Appendicitis: Clinical judgement and operative findings
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Abstract
Appendicitis is a common intra-abdominal disorder that requires emergency surgery, with a 6% lifetime risk. At the end of 20th Century, appendicitis still remains a clinical entity and an ongoing diagnostic dilemma as the presentation may be atypical1. Recent literature reports rates of normal appendix removal ranging from 9% to 40%. These results are not different from earlier reports of negative appendix removal between 15% to 35%1,2. In these cases signs of acute inflammation are absent. Some researchers suggest that inflammatory reactions, which might also involve epithelial cells and neuroproliferation, may cause chronic or repeated attacks of acute pain. Furthermore some classes of neuropeptides, such as Substance P (SP) and Vasoactive Intestinal Peptide (VIP) are involved in pain generation2.

Perforation rates range from 11% to 32%. Delay in diagnosis and treatment is associated with more advanced stages of disease. However, delay in patient consultation leads to perforation, whereas physician-related delay has little or no influence on the incidence of complicated appendicitis. Despite new adjuncts in the evaluation the patients with a suspected diagnosis of appendicitis, (Ultrasoundography, Complete Blood Count and Urinalysis) there is no difference in perforation or negative appendectomy rates3.

Aims and objectives
In the present study we tried to evaluate (1) The clinical performance of Physician and Surgeons (With limited adjunctive diagnostic modalities) with histological findings in relation to suspected appendicitis and (2) The factors associated with complicated appendicitis.

Materials and methods
412 consecutive appendectomy cases with suspected appendicitis, were reviewed from March 1997 to December 1999, from Department of Surgery, Medicine, Gynaecology as well as from General practice. Demographic data (Age, Gender), Symptoms (Fever, Nausea, Vomiting, Anorexia, Diarrhoea, Constipation, Dysuria), Clinical signs (Temperature, Pulse, Rebound tenderness, Peristalsis) and white blood cell count were collected. The results of ultrasonography, if done, was obtained. The
delays were categorised as: (a) Delay occurring before first physician consultation, (b) Delay between consultation and surgical intervention.

The status of appendix at the time of operation was obtained from operation note and later on from biopsy report. It was divided into Noncom Dlicated (Inflamed, gangrenous without perforation), Com R'icated (Perforation, abscess, peritonitis) and Normal. Other diagnosis were surgical-gynaecological conditions. Analysis with ANOVA method was carried out to identify which factors could predict the presence of complicated appendicitis.

Results
There were 270 (65.51%) males and 142 (34.49%) females with a mean age of 28.4 ± 14.2 years. 22 (5.33%) patients had surgical digestive tract disorder, and 17 (4.13%) had surgical gynaecological conditions. In the remaining 373 (90.53%) cases, there were 209 (50.73%) cases with noncomplicated appendicitis, 118 (29.64%) cases with complicated appendicitis and 46 (11.16%) cases with normal appendix. After exclusion of cases with other surgical disorder, the percentage of noncomplicated appendicitis, complicated appendicitis and normal appendix removal represents 56.03%, 31.64% and 12.33% respectively.

Anorexia, the most frequent complaint, was present in over 90% of cases. Rebound tenderness, the most important clinical sign, was present in over 80% of cases in each group. The mean temperature was 100.4 ± 0.8°F in noncomplicated appendicitis, 102.1 ± 0.9°F in complicated appendicitis 99.7 ± 1.2°F in normal appendix and 100.5 ± 1.2°F in other surgical conditions. The mean white blood cell count was 12.7 ± 4.7 mm3 in noncomplicated appendicitis, 16.6 ± 4.5 mm3 in complicated appendicitis, 13 ± 4.9 mm3 in normal appendix, 14.9 ± 4.5 mm3 in other surgical conditions. An ultrasound was obtained in 188 (89.95%) of noncomplicated appendicitis, 101 (85.59%) of complicated appendicitis, 37 (80.43%) cases of negative exploration and 28 (71.79%) in other conditions. Results of ultrasonography are shown in Table-I.

Table-I. Results of Ultrasonography.

The different delays are presented in Table -II. Delay between appearance of symptoms and first consultation was significantly longer in cases of complicated appendicitis (3.5 days) and negative exploration (5 Days) versus cases of noncomplicated appendicitis (1.5 days. P<0.001). The decision to operate was immediate in 84.5% of noncomplicated cases, 69% of complicated cases, 42.4% of negative cases and 45.7% of cases with miscellaneous surgical condition.

Table-II. Delay before surgery in different groups of appendicitis patients.

Appendectomy was carried out by "Grid-Iron" incision in all case. No case of mortality was observed in different groups. Complications are listed in Table-III.

Table-III. Complications observed in different groups.

7 patients (3.35%) had wound infection in the group with noncomplicated appendicitis, 11 patients (9.32%) in the group with complicated appendicitis, 3 patients (6.52%) in the group with negative laparotomy and 5 patients (12.82%) in the group with other surgical diseases.
Hospital stay was 3.5 ± 1.7 days in the group with noncomplicated appendicitis, 6.2 ± 2.9 days in the group with complicated appendicitis, 4.1 ± 2.8 days in the group with negative exploration, 7.6 ± 2.4 days in the group with other surgical conditions.

**Discussion**
Clinical judgement still remains the most important diagnostic tool for acute appendicitis; a negative exploration rate of 11.17% in this study represents a good clinical judgement.

No symptoms or signs accurately differentiated among normal, noncomplicated, complicated appendicitis or even other surgical condition. Complicated appendicitis was associated with increased delay before treatment.

It was believed that perforation rate was inversely proportional to negative appendectomy rate. However, the rate of perforation and the rate of negative appendectomy are two independent phenomena. Perforation is primarily due to factors related to the patients. In our study, delay before first medical consultation was significantly longer in complicated appendicitis versus noncomplicated cases (6.2 versus 3.5 days, P <0.001, Table -II). It was also longer (4.1 days) in the group with negative exploration. Delay before surgical consultation and delay before decision to operate were not significantly different in each group. Immediate decision to operate was more frequent in the group with noncomplicated appendicitis.

Ultrasonography was done in 354 (85.92%) cases for diagnosis of noncomplicated and complicated appendicitis as well as to rule out other differential diagnosis. Sonographic evaluation of suspected appendicitis is based on "Graded Compression Technique". This method was first described by Puylaret in 1986 and is based on the observation that normal appendix can be compressed with moderate pressure, but the inflamed appendix cannot be compressed. The US criteria for diagnosis of acute noncomplicated appendicitis include (1) Noncompressibility of appendix. (2) Enlargement of appendix with wall thickening (Axial diameter exceeding 6 mm). (3) Presence of faecolith in the lumen. The criteria for diagnosis of perforated appendicitis include- (1) Altered echogenicity of the surrounding fat. (2) Disruption of submucosal wall. (3) Presence of loculated fluid.

Laparoscopy remains a good diagnostic modality, but because of its invasive nature, we did not use it as a preferred diagnostic tool.

**Conclusion**

The diagnosis of appendicitis still remains clinical entity despite many advances in diagnostic modalities. Complicated appendicitis was primarily associated with a longer delay before the first medical consultation was made. Most of the patients remained symptom-free after operation, even though the appendix appeared normal at histological examination. In most series, the histologically normal appendix specimens are around 20%. This may be due to increased immunoreactivity of peptidergic innervation of appendix for Substance P and Vasorelaxing Peptide (VIP). A large scale clinical as well as immunohistochemical study is required to find-out the way in which nervous system and immune cells interact, producing neuroimmunity in histologically normal appendix, which may be regarded as distinct clinical entity.

**References**
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