

# NEGATIVE APPENDICECTOMY RATE IN CURRENT SURGICAL PRACTICE

Masoom Raza Mirza, Lubna Habib

Department of Surgery,  
Hamdard College of Medicine & Dentistry, Hamdard University Hospital, Karachi - Pakistan

## ABSTRACT

**Objective:** To determine the negative appendicectomy rate in current surgical practice

**Material and Methods:** This prospective descriptive study was conducted in Hamdard University Hospital and four other private hospitals where authors practice from March 2006 to February 2008. One hundred and sixty eight patients underwent appendicectomy during the study period. Details of clinical presentations, investigations, operative findings and histopathology were entered and analyzed. Result was compared with local and international studies

**Results:** A total number of 168 patients with age range from 8 to 59 years, including 88 male and 80 female, under went appendicectomy. Normal appendices were found in 31 patients (negative appendicectomy rate 18.45%) and associated pathology was seen in 13 patients, an incidental finding of Meckel's diverticulum in 5 patients and no other pathology was seen in 13 patients.

**Conclusion:** In current surgical practice negative appendicectomy rate is still high 18.45%.

**Key words:** Appendix, appendicitis, appendicectomy, negative appendicectomy, laparoscopy, female.

## INTRODUCTION

Acute Appendicitis is the most common cause of acute abdomen with a life time cumulative incidence of nearly 7%<sup>1</sup>. Principles of its management are, prompt diagnosis and rapid treatment (appendicectomy). The diagnostic accuracy on clinical examination alone is about 80%, it becomes lower in equivocal presentation and a significant proportion of patients (22-33%) do not present with typical symptoms and signs, causing difficulty in diagnosis and delay in treatment and these two factors lead to either perforation or misdiagnosis (negative appendicectomy)<sup>2</sup>.

A standard practice keeps a balance between these two outcomes, i.e. perforation and misdiagnosis.

## MATERIAL AND METHODS

This was a prospective descriptive study in which patient's data was prospectively entered in Microsoft Excel for two years from March 2006 to February 2008 and result was analyzed. Patients

from four private hospitals (where authors practice) were included in the study.

All patients who presented with right iliac fossa pain (RIF) of less than 48 hours duration were included in the study. These patients presented either in emergency room, consultant's clinic, referred by their general practitioner or referred by other departments (paediatrics, obstetrics & gynaecology and medicine). Patients with history of pain in RIF for more than 48 hours and a palpable lump in RIF were excluded from the study. Patients with minimal clinical signs (normal pulse and/or normal temperature and/or absence of tenderness) were kept in observation and those who improved during the period of observation and did not require operation were also excluded from the study. Limitation: as study being performed in private hospitals, any diagnostic scoring system was difficult to administer, therefore diagnosis was based on clinical judgment by a consultant in most of the cases. Detailed history, clinical examination and full blood count were performed on all 173 patients. Urine D/R and ultrasound abdomen (and

**DISTRIBUTION OF NORMAL LOOKING APPENDICES**

<b>Findings</b>	<b>Male</b>	<b>Female</b>	<b>Total</b>
Normal looking appendix	11	20	31
1) With other pathology	4	9	13
2) With an incidental finding	4	1	5
3) With no other finding	5	8	13

Table 1

pelvis in female) were performed in 35 patients with equivocal signs. Five patients were identified in whom urine D/R was suggestive of urinary pathology and/or ultrasound showed gynaecological pathology and/or dilated pelvic/cecal system. These patients were also excluded from the study. Therefore a total number of 168 patients qualified the inclusion criteria.

All patients who underwent appendicectomy received metronidazole and co-amoxiclav prior to their transfer to operation theatre. All operations were done by consultant surgeons. All removed appendices were submitted for histopathology.

**RESULT**

A total number of 168 patients were admitted with the diagnosis of acute appendicitis. Their age range was from 8 to 59 years and mean 24 years. Out of 168 patients 88 were male and 80 female. Pre operative work up included complete blood picture in all patients. Total leucocytes count (TLC) was found elevated ( $>10,000/\text{cmm}$ ) in 131 (77.98%) patients and raised neutrophils ( $>75\%$ ) were detected in 145 (86.31%) patients.

Regarding ultrasonography, the scan was normal in 13 patients, swollen appendix with free fluid was seen in 8 patients and only free fluid in right iliac fossa and/or pelvis in 9 patients. Finding of free fluid in RIF or in pelvis in the absence of any other pathology and clinical suspicion of acute appendicitis was taken as indirect evidence of acute inflammation of appendix.

