



Prevalence of Common Organisms Involved in Acute Appendicitis in Althowra Hospital, Elbyda, Libya

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Authors' contributions

This work was carried out in collaboration among all authors. Author SSM designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Authors NM and MS managed the analyses of the study, managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Background: Bacteria have been involved in the aetiopathogenesis of acute appendicitis. The known of bacteria and antibiotic sensitivity mode will assist in modulating treatment regime for acute appendicitis.

Aim: This study aimed to find out the incidence of the offending organisms in acute appendicitis to determine the most effective antibiotic in a local population in Albyda city.

Methods: Patients with acute appendicitis presenting between January 2019 and December 2019 were studied, At surgery 1cm rim of appendix was cut from the base and sent into the transport medium. The specimen was cultured for aerobic and anaerobic bacteria, Antibiotic sensitivity test was performed.

Results: Sixty patients were conscript; *Escherchia coli*, gram negative bacilli were the commonest organism isolated. They were sensitive to ciproflaxacin (65%), chloramphical (60%) and third generation cephalosporins (52%) resistant to amoxycilin with clavulanic acid and tetracycline. The anaerobes were sensitive to metronidazole (96.5%).

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1. INTRODUCTION

Acute appendicitis is the most common cause of an 'acute abdomen' in young adults, Appendicitis is sufficiently common that appendectomy is the most frequently performed urgent abdominal operation and is often the first major procedure performed by a surgeon in training.

There is a slight male preponderance of 3:2 in teenagers and young adults; in adults, the incidence of appendicitis is approximately 1.4 times greater in men than in women. The incidence of primary appendectomy is almost equal in both sexes [1,2].

1.1 Etiology and Pathogenesis

There is no unifying hypothesis regarding the aetiology of acute appendicitis. Decreased dietary fibre and increased consumption of refined carbohydrates may be important. As with colonic diverticulitis, the incidence of appendicitis is lowest in societies with a high dietary fibre intake. In developing countries that are adopting a more refined western-type diet, the incidence continues to rise. This is in contrast to the dramatic decrease in the incidence of appendicitis in western countries observed in the past 30 years. No reason has been established for these paradoxical changes; however, improved hygiene and a change in the pattern of childhood gastrointestinal infection related to the increased use of antibiotics may be responsible.

While appendicitis is clearly associated with bacterial proliferation within the appendix, no single organism is responsible. A mixed growth of aerobic and anaerobic organisms is usual. The initiating event causing bacterial proliferation is controversial. Obstruction of the appendix lumen has been widely held to be important, and some form of luminal obstruction, either by a faecolith or a stricture, is found in the majority of cases. Obstruction of the appendiceal lumen seems to be essential for the development of appendiceal gangrene and perforation. Yet, in many cases of early appendicitis, the appendix lumen is patent despite the presence of mucosal inflammation and lymphoid hyperplasia. Once obstruction occurs, continued mucus secretion and inflammatory exudation increase intraluminal pressure, obstructing lymphatic drainage. Oedema and mucosal ulceration develop with bacterial translocation to the submucosa.

Resolution may occur at this point either spontaneously or in response to antibiotic therapy.

further distension of the appendix may cause venous obstruction and ischaemia of the appendix wall. With ischaemia, bacterial invasion occurs through the muscularis propria and submucosa, producing acute appendicitis. Finally, ischaemic necrosis of the appendix wall produces gangrenous appendicitis, with free bacterial contamination of the peritoneal cavity. Alternatively, the greater omentum and loops of small bowel become adherent to the inflamed appendix, walling off the spread of peritoneal contamination, and resulting in a phlegmonous mass or paracaecal abscess. Rarely, appendiceal inflammation resolves, leaving a distended mucus-filled organ termed a mucocele of the appendix.

It is the potential for peritonitis that is the great threat of acute appendicitis. Peritonitis occurs as a result of free migration of bacteria through an ischaemic appendicular wall, the frank perforation of a gangrenous appendix or the delayed perforation of an appendix abscess. Factors that promote this process include extremes of age, immunosuppression, diabetes mellitus and faecolith obstruction of the appendix lumen, a free-lying pelvic appendix and previous abdominal surgery that limits the ability of the greater omentum to wall off the spread of peritoneal contamination. In these situations, a rapidly deteriorating clinical course is accompanied by signs of diffuse peritonitis and systemic sepsis syndrome [1,2,3].

