The Professional Medical Journal
www.theprofesional.com

ORIGINAL PROF-2529

ACUTE APPENDICITIS;

CLINICAL CORRELATION OF WITH HISTOPATHOLOGICAL DIAGNOSIS: A RETROSPECTIVE STUDY

Dr. Zahid Saeed

Classified Surgical Specialist
Department of Surgery
PNS Shifa Karachi, Pakistan

Correspondence Address:
Dr. Zahid Saeed
Classified surgical specialist
Department of Surgery
PNS Shifa Karachi, Pakistan
drzahidsaeed87@yahoo.com

Article received on:
20/05/2014
Accepted for publication:
09/10/2014
Received after proof reading:
15/12/2014

ABSTRACT... Background: Acute appendicitis is the commonest cause of acute abdomen presenting in emergency room, which is mainly diagnosed on clinical grounds. **Objective:** To determine the diagnostic accuracy in patient of acute appendicitis and to review the pathological diagnosis. **Material and Method:** A retrospective study was conducted at PNS SHIFA hospital at Karachi; from May 2012 to April 2013. A total of 120 patients were included in the study who presented with acute abdomen and clinically diagnosed as acute appendicitis. Emergency appendectomy was done in all consecutive subjects and intra operative finding along with histo-pathological reports were compared with clinical diagnosis. **Results:** A total of 120 patients were included in the study who underwent appendicectomy during this period. The majority of our patients were in the age group between 15-30 years (66.5%) and presented within 24 h of onset of symptoms. The most common symptoms were abdominal pain (100%), vomiting (57.4%) and anorexia (49.0%). Pyrexia was noted in 41.0%.Localized abdominal tenderness with positive release sign was mainly present. The most common incision was gridiron (57.2%) followed by Lanz (37.3%) and in remaining Rutherford Morrison incision was made. Acute appendiceal inflammation and gangrenous appendicitis was present in 67% and 13%, respectively. The perforation rate was 5.0% and there was a direct correlation with time of presentation. There were no patients with carcinoid tumour or adenocarcinoma. Parasites and other associated conditions were seen in 3 % of cases. On the basis of histo-pathological report, 84% were found to have acute appendicitis with negative appendicectomy rate of 16.0%. **Conclusions:** Clinical surgical skill is good enough to diagnose acute appendicitis but auxiliary diagnostic tools can help to elevate the diagnostic accuracy,but these are not 100% accurate and at times may not be available.So clinial good judgement is essential for proper diagnosis and that can be confirmed by histopathology report.

Key words: Acute appendicitis, clinical diagnosis, negative exploration

Article Citation: Saeed Z. Acute appendicitis; clinical correlation of with histopathological diagnosis: a retrospective study. Professional Med J 2014; 21(6):1139-1143.

INTRODUCTION

Acute appendicitis remains the commonest surgical condition requiring emergency admission and operative treatment. Though the surgeons have been confronting the acute appendicitis since it was first described in 1886 by R H Fitz[1], its diagnosis still remains a dilemma to almost all of the surgeons, at least some point in their practice. The surgeons prefer to proceed either by immediate operation as soon as the diagnosis of acute appendicitis is made or to observe the subject until the signs and symptoms make the diagnosis confidently clear as number of non appendiceal pathologies in right iliac fossa can mimic appendicitis. To overcome with the problems of misdiagnosis resulting in complications like perforation and sepsis; and unnecessary surgical interventions as well, superior clinical judgment has got no alternatives.

The diagnosis of acute appendicitis is essentially clinical (Bailey and love)[2].With objectives of improving the clinical judgments, various clinical and laboratory based scoring systems along with some computer assisted diagnostic tools have also been devised to date to assist diagnosis. These supplementary diagnostic tools, which are never 100% accurate, definitely helped to junior surgeons, who's diagnostic accuracy reported to be increased from 58% up to 71%[4], though can help in diagnosing the case may not always be available, especially at night time and in district hospitals. In addition to that, its presentation and the variability of signs are such that even the

most experienced surgeons may remove normal appendix or 'sit on' those that have perforated, always making them less than perfect in their entire carrier.

Therefore, this retrospective study was conducted to analyse the accuracy of clinical diagnosis made by surgeons without relying much on supplementary tools in acute appendicitis and confirmed in light of histopathological reports.

