EVALUATION OF APPENDICECTOMY SPECIMENS FOR NEGATIVE APPENDICECTOMY AT JAWAHARLAL NEHRU INSTITUTE OF MEDICAL SCIENCES HOSPITAL, IMPHAL, INDIA

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ABSTRACT

BACKGROUND

Acute appendicitis is the most common intra-abdominal condition requiring emergency surgery. Past reports have shown that up to 30% of appendices have been removed after clinical diagnosis of acute appendicitis, which may be normal on histopathological examination. In spite of advanced technology and vast knowledge about the condition, it remains a difficult task for clinicians to diagnose it cent percent accurately. Emergency appendicectomy is performed to prevent morbidity and mortality due to perforation and gangrenous changes. In such situations, a certain percentage of normal appendices are found to be removed due to misdiagnosis. There is general agreement that highly competent surgeons make false positive diagnosis of acute appendicitis and remove normal appendices about 20% to 25%. The discomfort and risks associated with an exploratory laparotomy and discovering "no disease" are far outweighed by the morbidity and mortality (about 2%) associated with perforation (Singhal R et al, 2007).¹

MATERIALS AND METHODS

This study was a prospective study conducted in Jawaharlal Nehru Institute of Medical Sciences, Imphal, Manipur, India from April 2010 to March 2017. 1000 cases of appendicectomy specimens were examined histopathologically to confirm for acute appendicitis. Detailed history was taken, physical examination and relevant laboratory investigations were performed during the clinical encounter. The diagnosis of acute appendicitis was made clinically and was confirmed after histopathological examination of the removed appendix.

RESULTS

Out of 1000 appendix specimens sent for histopathological examination, 440 (44%) showed simple appendicitis, 240 (24%) showed gangrenous appendicitis, 200 (20%) showed perforated appendicitis and 120 (12%) showed no appendicitis.

CONCLUSION

The diagnosis of acute appendicitis is based on clinical evaluation. Laboratory tests and imaging techniques add very little to the diagnosis. A definite diagnosis can be obtained only at surgery and after histopathological examination of the removed appendix. In children and elderly persons, the diagnosis should be made at the earliest and appendicectomy should be performed without delay to reduce the rate of perforation and gangrenous changes of the appendix.

KEYWORDS

Appendicitis, Negative Appendicectomy, Histopathological Examination, Perforation, Gangrenous Appendix.

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BACKGROUND

The appendix is a worm-like extension of the caecum and has been called the Vermiform appendix. Its average length is 8 to 10 cm (ranging from 2 to 20 cm). This organ appears during the 5th month of gestation and several lymphoid follicles are scattered in its mucosa.

Appendicitis is the inflammation of the inner lining of the appendix that spreads to the other parts. It may occur for

several reasons such as infection of the appendix, but the most important step is the obstruction of the appendiceal lumen.

Disease of the appendix loom large in surgical practice; appendicitis is the most common acute abdominal condition the surgeon is called on to operate. Appendicitis is one of the best known medical entities and yet may be one of the most difficult diagnostic problems to confront the emergency physician. There is general agreement that highly competent surgeons make false diagnosis of acute appendicitis and remove normal appendices about 20% to 25% of the times. The discomforts and risks associated with an exploratory laparotomy and discovering "no disease" are far outweighed by the morbidity and mortality (about 2%) associated with perforation, Baraev TM 2000.²

Despite long experience with the diagnosis of acute appendicitis and a crowded literature on the subject, rates of negative findings on appendicectomy have not decreased even today. Except for a few reports of negative findings on appendicectomy below 10%, most recent study reports rates between 15% and 34%. The situation is the same regarding

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the rate of complicated appendicitis, which has not changed substantially over time, remaining between 15% and 30%. Sonogram or CT scan may shorten delay in diagnosis in equivocal cases. These imaging modalities can, however, delay appropriate surgery, either while the patient is waiting the result or because of false negative result. The importance of clinical judgement has been underlined by others. Observation and repeated examinations may lead to favourable clinical outcomes in the ever-changing diagnosis of appendicitis, Bendeck SE, et al, 2002.³

Although, the clinical presentation of acute appendicitis is typical in more than 70% of the cases, about 30% of the patients have an uncertain pre-operative diagnosis. Consequently, the rate of unnecessary laparotomy for appendicitis is as high as 20 - 25%. The rate is even higher in (34 - 45%) in women of childbearing age because of the prevalence of disease of the female pelvic organs and complications of pregnancy in this group, Chang FC et al 1973⁴ and Dunn EL et al 1982.⁵

Although, the history and physical examination remain paramount, imaging studies have an increasingly important role in cases of equivocal presentation in diagnosis of acute appendicitis. Notwithstanding advances in modern radiographic imaging and diagnostic laboratory investigations, the diagnosis of acute appendicitis remains essentially clinical requiring a mixture of observation, clinical acumen and surgical science, Brown SP 2000.⁶

Objective

This study is carried out to judge the accuracy of diagnosis of acute appendicitis, diagnosed from history taking and clinical examinations.

