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Research Article

Clinico-pathological study of appendicitis in a tertiary centre in Vindhya region, Madhya Pradesh, India

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ABSTRACT

Background: Appendicitis is one of the commonest conditions responsible for the admission of patients to hospital for surgical treatment. Aim of study was to find the incidence of appendicular lesions according to age and sex and to analyze clinical condition of appendicitis according to Alvarado score and to investigate and correlate the finding with clinical symptoms in relation to TLC, X-Ray abdomen and Ultrasound and to manage the cases accordingly conservatively or subjected to emergency or elective appendectomy. Prospective cohort study.
Methods: The Patients with classical symptoms and sign of acute, recurrent and chronic appendicitis were admitted in surgical ward were subjected to investigations including haemoglobin, TLC & DLC, Blood Sugar, Blood Grouping, X-ray chest, x-ray abdomen and ultrasound of abdomen. Patients were evaluated according to Alvarado score. Study was done in 385 patients over 1 year period.
Results: Three hundred eighty five patients with Appendicitis were evaluated and incidence of appendicular lesions was 4.28%. Maximum incidence of appendicitis was in age group 21-30 years (33.50%), (30.39%) patients were of Alvarado score 6 or more. Majority of cases 315 (81.82%) out of 385 treat conservatively and 70 (18.18%) patients were operated. Patients with Alvarado score >7, 13 (3.37%) had positive operative findings and 11 (2.85%) had positive histopathological examination and patients with TLC > 10000, 11 (2.85%) had positive operative findings and 11 (2.85%) had positive histopathological examination and polymorph >75,28 (7.27%) had positive operative findings and 28(7.27%) had positive histopathological examination.
Conclusions: In this study we found that clinical score is a simple, rapid and non-invasive method to early diagnosis of appendicitis. TLC are inflammatory marker are also useful in early diagnosis of acute appendicitis. Ultrasound abdomen is also useful to confirm the diagnosis. The majority of our patients presented early disease. Conservative approach of treatment gave positive response and then we planned for elective appendectomy after regular interval. Because of these negative appendectomy rate are decreasing and morbidity period are also decreasing pre or post appendectomy. There was much less post-operative complication, which were higher in emergency appendectomy. In our study we concluded that timely intervention reduce the negative appendectomy and reduce the length of morbidity.

Keywords: Alvarado score, Appendectomy, Appendicitis

INTRODUCTION

Appendicitis is one of the commonest conditions responsible for the admission of patients to hospital for surgical treatment. Appendicitis is generally regarded as an inflammatory condition, reflected by the suffix to its name. But it is apparently not influenced by the antibiotics.[1] In acute appendicitis it is not possible to have definitive diagnosis by gold standard (Histopathology) preoperatively; we would like a simple test like Alvarado

scoring system which depends on the presence and absence of certain variables**.** Alvarado scoring system was identified as a useful clinical tool because it is readily available, extremely affordable and relatively accurate. Delay in diagnosis will lead to complication, which increases morbidity whereas overzealous diagnosis may lead to negative Appendectomy rate.[1-3] The people of this area because of poverty, illiteracy and superstitious believe came to hospital after taking home made medicine applying different solution over abdomen, doing abdominal massage and taking analgesic, from quacks so that the clinical picture changes and usually come with some complications of appendicitis like appendicular lump, localized or diffused peritonitis, appendicular perforation.[7]

This study involves to correlate the appendicitis between clinically diagnosed and histopathologically examined specimen and role of ultrasound in early diagnosis of appendicitis and to exclude negative appendectomy, in 385 patients admitted in surgical ward Sanjay Gandhi Memorial Hospital associated Shyam Shah Medical College, Rewa for period of 1 year.

METHODS

The present study 'Clinico-pathological study of appendicitis in a tertiary centre in Vindhya region' was carried in 385 patients of appendicitis admitted in surgical wards of Sanjay Gandhi Memorial Hospital, Associated with S.S. Medical College, and Rewa (M.P) during the period of 1 year. Patients with classical symptoms and sign of acute, recurrent and chronic appendicitis were admitted in surgical ward through SOPD or casualty or transferred from other wards. On admission the particulars of the patients regarding age, sex, occupation and residence were recorded, presenting complaint, past illness and associated illness were recorded. Patients were evaluated according to Alvarado score as follows.

