

## Morbidity and Mortality Pattern of Appendicitis in Rural Teaching Hospital of Nepal

\*Suryaman Menyangbo<sup>1</sup>, Gakul Bhatta<sup>2</sup>, Kripa Subedi<sup>3</sup>, Bibek Pun Magar<sup>4</sup>, Harihar Devkota<sup>1</sup>, Prem Prasad Panta<sup>5</sup>

<sup>1</sup>Assistant Professor, Department of General Surgery, <sup>2</sup>Lecturer, International Training Fellow, RCSEd (Royal College of Surgeon Edinburgh), <sup>3</sup>Teaching Assistant, <sup>4</sup>Lecturer Dept. of Biochemistry, <sup>5</sup>Associate Professor, Karnali Academy of Health Sciences, Jumla Nepal

\*Corresponding Author: Dr. Suryaman Menyangbo; Email: suryaman77@gmail.com

### ABSTRACT



**Background:** Acute appendicitis is the most common cause of surgical acute abdomen. It contributes for 40% of all emergency performed abdominal surgeries in western world and 26% it accounts for in Nepal. The treatment of acute appendicitis remains a health problem and considerable morbidity and mortality are still associated with it. Perforation, abscess formation, appendicular lump and surgical site of infection are well reported morbidities. Late arrival in hospital and use of inadequate dose of antibiotics in local might have association in increasing morbidities. The aim of the study is to observe the morbidity and mortality in appendicitis patients belonging to this Midwestern region of Nepal.

**Methods:** This retrospective cross sectional study was carried out in the Karnali Academy of Health Sciences, Jumla Nepal. The data includes the 5 years period from Jan 2014 to March 2020. The parameters included admission of acute appendicitis, age, gender, post-operative findings and complication.

**Results:** There were 186 cases collectively. 175 cases of appendicitis were recorded. The mean age was 31±15.16. Ninety two (52.6%) were female; 83(47.4%) were male. 119(68%) had appendectomies. 56(32%) were treated conservatively. 29(51.78%) were appendicular lump and 27(48.2%) were suspected appendicitis. Five were found to have perforation of appendix. Two had abscess in 29 cases of appendicular mass. and 2 had surgical site infection.

**Conclusion:** Among patients who were admitted in the hospital with diagnosis of acute appendicitis, the commonest complication is the appendicular lump, which might be due to late hospital arrival or early antibiotics use impulsively at local level, followed by perforation appendix. The result supports both appendectomy and conservative treatment are equally feasible for acute appendicitis accordingly the cases presented in the hospital.

**Keywords:** Appendicitis; Appendicular lump; Morbidity; Conservative treatment (NOM)

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## INTRODUCTION

Acute appendicitis is one of the most common cause of surgical acute abdomen, commonly affecting young adults.<sup>1,2</sup> Obstruction of the appendiceal lumen is considered the ultimate causative factor. Fecolith, intestinal worms, tumors, lymphoid hyperplasia or others conditions are deliberated as the origin of obstruction.<sup>3</sup> In the western world, it accounts for 40 % of all emergency performed abdominal surgeries<sup>1</sup> whereas it is reported that with around 26 % of all the emergency operation of appendicitis being the most common cause of emergency surgeries in Nepal.<sup>4</sup>

Precise and timely diagnosis with appropriate intervention is vital for the successful treatment of acute appendicitis. Clinical diagnosis plays a vibrant role. However, the clinical diagnosis is not always easy, even for experienced surgeons and in such circumstances, early intervention may sometimes lead to negative appendectomy. The treatment of acute appendicitis remains a health problem and considerable morbidity and mortality are still associated with it.<sup>5</sup> The rate of negative appendectomy is 12% of overall appendectomies.<sup>6</sup> Complications like perforation, abscess formation, appendicular lump and surgical site of infection are well reported.<sup>7-10</sup> The incidence of perforation is observed around 7.5 % of all histological confirmed appendicitices.<sup>7</sup> However, as high as 13-20 % are also reported.<sup>11</sup> The other common complication of appendicitis is the appendicular lump which is formed if treatment is delayed for 48-72 hours of first symptoms, and it accounts 2-6% of total appendicitis.<sup>12-15</sup>

Oschner-Shreen regime is the standard treatment with success rate of 88-95% for the appendicular lump<sup>16,17</sup> though, 2-4% fails to show response, which ultimately need immediate surgical intervention.<sup>18,19</sup> Sometimes, this regime has better outcomes on the subject of the potential damage to Caecum and the development of fecal fistula due to appendectomy.<sup>20</sup>

The general standard of care of appendicitis patients is the open or laparoscopic appendectomy. However, NOM with antibiotics, in some cases, is beneficial and emerging research indicates that broader applicability may occur.<sup>21</sup>

The hospital we are serving is the rural set up where the clinical diagnosis plays the vivacious role for appendicitis. The patients are also arrived late to hospital with early use of inadequate antibiotics dose in the local level which could have association in complication development in the patients. The aim of the study is to find out the morbidity and mortality associated with the appendicitis of the patients belonging to this region of Nepal.