MATERIALS AND METHODS

This is a prospective observational study conducted at Jawaharlal Nehru Institute of Medical Sciences, Imphal, Manipur, India, from April 2010 to March 2017. One thousand cases of acute appendicitis that attended the outpatients' department and emergency services of Jawaharlal Nehru Institute of Medical Sciences were admitted and studied. A detailed history of all the patients were taken with reference to the duration of onset, nature and site of pain, presence of nausea, vomiting, fever and history of same illness in the past. A detailed physical examination of each patient was undertaken. Relevant laboratory investigations were taken during the initial clinical encounter.

The diagnosis of acute appendicitis was made clinically and was confirmed after histopathological examination of the removed appendix.

After resuscitation and preparation, all the patients were taken up for surgery. The removed appendix was sent for histopathological examination. The patients were considered to have a negative appendectomy when the histopathological reports indicated no evidence of inflammation of the appendix. All the findings of each and every case were recorded in a standard proforma, which was specially designed for this study.

Exclusion Criteria

Patients who were previously admitted for recurrent appendicitis and readmitted for interval appendectomy and

those who are already diagnosed by ultrasonography or CT scan were not included in the study.

RESULTS

Age and Sex Distribution.

Age (In Years)	Sex		Total (%)
	Male	Female	
16 or less	80	40	120 (12%)
16 - 30	340	120	460 (46%)
30 - 50	140	180	320 (32%)
> 50	100	0	100 (10%)
Total	660	340	1000

Table 1. Showing Age and Sex Distribution

Highest incidence of acute appendicitis was found in the age group of 16 - 30 years (46%) and lowest incidence in the age group above 50 years (10%). Acute appendicitis was found more common in males (66%) than in females (34%), male-female ratio being 1.94: 1.

Symptoms		Number of Patients	Percentage (%)
Pain abdomen	Typical	940	94%
	Atypical	60	6%
Anorexia		920	92%
Nausea		920	92%
Vomiting		280	28%
Fever		160	16%
Bowel habits	Diarrhoea	20	2%
	Constipation	180	18%
Burning micturition		20	2%

Table 2. Showing the Presenting Symptoms

In this study, pain abdomen has been divided as typical, arising around the umbilicus or epigastrium and later shifted to the right iliac fossa and atypical, starting and remaining in the right iliac fossa. Most of the patients presented with pain in the right lower quadrant. There was history of shifting of pain to the right iliac fossa in 940 patients (94%). Whereas in 60 patients (6%), the pain started and remained in the right lower quadrant. In 920 cases (92%), there was history of Anorexia and 280 patients (28%) gave history of vomiting. Fever was present in 160 patients (16%). 20 patients (2%) had diarrhoea and 180 (18%) gave history of constipation before the onset of pain. 20 patients (2%) gave history of burning micturition.

Tenderness	No. of Patients	Percentage (%)
Periumbilical	700	70%
Right Iliac Fossa	1000	100%
McBurney's Point	1000	100%
Rebound Tenderness	760	76%
Generalized Tenderness	260	26%

Table 3. Showing Tenderness on Abdominal Examination

On palpation of the abdomen 700 patients (70%) showed periumbilical tenderness, 1000 patients (100%) showed right iliac fossa tenderness, 1000 patients (100%) showed tenderness over McBurney's point, 760 patients (76%) showed rebound tenderness and 260 patients (26%) showed generalised tenderness.

Sign		No. of Patients	Percentage (%)
Guarding	Right iliac fossa	740	74%
	Generalised	80	8%
Rovsing's Sign		820	82%
Cope's Psoas Test		780	78%
Cope's Obturator Sign		160	16%

Table 4. Showing Presenting Signs

On trying to elicit the classical signs of acute appendicitis, 740 patients (74%) were found to have muscle guarding on right iliac fossa, 80 patients (8%) had generalised guarding, 820 patients (82%) had positive Rovsing's sign, 780 patients (78%) had positive Cope's Psoas sign, 160 patients (16%) had Cope's Obturator sign positive.

Operative Findings		No. of Patients	Percentage (%)
Position of appendix	Retrocaecal	760	76%
	Pelvic	180	18%
	Subhepatic	40	4%
	Subcaecal	20	2%
Gangrene		240	24%
Perforation		200	20%
Faecolith		420	42%
Inflamed appendix		880	88%
Non-inflamed appendix		120	12%

Table 5. Showing Operative Findings

Operative findings regarding the positions of appendix were retrocaecal 760 (76%), pelvic 180 (18%), subhepatic 40 (4%) and subcaecal 20 (2%). 240 (24%) had gangrene on the appendix, 200 patients (20%) had perforation, 420 patients (42%) had faecolith in the appendiceal lumen, 880 (88%) appendices were found inflamed and 120 appendices (12%) were found non-inflamed on histopathological examination.