Knowledge of the bacteria and their sensitivity to antibiotics will help guide the choice of prophylactic antibiotic and control post operative wound infection. and will determine the choice of antibiotics combination in our region.

This study was designed to determine the bacterial and antibiotic sensitivity mode in acute appendicitis.

2. METHODS

The study was prospective, done over a period of 12 months (January, 2019 to december 2019). All patients aged above 15 years presenting to general surgery Department of the Teaching Athwra Hospital, Albyda city, with clinical diagnosis of uncomplicated acute appendicitis were involved for the study.

The proforma for the study was given and cleared up to all doctors in each unit of the general surgery. the diagnosis was made by the doctors in the units admitting the patients. Informed consent for the surgery was obtained from the patients.

The routine protocol for treatment of acute appendicitis; admitting the patient, start intravenous acces, taking blood samples for full blood count, electrolytes, urea and creatinine; urine analysis, intravenous fluid and antibiotics, and consent for the operation. The surgery was performed by registrar.

The surgical approach was through a grid iron incision. A routine appendicectomy was done. A 1centimeter pieces of tissue from the cecal end of the appendix was cut immediately after the specimen was carved from the caecum. The sample was sent in sterile container to the laboratory for culture.

The choice of antibiotics tested for sensitivity was based on the common antibiotics used in our hospital. data were collected using collection proforma, they were ; clinical features such as abdominal pain, fever, anorexia, vomiting, nausea, right lower abdominal tenderness and rebound tenderness. Others were full blood count, state of the appendix at surgery, culture results and antibiotics sensitivity. Results were presented using tables. data were summarized by frequencies and percentages. The bacterial and their antibiotics sensitivity patterns were mentioned.

3. RESULTS

Sixty patients were participate in the study, 28 (46.6%) males and 32 (53.3%) females with a male: female ratio of 1:1.2. The ages ranged between 15 and 55 years with a median age of 25 years. All the patients had abdominal pain as presenting complaint, 45 patients (75%) had anorexia with the abdominal pain and only 40 patients (66%) had fever. All the patients had right iliac fossa tenderness, 43 patients (71.3%) had rebound tenderness.

The appendix was grossly inflamed in 55 patients (91.6%) including 5 patients with ruptured appendix while remaining 5 patients (8.3%) had normal appendix.

Majority of bacteria isolated were Escherichia coli (32%) Gram Negative bacilli (30%),

posudmonous (5%), staphylococcus (5%), enterobacter (1.7%) No bacterial growth was observed in 4 specimens.

Table 1. Symptoms and Signs of Acute Appendicitis

Clinical feature	Frequency	Percent
Abdominal pain	60	100
Anorexia	45	75
Vomiting	36	60
Pyrexia	40	66
Rt. Iliac fossa pain	60	100
Rebound tendernes	43	71.1

Table 2. The bacteria isolates

Type of bacteria	No.	%
E.coli	32	53.3
Gram negative bacilli	18	30
Psudomonus aeruginosa	3	5
Staphylococcus	3	5
Enterobacter spp.	1	1.7
No growth	3	5

Majority of the aerobic bacteria were sensitive to ciprofloxacin(65%) ,chloramphenical (60%) and ceftriaxone (52%). (80)% of the bacteria were resistant to amoxyclav (amoxycilin + clavulanic acid) and almost all had resistance to tetracycline (86.6%).

The anaerobic bacteria were sensitive to metro_nidazole (96.5%). antibiotics sensiti_vity patterns for bacteria are shown in Table 3.

Table 3. sensitivity patterns for aerobic bacteria

Antibiotics	No.	%
Ciprofloxacin	15	65
Chloramphenical	14	60
Ceftriaxon	12	52
Cephalexin	7	30
Gentamycine	11	47.8
Ceohlazidun	8	34.7
Topramycin	8	34.7
Tetracycline	3	13
Augmentin	3	13

eighteen patients (30%) were discharged on the post- operative day 3, forty two patients (70%) on post-operative day 2.

4. DISCUSSION

Appendicitis is one of the commonest causes of surgical acute abdomen presenting to the

surgeons. The rate of appendicitis is slightly higher in female in this study with a male to female ratio of 1:1.2. Other studies showed higher incidence in male [4]. where peak incidence from 10 to 30 years was found. All the patients had right iliac fossa pain at presentation. Anorexia has been noted to be a constant symptom of acute appendicitis, in this study as only 75% had anorexia. A lower occurrence of anorexia (43%) has been reported by some study [5]. Right iliac fossa tenderness was a common sign in all the patients, rebound tenderness was found in 71.3% of patients and pyrexia in 66%. This is similar to the findings in other study [5] where rebound tenderness was found only in 72.9% of patients. A fever of greater than 38.20C may be a pointer of complicated appendicitis [6]. fever was strongly associated with leucocyte count.