Alvarado Score: Symptoms		Scoring System
Migratory RIF pain	1	1- 4 - Appendicitis unlikely
Anorexia	1	
Nausea/ vomiting	1	5- 6 - Appendicitis possible
Signs		
RIF tenderness	2	7- 8 - Appendicitis probable
Rebound tenderness	1	
Increase in temperature	1	9-10 - Appendicitis definitive
Lab findings		
Leucocytosis	2	
Shift to the left	1	
Total	**10**	

Figure 1: Alvarado score.

Treatment were initiated by parenteral fluids, electrolyte supplementation, administration of broad spectrum antibiotics intravenously (usually combination of Ciprofloxacin 500 mg 12 hourly+Amikacin 500 mg 12 hourly+Metronidazole 500 mg 8th hourly), and patient were investigated for haemoglobin, TLC and DLC, blood sugar, blood grouping, X-ray chest, x-ray abdomen and ultrasound of abdomen.

USG criteria of acute appendicitis

Acute appendicitis was confirmed by presence of non-compressible aperistaltic blind end tubular structure i.e. appendix - Diameter >6 mm, wall thickness >3 mm, Complex mass (echo poor, asymmetric) Irregular asymmetrical, loss of contour, free fluid, local dynamic ileus, probe tenderness over right iliac fossa. Patients which score 7 or >7 were subjected to surgery. Patients with acute appendicitis were operated in emergency or elective appendectomy was offered to those patients who responded to conservative treatment. Surgery was done under spinal anesthesia. Post operatively patients were kept nil orally, till bowel sounds returned, parenteral fluid, electrolytes, antibiotics and analgesics were continued. Cases were watched for any post-operative complications were treated wherever needed. Post operatively sutures were removed on 7-9 days and the patients were discharged and followed up in SOPD.

RESULTS

Table 1: Month wise distribution of appendicular lesions.

Months	Table no. of admissions	Cases of acute abdomen	Cases of appendicular lesions	Percentage of appendicular lesion in relation to	
				Total admission	Acute abdomen
August -12	754	273	29	3.84	10.62
September-12	816	219	42	5.14	19.17
October-12	688	221	31	4.50	14.02
November-12	987	317	23	2.33	7.25
December-12	684	185	24	3.50	12.97
January-13	660	182	30	4.54	16.48
February-13	659	162	31	4.70	19.13
March-13	713	175	42	5.89	24.0
April-13	674	199	36	5.34	18.0
May-13	733	190	26	3.81	14.73
June-13	686	140	31	4.87	14.02
July-13	814	240	40	4.91	22.8
Total	8562	2503	385	4.28	15.38

Table 2: Distribution of cases according to age and sex.

Age group (yrs)	Male		Female		Total	
	No	%	No	%	No	%
0-10	04	1.78	05	3.13	09	2.33
11-20	58	25.78	49	30.63	107	27.79
21-30	75	33.33	54	33.75	129	33.50
31-40	48	21.33	18	11.25	66	17.14
41-50	17	7.56	16	10.00	33	8.57
>50	23	10.22	18	11.25	41	10.64
Total	225	58.44	160	41.56	385	100.0

Table 3: Incidence of various symptoms.

Symptoms	No of cases	%
Pain in abdomen (paraumblical region)	370	96.10
Migration of pain in Right Lower abdomen	249	64.68
Fever	197	51.17
Vomiting/Nausea	186	48.31
Anorexia	171	44.42
Constipation	40	10.39
Diarrhoea	31	8.05
Frequency in Micturition	19	4.94
Burning Micturition	02	0.52

Table 4: Incidence of various signs.