A total of 168 patients underwent appendicectomy under general anesthesia. Operative findings were acutely inflamed appendix in 106(63.09%), suppurative appendicitis in 20(11.90%), gangrenous appendix in 11(6.54%) and normal looking appendices in 31(18.45%) patients. Distribution of normal looking appendices (negative appendicectomy rate, suggested by histopathology) in both sexes is shown in table I.

In the presence of normal appendices other pathology was seen in 13(41.94%), an incidental finding in 5(16.129%) and no other finding in 13(41.93%) patients (Detail is shown in table II).

**DISCUSSION**

Despite more than 100 years experience and enormous literature on the management of

**DETAILS OF VARIOUS FINDINGS AMONG 31 PATIENTS WITH NORMAL LOOKING APPENDICES**

<b>Presence of other pathology</b>	<b>Male</b>	<b>Female</b>	<b>Total</b>
Ruptured right ovarian follicular cyst		4	4
Ruptured right ectopic pregnancy		1	1
Torsion of right ovarian cyst		2	2
Ileocaecal tuberculosis	1	1	2
Thickened caecum	1	0	1
Perforated Meckel's diverticulum	0	1	1
Enlarged mesenteric lymph nodes	2	0	2
<b>Incidental finding</b>	<b>Male</b>	<b>Female</b>	<b>Total</b>
Meckel's diverticulum	4	1	5
<b>No other pathology seen</b>	<b>Male</b>	<b>Female</b>	<b>Total</b>
	5	8	13

Table 2

acute appendicitis, it is still an issue for on going research in surgical practice especially on the aspect of improvement in diagnostic accuracy and reduction in the rate of negative appendicectomy. Focusing at the out come of management of acute appendicitis, negative appendicectomy has always been taken as a diagnostic error but over the years rate of negative appendicectomy is 20 to 30%<sup>3,4,5</sup>. In our study normal looking appendices (no inflammation was seen in histopathology) were found in 18.45% patients and our negative appendicectomy rate seems comparable with published literature over last 8 years and it is shown in table III

Another observation among cases of negative appendicectomies is that it is quite high among female patients (58.04%) and concomitant with gynaecological problems; it is also an experience of various workers that the negative appendicectomy rate is high among female patients usually due to an underlying gynecological cause<sup>2,6,7,8</sup>.

An incidental finding of Meckel's diverticulum was present in 5 patients with normal looking appendices and it is difficult to comment that what was the cause of presenting abdominal pain (appendix or diverticulum) because none of them returned with same complaint. From our result if we exclude those cases with other pathology which had an indication for surgical intervention and a therapeutic procedure was performed, we may quote our corrected negative appendicectomy rate (10.71%).

Taking negative appendicectomy as diagnostic error, many ways have been sought to reduce this figure and beside clinical diagnosis, a number of diagnostic tools (TLC, C-reactive protein, ultrasonography, CT scan) have been in use to improve the diagnostic accuracy with some advantages, especially in women of reproductive age, children and elderly. Clinical scoring system has its utility<sup>9,10</sup> largely at teaching hospitals but we could not administer any scoring system as part of this study was contributed from non-teaching hospitals. Ultrasonography has established its position as a valuable diagnostic tool but its diagnostic accuracy is variable<sup>11</sup> as it is very much operator dependent procedure but in experienced hands its accuracy reaches up to 93%<sup>5</sup>. Its proven benefit in right iliac fossa pain has been published in a comparative study from Abbottabad that with the use of ultrasonography they reduced negative appendicectomy rate to 4.7%<sup>3</sup>. It is a cost effective and readily available imaging tool in our set up but in our experience ultrasound missed 7 (23.33%) gynaecological problems and showed only free fluid in pelvis and/or RIF which we took

as one of the evidence of acute appendicitis in the presence of normal pelvic organs. In literature the diagnostic accuracy of CT scan has been proven superior to ultrasound<sup>12,13</sup> and researchers have reported reduction of negative appendicectomy rate by 5% with routine use of CT scan in acute appendicitis during study period<sup>14</sup>. In our set up CT scan is not widely available and if available is not cost effective to use at larger scales Laparoscopy has revolutionized the surgical treatment of various diseases e.g. gall stone diseases. In the management of right lower quadrant pain especially in women of child bearing age, it is gaining popularity because of its advantage of being diagnostic and therapeutic simultaneously<sup>5,15</sup>.

