

Clinico-pathological features and outcome of acute appendicitis: A prospective study in our Institution

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Abstract

Background: Appendiceal disease is a frequent reason for emergency hospital admission and most commonly performed abdominal emergency surgery. Delay in diagnosis and management will result in significant morbidity and mortality.

Aim: To understand the various common presentations with investigations correlation, peroperative findings, postoperative complications and histopathological findings in our institution.

Materials and Methods: The materials for our prospective study were collected from our institution for a period of 10 months (November 2016 – August 2017). Patients admitted with history suggestive of acute appendicitis within 24- 48 hours from age group 13 years and above were studied. After admission patient’s vital signs were recorded and routine blood investigations, USG abdomen was done and documented. On basis of the history, Clinical examination and investigations a diagnosis of acute appendicitis was made and emergency

appendectomy was performed if indicated. Per operatively appearance of appendix and peritoneal cavity were recorded, the appendectomy specimen was sent for Histopathological examination and recorded. Post-operative cases were followed upto 1 month for any complications.

Conclusion: The collected data from the patients were analysed and showed that more than 70% of the acute appendicitis were in younger age group, less than 30 years, 55% were male. Almost all patients presented with abdominal pain/ Right Iliac Fossa tenderness. 66.7% of the patients presented with fever. 62.8% patients presented with vomiting. 80.9% of patients presented with leucocytosis (>10,000 cells/cmm). 69.4% patients presented with neutrophilia. USG findings was significant in 84.9% of patients. 92.5% patients underwent emergency open appendectomy and 7.5% of patients underwent laparoscopic appendectomy. Peroperatively 75.4% had acutely inflamed appendix, postoperative followup showed 14.3% of patients developed surgical

site infections and wound dehiscence. Histopathological examination showed 51.6% acutely inflamed appendix. Therefore early clinical diagnosis with accuracy and rapid detection will lead to better treatment outcome.

Keywords: Appendicitis, vermiform appendix, appendectomy, clinicopathological evaluation.

Introduction

Appendiceal disease is a frequent reason for emergency hospital admission and, most commonly performed abdominal emergency surgery is an appendectomy. In spite of recent advances in technology, it is difficult to diagnose using a specific laboratory test or examination with sensitivity and specificity. Its more common in males than in females.

Clinical diagnosis with accuracy is the challenging step in surgical practice. Rapid detection will lead to a better treatment outcome. We rarely need a specialist investigation to make the diagnosis of appendicitis as it is predominantly a clinical diagnosis. Use of bedside tests and laboratory investigations can give us additional evidence in the diagnosis of acute appendicitis and help us to exclude the important differential diagnosis. Delay in the diagnosis will lead to the complications. In view to decrease the complications early diagnosis and prompt treatment is needed, which will lead us to negative laparotomy (25%).

This present study was conducted to know the various and common presentations with investigation co-relation, per operative findings, common postoperative complications and Histo-pathological findings in our institution, surgical emergency ward, Government Stanley medical college. Most common surgical emergency performed in our institution are emergency open appendectomy.

Aims and Objectives Of The Study

- To study the various clinical presentation of acute appendicitis

- To study the age and sex distribution
- Role of ultra-sonogram in diagnosis
- Per operative appearance of appendix and peritoneal cavity.
- Postoperative complications and follow up
- HPE report of appendix after appendectomy

Materials and Methods

This study was conducted from the materials collected at department of General surgery, Government Stanley Medical College & Hospital for a period of 10 months from November-2016 to August 2017.

Patients admitted with clinical features suggestive of acute appendicitis within 24-48 hours in the surgical emergency ward of our institution were included in the study.

A detailed history and clinical examinations of the patient was carried out at the time of admission with special references to demographic characteristics, symptoms, signs and disease chronology etc. After admission patient's pulse, temperature and respiratory rate chart, routine blood investigations and USG were done and the findings were recorded. On the basis of history, clinical examinations and investigations, a diagnosis of acute appendicitis was made and Emergency Appendectomy was performed if indicated. Per-operatively appearance of appendix and peritoneal cavity were recorded. After Appendectomy, all specimens were sent for Histo-pathological examination and findings were recorded. Post operatively patients were followed up for any complications for one month.

