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A Study to Correlate Different Anatomical Positions of the Appendix by Clinical Examination, USG Findings with Intra-Operative Findings and Sequelae Associated with Respect to it in KIMS, Hubli

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Key Words
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ABSTRACT
The objective was to correlate different anatomical positions of the appendix by clinical examination, use findings with intro operative findings and to correlate different anatomical positions of appendix in appendicitis with its complications observed during appendicectomy. A Prospective study was conducted in the Department of General Surgery at Karnataka Institute of Medical Sciences, Hubli during the period from January 2021-2023 with calculated sample size of 100. The inclusion criteria included patients diagnosed with appendicitis with clinical examination, USG findings are operated in the department of surgery, Kims Hubli during the study will be included. Patients of age between 12 to 60 years and the Exclusion criteria were Age<12 years and >60 years, Patients with no consent for the study. Case of appendicular mass, managed conservatively. Acute appendicitis was more common between 16-25 years of age Acute appendicitis in male had preponderance with ratio of 1.3:1. Right iliac fossa pain was a leading symptom followed by vomiting and fever were seen in all positions. Urinary symptoms were most seen in Subcaecal position Bowel disturbances were most seen in Ileal position. Blumberg test was elicited in 135 cases, McBurney's test in 124 cases, Rovsings in 42 cases. Obturator test was elicited in 62.5% of Pelvic position and Psoas test was elicited 66.6% of Retrocaecal position. Accuracy of clinical examination in finding the positions of appendix showed that retrocaecal position is predicted in 76.4% followed by Pelvic position in 46.8% cases and Ileal position in 30.76% cases respectively. Accuracy of USG in finding different positions of appendix correlated retrospectively with Intraoperative findings showed that Retrocaecal positioned appendix showed that Retrocaecal positioned appendix was predicted in 79.4%cases and identified in10.29% cases, Pelvic appendix in 87.5%cases, Preileal appendix in 90.47% cases. USG was accurate in finding Preileal followed by Pelvic positions of appendix. Intraoperative findings showed Retrocaecal appendix in 68 cases (48.5%),Pelvic appendix in 32 cases(22.85%), Preileal appendix in 21 cases(15%), Paracaecal appendix in 10 cases(7.14%),Postileal appendix in 5 cases(3.57%), Subcaecal and Subhepatic appendix in 2 cases each (1.42%). Appendicitis complications are more associated in Post Ileal appendix (80%) followed by Pelvic appendix (78.1%). Diagnosis of appendicitis was made using various modalities vis-à-vis clinical examination laboratory investigations ultrasonography and intraoperative finding so, the position of the appendix as an implication on the clinical presentation although management doesn't vary.

INTRODUCTION

The most common cause of 'acute abdomen' in young adults is acute appendicitis. The associated symptoms and signs have evolved into a clinical teaching paradigm. The most common emergency abdominal operation is an appendicectomy. Although the appendix is considered a vestigial organ, its inflammation is of greater importance in the diagnosis of acute appendicitis. Appendicitis diagnosis remains primarily clinical, requiring a perfect blend of observation, clinical acumen and surgical science; as such, it remains an enigma and a reminder of the art of surgical diagnosis. Anatomy is widely regarded as the "Father of Surgery". The only organ in the body which has no fixed anatomy is the appendix. This Atypical anatomical variation in the position of the appendix is responsible for varied clinical presentation, hence to be aware of. The surgeon is concerned about the anatomic variations because a differential position of the appendiceal tip could very well account for differences in clinical presentation and the location of the associated abdominal discomfort. During childhood, the continued growth of the caecum commonly rotates the appendix into a retrocaecal but intraperitoneal position. In some cases, rotation of theappendix does not occur, resulting in a pelvic, subcaecal or paracaecal position. Occasionally, the tip of the appendix becomes extraperitoneal, lying behind the caecum or ascending colon. During development the caecum does not migrate, hence the appendix can be found near the gall bladder or, in the case of intestinal malrotation, in the left iliac fossa, causing diagnostic difficulty in case of appendicitis. Depending on the position of the appendix, signs and symptoms may differ from expected symptomatology to varying degrees. Patients with a Retrocaecal appendix may present with back or flank pain and patients with the appendiceal tip in the midline pelvis can reach the wall of the ureter and bladder, resulting in urinary symptoms and may present with suprapubic pain[4-5]. Pain. Peri-ileal appendicitis, in turn, can trigger a diarrhea. These presentations may result in a delayed diagnosis, as the symptoms are different from the classically anterior right lower quadrant abdominal pain associated with the appendiceal disease. Because the symptoms differ from the classically described anterior right lower quadrant abdominal pain associated with appendiceal disease, these clinical presentations may result in a delayed diagnosis. The clinical presentation is so atypical that it is easy to confuse it with a variety of non-surgical intra-abdominal disorders, and given the appendix's great anatomical variability, the doctor should consider appendicitis as a secondary suspicion in the face of an episode of acute abdominal pain. Knowledge of all these nuances can aid in the establishment of a diagnosis, allowing for early treatment and reducing the rate of complications such as abscess, perforation, peritonitis and septicaemia and its further sequelae.