Signs	No of cases	Percentage
Tenderness in RIF	349	90.65
Rebound tenderness	120	31.17
Muscle guarding	107	27.79
Rigidity	50	12.99
Lump in RIF	76	19.74
Abdominal distension	37	9.61
Bowel sounds		
Normal	318	82.60
Absent	07	1.82
Sluggish	38	9.87
Increased	22	5.71
Per rectal digital examination		
Normal	320	83.12
Tenderness in rectum	51	13.25
Bulging mass	14	3.64

Table 5: Hematological investigations.

TLC	Polymorph		Total
	>75	<75	
>10,000	100(51.81%)	93(48.19%)	193(50.13%)
<10,000	90(46.88%)	102(53.13%)	192(49.87%)
Total	190(49.35%)	195(50.65%)	385(100.00%)

Table 6: Distribution of cases according to Alvarado scores.

Alvarado Score	Male		Female		Total	
	No.	%	No.	%	No.	%
1	-	-	-	-	-	-
2	01	100.0	0		01	
3	-	-	-	-	-	-
4	40	58.82	28	41.18	68	17.66
5	58	56.86	44	43.14	102	26.49
6	62	52.99	55	47.01	117	30.39
7	25	69.44	11	30.56	36	9.35
8	15	57.69	11	42.31	26	6.75
9	18	66.67	09	33.33	27	7.01
10	06	75.00	02	25.00	08	2.08
Total	225	58.44	160	41.56	385	100.00

Table 7: Distribution of cases with different leucocyte count according to Alvarado scores.

Scores Groups		TLC				Total	
		(>10000)		(<10000)			
		No.	%	No.	%	No.	%
Alvarado score.	<7	185	57.10	139	42.90	324	84.16
	>7	07	11.48	54	88.52	61	15.84
Total.		192	49.87	193	50.13	385	100.0

Table 8: Distribution of cases with different neutrophills count according to Alvarado score.

Scores groups		Neutrophills				Total	
		>75%		<75%			
		No.	%	No.	%	No.	%
Alvarado score.	<7	170	52.47	154	47.53	324	84.16
	>7	25	40.98	36	59.02	61	15.84
Total		195	50.65	190	49.35	385	100.0

Table 9: Incidence of different types of appendicular lesions.

Type of appendicular lesion	No. of cases	Percentage
Acute appendicitis	250	64.93
Appendicular lump	66	17.14
Recurrent appendicitis	56	14.54
Appendicular perforation peritonitis	06	1.55
Appendicular abscess	07	1.81
Total	385	100.00

Table 10: Distribution of cases according to management.

Management	No. of cases	%
Conservative	315	81.82
Operative	70	18.18
Total	385	100.0

Table 11: Distribution of management ACC to various appendicular lesion.

Type of appendicular lesion	No. of cases	Management			
		Conservative	%	Operative	%
Acute appendicitis	250	234	93.6	16	6.4
Recurrent appendicitis	50	07	14.00	43	86.00
Appendicular lump	66	65	98.48	01	1.52
Appendicular perforation peritonitis	06	00	0.00	06	100.00
Appendicular abscess	13	09	69.23	04	30.77
Total.	385	315	81.82	70	18.18

Table 12: Distribution of cases according to operative procedure (n=70).

Complications	No. of cases	Percentage (%)
Elective appendectomy	43	61.42
Emergency appendectomy	16	22.85
Exploratory laparotomy	06	8.57
I and D	04	5.71
Laparoscopic appendectomy	01	1.4
Total	70	100.0

Table 13: Distribution of cases according to position of appendix (n=70).

Findings	No. of Cases	Percentage (%)
Retrocaecal	38	54.28
Pelvis	15	21.42
Preileal	05	7.14
Postileal	01	1.42
Paracaecal	04	5.71
Subcaecal	07	10.00
	70	100.0

Table 14: Distribution of operated cases according to various parameters, operative findings and histopathological report.