Results & Discussion

The collected data were analysed with IBM.SPSS statistics software 23.0 Version. To describe about the data descriptive statistics frequency analysis, percentage analysis were used for categorical variables and the mean and S.D were used for continuous variables.

The results of the study are explained below in detail with charts and tables for better understanding. Total 601 cases underwent appendectomy operation were included in the study. Among them 268 were females (44.6%) and 333(55.4%) were males. (Table 1)

Table 1: Sex Distribution

Sex	No of patients	Percentage
Female	268	44.6
Male	333	55.4
Total	601	100.0

Among the patients in the age group 250(41.6%) were in the group of 13 to 20 years, 177(29.5%) were in the age group of 21 to 30 years, 110 (18.3%) were in the age group of 31 to 40 years, 42 (7.0%) were in the age group of 41 to 50 years, 16 (2.70%) were in the age group of 51 to 60 years and 6(1.0%) were in the age group of above 60 years. Mean±SD of age of the patients was 26.10±11.425 years with a range of 13 to 80 years. (Table 2).

Table 2: Age Distribution

Age	Frequency	Percentage
13 - 20 yrs	250	41.6
21 - 30 yrs	177	29.5
31 - 40 yrs	110	18.3
41 - 50 yrs	42	7.0
51 - 60 yrs	16	2.7
Above 60 yrs	6	1.0
Total	601	100.0

Out of 601 patients all presented with abdominal pain (100%), 226 (37.5%) presented with nausea and anorexia, 378(62.8%) presented with vomiting, 401 (66.7%) presented with fever, 2 (0.3) presented with diarrhoea (Table 3).

Table 3: Distribution of clinical presentation of Acute Appendicitis *

Symptoms	Frequency	Percentage
Abdominal pain	601	100
Nausea	226	37.5
Vomiting	378	62.8
Anorexia	226	37.5
Fever	401	66.7
Diarrhea	2	0.3

*multiple responses

In the our study among 601 patients signs with, RIF Tenderness, elevated temperature >100 F abdominal guarding & rigidity, rebound tenderness, Rovsing’s sign, psoas test and obturator test were 100.0%, 68.4%, 56.7%, 56.7%, 56.6%, 80.2% ,19.6% respectively (Table 4).

Table 4: Distribution of clinical signs*

Clinical signs	Frequency	Percentage
RIF tenderness	601	100
Elevated temperature	411	68.4
Guarding & rigidity	341	56.7
Rebound tenderness	341	56.7
Rovsing’s sign	340	56.6
Psoas sign	482	80.2
Obturator sign	118	19.6

*multiple responses

Among them, 486 (80.9%) had WBC count ≥10,000/cumm (Table 5) and 417(69.4%) had neutrophil count ≥ 75% [1] (Table 6).

Table 5: Laboratory findings

W.B.C count	Frequency	Percentage
> 10000	486	80.9
< 10000	115	19.1
Total	601	100.0

Table 6: Neutrophils count

Neutrophils	Frequency	Percentage
> 75 %	417	69.4
< 75 %	184	30.6
Total	601	100.0

Out of 601 patients, 510(84.9%) USG had a report of acute appendicitis, 78 (13%) appendix could not be visualized, 13(2.2%) normal (Table 7).

Table 7: USG findings

USG findings	Frequency	Percentage
Acute appendicitis	510	84.9
Appendix could not be visualised	78	13.0
Normal	13	2.2
Total	601	100.0

Out of 601 patients, 556(92.5%) underwent open appendectomy and 45(7.5%) underwent laparoscopic procedure (Table 8).

Table 8: Type of Surgical procedure performed

Surgery	Frequency	Percentage
Open appendectomy	556	92.5
Laparoscopic appendectomy	45	7.5
Total	601	100.0

Out of 601 patients, the intra-op findings were 453 (75.4%) inflamed, 19 (3.2%) perforated, 26 (4.3%) gangrenous, 104(17.3%) fecolith (Table 9).

Table 9: Distribution of Per- Operative findings

Per Operative Findings	Frequency	Percentage
Inflamed	453	75.4
Perforated	18	3.0
Perforated & Fecolith	1	.2
Gangrenous	26	4.3
Fecolith	103	17.1
Total	601	100.0

A total 86 (14.2%) patients developed different complications within one month of surgery. These were surgical site infections 73 (12.1%) and wound dehiscence 13(2.2%) (Table 10).

