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Presentation and Management Outcome of Acute Appendicitis Among the Elderly Patients: A Hospital based Study

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ABSTRACT

Introduction: *Acute appendicitis is the most common surgical acute abdominal condition. Now a days, the atypical presentation and poor outcome of acute appendicitis in elderly patients is a challenge for surgeons. The aim of the study is to evaluate the presentation and management outcome of acute appendicitis among the elderly patients to reduce the morbidity and mortality.* ***Methods:*** *This cross-sectional descriptive study was carried out in different general surgical wards at Rangpur Medical College Hospital from April, 2011 to January, 2012. As per selection criteria, amongst 720 cases, total 50 diagnosed elderly appendicitis patients were enrolled for this study. They were divided into two groups on the basis of post-operative findings into complicated (23, 46%) and uncomplicated (27, 54%). A preformed questionnaire was used for data collection. Further information was obtained by clinical examination and from the patient`s admission register.* ***Results:*** *Out of 50 patients (above 50 years), male: female was 1.2:1 and majority of them had uncomplicated appendicitis 21 (77.77%). Regarding symptoms, pain was present in all (n-50) patients but typical migratory pain complained by 28 (56%) patients. In complicated group, majority of the patients presented with various symptoms like fever (18, 78.26%), anorexia (14, 60.86%), nausea (10, 43.47%) and vomiting (10, 43.47%). Whereas, in uncomplicated group, major symptoms like fever (17, 62.96%), anorexia (16, 60.86%), vomiting (15 ,55.55%) and nausea (12, 44.44%). Abdominal tenderness was present in almost all patients. In complicated group, atypical tenderness was felt in majority of patients (18, 78.26%) but in uncomplicated group, the majority of patients (21, 77.78%) presented typical tenderness. Rebound tenderness was the major sign in both uncomplicated group (19, 70.37%) and in complicated group (13, 56.52%). Leucocytosis was found in 19 (82.60%) patients of complicated group and in 17 (62.96%) patients of uncomplicated group. In uncomplicated group, the mortality was nil but one death occurred in complicated group.* ***Conclusion:*** *Acute appendicitis in the elderly patient continues to be a challenge for practising surgeon. A careful history taking, examination of elderly patient and avoidance of delayed diagnosis are important for prevention of morbidity and mortality. Late presentation, delayed diagnosis, presence of perforation and co-morbidities were associated with the poor outcome of surgery.*

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INTRODUCTION

Acute appendicitis is a common emergency condition in daily surgical practice. In elderly patients it is more serious which needs early diagnosis and treatment. The lifetime risk for an individual of developing appendicitis is 8.6% and 6.7% in male and female respectively.[1] In the developing countries, the incidence of acute appendicitis is rising but it is declining in the western countries. For which the rate of appendicectomy has remained constant to 10 per 1000 population per year.[2] Acute appendicitis is rare in infants and becomes common in childhood and early adult life, reaching a peak incidence in the early twenties. The incidence of appendicitis is equal among male and female before puberty. In teenagers and young adults, the male-female ratio increases to 3:2 at age 25; thereafter, the greater incidence in male declines.[3] The number of elderly population is rising all over the world as the life expectancy is increasing. Total number of elderly (≥55 years) in Bangladesh was 5.41 million in 1974 and 9.95 million in 2001.[4,5] Although modern diagnostic tools like CT scan, ultrasonography and laparoscopy has been shown to reduce the rate of negative appendicectomies.[6-8]

The timely surgical intervention can reduce both mortality and morbidity. Studies[9,10] have shown that the incidence of perforated appendix and the complication following perforation in the elderly patients may be decreased if surgery is expedited when there is leukocytosis. In young adult, acute appendicitis usually diagnosed clinically but in elderly patients, it is difficult due to high rate of atypical presentation. The risk of perforation in the elderly population is high (up to 70%).[11] In 1944, the mortality of acute appendicitis was 2.4%, today this figure is less than 1% in the general population.[12] Despite such progress, morbidity and mortality in elderly remains significant at 28-60% and 10% respectively.[13,14] This study was aimed to evaluate the presentation and management outcome of acute appendicitis among the elderly patients in the northern region of Bangladesh.

METHODS

This cross-sectional descriptive study was carried out in different surgical wards of Rangpur Medical College Hospital, Rangpur, Bangladesh during April, 2011 to January, 2012. Among total 720 cases, 50 were elderly appendicitis patients enrolled for this study according to selection criteria. Inclusion criteria were: clinically diagnosed acute appendicitis, Age ≥50 years and per operatively diagnosed as acute appendicitis. Exclusion criteria were negative appendicitis on histopathology and patients diagnosed with appendicular lump. Preoperative diagnosis was made from history, physical examination, relevant investigations that included CBC, Urine R/M/E, Plain X-ray KUB and USG. After appendicectomy, resected appendix was sent for histopathological examination to the department of pathology. In this study, complicated appendicitis was defined as perforated appendicitis with or without abscess formation. Informed written consent was obtained from the patients. Hospital authorities were informed about the study and permission was obtained. Detailed information was obtained in each cases according to protocol. Collected data was classified, edited, coded and entered into the computer for statistical analysis by using MS EXCEL. Chi square test was used for statistical analysis and *p*-value <0.05 was considered as statistically significant.

