The Bacteriology of Acute Complicated Appendicitis and its Septic Complication in Sulaimani, Iraq

Faruk H. Faraj and Falah H.Amin
Collage of Medicine, University of Sulaimani , Kurdistan Region/Iraq.

Abstract

Objectives: to determine the role of bacterial infection in acute complicated appendicitis and its septic complications in sulaimani territory. Design: Prospective study . setting: Sulaimani Teaching Hospital(STH),Sulaimani.Iraq. Methods : Study of 50 patients (29 men and 21 women, aged 9-60 years with mean age of 25.7 years) with acute complicated appendicitis, at the department of surgery, STH, between the 1st of Sept.1995 to 30th of Oct.1996, in order to examine the relevance of culturing peritoneal swabs for the antibiotics given and to determine the bacteriology of the cases and wound infection . Results: E.Coli was the most frequently isolated aerobes while Bacteriods were the most common anaerobes in both aspects of the study . In 90% of these cases, the cultured bacteria were completely sensitive to gentamycin and metronidazole(flagyl) and we conclude that these drugs are the most useful agents in the management of complicated cases of acute appendicitis and are cost-effective and no deaths occurred in this study.

Keywords:-bacteriology of complicated appendicitis. Septic complications of complicated appendicitis.

Introduction

Acute appendicitis(AA) is the most common cause of acute surgical abdomen[1,2,3,4] ,and more common in males[1,5,6] . A A is the most common cause of acute abdomen in children older than one year of age[7]. Bacteria play an important role in the pathogenesis of acute appendicitis[8] .

Prophylactic antibiotics will reduce the rate of wound infections after appendectomy[8,9].

Appendectomy is the most common surgical procedure performed for acute abdomen[1,2,5] and wound infection is the most common source of morbidity in appendicitis[10].

The authors performed this study to find out the bacteriology in acute complicated appendicitis . To show the post operative septic complications in our locality, subsequently to determine the best antibiotics for these cases . To determine if these antibiotics will improve the outcome of appendectomy . To detect their effects on hospital stay, morbidity , mortality rate and consequently if they are cost-effective .

Patients and methods:

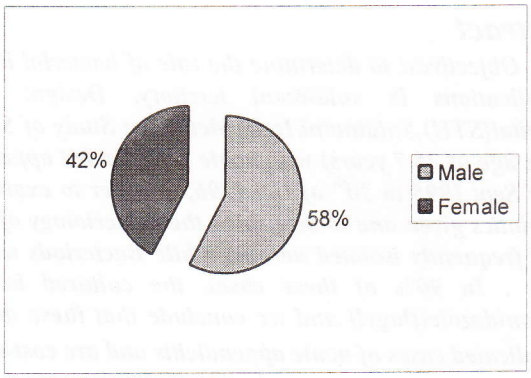
uring the period of one year, from Sept.1st 1995 to Oct.30th 1996, 180 patients with suspected acute appendicitis admitted to our surgical unit. Fifty patients were selected with complicated (gangrenous or perforated) appendicitis and studied prospectively. Data collected regarding age ,sex, clinical diagnosis, WBC, operative approach and findings. Swabs were taken from the peritoneal fluids, abscess contents(if present), appendiceal tissue (obtained so as to exclude the lumen) for culture . Data collected regarding antibiotics were used , and accordingly the cases divided into 2 groups , each 25 cases. Group A received triple antibiotics(metronidazole-flagyl, garamycin and ampicillin) . Group B received only two antibiotics, flagyl and garamycin) . Data collected regarding the costs of these antibiotics , their course and the duration of hospitalization .

All patients were managed postoperatively in the hospital until three criteria were met permitting discharge:
A-resolution of fever. B-normalization of WBC count and C-normal results of clinical examination .

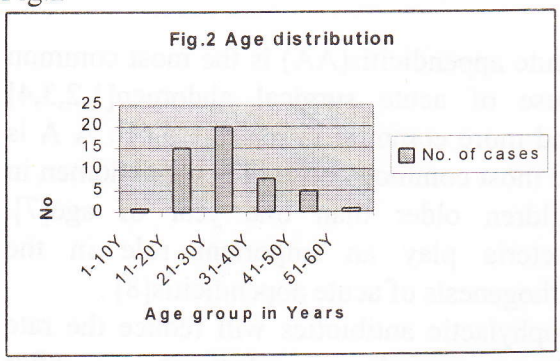
The patients were followed postoperatively in the outpatient clinic of STH for the outcome of surgery including data about wound infection and readmitted cases.
Regarding cost and infection rate ; t-test was used for test of significance.

Results

Patients characteristics-Of 50 cases, 29 were male(58%) and 21 were female(42%) with male to female ratio of 1.38:1
Fig 1 shows the sex distribution of AA in this study.
Fig.1



The age range was from 9-60 years with peak age at 10-30 years , with the mean age of 25.7 year. Fig 2 shows the age distribution of complicated AA in this study
Fig.2



In forty seven cases (94%) the WBC were above 10000/mm^3, while in the rest were between 7000-9500/cu.mm.