Table 10: Distribution of complication within one month of surgery (n=601)

Postoperative Complication	Frequency	Percentage
No Complication	515	85.7
SSI	73	12.1
Wound dehiscence	13	2.2
Total	601	100.0

All specimens were sent for histopathological examination. Among the 601 Patients, 309 (51.6%) had acutely inflamed, 13 (2.2%) had perforated, 22(3.7%) had gangrenous, 17(2.8%) acute on chronic, 103(17.2%) had fecolith, 2(0.4%) Enterobius vermicularis and 1(0.2%) had granulomatous appendicitis(Table 11).

Table 11: Distribution of histo-pathological findings

HPE Report	Frequency	Percentage
Acute Appendicitis	309	51.4
Acute Appendicitis & Enterobius Vermicularis	1	.2
Acute on Chronic Appendicitis	17	2.8
Chronic Appendicitis	135	22.5
Chronic Appendicitis & Enterobius Vermicularis	1	.2
Perforated	12	2.0
Perforated & Fecolith	1	.2
Gangrenous	22	3.7
Fecolith	102	17.0
Granulomatous Appendicitis	1	.2
Total	601	100.0

Total 601 cases underwent appendectomy operation were included in the study. Among the patients in the age group 250(41.6%) were in the group of 13 to 20 years, 177(29.5%) were in the age group of 21 to 30 years, 110 (18.3%) were in the age group of 31 to 40 years, 42 (7.0%) were in the age group of 41 to 50 years, 16 (2.70%) were in the age group of 51 to 60 years and 6 (1.0%) were in the age group of above 60 years. Mean \pm SD of age of the patients was 26.10 \pm 11.425 years with a range of 13 to 80 years. (Table 2). Many epidemiologic studies shown that acute appendicitis is a condition most commonly seen in the 13-29 years old age group. It is known to be common among adolescents age group than in children or young adults. Acute Appendicitis is the disease of the younger age population with 5-10% of cases reported in the elderly population. The incidence in

this age group seems to be rising because of the increase in the life expectancy.

Among the patients 110 (73.3%) were male and 40 (26.7%) were female (Table I). It is common in males than in females [2]. In previous study it was shown that the incidence was highest in males compared to females, in the ratio of 3:1[3], with females being mostly in the third and fourth decade [4].

Out of 601 patients all presented with abdominal pain (100%), 226 (37.5%) presented with nausea and anorexia, 378(62.8%) presented with vomiting, 401 (66.7%) presented with fever, 2 (0.3) presented with diarrhea (Table 3). Most predominant presenting symptoms were right iliac fossa pain (95%) followed by nausea (80%) and vomiting (73%) [2]. 63% are presented after 2 days of onset of symptoms and only 31% of patients presented with a typical history of acute appendicitis. Fever was seen in 15% of patients.

In our study among 601 patients signs with, RIF Tenderness, elevated temperature >100 F abdominal guarding & rigidity, rebound tenderness, Rovsing's sign, psoas test and obturator test were 100.0%, 68.4%, 56.7%, 56.7%, 56.6%, 80.2% ,19.6% respectively (Table 4).

Among them, 486 (80.9%) had WBC count \geq 10,000/cu.mm (Table 5) and 417(69.4%) had neutrophil count \geq 75% (Table 6). Out of 601 patients, 510(84.9%) USG had a report of acute appendicitis, 78 (13%) appendix could not be visualized, 13(2.2%) normal (Table 7)[3&5].

Out of 601 patients, 556(92.5%) underwent open appendectomy and 45(7.5%) underwent laparoscopic procedure[9]. Out of 601 patients, the intra-op findings were 453 (75.4%) inflamed, 19 (3.2%) perforated, 26 (4.3%) gangrenous, 104(17.3%) fecolith (Table 9). A total 86 (14.2%) patients developed different complications within one month of surgery. These were

surgical site infections 73 (12.1%) and wound dehiscence 13(2.2%) [8&9] (Table 10). Elderly patients had more underlying diseases as compared to younger age group [6]. Because of sluggish physiological reactions, elderly patients had higher rate of morbidity and mortality.