Thus, prior appendix determination by clinical examination and USG findings would aid in deciding the incision used during appendicectomy and observing if there is any role of the position of the appendix in its sequelae and to know the atypical signs and symptoms, to prevent the further rate of complications from appendicitis.

MATERIALS AND METHODS

A Prospective study was conducted in Department of General Surgery at Karnataka Institute of Medical Sciences, Hubli during the period from January 2021-2023 with calculated sample size of 100. The inclusion criteria included patients diagnosed with appendicitis with clinical examination, USG findings are operated in the department of surgery, KIMS HUBLI during the study will be included. Patients of age between 12 to 60 years and the Exclusion criteria were Age<12 years and >60 years, Patients with no consent for the study. Case of appendicular mass, managed conservatively.

Study Procedure All the patients fulfilling the inclusion criteria, who willingly give consent for the study undergo clinical examination, USG and position of appendix is predicted by both methods and correlated with the findings such as positions of appendix and its complications observed intraoperatively during appendicectomy.

RESULTS AND DISCUSSIONS

The Total numbers of cases studied are 140. All the cases presented as acute appendicitis which were operated on emergency or elective basis.

Age Distribution: In our study appendicitis was more common between 16-25 years of age, which are 56 cases (40%), followed by 26-35-year age group with 34 cases (24.3%) which was found to be statistically significant ($p<0.00001$)

Chi Square Value $X2$ (1, N=140) =89.64, $p< 0.00001$, (S) Statistically Significant ($p<0.05$)

Sex Distribution: In our study, Appendicitis was seen more in males with a total of 81 (57.8%) cases and females with 59(42.2%) cases, which was not statistically significant ($p=0.063$).

Clinical Evaluation: 140 Patients with different positions like Retrocaecal, Pelvic and Ileal were evaluated with different complaints such as Pain Abdomen in RIF, Pain Abdomen atypical sites, Vomiting/Nausea, Urinary complaints, Bowel

