



CLINICAL PROFILE OF APPENDICITIS WITH APPENDICOLITH AND WITHOUT APPENDICOLITH: OUR EXPERIENCE

General Surgery

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ABSTRACT

Background: Acute appendicitis is the commonest reported emergency to surgical department worldwide. Knowing the clinical profile of appendicitis is important. Moreover, since appendicolith is the commonly cited aetiology for appendicitis, knowing its prevalence and its association with severity of disease is also important.

Methods: It was a retrospective study of patients who were operated for appendicitis or suspected appendicitis. All patients irrespective of age and sex were included. Each patient chart was studied for demographic details, nature of presentation, surgical approach used, details of intraoperative findings, postoperative complications and length of hospital stay.

Further, on the basis of intra operative findings patients were divided into two groups; Group A (appendicitis with appendicolith) and Group B (appendicitis without appendicolith) which were then compared for intraoperative findings/complications; postoperative period and length of hospital stay.

Results: Out of 182 patients, only 128 patients were selected and studied. 64% (82) were males and 36% (46) were females, with male: female ratio of 1.8: 1. The mean age of the study population was 35.54 ± 15.42 years (minimum 6, maximum 78). 89.8% patients (115/128) had acute presentation where as 10.2% (13/128) had chronic presentation. Right lower quadrant approach (McBurney/Lanz/ Rutherford) was the commonest approach used for surgical intervention in 86.7% (111/128), followed by right lower paramedian in 10.2% (13/128) and lower midline in 3.1% (4/128). Position of appendix was retrocecal in ~61% (78/128) patients, followed by pelvic in 25% (32/128) patients, postileal in 4.7% (6/128), retrocolic in 3.1% (4/128), preileal in 2.3% (3/128), subcecal in 2.3% (3/128) and subhepatic in 1.6% (2/128) of the study population. Appendix was found inflamed in 85.9% (110/128) where as it was normal in 14.1% (18/128). Further, along with inflammation, appendix was perforated in 18.6% (24/128), gangrenous in 10.2% (13/128) and with pus/ abscess formation in 14.8% (19/128).

Appendicoliths were found in 14.1% (18/128). Most of the patients (10/18) had single appendicolith, 4 patients (4/18) had two appendicoliths, one patient had three appendicoliths (1/18); whereas three patients (3/18) had >3 appendicoliths. Most of the appendicoliths were <0.5 cm in size (along the long axis), three patients had appendicoliths of size 0.5- 1 cm, two patients had appendicoliths of size 1.1-1.5 cms; whereas single patient had a appendicolith of size 1.6-2 cms. Appendicoliths were mostly found in proximal third/ base of appendix (11/18) i.e. 61.1% appendicoliths, at middle portion in (6/18) 33.33% and least at distal third or tip (1/18) in 1.6% of appendicoliths. Postoperative complications were seen in (20/128) 15.6% patients. Further, on comparing Group A (appendix with appendicolith) with Group B (appendix without appendicolith), it was observed that appendix was inflamed in 100% of patients in Group A as compared to 83.7% in Group B which is statistically not significant ($P = 0.1374$). The complications were also more common in Group A (i.e. perforation 44.4%, abscess/pus formation 38.9%, gangrenous changes 38.9%) as compared to Group B (i.e. perforation 14.5%, abscess/pus formation 10.9%, gangrenous changes 5.5%) with P value of 0.0072 with respect to perforation which is statistically significant, $P = 0.0062$ for abscess/pus formation which is statistically significant, $P = 0.0001$ for gangrenous changes which is statistically significant. Post-operative complications during hospital stay were more in Group A i.e. 33.33% (6/18) than Group B i.e. 12.7% (14/110) with P value=0.0598 which is statistically significant. The average length of hospital stay was 6.44 ± 2.11 days in Group A and 4.24 ± 1.49 days in Group B.

Conclusion: Appendicoliths were present in 14.1% of the patients operated for acute appendicitis. The complications were more frequent and severe in patients with appendicoliths on intraoperative findings than those without any appendicoliths; and as such patients with appendicoliths had more duration of hospital stay. So patients with abdominal pain and presence of appendicoliths on radiological findings should be promptly subjected for surgical intervention to prevent complications and improve outcome.

KEYWORDS

appendicitis, appendicoliths, gangrene, perforation.

INTRODUCTION:

Acute appendicitis is the commonest reported emergency to surgical department worldwide. It affects ~7% of the general population in a lifetime¹. First successful removal of appendix was reported by Hancock in 1848². However, Fitz in 1886 gave the first description of acute appendicitis³. Wangenstein and Dennis in 1939 proposed the obstructive phenomena in pathogenesis of acute appendicitis⁴. As such appendicoliths and lymphoid hyperplasia are the commonly implicated aetiology in the pathogenesis of appendicitis^{5, 6, 7, 8}. Therefore, the aim of this study was to know the clinical profile of

appendicitis in terms of demographic details, nature of presentation, surgical approach and intra operative details. We also noted the prevalence of appendicoliths and its association with the severity of the disease.