All specimens were sent for histopathological examination. Among 601 Patients, 309 (51.6%) had acutely inflamed, 13 (2.2%) had perforated, 22(3.7%) had gangrenous, 17(2.8%) acute on chronic, 103(17.2%) had faecolith, 2 (0.4%) enterobius vermicularis and 1(0.2%) had granulomatous appendicitis[6]. In the previous study [2], they reported that histopathology results showed perforated appendix with or without generalized peritonitis in 41 patients (28.7%), gangrenous appendicitis 9(6.6%), inflamed appendix 38(26%) and 16(10.9%) of cases showed normal appendix.

Conclusion

More than 70% in the present study were in younger age group less than 30 years and 55% were male. 100% of the patients presented with abdominal pain and RIF tenderness.66.7% of the patients presented with fever, 62.8% of the patient presented with vomiting. 80.9% presented with Leucocytosis (>10,000cells/cu.mm) and 69.4% presented with Neutrophilia (>75%). Abdominal pain, vomiting, fever, RIF tenderness, Leucocytosis(>10,000cells/cu.mm) and Neutrophilia (>75%) were the commonest findings in our study. USG findings of 84.9% showed acute appendicitis. 92.5% of the patients underwent emergency open appendectomy and 7.5% underwent laparoscopic appendectomy.

Per-operatively, 75.4% had acutely inflamed appendix, 3.2% were perforated, 4.3% were gangrenous, 17.1% showed faecolith. Post-operatively, 14.3% were treated for complications such as SSI's and wound dehiscence. No mortality. Histo-pathological findings showed 51.6% acutely inflamed, 2.8% acute on chronic, 2.2% perforated,

3.7% gangrenous, .4% showed worms, 0.2% granulomatous, 22.5% chronic appendicitis.

References

1. Daldal, Emin, and Hasan Dagmura. "The Correlation between Complete Blood Count Parameters and Appendix Diameter for the Diagnosis of Acute Appendicitis." *Healthcare (Basel, Switzerland)* vol. 8,1 39. 13 Feb. 2020, doi:10.3390/healthcare8010039
2. Nshuti, Richard, et al. "Clinical Presentation of Acute Appendicitis in Adults at the Chris Hani Baragwanath Academic Hospital." *International Journal of Emergency Medicine*, vol. 7, no. 1, 2014.
3. Petroianu, Andy. "Diagnosis of Acute Appendicitis." *International Journal of Surgery*, vol. 10, no. 3, 2012, pp. 115–19. Crossref, doi:10.1016/j.ijssu.2012.02.006.
4. Oguntola, A S et al. "Appendicitis: Trends in incidence, age, sex, and seasonal variations in South-Western Nigeria." *Annals of African medicine* vol. 9,4 (2010): 213-7. doi:10.4103/1596-3519.70956
5. Yoo, Hong Yeol, et al. "Unexpected Appendiceal Pathologies and Their Changes With the Expanding Use of Preoperative Imaging Studies." *Annals of Coloproctology*, vol. 33, no. 3, 2017, pp. 99–105. Crossref, doi:10.3393/ac.2017.33.3.99.
6. Omari, Abdelkarim H et al. "Acute appendicitis in the elderly: risk factors for perforation." *World journal of emergency surgery : WJES* vol. 9,1 6. 15 Jan. 2014, doi:10.1186/1749-7922-9-6
7. Duduyemi, Babatunde M. "Clinicopathological Review of Surgically Removed Appendix in Central Nigeria." *Alexandria Journal of Medicine*, vol. 51, no. 3, 2015, pp. 207–11. Crossref, doi:10.1016/j.ajme.2014.08.003.
8. Humes, D. J., and J. Simpson. "Acute Appendicitis." *BMJ*, vol. 333, no. 7567, 2006, pp. 530–34. Crossref, doi:10.1136/bmj.38940.664363.ae.

9. Ingraham, Angela M et al. “Comparison of outcomes after laparoscopic versus open appendectomy for acute appendicitis at 222 ACS NSQIP hospitals.” *Surgery* vol. 148,4 (2010): 625-35; discussion 635-7. doi:10.1016/j.surg.2010.07.025.