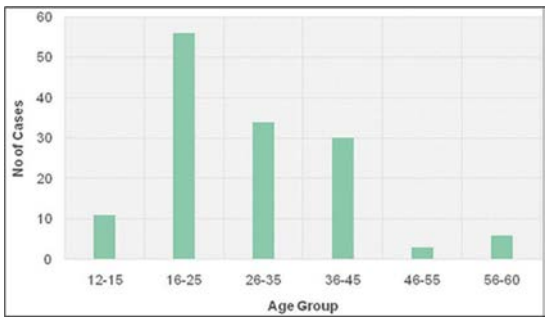

Fig 1: Age distribution of cases

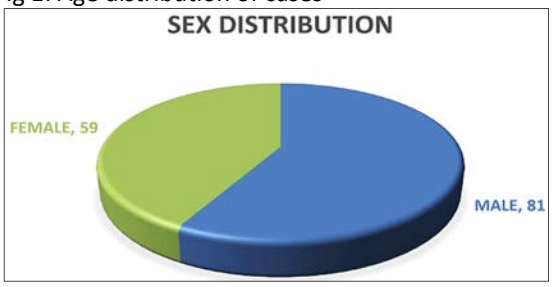

Fig 2:Sex distribution of cases

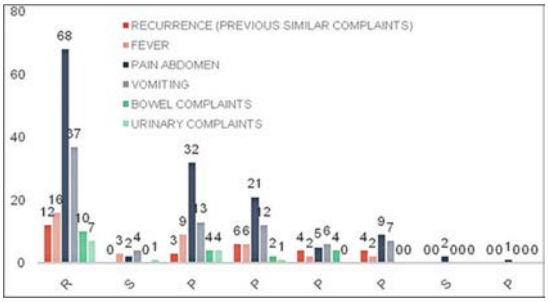

Fig 3: Clinical Symptoms for different positions

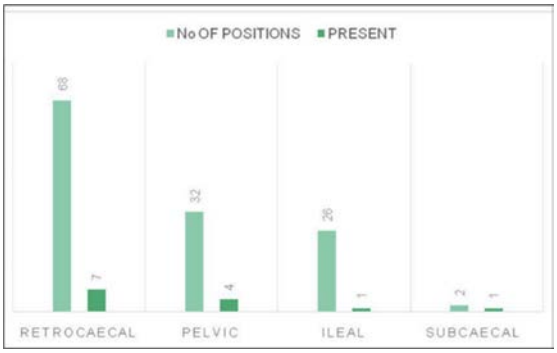

Fig 4: No of cases with Urinary Complaints

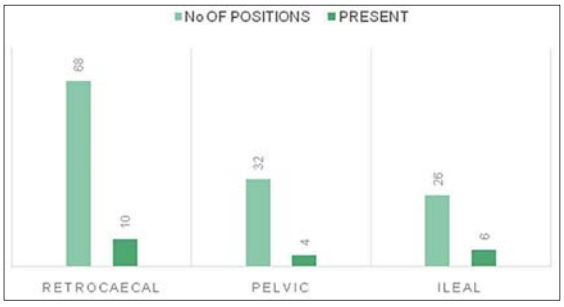

Fig5: No of cases with Bowel Distribution

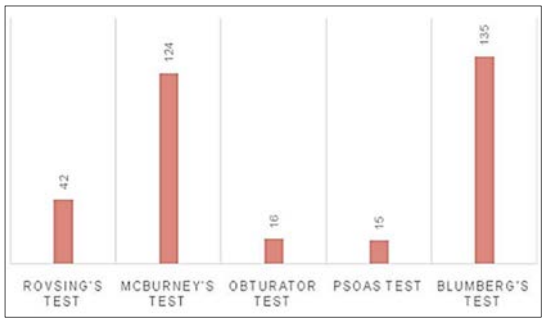

Fig 6: Various Clinical signs

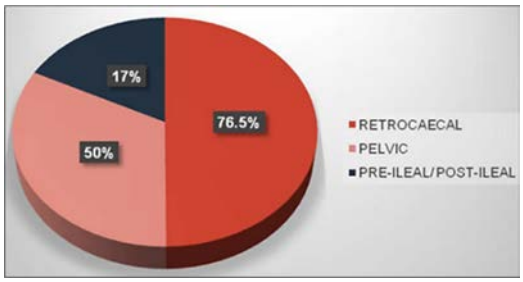

Fig 7: Accuracy of Clinical finding with Intra-position Findings

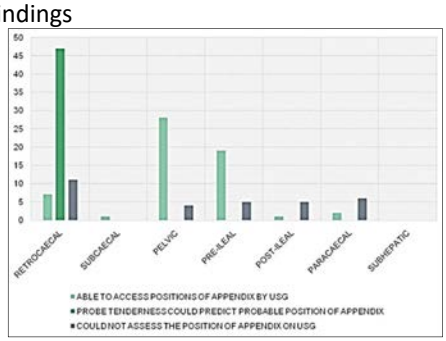

Fig 8: USG finding for different positions of Appendix

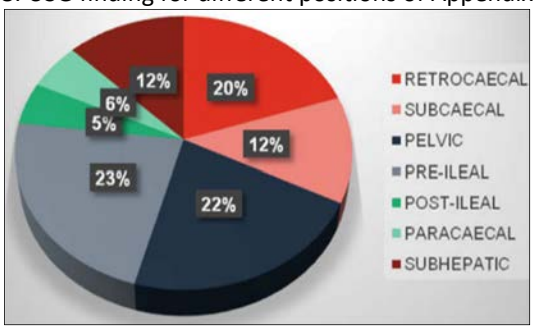

Fig 9: Accuracy of USG in finding different of Appendix

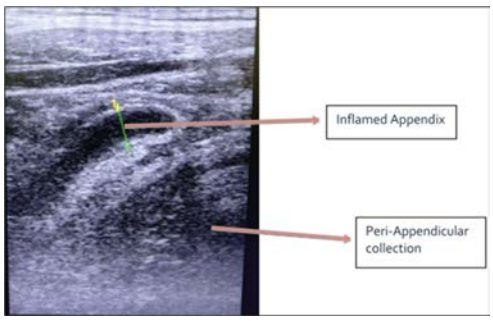

Fig 10: Pelvic position with minimal peri-appendicular collection

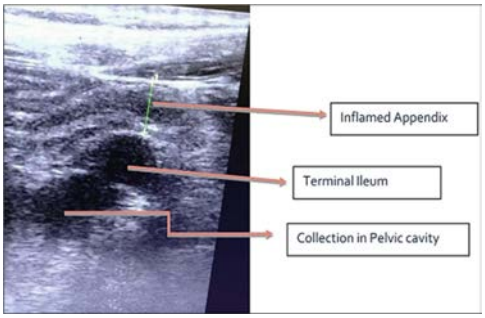

Fig 11:Appendix in pre-ileal position

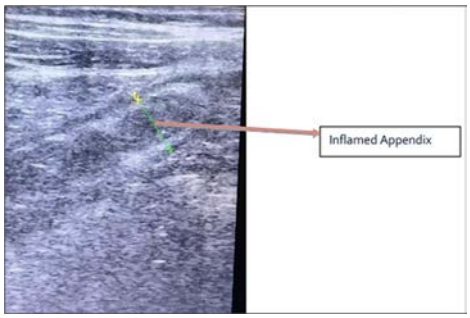

Fig 12:Appendix in pelvicposition

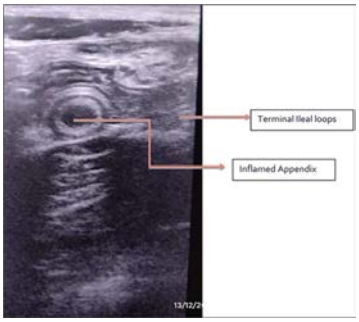