Parameters	Operative findings				Histopathlogical reports			
	Positive.		Negative		Positive.		Negative	
	No.	%	No.	%	No.	%	No.	%
Alvarado score								
>7	13	3.37	311	80.77	11	2.85	313	80.77
<7	58	15.06	03	0.77	58	15.06	03	0.77
Total leucocyte count								
>10,000	11	2.85	184	47.79	11	2.85	169	43.89
<10,000	59	15.32	134	34.80	58	15.32	105	27.27
Polymorph								
>75	28	7.27	158	41.03	28	7.27	158	41.03
<75	42	10.90	157	40.77	41	10.90	159	41.29

DISCUSSION

The present study 'Clinico-pathological study of appendicitis in a tertiary centre in Vindhya region' was been carried in 385 patients of appendicitis admitted in surgical wards of Sanjay Gandhi Memorial Hospital, Associated with S.S. Medical College, Rewa (M.P) during the period.

In this study, it was concluded to evaluate Alvarado scoring system to diagnosis of Appendicitis and its correlation by TLC, ultrasound and histopathology in our set up.[2]

Clinical scoring system are good supporting tool for diagnosis for appendicitis because it is simple, easy to use and non-invasive to use clinical routine practice .there was no special equipment required.[2]

In the present study patients who admitted for elective appendectomy as a routine admission alvarado score of these patients calculated according to symptoms and sign present during their acute attack of appendicitis.[7]

In the present study we observed the operative findings of patients and classify them into positive and negative. Positive findings mean presence of trans mural inflammation or pus in the lumen of appendix. A negative finding means one which performed a clinical diagnosis of acute appendicitis but when the appendix is found to be normal on histopathological examination. This include histologically normal appendix with or without the presence of fecolith or parasite in the lumen.[5]

We observed incidence of appendicular lesions was 385 (4.28%) out of all surgical admissions (8562). Ashley also found incidence of appendicitis is (12%) in sub population.[1]

We observed maximum incidence of appendicitis in the age group 20-40 years (50.64%). Ashley also found incidence of appendicitis more in the young adults with peak age of appendicitis is 18 year of age.[1] I Chamisa[5] also found majority of patient's incidence of appendicitis in the second decades.[1, 5]

In our study male female ratio is slightly equal i.e. 1.4:1 but Ashley showed slightly higher incidence in female.[1]

In our study we observed common clinical symptoms encountered were pain in abdomen (100.0%), Vomiting/Nausea (48.31%) and Anorexia (44.2%). This result comparable with the retrospective analysis by I chamisa where the most common clinical symptom was pain abdomen followed by vomiting and fever.[5]

In our study we observed most common clinical sign were tenderness in right iliac fossa (90.65%) and rebound tenderness (31.17%).This result comparable with the Dipak P when the most common sign is tenderness in right iliac fossa followed by rebound tenderness .the other retrospective analysis by I Chmisa found the most common sign is abdominal tenderness.[5,7]

In our study Alvarado score were found to be the most important diagnostic parameter of appendicitis.[2]

We observed that TLC >10000 in (50.13%) patients and Neutrophils >75 in (48.13%) patients.

We observed that TLC > 10000 with Alvarado score >7 was found in 11.48% while TLC >10000 with Alvarado score <7 was found in 57.10%. Normal WBC Count in appendicitis in present study was 50.13% i.e. TLC alone is not a positive indicator to rule out appendicitis. Ire Teicher et al (1983) reported that in non-differentiating factors of Appendicitis one of the white blood cell count between 10,000 to 13000 were found equally in both group. I.e appendicitis and non-appendicitis.[3]

It is obvious that when the clinical sign of appendicitis shows the Alvarado score more than 6, the findings are confirmed by leucocytosis. Leucocytosis is present in the inflammatory changes, even though clinically Alvarado score may show a lower count. Thus in present study, Alvarado score alone only appears to be a good indicator in predicting appendicitis but along with TLC, polymorph count and it become more reliable[7].