All the candidates were recieved antibiotics either at presentation or at induction of anesthesia. Rocephin and metronidazole has been the practice in the surgical Department for any patient presenting with acute abdomen. As Rocephin is broad spectrum antibiotic that is effective against wide range of Gram positive and negative bacteria [7]. Metronidazole is effective against most anaerobes. Pre-operative (or prophylactic) antibiotics aim at reducing post operative surgical site infection, and not directly targeting at the gut bacteria.. Gross examination of the specimen showed inflamed appendix in most of the specimen (83.3%) and ruptured appendix in 8.3%.The grossly normal appendix rate of 8.3%.

Escherichia coli and Gram_Negative bacilli, were the most common bacteria isolated in this study. Majority of the bacterial isolates were sensitive to fluoroquinolones (ciprofloxacin, sparfloxacin and pefloxacin) and third generation cephalosporin. The aerobes have high resistance to penicillin containing drugs and tetracycline. Anaerobic bacteria are most sensitive to metronidazole. Bacterial sensitivity to flouroquinolones especially ciprofloxacin and sparfloxacin is comparable to third generation cephalosporin like ceftriaxone and ceftaxidime. like ceftriaxone and ceftaxidime. Therefore a combination of ciprofloxacin and metronidazole will suffice as prophylactic antibiotics in uncomplicated appendicitis.the dose of ceftriaxone costs about five times the price of ciprofloxacin. this reduces the cost of antibiotics. The antibiotics may also be the only treatment required especially for the patients with catarrhal inflammatory appendix. who will improving with disappearance of the

features of acute appendicitis. This is will be safe in compare to appendicectomy [8]. in his study concluded that antibiotic treatment in the patients with acute appendicitis is quite effective, and these patients may not need surgery. Intravenous administration of the drugs for 48 hours before changing to oral medication is recommended.

5. CONCLUSION

Appendicitis is a common surgical disease especially among the young adults with almost equal affection of the sexes. Diagnosis of acute appendicitis mainly clinically and its precise in over 90% of cases. Escherichia coli and gram_negative bacilli are the most common bacteria isolated and they are sensitive to flouroquinolones, third generation cephalosporins and metronidazole.

6. RECOMMENDATIONS

Combination of Intravenous ciprofloxacin and metronidazole should be commenced in acute appendicitis as prophylaxis and in treatment of catarrhal appendicitis especially in areas with limited facilities and expertise.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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APPENDIX

GENERAL CONSIDERATIONS

I suggest a grammatical (punctuation rules) and orthographic revision throughout the manuscript. Start sentences with capital letters throughout the text, including the title of the tables.

Conflict of interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors stated that this study did not receive financial support.

I suggest including the approval of the ethics committee for conducting the research.

SPECIFIC CONSIDERATIONS

Title does not address the problem addressed. I suggest including in the title the elements present in the objective: bacteria and antibiotics.

In the abstract session, the stated objective differs from that mentioned in the Introduction. The methods need to be described more clearly (sample number, location, tested antibiotics,). In the results, point out the percentage referring to the prevalence of the types of bacteria found in the sample. Review the writing of the other results. I suggest putting the research outcome.

In the introduction session use current references, that is, published in the last 5 years and based on scientific studies. In the text referring to the subsection Etiology and Pathogenesis, I suggest placing the references for each information cited at the end of each one. Still regarding this subsection, a lot of information is not related to the article. I suggest reporting the relevance and relationship of the bacteria found in cases of acute appendicitis and the sensitivity to antibiotics, their consequences and others, in order to justify the relevance of the manuscript and the problem.

In the methods session I suggest placing the country where the research was carried out. I suggest putting the approval of the Ethics Committee. How has sensitivity to antibiotics been assessed? Are the results presented in the first paragraph pre or post-surgical? In the tables, I suggest adding a caption for the term N°. Tables 1 and 2 were not mentioned.

In the discussion session I suggest discussing the data regarding the results of your research that meet the objective of the study by citing other articles.

In the recommendation session it is not part of the objective of the study.

In the references session all references must be described according to the established model. Review reference 7. References in a scientific study follow a model established by the journal. Use references based on scientific studies.

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