At present and in future wide spread use of CT scan and laparoscopy especially in female seems to be beneficial to reduce the rate of negative appendicectomy<sup>6,16</sup>.

## CONCLUSION

In current surgical practice negative appendicectomy rate is still high and in future it can be reduced by increasing use of CT scan and laparoscopy especially in females as they at higher risk to under go negative exploration.

## REFERENCES

1. Cydulka K. Has misdiagnosis of appendicitis decreased over time? *JAMA* 2001;286:1748-53
2. Poh ACC, Lin M, Teh HS, et al. The role of computed tomography in clinically suspected but equivocal acute appendicitis, *Singapore Med J* 2004;45(8):379-84.
3. Walker SJ, West CR, Colmer MR. Acute appendicitis: does removal of a normal appendix matters, what is the value of diagnostic accuracy and is surgical delay important. *Ann R Coll Surg Engl* .1995; 77:358-63.
4. Benjamin and patel Managing acute appendicitis, *BMJ* 2002; 325:505-506.
5. Jones PF. Suspected acute appendicitis: trends in management over 30 years. *Br J Surg* 2001; 88(12):1570-77.
6. Lim GH, Shabbir A, So JBY. Diagnostic laparoscopy in the evaluation of right lower abdominal pain: a one year audit. *Singapore Med J*2008; 49(6):451-53.
7. Singhal V, Jadhav V. Acute appendicitis: are we over diagnosing it? *Ann R Coll Surg Engl* 2007; 89(8): 766-769.
8. Marudanayagam R, William GT, Rees BI. Review of the pathological results of 2660

- appendicectomy specimens. *J Gastroenterol* 2006; 41(8):745-49.
9. Jan H and Khan J. Evaluation of modified Alvarado score in acute appendicitis. *Pak J Surg*.2007; 23(4):248-50
  10. Malik KA, Sheikh MR. Role of modified Alvarado score in the diagnosis of acute appendix. *Pak J Surg*.2007; 23(4):251-54.
  11. Carolyn SC, John MB, Mark P, David TH. Computed tomography in the diagnosis of equivocal appendicitis. *ANZ*.1999; 69(9):664-667. Paterson HM, Qadan M, Delucas SM, et al. Changing trends in surgery for acute appendicitis. *Br. J Surg* 2008; 95(3):363-68.
  12. Erik BW, Christopher CJ, Michael LN, Donald RC, Randall WS. Computed Tomography and Ultrasonography in the Diagnosis of Appendicitis: When Are They Indicated? *Arch Surg*. 2001; 136(6): 670-75.
  13. Rao PM, Rhea JT, Novelline RA, Mostafavi AA, McCabe CJ. Effect of computed tomography of the appendix on treatment of patients and use of hospital resources. *N Engl J Med*. 1998; 338:141-46.
  14. Wagner PL, Eachempati SR, Pieracci FM, et al. Defining the current negative appendicectomy rate: for whom is preoperative computed tomography making an impact? *Surgery* 2008; 144(2):276-82.
  15. CM Whitworth, PW Whitworth, J Sanfillipo, HC Polk Jr. Value of diagnostic laparoscopy in young women with possible appendicitis. *Surg Gynecol Obstet*. 1988; 167 (3): 187-90.
  16. Paterson HM, Qadan M, Delucas SM, et al. Changing trends in surgery for acute appendicitis. *Br. J Surg* 2008; 95(3):363-68.
  17. Rajan P, Sharma DC, Watson CJE. A Retrospective review of appendicectomy management in a UK teaching hospital; *The Internet Journal of Surgery*. 2006; 7(2)
  18. Fleming NgS, Drum J, Waldron D, et al. Current trends in the management of acute appendicitis. *Ir J Med Sci* 2008; 177(2):121-25.
  19. Mardan AA, Mufti TS, Khattak I, et al. Role of ultrasound in acute appendicitis. *J Ayub Med Coll Abbottabad* 2007; 19(3):72-79.
  20. Althoubaity FK. Suspected acute appendicitis in female patients. Trends in diagnosis in emergency department in a university hospital in western region of Saudi Arabia. *Saudi Med J* 2006; 27(11):1667-73.

**Address for Correspondence:**

**Dr. Lubna Habib**

Department of Surgery,  
Hamdard University Hospital,  
M.A. Jinnah Road,  
Karachi-74400 Pakistan – Pakistan.  
e-mail: drlubnahabib@yahoo.com