Fig 13:Appendix in pre-ileal position

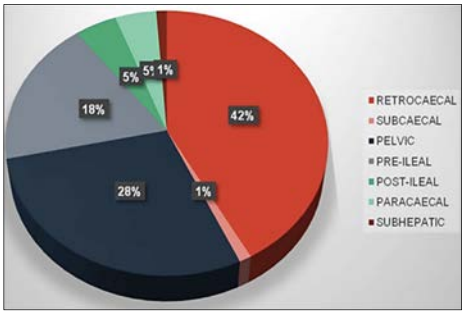

Fig 14:Different position of appendix with its complications

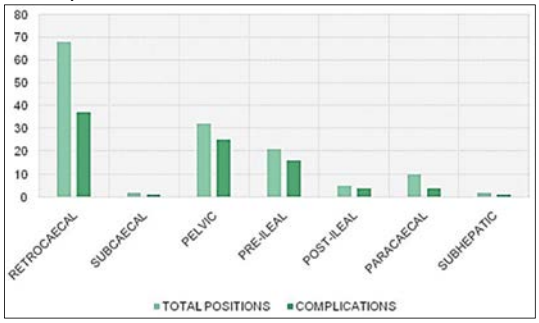

Fig 15:Intra-operative findings of different position of appendix with its complications

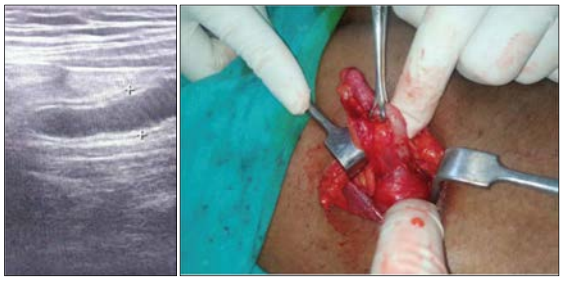

Fig 16: A. USG-Pelvic appendix with no collection
B. Intra Op-uncomplicated appendix

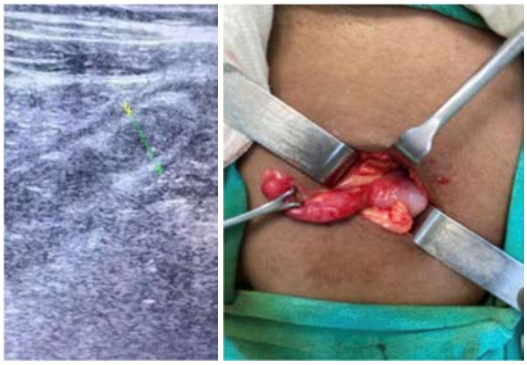

Fig 17: A. USG-Pelvic ilealappendixwith minimal peri-appendix cularcollections
B. Intra Op-complicated appendix

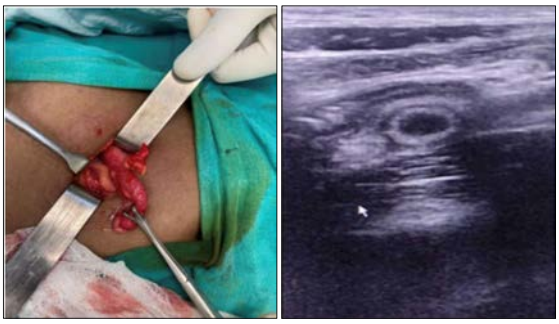

Fig 18: A. USG-Pelvic ilealappendixwith minimal peri-appendix cularcollections
B. Intra Op-complicated appendix

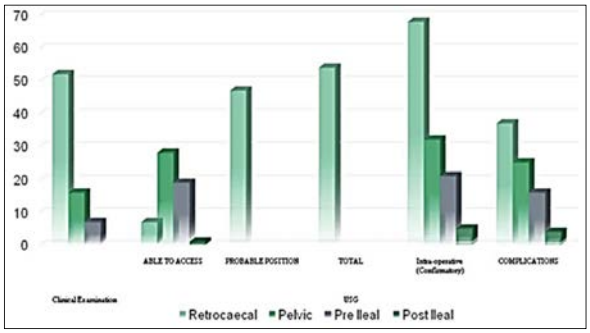

Fig 19: Accuracy of clinical findings with USG and intra-operative findings

Table 1: Age distribution of cases

Age Group	No of Cases	Percentage
12-15	11	7.8%
16-25	56	40%
26-35	34	24.3%
36-45	30	21.4%
46-55	3	2.2%
56-60	6	4.3%
Total	140	100%

Chi Square Value X2 (1, N = 140) = 89.64, p< 0.00001, (S) Statistically Significant (p<0.05)