RESULTS

During the study period, total 720 appendicectomies were performed in three general surgical wards of Rangpur Medical College Hospital. Out of them 50 patients were found to be ≥50 years of age with an occurrence rate of 6.9%. Out of 50, 28 (56%) patients were male, with a male: female ratio 1.2:1 (Figure 1). Among these elderly patients, most of them (33, 66%) were between 50-59 years age group. On the basis of the operative findings, the study subjects were divided into complicated (23, 46%) and uncomplicated group (27, 54%). Complicated appendicitis was found frequently with increasing age (Table I, Figure 2).

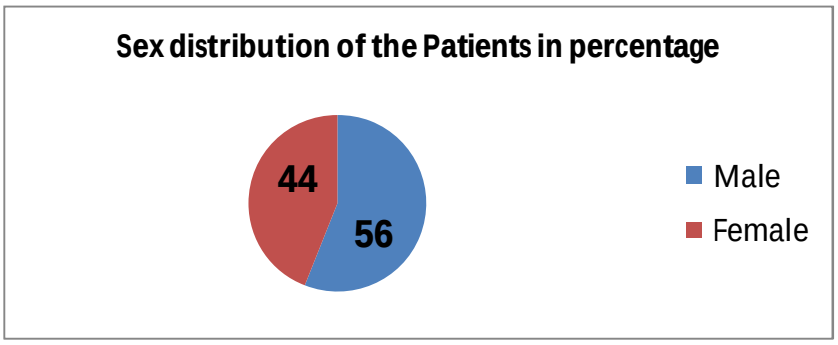

Figure 1: Sex distribution of patients

Table I: Distribution of appendicitis patients by different age groups (n-50)

Age groups (in years)	Complicated Appendicitis	Uncomplicated appendicitis	% of Complicated Appendicitis
50-59 Year (n-33)	12	21	36.66%
60-69 Year (n-11)	6	5	54.54%
70-79 Year (n-5)	4	1	80%
>80 Year (n-1)	1	0	100%
Total	**23 (46%)**	**27 (54%)**	

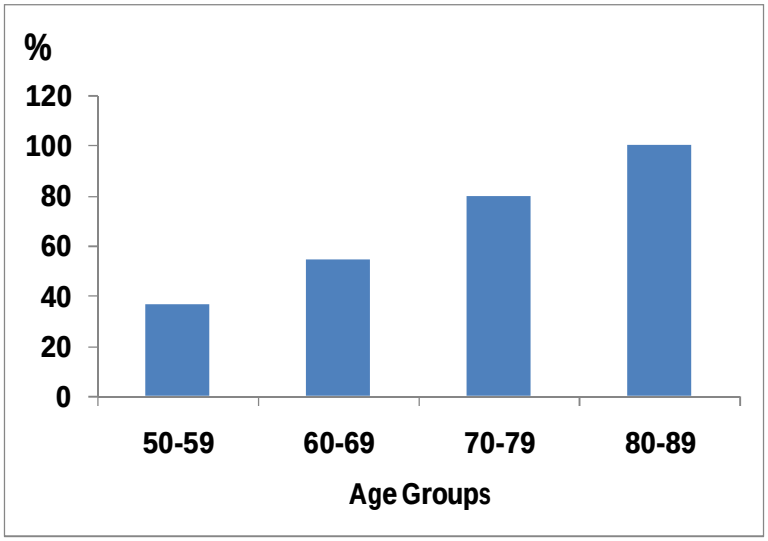

Figure 2: Distribution of complicated appendicitis in various age groups

Table II: Distribution of co-morbidities among complicated and uncomplicated groups

Co-morbidities	Complicated (n-23)	Uncomplicated (n-27)
Hypertension (n-11)	9 (39.1%)	2 (7.4%)
Cardiac disease (n-08)	6 (26.08)	2 (7.4)
Diabetes mellitus (n- 06)	5 (21.73%)	1 (3.7%)
COPD (n-03)	2 (8.69%)	1 (3.7%)
Malignancy (n-01)	1 (4.35%)	0

Pain was the dominant presenting symptom and was present in all cases (n-50), only 28 (56%) patients felt the typical migratory pain (peri-umbilical pain shifted to the right iliac fossa) of which 21 (77.77%) patients were belongs to uncomplicated group. Rest 22 (44%) patients, experienced atypical pain (diffuse abdominal pain). Among them 16 (69.56%) patients were in complicated group (Table III).