METHODS

The clinical and pathological reports of 120 patients who presented to emergency department of PNS SHIFA from May 2012– April 2013, consulting for acute abdomen and admitted in surgical department with provisional diagnosis of acute appendicitis and underwent emergency appendicectomy, were included in the study. Patients with appendicular mass in right iliac fossa and those with peritonitis were excluded from the study.

A good clinical history and proper physical examination was performed on all the subjects admitted. Clinical history focusing on type, character and shifting of the abdominal pain, nausea/vomiting, anorexia and fever were made. History of similar attacks of pain in the past and LMP in female subjects were also extracted.

Physical examination was started from vital signs including pulse, temperature and detailed abdominal examination was carried out giving special attention to right lower quadrant, point of maximum tenderness, rebound tenderness and muscle guarding. Signs like Dumphy's sign, Psoas sign, Obturator sign and Rovsing's signs were also evaluated and systematically recorded. Some subjects requiring additional period of observation were re-evaluated frequently and finding were recorded accordingly. No additional diagnostic tools were done unless indicated for medical purposes other than diagnosing acute appendicitis. Appendicectomy was indicated when there was high suspicion of acute appendicitis based on sign and symptoms.

White cell count was used as a complimentary finding and ultra sound abdomen was performed in all equivocal cases.

All patients who were finally diagnosed clinically as having acute appendicitis, planned for emergency open appendectomy after patient's counselling. All subjects were explained clearly beforehand for the least possibility of misdiagnosis resulting to negative exploration and other differentials as a universal rule in acute appendicitis. Written informed consent was obtained from all patients and emergency appendectomy was done by surgical team on duty. Intra operative findings like location, morphology, perforation status of the appendix were recorded .Appendix was removed and sent for histopathological examination in all the study subjects, including clinically normal looking appendix. Histopathological examination report (once was made available) , was taken as final diagnosis, and results were compared with clinical presentation and intra operative findings and study was analyzed.

RESULTS

Total one hundred and twenty subjects were studied. Out of which, 82%(92) were male of mean age 27±10.2 and 18% (28) were female of mean age 30.2±11 with male to female ratio of 3.3:1 , with their age ranges from 15 to 50 years (mean age of 28±10.5), no paediatric subjects were included in this study.

On gross examination of the specimen intra operatively, 11%(13) were diagnosed to have normal appendix, with 89%(107) grossly looking inflamed appendix at their various stages of inflammation like acutely inflamed (67%), gangrenous (13%) and perforated (5%).

Operative Findings	Percentage	No. of patients
Inflammed appendix	67 %	80
Gangrenous appendix	13 %	16
Perforated appendix	5%	6
Faecolith	4 %	5
Normal	11%	13

Intra operative diagnosis of the patients with clinical features of acute appendicitis

On the basis of gross examination of the specimen intra-operatively, the rate of negative exploration for the cases of acute appendicitis seems only 11%.

However, according to the histopathological examination report of the specimen, which is considered as the final definitive diagnosis, 16% found to have normal appendix with 84% of appendicitis at their various stages of inflammation.

Histopathological Findings	Percentage	No of patients
Acutely Inflammed	63%	76
Gangrenous appendix	13%	16
Perforated appendix	5%	6
Other	3%	3
Normal	16%	19

Histopathological diagnosis of the patients with clinical features of acute appendicitis

S .No.	Age	Males	Females
1	15-20	16	5
2	20-25	24	7
3	25-30	22	6
4	30-35	9	3
5	35-40	8	3
6	40-45	8	2
7	45-50	5	2
Total	--	92	28

Table-I. Age and Sex distribution of the patients

Most of the cases of acute appendicitis belonged to the age group between 15 –30 years, for both the sexes. Though the negative exploration was found in various age groups in both sexes, but female subject of child bearing age (21–35 years) were subjected the most. The sex distribution of the acute appendicitis seems higher in male in compare to female, with male to female ratio of 3.3: 1. But, statistically, gender has no significant predilection to the acute appendicitis.

Since all of the subjects studied were initially diagnosed as the case of acute appendicitis, the overall negative appendectomies in male gender was found to be 7.7% (7/92) and that was relatively high in female subjects (7/28), comprising of 25%. Therefore, the diagnostic accuracy in case of male subjects seems to be highly significant in comparison to that in female subjects (p=0.001)

Among the patients who underwent negative exploration for acute appendicitis, no other surgical problems requiring immediate intervention was encountered and were treated accordingly following the appendectomy. In comparing the intra-operative diagnosis with the histo-pathological diagnosis, there is a good correlation in between (p=0.0002), where the accuracy rate in diagnosing the acute appendicitis by examining the gross specimen intra operatively is 89%.