Table 2: Clinical Evaluations for Positions of Appendix with different complaints

	Retrocaecal	Pelvic	Iea I/Post-Ileal
Fever	+	+	+
Pain Abdomen-RIF	+	+	+
Pain Abdomen-Right Lumbar Region	+		
Pain Abdomen-Suprapubic	-	+	-
Pain Abdomen-Right to Umbilicus	-		+
Vomiting/Nausea	+	+	++
Urinary Complaints		+	
Bowel Complaints	-		+
Psoas Test	+		
Obturator Test	-	+	

Table 3: Clinical Symptoms with respect to different positions of Appendix

Positions	Total Cases	Similar Complaintsin Past	Fever	Pain Abdomen	Vomiting	Bowel Complaints	Urinary Complaints
Retrocaecal	68	12	16	68	37	10	7
Subcaecal	2	0	1	2	2	0	1
Pelvic	32	3	9	32	13	4	4
Pre-ileal	21	6	6	21	12	2	1
Post-ileal	5	4	2	5	5	4	0
Paracaecal	10	4	2	10	7	0	0
Subhepatic	2	0	0	2	0	0	0
With complaints	-	29	36	140	76	20	13
No complaints	-	111	104	0	64	120	127
Total	140	140	140	140	140	140	140

Chi Square Value X2 (1, N = 140) = 32.3, p = 0.00184, (S) Statistically Significant (p<0.05)

Table 4: No of Cases with Urinary Complaints

Positions	No. of Positions	Present	%	Absent	%
Retrocaecal	68	7	10.3	61	89.70
Pelvic	32	4	12.5	28	87.5
Ileal	26	1	3.8	25	96.15
Subcaecal	2	1	50	1	50.00
Paracaecal	10	0	0	10	100
Subhepatic	2	0	0	2	100
Total	140	13	9.28	127	90.72

Chi Square Value X2 (1, N = 58) = 116.42, p <0.00001, (S) Statistically Significant (p<0.05)

Table 5: No of cases with bowel Distribution

Positions	No of Positions	Present	%	Absent	%
Petrocaecal	68	10	14.7	58	85.29
Pelvic	32	4	12.5	28	87.50
Ileal	26	6	23.1	20	76.92
Subcaecal	2	0	0	2	100
Paracaecal	10	0	0	10	100
Subhepatic	2	0	0	2	100
Total	140	20	14.3	120	85.7

Chi Square Value x2(1,N=58)=137,p<0.00001,(S) Statistically Significant(p<0.05)

Table 6:Clinical signs for different positions of appendix

Tests	Present	Absent	Total
Rovsings test	42	98	140
Obturator test	124	16	140
Psoas test	16	124	140
Blumbergs test	135	5	140
Tenderness in RIF140	0	140	

Table 7: Accuracy of tests in finding the position of appendix

Tests	Positions	No of Cases	Positive	Sensitivity
Psoas test	Retrocaecal	68	10	14.7%
Urator test	Pelvic	32	10	31.3%

Table 8:Accuracy of clinical finding with intra-position findings

Positions	Total Cases	Predicted Positions	Sensitivity
Retrocaecal	68	52	76.5
Pelvic	32	16	50%
Pre-Ileal/Post-Ileal26	26	7	26.9%
Others	14	0	0%
Total	140	75	53.57%

Table 9:USG finding for different positions of appendix

Positions	Total no of cases	Able to access positions of appendi X BY USG	Probe tendernes could Predict probable position	Could not axxess the Position of appendi X on USG	Percentage
Retrocaecal	68	7	47	14	79.4%
Subcaecal	2	1	0	1	50%
Pelvic	32	28	0	4	87.5%
Pre-Ileal	21	19	0	2	90.5%
Post-Ileal	5	1	0	4	20%
Paracaecal	10	2	0	8	22.2%
Subhepatic	2	1	0	1	50%
Total	140	49	47	34	

Table 10: Ubtraioeratuve findings for different position of appendix

Position -+	Total positions	Complications	Sensitivity
Retrocaecal	68	37	54%
Subcaecal	2	1	50%
Pelvic	32	25	78.1%
Pre-Ileal	21	16	76.2%
Post-Ileal	5	4	80%
Paracaecal	10	4	40%
Subhepatic	2	1	0%
Total	140	88	62.85%

Table 11: accuracy of clinical finding with USG and intra-opreative findings

USG Poisitions	Clinical Examination	Able to access	probable position	Total	Intra-operative (confirmatory)	complications
Retrocaecal	52	7	47	54	68	37
Pelvic	16	28			32	25
Pre-Ileal	7	19			21	16
Post-Ileal		1			5	4

complaints, previous similar complaints and clinical tests like Psoas and Obturator test. Details are summarized in the (Table 2).

