ORIGINAL ARTICLE

Bacteriology of Acute Appendicitis and its Implication for Rationale Use of Antibiotics

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ABSTRACT

Objective: To determine the frequency of common bacteria with antibiotic sensitivity among patients with acute appendicitis.
Study Design: Cross Sectional study
Place and Duration of Study: Department of Surgery, District Headquarter Hospital and Mardan Medical Complex from 1st January 2019 to 31st July 2019
Methodology: All patients were subjected to appendectomy. Patients with antibiotic use in the last one week or those with diabetes were excluded from the study. Biopsy specimen was sent to the laboratory for culture to detect E Coli, Streptococci, Pseudomonas, Klebsiella and Enterococci. All the detected bacteria were tested against commonly used antibiotics.
Results: The mean age was 30 (2.54) years with 113 (63%) male and 66 (37%) female patients. E coli was found in 122 (68%) patients, Streptococci in 48 (27%), Pseudomonas in 45 (25%), Klebsiella in 21 (12%), while 18 (10%) patients had Enterococci. The patients with E Coli, Klebsiella, and pseudomonas frequently responded well to most of the antibiotics like Ceftazidine, gentamicin, and ceftriaxone. Streptococci was most sensitive to ciprofloxacin, gentamicin, and Cefradine.
Conclusion: The most common bacteria in patients presenting with acute appendicitis was E Coli followed by Streptococci, Pseudomonas, Klebsiella, and Enterococci. A minority of these bacteria had developed resistance to the commonly used antibiotics like Amoxicillin, Ciprofloxacin, and Ceftriaxone.
Key words: Amoxicillin, Bacteriology, Broad spectrum, E. coli, Culture, Resistance, Sensitivity

INTRODUCTION

Appendix is a small pouch that is connected to the beginning of the large intestine.[1] Appendix Appendix Appendix A, the most common acute, lifetime-risk surgical condition of the abdomen, is 12 percent men's and 25 percent women's Appendix[2] surgical removal is worldwide the most frequent emergency operation[3] and is long taken into account.

However, there are limited data on acute appendicitis causative agents and on the human appendix' microbial composition.[4,5] In addition to Escherichia coli and Streptococcus Spp. culture-dependent studies have recorded the predominance of Bacteroide species in stable and inflamed annexes.[6] Restored out of the tissue. Recent experiments using hybridisation with fluorescence in situ have shown that local invasions of Fusobacterium species cause help appendicitis in the majority of cases.[7,8] Fusobacterium spp 's presence. In the mucosal lesions, the magnitude and the involvement of other faecal species, including Bacteroides, Eubacteriumrectale, Faecali bacteriumprausnitzii, and Akkermansiamukiniphila are associated positively with the magnitude of the acute appendicitis, and reversed to organ inflammation.[7]

In the appendicitis such as bacteria fragilis, beta hemolytic streptococci, yersinia enterocolitica, eschrichia coli, klebsiella spp and citrobacter frundis, both aerobic and anaerobic, gram-negative and gram-positive bacteria have been described. In the majority of the research, appendicitis was diagnosed. Further experiments have been conducted on parasites but very rare experiments of bacterial appendicitis infection have been carried out9. In this research, the frequency and antibiotic sensitivity of common bacteria in patients with acute appendicitis are determined. The most common operation in the population, irrational antibiotic use is acute appendicitis, which places an extra strain on both the hospitals and the patient. In addition, as described above, acute appendicitis bacteriological studies have rarely been performed and have yet to be performed. This research is intended to classify and assess their antibiotic sensitivity as common bacteria involved in acute appendicitis. The findings of this analysis will give us fresh local data on the present trend of acute appendicitis bacteria. The study findings will be shared with local health professionals to learn about the common bacteria involved in this condition and to make them aware of the most sensitive antibiotics that can help them manage the condition rationally using antibiotics.

MATERIALS AND METHODS

This cross-sectional study was conducted at Department of Surgery, District Headquarter Hospital and Mardan Medical Complex, Mardan during from 12/1/2019 to12/7/2019 after approval from hospitals ethical and research committee. The study included a total of 179 patients with OPD with high suspicions of acute appendicitis. After receiving informed written consent from a neonate parent, all patients were subjected to a thorough clinical review and history. Patients with history of abdominal surgery in the past one month, those with an antibiotic history in the past one week, and those diabetes as diagnosed in medical records have been excluded. Patients were excluded from this care. The appendectomy and biopsy was performed on all patients. Both procedures were conducted using the same basic procedure by a general surgeon. Both biopsy tests were carried out by a single histopathologist with a minimum of five years ' experience to validate the acute appendicitis. The biopsy specimen was further transmitted to the hospitals for the cultural detection of E Coli, Streptococci, Pseudomonas, Klebsiela and Enterococci with histological evidence of acute appendicitis. Topical antibiotics such as ceftazidine, amikacin, gentamicin, ampicillin, ceftriaxone, amoxicielline, ciprofloxacin, cotrimaxazole, cephritin, cefuroxime and doxycycline have been tested in all detected bacteria. All laboratory study has had a minimum of five years of experience with a single specialist microbiologist. The data was entered and analysed through SPSS-20.