Age	Normal appendix		Appendicitis by HPE	
	Male	Female	Male	Female
15-20 years	0	0	20	7
21 – 25 years	2	3	20	4
26 – 30 years	1	2	5	3
31 – 35 years	1	2	12	5
36 – 40 years	1	2	3	0
41 – 45 years	1	0	0	1
46 – 50 years	0	1	3	1
Total	6	10	63	21
Acute appendicitis	82%	7%	107	
Normal appendix	2%	9%	13	
Total	84%	16%	120	

Table-II. Correlation between intra operative and HPE diagnosis

OR = 42.0, 95% CI (5.97, 447.67), p<0.0001,
sn= 97.7, 91. 1, 99.6, sp= 50.0, 24.0, 76.0
ppv= 92.3, 84.3, 96.6, pv=77.8 ,40.2, 96.1
False positive rate = 50.0%,
False negative rate = 2.3%
Accuracy rate = 91.0%

DISCUSSION

Acute appendicitis remains the most common cause of acute abdomen requiring emergency surgery. Out of one hundred and twenty subjects clinically diagnosed as acute appendicitis and

explored, 84% were confirmed histopathologically giving our clinical diagnostic accuracy rate of 84%. The negative exploration rate of 16% determined in this study is in accordance with other studies showing the ranges from 15–30%[3]. Since the diagnosis of acute appendicitis was made purely on clinical grounds, its accuracy varies according to the patient population as well as the experience of surgeons. We evaluated the clinical presentation, diagnostic clues, and final outcome in light of histo-pathological findings of specimens of appendix. The accuracy further improves in young adult males but considerably poor at the extreme of ages. The achievement of significantly high diagnostic accuracy rate in the present study is mostly due to covering adult population rather than subjects from extreme of ages.

In this study, appendicitis occurred most commonly in age group between 15-30 years (66.5%), indicating its higher prevalence in young adults. In comparative international studies, up to 90% of the cases belong to the age group of 10-30 years[4,5,6].

The male to female ratio in the present study is 3.3:1, which is in accordance with the other similar studies[7,8,9,10,11]. The exact cause of male preponderance in these studies is not known. It has also been proven that, though the prevalence of acute appendicitis in adult females is less, there will be a greatest diagnostic challenge at their child bearing age, especially in the mid portion of menstrual cycle[12]. Because of the various additional possible pathological states that mimic acute appendicitis in female, the rate of negative exploration also suits high. All these facts therefore ultimately provide higher diagnostic accuracy in male subjects than to its counter-part.

In the present study also, as all of the subjects operated had already been diagnosed clinically as acute appendicitis and final diagnosis was obtained from pathological specimen, the clinical diagnostic accuracy in male subjects 94.5% (87/92) seem to be highly significant (p=0.001) in comparison to that of female 75% (24/32) subjects. Therefore, the negative appendicectomy rate in the present study was found to be higher in females (25.0%) compared to that in males (7.7%), which is in agreement with the study done by Anderson et al[13], where the rate of normal appendix being removed was twice (24%) higher in women than in men 12%. Use of USG in female patients and in those with equivocal signs and symptoms were assessed by gynaeclogist. Furthermore laparoscopy can be used to reduce negative appendicectomy but we normally do not use laparoscopic technique for acute appendicitis largely because of lack of suitable facilities and expertise.

Borgstein et al[14] concluded that the negative appendicectomy rate was reduced from 38.0% to 5.0% in fertile female patients by the use of laparoscopy and from 8.0% to 4.0% in postmenopausal women and in men.

Surgeon can only be fully satisfied when the inflamed appendix was found intraoperatively to be the cause for the patient's symptoms. If not, other intra-abdominal pathology should be explored for, unnecessarily elevating the degree of morbidity and mortality. Therefore, the association in between the intra operative diagnosis for acute appendicitis with the histo-pathological report was evaluated, which was found to be statistically significant (p=0.0002). The accuracy of intra operative diagnosis in this study is 89%, with sensitivity and specificity of 97.7% and 50% respectively, which is superior in compare to the similar studies done by Tiwari A et al[15] and Shum CH[16], where it was only 76% and 85% respectively.

