Original Article

Pattern of Microbes Associate to Acute Appendicitis at Liaquat University Hospital

Acute Appendicitis

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ABSTRACT

Objective: To identify the most common of causative microbes associate to acute appendicitis and choice of different antibiotics according to sensitivity.

Study Design: Observational and Prospective Study

Place and Duration of Study: This was carried out in the Department of Surgery, Liaquat University Hospital, Hyderabad from January 2009 to January 2010.

Materials and Methods: In this study patients various cultures obtained at the time of appendectomy was sent under sterile conditions for isolation of organisms and their sensitivity were sent to university hospital. The condition of the appendix regarding catarrhal inflammation, perforation and gangrene were noted on the preformed. Cultures were sent from the appendix wall and peri appendix peritoneal fluid for aerobics and anaerobic cultures.

Results: Total number of 100 culture reports of the patients who underwent open appendectomy was enrolled in this study irrespective of sex. The Pipracillin + Amikacin was the most effective (41.8%, n = 55) antibiotic followed by Ceftazidime + Amikacin, the second commonest effective antibiotic in 17 patients (30.9%).

Conclusion: We conclude that the most common isolated organisms of the aerobes were found sensitive against cephalosporins. Pipracillin tazobactum and Quinolones are the most sensitive antimicrobial to most of the pathogens isolated in our study.

Key Words: Microbes, Acute Appendicitis, Appendectomy

INTRODUCTION

Acute appendicitis is acute abdominal pain condition and very common surgical emergency, 10% of the population globally effected, mostly found b/w age of 10-30 year and its caused by inflammation, obstruction of the appendix lumen by faecolith, neoplasia or any foreign body.[1] Scientists suggested that the appendix serves as a reservoir for healthful bacteria which may take part in the process of acute inflammation.[2]

It has been estimated that approximately six percent of the population effected by acute appendicitis during their lifetime.[3]

Pathologically appendicitis is based on examinations, where it is considered that the primary location initiates by limited necrosis of the mucous epithelium "appendicitis catarrhalis", and the process of expanding wedge shaped throughout the bowel wall "phlegmonosa appendicitis", and after that, infection and consequential creates gangrene "appendicitis gangrenous" with perforation appendicitis "gangrenous perforativa" and the development of diffuse peritonitis.[4,5]

SSI (surgical site infection) is the very common post operative complication presenting in 5 to10 percent of all cases.[6] The organisms responsible are usually a mixture of Gram-negative bacilli and anaerobic bacteria, predominantly bacteriods species and anaerobic streptococci.[7] SSI (surgical site infection) result in increased post operative morbidity and financial cost.[8,9] The advantage of prophylactic antibiotics to decrease the complications following open (appendectomy) has been demonstrated.[10] Single dose prophylactic antibiotic (intravenous cefuroxime 2g + metronidazole 500mg) at the time of induction of anesthesia reduce the surgical site infection to (6.5%).[11] While multiple doses of the similar antibiotics given at different intervals decreases the surgical site infection to (0.32%).[10] The optimum time and schedule of antibiotics is unknown and thus there is the potential for either under treatment with increased risk of post operative infections or over treatment with the risk of creating microbial resistance.[10]

Antibiotics gained a place in the treatment of acute appendicitis when the bacterial incidence was demonstrated. Culture swabs were obtained routinely during open appendectomies to guide the uses of antimicrobial agents. While recent antimicrobial treatment use has become prophylactic as well as empirical.[12]

This study was carried out to find out the common causative organisms' responses for acute appendicitis to determine the choice of antibiotics in complicated appendicitis.

MATERIALS AND METHODS

This observational prospective study was carried out in the Department of Surgery, Liaquat University Hospital, Hyderabad/Jamshoro from January 2009 to January 2010 on100 culture reports from patients of acute appendicitis All patients more than 12 years of age, irrespective of sex who underwent open

appendectomy, with evidence of clinical diagnosis of acute appendicitis were included whereas the patients under 12 years of age, Pathologies other than appendicitis diagnosed during appendectomy including carcinoma appendix and carcinoid tumor and Pregnant women's who underwent appendectomy and Laparoscopic appendectomy were excluded. Data was collected in a pre designed Performa and results were tabulated at the end of this study with microbial patterns responsible for acute appendicitis and their antibiotic sensitivity on culture reports. Data was entered and analyzed in statistical program SPSS version 16.0.