## MATERIALS AND METHODS

This retrospective cross sectional study was carried out in the Karnali Academy of Health sciences, Jumla Nepal. The ethical permission was taken from IRC of Karnali Academy Health Sciences (KAHS). The data of appendicitis and appendectomy performed during the 5 years period from Jan 2014 to March 2020 from the inpatient ward and operation theater respectively were retrieved. The data variables included all the admission of acute appendicitis, age, gender, preclinical and post-operative findings and complication.

**Inclusion criteria:** All patients admitted in inpatients ward with clinically suspected appendicitis, appendicular lump conservatively treated, and appendectomy done patients, perforated appendix and pus found during surgery.

**Exclusion criteria:** patients with acute abdomen under evaluation, mesenteric lymphadenitis, non-specific abdomen pain and diagnosis changed were excluded.

## RESULTS

Cases of appendicitis from Jan 2014 to March 2020 in the Dept. of Surgery, KAHS were noted. Out of 186 clinical appendicitis, 175 cases of appendicitis were included in the study. Eleven cases were excluded as the diagnosis was changed. The mean age was 31.6±15.16 with age ranging from 8 years to 76 year. Out of 175, 92 (52.6%) were female and remaining 83(47.4%) were male. Out of 175 cases, 119(68%) had appendectomy with open 108(90.75%), and laparoscopic 11(9.2%). Remaining 56(32%) were treated conservatively. Of which, 29(51.78%) were appendicular lump and 27(48.2%) were suspected

appendicitis. Out of 119 appendectomies, 5 were found to have perforation of the appendix. Two cases were found to have abscess in 29 cases of appendicular mass. Two cases had surgical site infection in appendectomy cases.

**Table 1: Characteristic features of the patients**

Characteristics	Frequency
Age	N (%)
<10	6(3.4)
10-19	39(22.3)
20-29	46(26.3)
30-39	25(14.3)
40-49	37(21.1)
>50	22(12.3)
Total	175(100)
Gender	N (%)
Male	83(47.4)
Female	92(52.6)
Mean	31.6 ±15.16

**Table 2: Showing the treatment and complication of patients in different age group**

Age of the patients	Condition					Remark	
	Open appendectomy	Laparoscopic appendectomy	Appendicular Lump	Simple appendicitis	Total	Perf	SSI
Below 10	5	0	0	1	6		
10-19	26	3	4	5	39	1	-
20-29	32	2	3	8	46	-	-
30-39	16	2	3	6	25	-	-
40-49	20	4	10	3	37	2	
50 and above	9	0	9	4	22	2	2
Total	108	11	29	27	175	5	2

\*Perf=perforation, \*STI=surgical site infection

**Table 3: Showing the distribution of treatment of appendicitis according to the sex**

Types of intervention	Sex of the patients		Total (n,%)
	Male (n %)	Female (n,%)	
Open appendectomy	49	59	108
	46.7%	53.3%	100.0%
Laparoscopic appendectomy	6	5	11
	54.5%	45.5%	100.0%
Appendicular Lump (Oschner-Shreen)	17	12	29
	58.6%	41.4%	100.0%
Simple appendicitis (conservative)	11	16	27
	40.7%	59.3%	100.0%
Total	83	92	175
	47.4%	52.6%	100.0%

## DISCUSSION

Appendectomy for acute appendicitis is the most commonly executed abdominal procedure. In western world, acute appendicitis accounts for about 40 percent of all surgical emergencies though the recent systematic review of population based studies reported the decreasing trend in appendicitis incidence<sup>1,22</sup>. Study from Nepalgunj by Khan et al.<sup>4</sup> also reported 26 % acute appendicitis being the most common cause of emergency laparotomy.

The clinical diagnosis accuracy has been estimated between 76 % and 82 %.<sup>11,23</sup> However, it is still not easy to diagnose even for experienced surgeons. Thus, there could be the possibility of delay in instituting treatment which might either give benefit to patients by allowing self-resolution time to appendicitis thus avoiding surgery or give morbidity and mortality due to sepsis or peritonitis.<sup>15</sup> The common complication of appendicitis could be the perforation, abscess formation and appendicular lump.<sup>24</sup>

In our study, the patients' age ranged from 8 years to 76 years with mean age  $35 \pm 15.6$  with maximum incidence 87.4 % below 50 years. This result is nearly consistent with several studies that report 95 % appendicitis below 50 years age.<sup>25</sup> The exact etiology is not acknowledged, but the change in life styles, air pollution, smoking, reduced fibers intake, as well as the over consumption of sweet and sugary diet is speculated by some authors to the cause of appendicitis.<sup>26,27</sup> Moreover, the etiology of appendicitis is apparent to be multifactorial.