Clinical Symptoms: In (Table 3), frequency distribution of various symptoms retrospectively compared with intra-operative findings of positions of appendix. The Pain Abdomen was the most common presentation observed in all positions, followed by vomiting with fever being the most common presentation respectively. Pain Abdomen, Vomiting/Nausea and fever were more observed in Retrocaecal positions, followed by Pelvic and Ileal respectively. Statistical evaluation of symptoms on the various cases with different positions of appendix indicate that the result is statistically significant and implies that the same pattern can be expected with more repeatability of different samples (p=0.00184)

Patients may present with atypical symptoms like Urinary complaints and Bowel disturbances. In our study, 13 cases which presented with Urinary symptoms of which 4 cases were Pelvic position, 7 were Retrocaecal position, 1 were pre-ileal position and 1 was Sub caecal position. So, Subcaecal followed by Pelvic has more preponderance to Urinary symptoms. The distribution of incidence of Urinary symptoms differs significantly with different positions of Appendix ($p < 0.00001$).

Chi Square Value X2 (1, N=58) =116.42, p<0.00001, (S) Statistically Significant (p<0.05)

In our study, 20 cases which presented with Bowel disturbances of which 10 cases were Retrocaecal position, 4 were Pelvic position, 6 were Ileal position. The distribution of incidence of Bowel disturbances differs significantly over different positions of Appendix (p<0.00001)

Clinical Signs: Various Clinical Signs are depicted in Table 6. McBurney's point tenderness was observed in 124 cases followed by Blumberg's rebound tenderness was observed in 135 cases and Rovsing's sign in 42 cases. Obturator test was positive in 10 cases of Pelvic position, 6 cases in other positions, absent in 124 cases. Psoas test was positive in 10 cases of Retrocaecal position and 5 cases of other positions and absent in 125 cases.

Blumberg rebound test was elicited in 135 patients, McBurney's test in 124 patients and Rovsing's test in 42 patients.

10 cases positive for Psoas test were having Retrocaecal position intra-operatively (14.7%) and 10 cases positive for Obturator test were having Pelvic position intraoperatively (31.3%).

Accuracy of Clinical Findings with Intra Operative Findings: Clinical findings with Intra-operative findings showed that 52 cases of Retrocaecal out of 68 cases (76.5%), 16 cases of Pelvic out of 32 cases (50%), 7 cases of Ileal out of 26 cases (26.9%) were accurate with Intra-operative findings and the same are tabulated in (Table 15).

Accuracy of USG in Finding the Positions of Appendix: In this study, while evaluating the accuracy of USG in depicting different positions of Appendix with respect to Intra-operative finding, it has been found that in Retrocaecal Appendix only 54 cases out of 68 cases (79.4% Approx), followed by Pelvic with 28 cases out of 32 cases(87.5% Approx), Pre-ileal with 19 cases out of

21 cases (90.5% Approx), Sub caecal with 1 out of 2 cases (50%), Post-ileal with 1 out of 5 cases (20%), Para caecal with 2 out of 9 cases (22.2%) identified. Hence USG can best detect the Pre-ileal (Approx 90.5%) followed by Pelvic position Appendix (Approx 87.5%). In our study, USG could identify only 10.3% and predict 79.4% of Retrocaecal positions. USG is not accurate in case the patient is obese and in patients with loculated collections in the peri-appendicular region and in Pelvic cavity and in Retrocaecal position.

Chi Square Value X2 (1, N=140) = 75.40, p<0.00001, (S) Statistically Significant (p<0.05)

In this study, Outcome of appendicitis like peri-appendicular adhesions, perforation, abscess, peritonitis was observed Intra-operatively in 16 out of 21 cases of Pre-ileal position (76.2%), 25 out of 32 cases for Pelvic position (78.1%), 1 out of 2 cases in Sub caecal position (50%), 4 out of 5 cases in Post-ilealposition (80%), 37 out of 68 cases in Retrocaecal position (54.4%), 4 out of 9 cases for Para caecal position (44.4%). In this study, complications of appendicitis were more observed in post-ileal followed by Pelvic position with significance of (p=0.045) and hence position of appendix play a vital role in its sequelae as depicted in (Table 10).

The associated symptoms and signs have evolved into a clinical teaching paradigm.The most common emergency abdominal operation is an appendicectomy[1].

Although the appendix is considered a vestigial organ, its inflammation is of greater importance in the diagnosis of acute appendicitis[2]. The only organ in the body which has no fixed anatomy is the appendix. The appendicular orifice is shielded by an indistinct semi-lunar fold of membrane lying underneath and a little beyond the ileo-caecal opening known as the Valve of Gerlach[3]. Patients with a Retrocaecal appendix may present with back or flank pain and patients with the appendiceal tip in the midline pelvis can reach the wall of the ureter and bladder, resulting in urinary symptoms and may present with suprapubic pain[4]. A peri-ileal appendicitis, in turn, can trigger a diarrhea[1-2]. These presentations may result in a delayed diagnosis, as the symptoms are different from the classically anterior right lower quadrant abdominal pain associated with the appendiceal disease[1]. Patients with a Retrocaecal appendix may present with back or flank pain and patients with the appendiceal tip in the midline pelvis can reach the wall of the ureter and bladder, resulting in urinary symptoms and may present with suprapubic pain[2]. Because the symptoms differ from the classically described anterior right lower quadrant abdominal pain associated with appendiceal disease, these clinical presentations may result in a delayed diagnosis[5]. Abdominal parts were removed during the mummification process and placed in Coptic jars with inscriptions describing the contents. When these jars were discovered, an inscription referring to the "intestinal worm" was discovered[6]