The perforation rate on histology was 16.0% and this is in accordance with range of 5–26% reported in the literature[17] Colson et al[18] proposed that a delay in presentation of more than 12 h after onset of symptoms increased the perforation rate and that an in-hospital delay did not effect the perforation rate. In our study, the perforation rate was comparatively low because of early presentation within 24 hours.

CONCLUSIONS

Diagnosis of acute appendicitis is primarily clinical and should be made confidently with proper history and thorough physical examination on the basis of clinical symptoms and signs. Though, there are various supplementary laboratory investigations and radiological diagnostic tools to aid in its diagnosis, none of them seems accurate enough and might not be available all the time as wel l. If the diagnosis is made on the basis of good clinical history and thorough physical examination, with repetition if necessary, satisfactory result of international standard can be achieved. Therefore, none of the diagnostics laboratory tests available at present day seem can replace the clinical skills of an experienced surgeon so histological findings in our setting justifies routine histopathological examination of appendices.

REFERENCES

1. G Rainey Williams. **Presidential address: A history of appendicitis.** Annals of Surgery; 1983;197 (5): 495-506.
2. McAdam WA, Brock BM, Armitage T, et al. **Twelve years' experience of computer aided diagnosis in a district general hospital.** Ann R CollSurg 1990; 72: 140 – 146.
3. Juan Carlos Rodríguez-Sanjuán, Martín-P, Isabel S, Luis G and Angel N. **C-reactive protein and leukocyte count in the diagnosis of acute appendicitis in children.** Diseases of the Colon & Rectum 1999; 42(10):325-132.
4. Adesunkanmi AR. **Acute appendicitis: a prospective study of 54 cases.** West Afr J Med 1993; 12(4): 197-200.
5. Amir M, Shami IH. **Analysis of early appendicectomies for suspected acute appendicitis. A prospective study.** J SurgPIMS 1992; 3-4: 25-28.
6. Ahmad N, Abid JK, Khan AZ, Shah STA. **Acute Appendicitis - Incidence of Negative Appendicectomies.** Ann KE Med Coll2002;8(1):32-4.
7. Wazir MA, Anwar AR, Zarin M. **Acute Appendicitis, a retrospective study.** J Postgrad Med Inst 1998; 12(1): 33-6.
8. Gulzar S, Umar S, Dar GM, Rasheed R; **Acute appendicitis – importance of clinical examination in making a confident diagnosis.** Pak J Med Sci 2005; 21(2): 125- 32.
9. Walker SJ, West CR,et al. **Acute appendicitis: does removal of a normal appendix matter, what is the value of diagnostic accuracy and is surgical delay important?** Ann R CollSurgEngl 1995; 77(5): 358-63.
10. Eriksson S, Granst rom L, Bark S. **Laboratory tests in patient s with suspected acute appendicitis.** ActaChirScand 1989;155(2):117-20.
11. Hale DA, Molloy M, Pearl RH, Schutt DC, Jaques DP. **Appendectomy: a contemporary appraisal.** Ann Surg 1997;225(3):252-61.
12. Bener A, Suwaidi MH, Ghazawi IE et al. **Diagnosis of Appendicitis.** Can J Rural Med 2002; 7(1):26-9.
13. Anderson R , Hugander A , Ghazi S , RavanH , Offenbartl S, Nystron P et al. **Diagnostic value of disease history, clinical presentation and inflammatory parameters of appendicitis.** World J Surg1999; 23(2):133-40.
14. Borgstein PJ, Gordijn RV, Eijsbouts QA, Cuesta MA. **Acute appendicitis – a clear-cut case in men, a guessing game in young women. A prospective study on the role of laparoscopy.** Surg Endosc. 1997;11:923–7. [PubHYPERLINK "http://www.ncbi.nlm.nih.gov/pubmed/9294274"Med]
15. Tiwari A M, Kumar Y, et al; **Can surgical retistrars identify an acutely inflamed appendix? A prospective audit.** Journal of Evaluation in clinical practice 2003;11(5); 507-8.
16. Shum CF, Lim JF, Soo KC, Wong WK. **On table diagnostic accuracy and the clinical significance of routine exploration in open appendectomies.** Asian J Surg2005;28(4):257-61.
17. Epstein MD. **Complications of acute appendicitis.** Ohio Med. 1990;8:602–7. [PubMed]
18. Colson M, Skinner KA, Punnington G. **High negative appendicectomy rates are no longer acceptable.** Am J Surg. 1997;174:723–6. [PubMed]