Table III: Distribution of presentation of pain

Type of Appendicitis	Nature of pain	
	Typical (n-28)	Atypical (n-22)
Complicated (n-23)	7 (30.43%)	16 (69.56%)
Uncomplicated (n-27)	21 (77.77%	6 (22.22%)

In both complicated and uncomplicated group, most common presenting symptoms were fever (35, 70%) and anorexia (30, 60%). (Table IV).

Table IV: Presenting symptoms patients (n-50)

Symptoms	Complicated Group (n-23)		Uncomplicated Group (n-27)	
	Present	Absent	Present	Absent
Fever (n-35)	18 (78.26%)	5 (21.73%)	17(62.96%)	10(37.03%)
Anorexia (n-30)	14 (60.86%)	9 (39.13%)	16(59.25%)	11(40.74%)
Nausea (n-22)	10 (43.47%)	13(56.52%)	12(44.44%)	15(55.55%)
Vomiting (n-25)	10 (43.47%)	13(56.52%)	15(55.55%)	12(44.44%)

Out of 27 patients in the uncomplicated group, 25 (92.59%) patients had typical tenderness and out of 23 complicated group, 18 (78.26) patients had atypical tenderness (Table V).

Table V: Frequency of abdominal tenderness among complicated and uncomplicated groups (n-50)

Appendicitis (n-50)	Tenderness	
	Typical (n-30)	Atypical (n-20)
Complicated (n-23)	5 (21.74%)	18 (78.26%)
Uncomplicated (n-27)	25 (92.59%)	2 (7.40%)

Rebound tenderness was present in 19 (70.37%) uncomplicated patients and 13 (56.52%) in complicated group (Table VI).

Table VI: Comparison of rebound tenderness among complicated and uncomplicated groups

Appendicitis (n-50)	Rebound Tenderness	
	Present (n-32)	Absent (n-18)
Complicated (n-23)	13 (56.52%)	10 (43.47%)
Uncomplicated (n-27)	19 (70.37%)	8 (29.62%)

Among 50 patients, Leukocytosis was present in 19 (82.60%) patients among complicated group and in 17 (62.96%) patients of uncomplicated group (Table VII).

Table VII: Comparison of leukocytosis among complicated and uncomplicated groups

Appendicitis	Leukocytosis	
	Present (n-36)	Absent (n-14)
Complicated (n-23)	19 (82.60%)	4 (17.39%)
Uncomplicated (n-27)	17 (62.96%)	10 (37.03%)

Out of 50 patients, 30 (60%) patients were clinically diagnosed as acute appendicitis and 20 (40%) patients diagnosed as acute abdomen.

In this study, Gridiron was the most common (23, 85.18%) incision among uncomplicated appendicitis. Whereas, right lower paramedian/ midline incision was common (16, 69.5%) in complicated appendicitis. On average, Post-operative hospital stay for complicated group and uncomplicated group were 14.67 days and 6.10 days respectively.

In case of uncomplicated group, a post-operative complication was found only in 4 (14.81%) patients but in case of complicated group it was present in 16 (69.56%) patients (Table VIII). The *p*-value is 0.000082, which is statistically significant at $p<0.05$.

Table VIII: Post-operative complications among the study subjects

Appendicitis (n-50)	Post-operative complications		*p*-value
	Present (n-20)	Absent (n-30)	
Complicated (n-23)	16 (69.56%)	7 (30.43%)	*p*-0.000082
Uncomplicated (n-27)	4 (14.81%)	23 (85.18%)	

The only one death occurred in the complicated group of patients with an occurrence rate of 4.34%

DISCUSSION

Although acute appendicitis is rare in elderly, with an incidence rate of 5-10%, it is becoming more common as the rising number of elderly people due to rising life expectancy.[8]

In this study, the occurrence rate of appendicitis in elderly was 6.9%. In 2003, Gurleyik et al.[15] had found an incidence rate of 4.3% in their study. Addiss et al.[3] had shown a male: female ratio of acute appendicitis was 1.4:1. In this study, male: female ratio was 1.2:1. Luckmann[16] showed incidence of complicated appendicitis was more in elderly patients, which is consistent with our findings. For the elderly, diagnosis of acute appendicitis is much more difficult due to atypical presentation, associated co-morbidities, as well as delayed diagnosis.