MATERIALS AND METHODS:

It was a retrospective study of patients who were operated for appendicitis or suspected appendicitis over a period of 2 years (March 2016- Feb 2018) in a teaching hospital. All patients irrespective of age and sex were included. Those patients in whom intraoperative findings

confirmed other diagnosis as the cause of abdominal pain other than the appendix or in whom no cause could be identified (negative intervention) were excluded from the study. Each patient chart was studied for

- Demographic data,
- Type of presentation (acute or chronic),
- Surgical approach -right lower quadrant (McBurney/Lanz/ Rutherford), right lower paramedian, lower midline.
- Intraoperative findings were noted in terms of

1. Position of appendix(retrocecal, pelvic, postileal, preileal, subcecal),
2. Condition of appendix(normal/inflamed/perforated/gangrenous changes)
3. Presence of appendicoliths (their number, size and their location in the appendicular lumen)

- Postoperative complications during hospital stay(local- wound infection, pus collection, wound dehiscence, fistula formation) or systemic complications (sepsis/ pulmonary/renal/cardiac)

- Length of hospital stay.

Further, on the basis of intraoperative findings, patients were divided into two groups:

- Group A in which appendix contains appendicolith and
- Group B in which there were no appendicolith could be found on intraoperative findings.

These groups were further compared for intraoperative findings or complications and hospital stay.

RESULTS AND OBSERVATIONS:

Records of 182 patients operated for acute appendicitis or suspected appendicitis were analysed. Out of 182 patients only 128 patients were selected and studied. Rest were excluded due to lack of adequate data. Among 128 patients 64% (82) were males and 36% (46) were females, with male: female ratio of 1.8 : 1. The mean age of the study population was 35.54 ± 15.42 (minimum 6, maximum 78) years. Most of the patients (115/ 128) admitted had acute presentation i.e. 89.8% , where as 10.2% (13/128) of patients had chronic presentation. Right lower quadrant approach (McBurney/ Lanz/ Rutherford) was the commonest approach used for surgical intervention in 86.7% (111/128), followed by right lower paramedian in 10.2% (13/128) and lower midline in 3.1% (4/128) of study patients. Table 1.

On intraoperative findings, the most common position of appendix noted was retrocecal in ~61% (78/128), followed by pelvic in 25% (32/128) patients, postileal in 4.7%(6/128), retrocolic in 3.1%(4/128), preileal in 2.3% (3/128), subcecal in 2.3% (3/128) and subhepatic in 1.6% of the study population. Appendix was found inflamed in 85.9% patients (110/128); whereas it was normal in 14.1% patients (18/128). Further, along with inflammation appendix was perforated in 18.6% (24/128), gangrenous in 10.2% (13/128) and with pus/ abscess formation in 14.8% (19/128). Table 2. (Figures 1-5).

Table 1. Clinical profile of patients with appendicitis.

Parameters	No. of patients	Percentage
Total no. of patients	128	100%
Mean age	35.5 ± 15.42 years (min. 6, max. 78)	
Sex		
• Males	82	64%
• Females	46	36%
Presentation		
• Acute	115	89.84%
• chronic	13	10.16%
Surgical approach		
• R lower quadrant	111	86.7%
• R lower paramedian	13	10.2%
• Lower midline	4	3.1%

Table 2. Intra operative findings

Parameters	No. of patients	Percentage
Position of appendix		
• Pelvic	32	25%
• Retrocecal	78	~61%
• Subcecal	3	2.3%
• Postileal	6	4.7%
• Preileal	3	2.3%
• Retrocolic	4	3.1%
• Subhepatic	2	1.6%
Condition of appendix		
• Normal	18	14.1%
• Inflamed	110	85.9%
Inflamed + Perforated	24	18.6%
Gangrene	13	10.2%
Abscess/pus formation	19	14.8%
Prevalence of appendicolith	18	14.1%