Andreas Vesalius, Professor of Anatomy at Padua, detailed the normal appendix in his treatise "Dehumani Corporis Fabrica" in 1534.Harry Houdini, the famous magician, died of a ruptured appendix after being hit in the abdomen[7].The clinical entity is credited to Reginald Fitz, who presented a paper titled "Perforating inflammation of the vermiform appendix" at the first meeting of the Association of American Physicians in 1886[8]. In 1904, Oschner in Chicago and Sherren in London boldly introduced the conservative management of appendicitis that bears their names [9-10] arry Houdini, the famous magician, died of a ruptured appendix after being hit in the abdomen[13].

As the cecum rotates medially and becomes fixed in the right lower quadrantof the abdomen, the appendix becomes more e longated and tubular[14-16].

The appendix finds its adult position on the posteromedial wall, just below the leocaecal valve, due to the subsequent unequal growth of the caecum's lateralwall[4-12-14]is attached to the terminal ileum by the Treves ligament, and its vascular supply is provided by the mesoappendix, which extends from themsentery[15]

Mesoappendix[17]: The appendix mesentery is a triangular fold of the peritoneum that wraps around the vermiform appendix. This is connected to the posterior surface of the lower end of thesmall intestine's mesentery, close to the ileocecal junction. It usually reaches the tip of the appendix but occasionally fails to reach the distal third, where a vestigial low peritoneal ridge containing fat is present. It encloses the vermiform appendix's blood vessels, nerves, and lymph vessels and usually contains a lymph node. The attachment of the mesoappendix to the cecum is consistent with the highly visible free taeniae leading directly to the appendix's base, but the rest of the appendix varies greatly. Sir Frederich reaves has defined various appendix positions (making the vermiform appendix as the pointer and caecum as the dial of the clock)[16] Because of these varying positions, atypical presentations of appendicitis can occur; thus, the urgical dictum, "appendicitis should always be in he top three differential diagnoses of acute abdominal pain in any location"[17]. The appendicular branch is the lower division of the ileocolic artery that originates posterior to the terminal ileum, enters the free border of the mesoappendix near the base of the appendix, and continues its journey through to the tip of the appendix 20. The accessory appendicular artery, also known as the artery of Seshachalam, is indeed a branch of the posterior caecal artery, which arises from the ileocolic artery and runs through the mesoappendix [19] The appendix is located in the right

hypochondrium due to the caecum's failure to descend. (sub-hepatic position)[20].

Microscopy[21]: The appendix possesses the same four layers as the rest of the gut in terms of histology, namely Mucosa, submucosa, muscularis propria and serosa. Mucosa- Surface epithelial cells in a single layer, including columnar cells with basally located nuclei, goblet cells, absorptive cells and apical mucin. The Lamina propria is moderately cellular, with Lieberkunn crypts that are contiguous with the surface epithelium. Lymphoid follicles with germinal centres are also prominent. Sub-mucosa-A rich network of arterioles, venules, capillaries and lymphatics in a connective tissue framework. The Meissner's plexus is a collection of ganglion cells and associated neuronal processes and Schwann cells found in the submucosa. Muscularis propria- Auerbach's plexus is made up of an inner circular layer of smooth muscle and an outer longitudinal layer of smooth muscle. Serosa-A thin band of fibrous tissue surrounds a single layer of cuboidal epithelial cells.

Classification of Appendicitis[25]**:**

- Acute appendicitis
- Recurrent appendicitis
- Recurrent acute appendicitis
- Recurrent sub-acute appendicitis
- Chronic Appendicitis