Several authors have reported a sex difference for appendicitis with, male being more common than female, ratio ranging from 1.1 to 2.9:12.<sup>2,9,28</sup> Study by Saleh Al\_Mulhim et al.<sup>29</sup> showed 540(61.2%) patients were males and 38.8 % were females with ratio 1.6:1. There is inconsistency in the result regarding the sex difference incidence, with ratio close to each other with male dominance. However, our study showed grossly higher number of females with 52.6 %, with ratio of female to male 1.16:1. This could be attributed to hidden factors such as constipation, poor self-sanitation or hygiene of the female belonging to this region. Most people from this region amalgamated a habit of drinking less

water and eating inadequate fiber diet that decrease colon transit time of feces which could increase the possibility of fecal obstruction to appendiceal lumen progressing to appendicitis.<sup>27</sup> The other possibility of female preponderance in this region is probably due to male population been out for search of job.

In our study, total appendectomies performed with gross findings of intra-operative appendicitis was 119(68%). Eleven laparoscopic (recently started in our hospital) and 108 open appendectomies were performed. The study still mandates the important of emergency appendectomy because the delay in surgery might increase the perforation rate and morbidity. Ditillo et al.<sup>30</sup> found the possibility of developing advanced pathology and complications increased with time in adult patients with acute appendicitis suggesting delay in surgery was unsafe. In addition, the consensus from the 2015 meeting of the European Association of Endoscopic Surgery also recommended an early appendectomy as an official opinion regardless of contrary views.<sup>31</sup> Among 119 appendectomies, the perforations was found 2.8% lower than expected. Andersson et al.<sup>11</sup> showed perforation rate of 13% in male and 18% in female in the study. Another study also reported 19% of perforation.<sup>32</sup> However, the study in Nepal by Makaju et al.<sup>33</sup> showed the lowest rate with 2.12 % that is close to our result. The exact cause is not well-known, however many factors might be involved. The circumstances and geography could be the indirect factors responsible for perforation of appendicitis. The other direct factors elaborated could be the early use of antibiotics at the local level by the local health worker. However, this is the postulation based knowledge while working in this region that local health worker was often reluctant to give antibiotics in any kind of disease. Using antibiotics improperly might increase resistance widely however its use instinctively in rural area, where health service in time is inaccessible, is debatable. This need to be studied in detail.

In our study, appendicular lump was found in 16.66% of overall appendicitis which is significantly high. While some study have reported only 2-7 % lump development in the appendicitis.<sup>34</sup> The lump was found 41.4% in female and 58.6% in male with male

supremacy that's shown in table:3. All the palpable abdomen mass with clinically pain in the right iliac fossa and ultrasound findings reporting lump were managed as appendicular lump. Mostly patients were arrived in our hospital late treating locally by the community health worker. Most of them were already started on antibiotics. Until patients get worse or unimproved, they do not come to the hospital. The late arrival of patients to the hospital with earlier use of inadequate antibiotics dose could be the factors nurturing the numbers of appendicular lump in our setup.

Our study has revealed, out of 29 appendicular mass, 2 cases developed abscess. Of which one is drained by pigtail under ultrasound guidance while the other is drained by open technique. Twenty seven out of 29 patients improved on conservative treatment and discharged. The need for interval appendectomy after conservative treatment is debatable. The reasons for this controversy are the data indicating the low rate of reoccurrence of appendicitis (around 10%) if the conservatively treated appendicular lump and abscess is not followed by interval appendectomy.<sup>35-37</sup> During discharge, our patients are suggested for interval appendectomy. The purpose for this counseling acknowledged that patients are from distance and if recurrence of appendicitis occurs again, they might have developed complication escalating the morbidity. But most patients did not comply. There might be either the patients won't have recurrence of pain or have financial constraints to bear for surgery. Thus it is difficult to reach to a conclusion. Study reported that conservative treatment of appendicitis is highly linked with the risk of missing or delayed hidden pathologies such as Crohon's disease and Carcinoid tumor in 2 to 3 % of the patients.<sup>38</sup>Therefore conducting tests such as colonoscopy, barium enema of the colon, and contrast-enhanced CT scan are suggested to rule out of such diseases after conservative treatment.

Total of 27 patients were treated conservatively who were suspected appendicitis. All the patients who showed relieve in pain within 24 hours of antibiotics use, and were continued with same drugs. Those patients who do not response to antibiotics were taken for appendectomy. These numbers are the

only successfully treated patients with non-operative management, excluding cases of changed diagnosis. In the recently published literature, some authors advocated conservative treatment for uncomplicated appendicitis.<sup>39</sup>However, other strongly put ambiguity in non- operative management of appendicitis regarding the failure rate, health care cost and increase morbidity.<sup>44</sup> In the midst of this ambiguity between surgical and conservative treatment of appendicitis, we have the fervent result in the conservative treatment, however surgical intervention is still remained as the back bone for appendicitis.

This is a retrospective, single center study. The choice of treatment given to the patients is completely on surgeon's choice which might be a bias factor to the result. Prospective studies in similar multicenter with randomization of patients before treatment could help to decrease the limitation of this study.

## CONCLUSION

Among patients who were admitted in the hospital with diagnosis of acute appendicitis, the commonest complication is the appendicular lump, which might be due to late hospital arrival or early antibiotics use impulsively at local level, followed by perforation appendix. The result supports both appendectomy and conservative treatment are equally feasible for acute appendicitis accordingly the cases presented in the hospital.

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