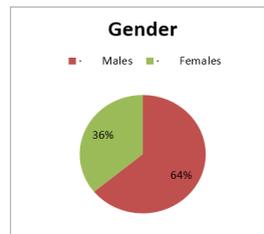


Fig.1

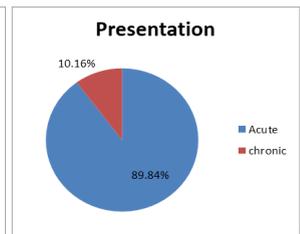


Fig. 2

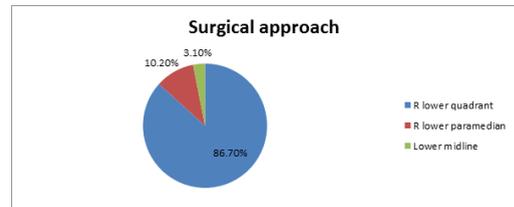


Fig.3

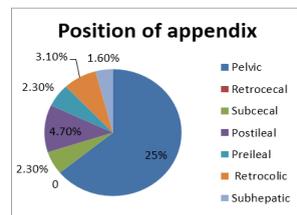


Fig.4

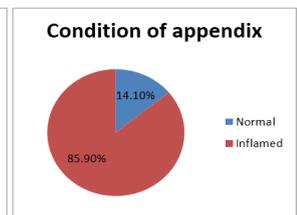


Fig.5

Figures 1-5: Clinical profile and intra-operative findings.

Appendicoliths were found in 14.1% patients (18/128). Most of the patients (10/18) had single appendicolith, 4 patients (4/18) had two appendicoliths, one patient had three appendicoliths (1/18); whereas three patients (3/18) had >3 appendicoliths. Most of the appendicoliths (12/18) were less than 0.5 cm in size (along long axis), three patients had appendicoliths of size 0.5- 1 cm, two patients had appendicoliths of size 1.1-1.5 cms; whereas single patient had a appendicolith of size 1.6-2 cm. Appendicoliths were mostly found in proximal third/ base of appendix in 61.1% (11/18), at middle portion in 33.3% patients (6/18) and least at distal third or tip in 1.6% (1/18). Table 3. (Figures 6-8)

Table 3.Profile of appendicoliths

Parameters	No. of patients (n=18)	Percentage
No. of appendicoliths in lumen		
• 1	10	55.6%
• 2	4	22.2%
• 3	1	5.6%
• >3	3	16.6%

Size of appendicoliths		
• <0.5 cm	12	66.6%
• 0.5-1 cm	3	16.7%
• 1.1-1.5 cm	2	11.1%
• 1.6-2 cm	1	5.6%
Position of appendicoliths in appendix		
• Proximal third/base	11	61.1%
• Mid-portion	6	33.3%
• Distal third/tip	1	5.6%

Fig.6

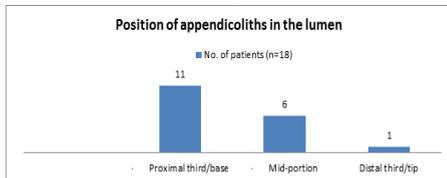


Fig.7

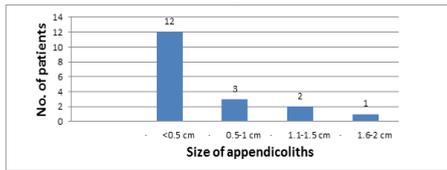


Fig.8

Figures 6-8: Profile of appendicoliths.

Postoperative complications were seen in 15.6% patients (20/128). Most of these were local complications (wound infection/pus collection/ wound dehiscence/fistula formation). Only 5 patients developed systemic complications in the form of low oxygen saturation, transient dearrangement in renal function). All were managed conservatively and with supportive therapies. Table 4.

Table 4. Complications and length of hospital stay.

Parameters	No. of patients	Percentage
Post operative complications:	20	15.6%
• Local (wound infections/ pus collections/ wound dehiscence/fistula formation).	15	
• Systemic (respiratory/pulmonary/ renal/cardiac).	2	
• Combined (local+systemic)	3	

Further, on comparing Group A (appendix with appendicolith) with Group B (appendix without appendicolith), it was observed that appendix was inflamed in 100% (18/18) of patients in Group A as compared to 83.7% (92/110) in Group B which is statistically not significant (P = 0.1374). The complications were also more common in Group A (i.e. perforation 44.4%, abscess/pus formation 38.9%, gangrenous changes 38.9%) as compared to Group B (i.e. perforation 14.5%, abscess/pus formation 10.9%, gangrenous changes 5.5%) with P value of 0.0072 with respect to perforation which is statistically significant, P= 0.0062 for abscess/pus formation which is statistically significant, P= 0.0001 for gangrenous changes which is statistically significant. Post-operative complications during hospital stay were more in Group A i.e. 33.33% (6/18) than Group B i.e. 12.7 % (14/110) with P value= 0.0598 which is statistically significant. The average length of hospital stay was 6.44±2.11 days in Group A and 4.24±1.49 days in Group B. Table 5. (Figures 9-10).

Table 5. Comparing intra-operative findings and post-operative complications.