This observational study was conducted in Karnataka institute of medical sciences, Hubli during the period from January 2021-2023.During this period ,140 cases fulfilling the inclusion criteria, who willingly give consent for the study undergo clinical examination, USG and position of appendix is predicted by both methods and correlated with the findings observed intraoperatively during appendicectomy. Intraoperative findings of position of appendix and its complications documented by the operating surgeon in operative notes. Acurate diagnosis of acute appendicitis is still challenging due to its atypical presentation and its varied position leading to its complications which is difficult to treat. In Our study Acute appendicitis was more common between 16-25 years of age(40%) followed by 26-35 years (24.3%) respectively which was statistically significant($p<0.00001$). The study conducted by Patel KG et al. said that acute appendicitis was common in 3rd decade followed by 4th decade. Lewis *et al.* (1975) in their study said that 2nd and 3rd decade is the most common age group for acute appendicitis. Acute appendicitis was seen more in males with total of 81(57.8%) cases and 59(42.2%) in females with the ratio of 1.3:1. Addis *et al.* and Korner *et al.* reported Male preponderance (1.2:1 to 1.3:1). Pain abdomen in Right iliac fossa was the leading symptom (100%) followed by vomiting and fever respectively in all the positions of appendix which was statistically significant($p<0.05$) These observations were similar as compared to the study made by Patel K G et al. Urinary symptoms was seen in Subcaecal position(50%) followed by Pelvic position (12.5%) and retrocaecal position (10.29%).Bowel disturbances were most commonly seen in Ileal position (23.07%) followed by Retrocaecal position (14.7%) and Pelvic position(12.5%). Blumberg test was elicited in 135 cases, McBurney's test in 124 cases, Rovsings in 42 cases Obturator test was elicited in 62.5% of Pelvic position and Psoas test was elicited 66.6% of Retrocaecal position. In our study accuracy of clinical examination in finding positions of appendix correlated retrospectively with intraoperative findings showed that Retrocaecal position is predicted in 76.4% followed by Pelvic position in 46.8% cases and Ileal position in 30.76% cases respectively. In a study by Patel K G et al. 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). In 50-60% cases, diagnosis of appendicitis requires no imaging studies and can be made on clinical grounds alone. In our study accuracy of USG in finding different positions of appendix correlated retrospectively with Intraoperative findings showed that Retrocaecal positioned appendix was predicted in 79.4% cases and identified in 10.29% cases ,Pelvic appendix 87.5%,Preileal appendix in 90.47% cases, Paracaecal appendix in 22.2% cases ,Subcaecal and sub hepatic appendix in 50% cases respectively and Postileal appendix in 20% cases. Hence USG has more accuracy for finding Preileal followed by Pelvic positions of appendix. According to Patel K G [2]. 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 and subcaecal. On comparison with intraoperative findings Ultrasound has sensitivity of 88.88% in detection of pelvic type followed by 85.41% retrocaecal type appendicitis [P value >0.05, $X2 = 4.681$] which was comparable with our study.

CONCLUSION

This study was conducted in Karnataka institute of medical sciences, Hubli during the period from January 2021-2023. Total sample size collected was 140 the following conclusions are drawn from the study. Acute appendicitis was more common between 16-25 years of age (40%).Number of males with acute appendicitis were 81(57.8%) cases and females were 59(42.2%). Pain abdomen mainly in Right iliac fossa was the leading symptom followed by vomiting and fever respectively for all positions of appendix. Urinary symptoms was most commonly seen in Subcaecal position (50%) followed by Pelvic position (12.5%).
Bowel disturbances were most seen in Ileal position

(23.07%) followed by Retrocaecal position (14.7%). Blumberg test was elicited in 135 cases, McBurney's test in 124 cases, Rovsings in 42 cases. Obturator test was elicited in 62.5% of Pelvic position and Psoas test was elicited 66.6% of Retrocaecal position. Accuracy of clinical examination in finding positions of appendix correlated retrospectively with intraoperative findings showed that Retrocaecal position is predicted in 76.4% followed by Pelvic position in 46.8% cases and Ileal position in 30.76% cases respectively. Accuracy of USG in finding different positions of appendix correlated retrospectively with Intraoperative findings showed that Retrocaecal positioned appendix was predicted in 79.4% and identified in 10.29% cases, Pelvic appendix in 87.5%cases, Preileal appendix in 90.47% cases. USG was accurate in finding Preileal followed by Pelvic positions of appendix.

Intraoperative findings showed Retrocaecal appendix in 68 cases(48.5%) ,Pelvic appendix in 32 cases(22.85%), Preileal appendix in 21 cases(15%), Paracaecal appendix in 10 cases(7.14%),Postileal appendix in 5 cases(3.57%), Subcaecal and Subhepatic appendix in 2 cases each (1.42%).Outcome of acute appendicitis like Peri appendicular adhesion, Gangrenous appendix, Perforative appendicitis, Appendicular mass and abscess were analysed and noted that it is associated more in Post Ileal appendix (80%) followed by Pelvic appendix (78.1%) which is statistically significance (p=0.045), hence position of appendix plays a role in its sequelae. Prediction of positions of appendix prior to surgery with clinical examination and USG helps in determining the atypical signs and symptoms pertaining to the position of appendix and to diagnose the problem at its earliest and to reduce morbidity and mortality. In Retrocaecal appendix symptoms may be silent, Pelvic appendix it may form abscess, Ileal positions in peritonitis and post ileal appendix may be missed in diagnosis, hence to be aware of. It also aids in determining the intraoperative difficulty pertaining to different positions like Retrocaecal and Post ileal position and to predict intraoperative time and to select the incisions during surgery based on the position and its complications.

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