RESULTS

Total of 100 cases which underwent open appendectomy, their appendicular tissue and peri appendeceal peritoneal fluid were sent to (Research diagnostic laboratory of LUH) to identify aerobic and anaerobic culture and its sensitivity to different antimicrobial agents.

In the present study no growth was observed in 08 specimens (8.0%, n = 100) while 92 (92.0%, n = 100) patients were observed with positive culture and the greatest number of acute appendicitis was observed in age groups, 12-24(38%) and 25-36(34%) years in all study participants (Table No.1).

Further distribution from positive culture (92 patients), E.coil (59.8%) was found to be the most commonly involved pathogen in 55 patients followed by Klebsiella (21.7%), Proteus (4.3%) species and Staphylococcus Aureus (3.3%) (Chart No.1).

Table No. 1: culture frequency & age groups (n = 100)

	Number of cases	Percentage
Culture		
Positive	92	(92.0%)
Negative	08	(8.0%)
Age groups		
12 – 24	38	(38.0%)
25 – 36	34	(34.0%)
37 – 48	20	(20.0%)
More then 48	08	(8.0%)

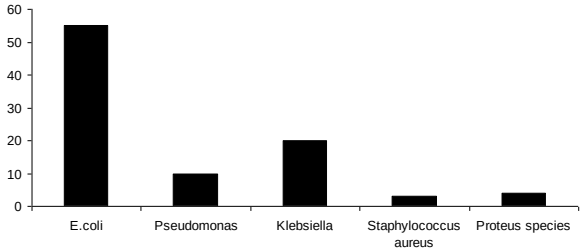

Chart No. 1: Frequency of Microbes (n = 92)

Table No. 2: Use of antibiotics with culture & sensitivity (n = 92)

	E. coli n = 55	Pseudo-monas n = 10	Klebsiella n = 20	Staphyloco-ccus aureus n = 3	Proteus species n = 4
Pipracillin + Amikacin	23(41.8%)	4(40.0%)	0	0	0
Ceftazidime + Amikacin	17(30.9%)	2(20.0%)	0	1(33.3%)	0
Ciprofloxacin + Amikacin	15(27.3%)	0	0	0	1(25.0%)
Ticarcillin/calvulanate+Amikacin	0	0	9(45.0%)	0	1(25.0%)
Ceftriaxone + Amikacin	0	0	5(25.0%)	0	0
Cefipime + Amikacin	0	0	4(20.0%)	0	2(50.0%)
Fosfomycin + Amikacin	0	0	2(10.0%)	0	0
Meropenem + Amikacin	0	0	0	0	0
Meropenem + Vancomycin	0	4(40.0%)	0	2(66.7%)	0

Table No. 3: Sensitivity of Antibiotics Against Aerobic Organisms

S.No	Group	Antibiotics	Senstivity
1	Beta- lactamase Resis: penicillin	Amoxycillin Plus Clavulinic Acid	82%
2	Cephalosporins	Cefotaximf	88%
		Ceftazidime	86%
		Ceftazidime.	79%
		Cefirlazoni	82%
		Cefixime	78%
3	Qunolones	Ofloxacin	79%
		Ciproxin	79%
		Azteronam	79%
4	Aminoglycosides	Tobramycin	74%
		Amikacin	74%
5	Carbapenum	Imepenum	82%
		Meropenum	82%

The results of this study showed that E. coli was the common organism which was seen in 55(55.0%, n = 100) patients, the Pipracillin + Amikacin was the most effected 23(41.8%, n = 55) antibiotic sensitive to most of the organisms. Ceftazidime + Amikacin were the second common effected antibiotic against patients of E. Coli (30.9%). Second most organism Klebsiela was found in 20(20.0%, n = 100) of patients, the Ticarcillin/calvulanate+Amikacin was the most sensitive antibiotic (Table no.2).