RESULTS

Age distribution among 179 patients was analyzed as 68(38%) patients were in age range 21-30 years, 65(36%) patients were in age range 31-40 years, 32(18%) patients were in age range 41-50 years and 14(8%) patients were in age range 51-60 years. Mean age was 30±2.54 years (Table 1). Gender distribution among 179 patients was analyzed as 113(63%) patients were male while 66(37%) patients were female (Table 2). Common bacteria among 179 patients were analyzed as 122(68%) patients had E Coli, 48(27%) patients had Streptococci, 45(25%) patients had Pseudomonas, 21(12%) patients had Klebsiella and 18(10%) patients had Enterococci (Table 3). Stratification of common bacteria with age and gender is given in Tables 4,5 and its antibiotic sensitivity is given in Table 6.

Table 1: Age distribution (n=179)

Age (years)	No.	%
21-30	68	38.0
31-40	65	36.0
41-50	32	18.0
51-60	14	8.0

Table 2: Gender distribution (n=179)

Gender	No.	%
Male	113	63.0
Female	66	37.0

Table 3: Common bacteria (n=179)

Common bacteria	No.	%
E. Coli	122	68.0
Streptococci	48	27.0
Klebsiella	45	25.0
Pseudomonas	21	12.0
Enterococci	18	10.0

DISCUSSION

Our analysis shows that the age mean for SD± 2.54 was 30 years. 60 % of people were male and 37% were female patients. More than 68% of E Coli patients, 27% of Streptococci patients, 25% of Pseudomonas patients, 12% of Klebsiella pacients and 10% in Enterococci. Another study with Escherichia coli as the most common organism (85%) showed similar results. Klebsiella pneumoniae (26%), Streptococcus spp, were less common species. Enterococcus spp. (25%). Aeruginosa (18%) and aeruginosa Pseudomonas (15%). Both P. aeruginosa isolates had amicacin, ceftazide and cefepime sensitivities; but seven of the eight were cefuroxime resistant.[11]

Escherichia coli (57%), followed by Streptococcus spp, was the most common pathogen for another study. Aeroginosa (7.9%), Pseudomonas and Enterococcus spp. (27.6%), (6%) (10.4%). The ease of use of E. Coli was 74.1 percent to quinolones (ciprofloxacin or levofloxacin). The sensitiveness of E. Coli reached 75%, 86%, 90%, 98 and 100%, respectively, for amoxiciellin/clava, Cefoxitin, Ceftriaxone, piperacillin/tazazobactam and carbapenem 10%, 90%, 90%.

E. Coli is the most commonly known Pathogen in this study (such as findings in the past of a ruptured appendix writing, 66.7 percent of all segregates),[12] Likewise, Streptococcus and Enterococcus were the most often reclusive grammes-positive animals.[12,13] The ESBL-supply proportion E. Coli was 3.9%, inside scopes previously registered 3.5-15.4% 14. 14. The rate of E isolation. In the extreme sepsis band, coli was more common, even though this distinction was not factually enormous. Some studies indicated that P. aeruginosa in a ruptured appendix usually has a secluded strain of 19% to 32%; however, this has not been the case in the current study.[15]

Table 4: Stratification of common bacteria according to age (n=179)

Age (years)	E. Coli	Streptococci	Klebsiella	Pseudomonas	Enterococci	P value
21 – 30						
Yes	60	19	18	8	7	0.6469
No	62	29	27	13	11	
31 – 40						
Yes	34	15	14	6	5	0.9896
No	88	33	31	15	13	
41 – 50						
Yes	20	10	9	5	4	0.8922
No	102	38	36	16	14	
51 – 60						
Yes	8	4	4	2	2	0.9503
No	114	44	41	19	16	

Table 5: Stratification of common bacteria according to gender (n=179)

Gender	E. Coli	Streptococci	Klebsiella	Pseudomonas	Enterococci	P value
Male						
Yes	77	30	28	13	11	0.9998
No	45	18	17	8	7	
Female						
Yes	45	18	17	8	7	0.9998
No	77	30	28	13	11	