Clinical sign symptoms and TLC were the important hallmark of our study .Pain and tenderness in right iliac fossa and raised TLC, Alvarado score higher than 6 formed the quick diagnostic tools of acute appendicitis .Fever, vomiting, loose motion, shifting of pain, rigidity, raised TLC are present only in few cases of acute appendicitis hence their absence cannot rule out of the inflammatory pathology.[7]

In our study we observed that positive ultrasound findings of 54 (93.10%) out of 58 had undergone surgery, while only 4 (6.90%) patient had conservative treatment. Our study shows that ultrasound in appendicular lesion have high true positive result.

In our study it is found that Alvarado scoring systems is superior in diagnosis of acute appendicitis .[2, 6]

In our study majority of appendicitis patients treated conservatively (81.82%) and 70 (18.18%) patients underwent operative intervention.

We observed that most common operative incision Mc, Burney's incision (50.72%) followed by lanz incision (27.54%) and Rutherford Morrison incision (11.59%). i.e reflect that patients had early presentation and treated conservative after that planned for elective surgery. I chamisa reported that the most common incision in retrospective study i.e lower midline laprotomy (47.2%) reflect that the high rate of delayed presentation with complicated appendicitis.[5]

In our study majority of cases (68.25%) have mucus and pus found in histopathological finding i.e reflected that high rate of positive appendectomy in our setup.

In our study we found that there were 11 post-operative complication recorded 4 patients have chest infection and wound dehiscence. 2 patients have wound sepsis and 1 of them have Enter cutaneous fistula because most of Appendectomy were planned and patients came at hospital without delay. I Chamisa found wound sepsis is most common complication, in our study chest infection is common.

In this study we found that clinical score is a simple, rapid and non-invasive method to early diagnosis of appendicitis. TLC and ultrasound of abdomen are also useful in appendicitis.

Our study was primarily designed to differentiate between appendicitis and other acute abdominal conditions which could be treated conservatively.[3]

In this study the policy of controlled observation rather than immediate laparotomy for a diagnosis of questionable appendicitis has resulted in decreasing the rate of negative appendectomy. Or decreasing the morbidity as well as mortality.[3]

CONCLUSION

The present study 'Clinico-pathological study of appendicitis in a tertiary centre in Vindhya region' was carried in 385 patients of appendicitis admitted in surgical wards of Sanjay Gandhi Memorial Hospital, Associated with S.S. Medical College, Rewa (M.P) during the period of 1 year. After analyzing the data following conclusion are drawn-

Incidence of appendicular lesions was 385 (4.28%) out of all surgical admissions (8562) and incidence was 15.38% out of total cases of acute abdomen. Majority of patients were admitted in month of march-13 (42).

Maximum incidence of appendicitis age group 21-30 years (33.50%). The maximum incidence of appendicitis was in female age group 21-30 (33.75%). The total incidence of appendicitis Male: female ratio=1.4:1. There were 9 cases in under 10 year age and 41 cases in>50 age group.

Most common symptom was pain in abdomen 385 (100.0%) and other symptoms migration of pain in lower abdomen in 249 (64.68%), fever 197(51.17%), nausea/vomiting 186 (48.31%), and anorexia 171 (44.44%).

Most common sign was tenderness in right iliac fossa (90.65%) and next common signs were muscle guarding (27.79%) and rebound tenderness (31.17%).

Patient with TLC >10,000, also having raised polymorph (>75) in 100 (51.81%) cases, while patients with the TLC < 10000, having polymorph > 75 only in 90 (46.88%) cases.

Majority of the patients 117 (30.39%) were of Alvarado score 6 and more followed by score between 4 and 6 i.e. 287 (74.0%).

In present study with Alvarado score <7, 185(57.10%) patients out of 324 had total leucocytes count >10000 while 139 (42.90%) patients had total leucocytes count <10000. With Alvarado score > 7, 07 (11.48%) patients out of 61 had total leucocyte count > 10000 while 54 (88.52%) patients had total leucocyte count < 10000.In this study we observed that 192 (49.87%) patients had total leucocyte count >10000.