Aerobic cultures of the specimen showed sensitivity of 82% with Penicillin group (Amoxycillin plus Clavulinic acid), cephalosporins and carbapenum groups sensitivity found 88% and 82% while Quinolones and aminoglycosides showed a sensitivity of 79% and 74% respectively (Table No.3)

Anaerobic culture showed 100% sensitivity for the metronidazole and vancomycin (Table No 4).

Table No. 4: Sensitivity Of Antibiotics Against Anaerobic Organisms

S.No	Antibiotic	Sensitivity
1	Metronidazole	100 %
2	Vancomycin	100%
3	Clindamycin	98%
4	Beta lactamase resistant penicillins	96%
5	Co-trimaoxazole	60%
6	Chloramphenicol	38%

DISCUSSION

Acute appendicitis is the very common surgical emergency the prevalence according to sex mostly both gender equally affected and according to age appendicitis mostly found in adult patients, as in this study age groups, 12-24(38%) years and 25-36(34%) years are mostly affected, same results were found in another study mostly affected age group was (10 -30) years.[1]

Appendicitis is almost invariably secondary to a microbial infection the commonest pathogen examined has been E-coli followed by pseudomonas and kliebsiella observed in a high quantity from isolated culture.[13] The pathogens and their sensitivity to several antibiotic has been reported in different studies in literature.[14]

In the present study, E.coli was the most common micro organisms found in (55%, n= 100) followed by Pseudomonas (10.9% n = 100) and Klebsiella (21.7%). The same observation is comparable to the study.[15] in which reported E. coli 51.2% followed by Pseudomonas (8.9%) and Klebsiella (5.6%) in his study. In another study, the most common organism isolated was Escherichia coli and the next most common were Enterococcus and other Streptococcus species whereas Pseudomonas, Klebsiella, and Bacteroides species were less commonly isolated.[16]

In this study E. coli was found most common organism which was seen in 55(55.0%, n = 100) patients, the Pipracillin + Amikacin was the most effected 23(41.8%, n = 55) antibiotic sensitive to most of the organisms. Ceftazidime + Amikacin were the second common effected antibiotic against patients of E. Coli (30.9%). Second most organism Klebsiela was found in 20(20.0%, n = 100) of patients, the Ticarcillin/calvulanate+Amikacin was the most sensitive antibiotic Aerobic cultures of the specimen showed sensitivity of 82% with Penicillin group (Amoxycillin plus Clavulinic acid), cephalosporins and carbapenum groups sensitivity found 88% and 82% while Quinolones and aminoglycosides showed a sensitivity of 79% and 74% respectively.

The *E. coli* sensitivity to cefazolin (56.8%) was significantly higher than other studies.[17,18] Klebsiella pneumonia sensitivity to ciprofloxacin varied from 80.7% in Latin America to 91.4% in Europe countries which is comparable to the sensitivity rate in this study (75%), however, Klebsiella pneumonia sensitivity to ampicillin was 20% which is much lower than the reported value in middle east (75.6%) and USA (91.3%).[18.]

As compare to results antibiotic sensitivity of our study, there are many procedures for uses of antibiotic treatment and profilactic treatment in acute appendicitis which are dfferent in group of antibiotics and in one or more antibotics as are ampicillin, gentamicin and metronidazol or klindamycin, cefuroxim and klindamycin in therapy purpose or cefofetan or cefuroxime in profilactic purpose.[19,20,21] In another study reported that complicated intra abdominal infection, ertapenem, meropenem, imipenem/cilastatin, ticarcillin clavulanate, and piperacillin-tazobactam as single agent treatment or Ceftriaxone, cefotaxime, cefepime, ceftazidime, each in combination with metronidazole, gentamicin or tobramycin, each in combination with metronidazole or clindamycin, and with or without ampicillin are recommended.[22]

CONCLUSION

The results of this study concluded that the E. coli *was* found most common orgnism and the highest sensitivity to Pipracillin Tazobactum and Amikacin. Ampicillin showed the lowest antibacterial activity against most of the microbial isolates. We also conclude that the choice of antimicrobial therapy should be based on culture growth and antibacterial sensitivity tests.

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