Table 6: Antibiotic sensitivity pattern against isolated bacterial pathogen (n=179)

Antibiotic	E Coli (n=122)	Streptococci (n=48)	Klebsiella (n=45)	Pseudomonas (n=21)	Enterococci (n=18)
Ceftazidine	S=102 R=20	S=40 R=8	S=41 R=4	S=17 R=4	S=14 R=4
Amikacin	S=100 R=22	S=41 R=7	S=40 R=5	S=16 R=5	S=13 R=5
Gentamycin	S=105 R=17	S=42 R=6	S=40 R=5	S=18 R=3	S=13 R=5
Ampicillin	S=100 R=22	S=40 R=8	S=39 R=6	S=17 R=4	S=14 R=4
Ceftriaxone	S=105 R=17	S=42 R=6	S=39 R=6	S=16 R=5	S=12 R=6
Amoxicillin	S=102 R=20	S=40 R=8	S=40 R=5	S=16 R=5	S=12 R=6
Ciprofloxacin	S=106 R=16	S=43 R=5	S=41 R=4	S=18 R=3	S=13 R=5
Cotrimaxazole	S=102 R=20	S=40 R=8	S=40 R=5	S=15 R=6	S=14 R=4
Cefridine	S=100 R=22	S=41 R=7	S=39 R=6	S=18 R=3	S=12 R=6
Cefuroxime	S=100 R=20	S=39 R=9	S=40 R=5	S=15 R=6	S=13 R=5

The flaws in the study decreased within the time setting and yet without factual hugensis (P = 0.064 and P=0.53, respectively), showed a high sensitivity rate of 97% to secondary and third-period cephalosporines which are most commonly used to treat exact anti-infection. The defences of quinolones were 78.7 percent, with a decrease in the time frame of the analysis measurably high (P = 0.040). Quinolones had 71.4–85.6% coli isolated from contaminated appendix tests.[16] The imperceptibility of coli in anti-infection agents or in the downed MIC breakout in cephalosporins developed by CLSI rules has been extended. For the majority of anti-infectious substances E. Colli vulnersity rates reported by Bochicchio et al in this study were slightly lower, with the rate of helplessness for quinolones. In either previous research the ESBL-creation of life forms was especially delicate in piperacillin/tazobaktam (12/12, 100 percent). Both studies found high susceptibilities to carbapenem, amikacin and piperacillin/tazobactam. Streptococcus species lacked defence against penicillin at 68.9%, with all strains susceptible to ceftriaxone. P. aeruginosa disconnected in this study, however, was less highly affected to quinolones (87.5%) and was deeply vulnerable to amicacin, cefepim, piperacillin/tazabactam and carbapenem.

Antimicrobial care should be available to all patients who undergo an operation for an infected appendix. Fitting antimicrobial care requires operators who reject voluntary and robust gramme negative modes of life and anaerobic living creatures. In confused a ruptured Appendix 18, there is knowledge that the absence of an empirical cure for an anti-infection results in increased dreariness or dissatisfaction. Should impermeability of a specific antitoxin occur within 10 – 20% or a larger number of confines of the group's usual intra-stomach pathogen, the use of that specialist should be avoided. In a study published in Taiwan, a quinolone used to treat a group of pollutants from inside the stomach, such as E. Coli was observed that ciprofloxacin and levofloxacin were helpless to around 82–85 percent 19 Notwithstanding the resistance rate of E in this concentrate. Coli is > 20 percent for quinolones; in Korea it is not careful to use them as an experimental anti-toxin. Cephalosporins of the second and third period appeared to be a suitable treatment according to our results, according to all accounts. With the presumption that social checks for intraoperative examples do not affect the expectation of patients with a ruptured appendix, multiple basis research in routine communities cannot be carried out.[20,21] In either case it may be beneficial to consider improvements in helplessness and choose fit anti-infection agents, given the reality of increasing anti-toxin resistance. Anaerobial societies are a bit large for intra-stomach-packed patients if they are given empiric antimicrobial pathogens dynamically. Although the study did not contain refined anaerobic microorganisms, studies about the anaerobic society have shown that bacteroides fragilis along with E. Coli, in an infected appendix 18, was the most frequently uncontaminated pathogen. An infected appendix for anaerobic protection testing, B was investigated previously. B. It has been observed that fragilis is over 95% potent to metronidazole. For future research the refined anaerobic microscopic species could be considered when extending the anaerobic imperceptibility of bacteria to metronidazole.

CONCLUSION

The most common bacteria in patients presenting with acute appendicitis was E Coli 68% followed by Streptococci 27%, Pseudomonas 25%, Klebsiella 12% and Enterococci 10%.

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