Histopathological Findings	Number of Patients	Percentage (%)
Simple appendicitis	440	44%
Gangrenous appendicitis	240	24%
Perforated appendicitis	200	20%
No appendicitis	120	12%
Total	1000	100%

Table 6. Showing Histopathological Findings

Out of 1000 appendix specimens sent for histopathological examination, 440 (44%) specimens showed simple appendicitis, 240 (24%) specimens showed gangrenous appendicitis, 200 (20%) specimens showed perforated appendicitis and 120 (12%) specimens showed no appendicitis.

DISCUSSION

The present prospective observational study consists of 1000 patients aged 12 years to 70 years, with mean age of 31.64 years which is similar with the findings of Gaensler et al (1989),⁷ in which the mean age of patients with appendicitis was reported to be 26 years. In the study the male-to-female ratio of patients suffering from appendicitis was 1.9: 1, which is in consistence with the findings of Madan S (2000)⁸ who found it to be 1.7: 1.

In the present series, the majority of patients were from middle class income group (70%). Similar finding was reported by Mann CV (1995).⁹

In this study 720 patients (72%) had pain starting around the umbilicus, 220 patients (22%) in the epigastrium and 60 patients (6%) in the right lower quadrant. 940 patients (94%) had shifting pain to the right lower quadrant. All the 1000 patients had pain at the right lower quadrant at the time of examination. Tenderness was found at the right iliac fossa and McBurney's point in all the patients. Rebound tenderness was found in 760 (76%) patients and muscle guarding was found in 740 (74%) patients in the right iliac fossa and in 80 (8%) patients all over the abdomen.

Mann CV (1991)¹⁰ stated that it is rare to find a child with appendicitis who has not vomited, and they usually have complete aversion to food, in addition they do not sleep during the attack. In this series, 920 (92%) had history of nausea and 280 patients (28%) had history of vomiting.

Rappaport WD et al (1989)¹¹ reported that right lower quadrant pain or tenderness was present in 95% of all simple appendicitis and 71% with advanced appendicitis, and he further stated that even in very young child history and physical examinations were the keys for early diagnosis. Our present findings are in consistence with this.

As part of the protocol, these patients did not undergo ultrasonography and CT scan. A recent study comparing clinical versus ultrasonography evaluation of acute appendicitis found that patients undergoing ultrasonography before appendicectomy have a delay before operation, a higher rate of misdiagnosis and more postoperative complications (Emil S et al 2001).¹² In addition, Brenner D et al (2001) stated that evidence suggests that the radiation from CT scans causes a slightly increased lifetime risk of malignancy.

In the present series, the duration of hospital stay ranges from 4 to 11 days. With mean hospital stay of 7.56 days, patients with postoperative complications had longer hospital stay. Curran TJ and Muenchow SK (1993) found the average hospital stay to be 8.7 days. An 8.1% rate of negative appendicectomy represents a good clinical performance, because a rate of 15% is still considered acceptable. Despite many trials to improve these results, it has become apparent that in most units, the rate of normal appendix removal remains around 155 (Bergeron E, 2006)¹³ and 16.7% (Wen SW et al 2011).¹⁴

Singhal R et al (2007),¹ in their histopathological examination of 348 removed appendices for appendicitis found that 38 appendices were normal, giving the negative appendicectomy rate of 10.9%. In our present series, 120 out of 1000 appendices removed for appendicitis were found non-inflamed. This gives a negative appendicectomy rate of 12%. The negative appendicectomy rate was higher in females and they were in the reproductive age group (28 - 42 years).

CONCLUSION

The diagnosis of acute appendicitis is primarily clinical, and the accuracy rate is related to the experience of the evaluating surgeon. The most reliable guidelines in deciding whether an operation is indicated are a history of anorexia and pain in the right lower quadrant in combination with presence of persistent, focal and reproducible tenderness at McBurney's point, Bergeron E 2002.

Early diagnosis of acute appendicitis reduces the morbidity of the disease. The clinical picture of early appendicitis is not atypical. Right lower quadrant signs and symptoms are usually present. Progression of pain, nausea and anorexia are symptoms that could usefully help to distinguish acute appendicitis from other causes of acute pain abdomen.

A detailed history, clinical examination and their interpretation are the most important factors to come to a diagnosis of acute appendicitis. Menstrual history should always be taken while evaluating women of reproductive age, and their abdominal examination should be carried out in profound detail to reduce the rate of negative appendectomy.

In children and elderly persons, the diagnosis should be made at the earliest and appendectomy should be performed without losing time to reduce the rate of perforation and gangrenous changes of the appendix.

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