With Alvarado score < 7, 170 (52.47%) patients out of 324 had neutrophils > 75%, while 154 (47.53%) patients had neutrophils < 75%.With Alvarado score > 7, 25 (40.98%) patients out of 61 had neutrophils > 75%,while 36 (59.02%) patients had neutrophils < 75%.In this study we observed that 195 (50.65%) patients had total neutrophils > 75%.

Majority of patients were of acute appendicitis (64.93%) followed by recurrent appendicitis (14.54%), appendicular lump (17.14%) and lowest incidence found in appendicular abscess (1.81%), appendicular perforation peritonitis (1.55%).

Majority of the patients with having Alvarado score < 7 acute appendicitis 238 (95.12%) out of 250 cases. And > 7 having only 12(4.86%) patients out of 250 cases.[17] Majority of patients with having TLC > 10,000 acute appendicitis 138 (55.2%) out of 250 cases. and TLC < 10,000 of 112 (44.8%) out of 250 cases.

With Normal X-Ray, 165 (85.49%) patients out of 193 had conservative management, while 28(14.51%) patients had operative management. With generalized haziness, 150 (81.52%) patients out of 184 had conservative management, while 34 (18.48%) patients had operative management. With free gas under diaphragm total 8 patients had operative management.

Majority of patient's positive ultrasonography finding, 54 (93.10%) patients out of 58 had undergone surgery, while only 4(6.90%) patients had conservatively treatment. In this study shows that ultrasonography in appendicular lesion have high sensitivity.

Majority of cases 315 (81.82%) out of 385 treat conservatively and 70 (1818%) patients were treat operatively.

With acute appendicitis, 234 (93.6%) patients out of 250 had conservative management while 16 (6.4%) patients had operative management. With recurrent appendicitis,

43 (86%) patients out of 50 had operative management, while 7 (14.0%) patients had conservative management, with appendicular lump 65 (98.48%) patients out of 66 had conservative management while only 1 patient was operated, with appendicular perforation all 6 patients were subjected to operative management. With appendicular abscess, 9 (69.23%) patients out of 13 had conservative management; while 4 (30.77%) patients had operative management

In present study according to type of operation, out of 70 patients, 43 (61.42%) of the patients were subjected to Elective appendectomy, followed by, 16 (22.85%) Emergency appendectomy, 6(8.57%) Exploratory laparotomy, 1 (1.43%) laparoscopic appendectomy, 1 (1.43%) I and D.

In present study according to type of operative incision, 35 of the patients were operated by Mcburney's incision, followed by 19 of Lanz incision, 8 of Rutherford Morrison incision, 6 of Midline incision,1 of Paramedian incision and 1 of laproscopic port site incision.

In present study according to position of appendix, 38 (54.28%) of the patients were retrocaecal, followed by 15(21.42%) of Pelvis , 7(10.0%) of Subcaecal, 5(7.14%)of Preileal, 4(5.871%) of Paracaecal.

In present study according to intraluminal finding, maximum 32 appendix filled with Mucus followed by, 16 of Pus, 9 of Faecolith, 13 of others.

In present study 11 out of 70 cases that had operated, 4 have chest infection and wound dehiscence, 2 have wound sepsis and 1 have Enterocutaneous fistula. No death recorded.

In present study patients with Alvarado score >7, 13 (3.37%) had positive operative findings and 11 (2.85%) had positive histopathological examination and patients with TLC>10000, 11 (2.85%) had positive operative findings and 11 (2.85%) had positive histopathological examination and polymorph > 75, 28 (7.27%) had positive operative findings and 28(7.27%) had positive histopathological examination.

In this study we found that clinical score is a simple, rapid and non-invasive method to early diagnosis of appendicitis TLC as inflammatory marker is also useful in early diagnosis of acute appendicitis, and ultrasound abdomen are also useful to confirm the diagnosis.

The majority of our patients present early disease .Then we are conservative approach of treatment give positive response then we are planned to elective appendectomy after regular interval. Because of these negative appendectomy rate are decreasing and morbidity period are also decreasing pre or post appendectomy. In our study we concluded that timely intervention reduce the negative appendectomy and reduce the length of morbidity.

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