our study is retro-caecal position. The position of appendix influences the clinical presentation of the appendix even though most of the patients experience pain and tenderness in the right iliac fossa, depending on the position of the appendix patients may experience additional symptoms and signs, which frequently results in delayed diagnosis.

In retro-caecal appendicitis the patient may experience flank pain and tenderness and symptoms akin to upper urinary tract infections because of proximity of the appendix to the ureters. These features are more common if the appendix is fixed either because of adhesions or because of its extra peritoneal location. In pelvic appendicitis patients will present with supra pubic pain and other symptoms and may occasionally have bowel disturbances. Tenderness on digital rectal examination is constant feature. In post ileal position patients will have subtle signs and symptoms and may occasionally have bowel disturbances.

In patients with fixed retro-caecal, paracaecal and pelvic position of appendix, diagnosis was delayed because of atypical clinical presentatin, leading to increased incidence of complications. The length of appendix is slightly more in females than males.

CONCLUSIONS

This study was conducted from Oct 2016 to Oct 2018, for a period of 25 months in Government General Hospital, Kurnool. There were 50 cases included in this study.

The following conclusions were drawn from present study

Appendicitis is commonest during the 3rd decade (50%) followed by the 2nd decade (30%). Appendicitis is slightly more common in males than females (2.3:1). Pain occurred in all cases. Typical pain (60%)is more common than atypical pain(40%) in acute appendicitis. Site of the pain varies on position of the appendix. In pelvic appendix patient had pain in supra pubic, in retro-caecal appendix patient had pain in the right hypochondrium. Atypical pain was more common in cases of fixed retro-caecal appendix and in cases of pelvic appendicitis . Patients with post-ileal and pelvic appendix had some sort of bowel disturbances (constipation or diarrharea).

Patients with retro-caecal appendix had symptoms of upper urinary tract infections, due to irritation of the adjacent ureter and pelvic appendix had symptoms of lower urinary tract infections, due to irritation of the adjacent urinary bladder.

Anorexia (72%) is most commonly seen in appendicitis, nausea (48%) and vomiting(24%) are seen less commonly. Incidence of severity of vomiting is more in patients with complicated appendicitis (52%) as compared to simple acute appendicitis (20%).vomiting usually does not relieve pain

Tenderness was present in all cases of acute appendicitis. Site of tenderness may vary and depends on the position of the appendix. In retro-caecal position tenderness may be present in right flank or in the right lumbar region more so if appendix is fixed either by the adhesions or because of its extra-peritonial 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 supra pubic region or the patient may have rectal tenderness. In sub-hepatic position patient may have tenderness in right hypochondriac region. Right lower quadrant tenderness and rebound tenderness were the most common signs (70% & 50% respectively)

Tenderness at the McBurney's point is present in only 4 patients (8%) in all the other cases tenderness was either medial or lateral to McBurney's point. Psoas sign and Baldwin test though not consistently positive in all cases of retro-caecal appendicitis, they are positive in most cases of fixed retro-caecal appendix (9 of 12cases) and 2 of 2 sub-hepatic positons. Obturator test is not positive in all cases of pelvic appendicitis, but positive in most of the complicated appendicitis. All 3 complicated cases of pelvic appendicitis had positive obturator test .Rectal examination detects pelvic peritonitis or pelvic abscess in cases of pelvic appendicitis .Rectal tenderness was present in 8 of the 10 cases of pelvic appendicitis and in two cases of generalized peritonitis

The signs and symptoms are subtle or atypical in cases of retro caecal fixed, post ileal, pelvic appendicitis leading to increased risk of complications (P- value 0.01).The most common position was retro-caecal followed by pelvic, paracaecal,post-ileal, pre-ileal &sub-caecal, subhepatic.There is increased risk of complications in those with atypical presentation than typical presentation. Only 2 of 30 (6.66%) cases with typical presentation had complications whereas 12 of the 20 cases (60%) with atypical presentation had complications .The patient with appendicular abscess and generalized peritonitis who were operated had delayed recovery.

REFERENCES

1. Karl A Zucker, Surgical Laparoscopy 2nd edition Lippincot Williams & Wilkins, P: 229-2
2. Williamson WA, Bush RD, William LF. Retrocaecal appendicitis. Am J Surg 1981; 141:507-509
3. Grunditz T, rayden CI, Janzon L Does the retrocaecal position influence the course of acute appendicitis? Acta Chir Scand. 1983; 249 :707-710.
4. Lewis FR, Holcroft JW, Boey et-al. Appendicitis: a critical review of the diagnosis and treatment in 1000 cases. Arch Surg 1975; 110: 677-684.
5. Berry J, Malt RA: Appendicitis near its centenary. Ann Surg1984; 200:567.
6. Varshney S, Jhonson CD, Rangnekar GV. Retrocaecal appendix appears to be less prone to infection. Br J Surg 1996; 83:223-224
7. Shen GK, Wong R, Daller J, Melcer S, Tsen A, Awry S, et-al. Does the retrocaecal position of the vermiform appendix alter the clinical course of acute appendicitis? Arch Surg. 1991; 126:569-570.
8. Williamson WA, Bush RD, William LF. Retrocaecal appendicitis. Am J Surg 1981; 141:507-509