Parameters	Appendix with appendicoliths (Group A)		Appendix without appendicoliths (Group B)		P-Value
	No. of patients	%	No. of patients	%	
Inflamed appendix	18	100%	92	83.7%	0.1374
Perforation	8	44.4%	16	14.5%	0.0072*

Abscess/pus formation	7	38.9%	12	10.9%	0.0062*
Gangrenous changes	7	38.9%	6	5.5%	0.0001*
Post-operative complications	6	33.3%	14	12.7%	0.0598*
Length of hospital stay (Average± SD) in days.	6.44± 2.11 days	--	4.24 ±1.49 days	--	<0.001*

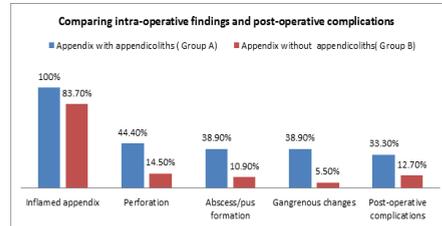


Fig.9 : Findings of Group A and Group B.

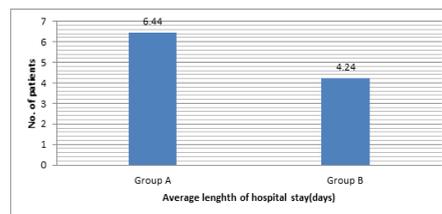


Fig.10: Length of hospital stay in Group A and Group B.

DISCUSSION

Common pathologies associated with appendicitis include appendicoliths, lymphoid hyperplasia, constipation, trauma, low fibre diet, genetic predilection, tumours and hypersensitivity with mucosal ulceration⁷. Wangenstein and Dennis^{4,10} proposed the obstructive phenomena in pathogenesis of acute appendicitis. Appendicoliths are the commonly implicated pathology in appendicitis. Appendicoliths are more common in young and children; prevalence is more in males than females, more common in retrocecal appendix probably due to poor drainage and common in patients who consume low fibre diet^{11,12,13,14}.

Appendicoliths are composed of firm faeces and some mineral deposits¹². The reported prevalence in general population is 3%¹⁵. They are found in ~10% of patients with appendicular inflammation¹². Appendicolith obstruct the appendicular lumen, also destroys the mucosa with its local mass effect and then gangrene is inevitable. Patients with appendicoliths are usually asymptomatic. They may cause intermittent abdominal pain (mimic stone disease of urogenital tract). However, sometimes it may be associated with complicated appendicitis with serious complications (perforation/ abscess or pus formation/ gangrenous changes)^{12,16,17}.

Similar findings were noted in our study. The prevalence of appendicolith was 14.1% in patients operated for acute appendicitis/suspected appendicitis; thus proving that appendicoliths are not the dominant cause of appendicitis. However, appendicoliths are associated with more severe or complicated appendicitis than with uncomplicated appendicitis (i.e. perforation- 44.4%, abscess/ pus formation -38.9%, and gangrenous changes -38.9% versus perforations-14.5%, abscess/pus formation- 10.9%, and gangrenous changes- 5.5% respectively).

Several other studies also support our findings that fecoliths are associated with perforation more often than with non-perforated appendicitis. Studies by Fitz³, Matterstock & Wangenstein⁷, JB Singh et al.¹³ reported the similar findings.

GP Singh *et al.*¹³ in 2011 in their study noted the prevalence of appendicolith in appendicitis and reported that fecoliths were found in 18.1% (178/986) of appendicitis specimen. Fecolith prevalence was 39.4% in perforated appendicitis but only 14.6% in non-perforated appendicitis (p value<0.05) they also mentioned in their article that the

older studies had higher prevalence of fecoliths since they had much higher perforation rates and more severe form of appendicitis where fecoliths play in larger role.

Muhammed Sohaib Khan *et al*¹⁸ in their study to determine the risk of appendicitis in patients with appendicolith found incidentally on CT scans, concluded that patients found to have appendicoliths discovered incidentally did not develop appendicitis at mid-term follow-up of 4.0+- 1.7 years. Hence the risk of developing acute appendicitis for these patients does not seem higher than the general population and conclusion could be inferred that appendicoliths are not the dominant aetiology in appendicitis.

CONCLUSION:

From our study the following points were concluded:

- Dominant gender involved in the pathology is male gender.
- Though acute presentation is the commonest, chronic presentation is also not uncommon which is present in 10.2% of patients
- Most patients can be managed by right lower quadrant approach (86.7%).
- Most common position of appendix is retrocecal (~61%), followed by pelvic (25%).
- Appendix was inflamed in 85.9% of all patients.
- Appendicoliths were present in 14.1 % of the patients operated for acute appendicitis.
- Appendicoliths along with abdominal pain were associated with inflamed appendix in 100% of the patients operated.
- The complications were more frequent and severe in patients with appendicoliths on intraoperative findings than those without any appendicoliths; and as such, patients with appendicoliths had more duration of hospital stay. So patients with abdominal pain and presence of appendicolith on radiological findings should be promptly subjected for surgical intervention to prevent complications and improve outcome.

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