The most common presentation of acute appendicitis in both older and younger patients were abdominal pain, fever, anorexia, nausea, vomiting and leukocytosis. Unlike the presentation in younger patients, it is rare for all features to be present in older patients. Lee et al.[9] found in their study population of 130, only 43 (33.1%) were febrile, 34 (26.1%) had a history of vomiting and 6 (12.3%) had diarrhea**.** All patients presented with abdominal pain but the classical site of pain in the right lower quadrant was present only in 90 (69%) patients. Sheu et al.[10] observed more classic signs and symptoms in non-perforated appendicitis among elderly patients. But in perforated appendicitis there was higher percentage of fever and anorexia.

In this study, abdominal pain was the most common symptom and presented in all 50 cases. Typical pain of acute appendicitis was in 28 (56%) patients, rest 22 (44%) complained of pain in other parts of the abdomen along with the right lower abdomen and was grouped together as atypical pain. Typical pain was felt by most of the uncomplicated patients. Among the other

symptoms, fever was present in 35 (70%) patients, anorexia in 30 (60%) patients, nausea in 22 (44%) patients and vomiting in 25 (50%) patients.

The diagnosis of appendicitis rests more on thorough clinical examination of the abdomen than on any aspect of the history or laboratory investigation. Among the signs, abdominal tenderness was found in all patients but the right lower quadrant tenderness is typical 30 (60%) for acute appendicitis, out of which 21 (77.78%) were uncomplicated. Most of the complicated appendicitis presented with atypical tenderness 18 (78.26%). Rebound tenderness, another important sign, was present in 32 (64%) patients. 36 (72%) had leukocytosis. Out of 23 complicated patients 19 (82.60%) had leukocytosis. On the other hand, 17 (62.96%) out of 27 uncomplicated patients had leukocytosis.

Diagnosis may be delayed by atypical presenting signs and symptoms, so acute appendicitis does not immediately come to mind when evaluating abdominal pain in elderly.[8] Longer duration of pain was one of the risk factors for perforated appendicitis.

Hui et al.[6] mentioned that associated illness occurred in 71 (75%) patients. In this study, the co-morbidities found among the study subjects were hypertension, cardiac disease, diabetes mellitus, chronic lung disease and malignancy. But those co-morbid diseases obscured the diagnostic features in elderly patients. An accurate clinical diagnosis of acute appendicitis were made among 54% and 69.8% of patients respectively by several researchers.[17,18]

In this study, out of 50 patients, 30 (60%) had the preoperative clinical diagnosis. Rest was diagnosed as acute abdomen. Though there is advancement in the field of imaging study but unfortunately, scholars failed to give accurate and effective opinion regarding the diagnosis of acute appendicitis.[6,9,19-21]

In addition to delay in presentation and difficulties with diagnosis, there is a natural tendency for the appendix to be more prone to rupture with age. Lee et al.[9] have shown, the blood supply to the appendix is affected by atherosclerosis that predisposes the appendix to perforate.

Luckmann[16] has shown the perforation rate in younger ranges from 17-20%. But in elderly it increases with age. In this study, Out of 50 elderly study subjects, 23 (46%) had complications. Among them 17 (73.9%) had perforated appendicitis, 2 (8.6%) had abscess and 4 (17.39%) had gangrenous appendicitis.

Lee et al.[9] and Gurleyik et al.[15] discussed older patients are more likely to receive midline or paramedian incisions which need more hospital stays. In this study, 20 (40%) received either a right lower paramedian or a midline incision. Midline or paramedian incisions are preferable as the cases are more complicated and there are chances of diagnostic dilemma.

Most of the studies[10,15] showed that there is a high post-operative complications and morbidity among the elderly which resulted in longer duration of hospital stay as well as increased treatment cost. In this study, post-operative complications were present in 20 (40%) of patients. Among them, ten had minor wound infection, five had major wound infections with wound dehiscence, three had intra-abdominal abscess, one had faecal fistula and one had septicemia. Contrary to this, 23 (85.19%) patients in the uncomplicated group did not have post-operative complications. Another interesting observation of this study was, majority of the post-operative complications was related to patients who received right lower para-median incision. For 23 complicated patients post-operative hospital stay was 14.67 days which was prolong than uncomplicated group.

The mortality rate among the elderly with acute appendicitis is much higher than the younger age group as supported by most of the studies.[15] In this study, the overall mortality rate was 2%, 4.34% mortality among the complicated group and 0% in uncomplicated group. Besides atypical presentations, lax abdomen and obesity coupled with comorbidities produces higher mortality for acute appendicitis in elderly.

CONCLUSION

This study observed that the incidence of acute appendicitis falls with increasing age in elderly patients but complications rise. Typical presentations were more common with uncomplicated appendicitis whereas most of the complicated patients presented atypically. This study concluded with the message that a high index of suspicion and emergency surgery are the

keys to minimizing morbidity and mortality. Early diagnosis of these disease and proper treatment at early stages can save life of many patients.

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Conflict of Interest: There is no conflict of interest.

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