The gross appearance of appendix in these selected, advanced, complicated cases were; gangrenous or perforated appendix.

By using optimal sampling, transport and culture techniques, the bacteriological results were as follows: in 90% of the cases the cultures were positive and in 70% of these cases there were mixed infection . E. coli was the most commonly isolated aerobes while Bacteriods species were the most commonly isolated anaerobes. Both of these microorganisms were isolated in the majority of cases.

Table 1 shows the type of microorganism isolated , their prevalence and the percentage of their distribution.Table 1 :

Type of M.O (microorganism)	*Prevalence (No. of cases)*	*%*
E.Coli	40	80
Bacteriods	39	78
Mixed infection	35	70
Streptococcus	4	8
Proteus	2	4

The hospital stay varied from 1 day to 15 days with mean hospital stay of 4.2 days.

Seven cases (14%) developed wound infection. five cases were minor wound infection and treated as outpatient. Two cases developed severe wound infection and they were readmitted to the hospital with readmission rate of (4%),

In 4 cases, single microorganism isolated in the wound while mixed infection in 3 cases. E.coli detected in 5 cases (71.4%), Bacteriods in 4 cases (59.1%) and streptococci in 1 case (14.2%)

Table 2 shows the bacteriology of intraperitoneal isolate and that of the infected wounds :Table 2:

Intraperitoneal Culture			*Wound infection isolate*	
M.O	*No.of Cases*	*%*	*No. of cases*	*%of infected Wonud*
E.coli	40	80	5	71.4
Bacteriods	39	78	4	59.1
Mixed Infection	35	70	3	42.8
Strept.	4	8	1	14.2
Proteus	2	4	1	14.2

No deaths occurred among these patients.

:The cases were revised statistically:

Table 3 shows means and standard deviations of the trait studied.

Col.1 , 3 from group 1, col.2,4 from group 2.

Col.1 and 2 for cost analysis , while col.2 and 4 for infection rate.

Table 3 :

	Cost		Infection	
	Col.1	Col.2	Col.3	Col.4
Count	25	25	25	25
Average	367.2	269.8ID	0.12	0.16
Standard deviation	15.667	11.8568	o.331662	0.374166

Regarding the cost:

Since the computed P-value is < 0.05 , we can reject the null hypothesis in favor of the alternative, indicating significant difference in the costs of the medications between the two groups.

Regarding the infection rate in the two groups:

. Since the computed P-value is > 0.05 , we cannot reject the null hypothesis, indicating non-significant difference in the infection rates between the two groups.

Discussion:

AA commonly occurs in the 2nd and 3rd decades of life with a male predominance [1,2,3,4,5,6], this is in agreement with our study. The diagnosis of AA is basically clinical , supported by elevated WBC and radiological investigations including abdominal ultrasound. The WBC in this study was above 10,000/ cu.mm in 94% of the cases, while it was less than that in (6%) of the cases.

Prophylactic antibiotic therapy (including; metronidaxole 500mg i.v, gentamycin 80mg i.v with ampicillin 500 mg i.v in group A and without it in group B, started before surgery , to reduce postoperative septic complications [10,11,12,13], while in the Italian study[12], they categorized the cases of complicated AA into two group , (A) received prophylactic antibiotics and (B) , only received antibiotics after surgery and their results were:

	A	B
Septic complications :	18.2%	33.3%
Wound infection :	13.6%	23.8%

This is in agreement with our results in that prophylaxis will reduce the rate of wound infection.

The antibiotics were adjusted postoperatively according to culture and sensitivity, and usually continued as therapeutic for 5-7 days in the majority of cases (90%), in the form of oral metronidazole 500mg t.d.s and oral ampicillin 500mg q.d.s, and this was comparable to others [10,12].

In all cases the wound closed primarily which were very convenient for the patients and practical as in other studies [14,15]

The perioperative cultures of pus coming from the peritoneal cavity and appendiceal tissue were positive in 90% of the cases, while they were positive in 83.7% in Italian study [12] and in 70% were mixed aerobe-anaerobe cultures, while they were mixed infection in 53.5% in Italian study [12].

The bacteriological results(table 2) were comparable and similar to other studies [12,16,17,18,19].

In this study, in 90% of the cases the cultured bacteria were completely sensitive to the gentamycin and metronidazole but in 20% they were resistant to ampicillin, while in Danish study [20] in 65% of the cases the cultured bacteria were sensitive to these agents.

The incidence of septic complications was 14%, while it varied in other study from 3.4% in pediatrics[10] to 34% in other studies[12,21,22,23], with systemic prophylactic antibiotics including metronidazole [23].

In our study, the infected cases , in both groups, were revised and statistical analysis revealed that :there was not statistically significant difference in the infection rate between the two groups, as P-value is more than 0.05, indicating that using 3 antibiotics will not reduce the rate of wound infection postoperatively and is unnecessary.

Costs of the medications(triple or double antibiotics) : Statistical analysis revealed;

There was a statistically significant difference between the costs in the two groups ,as the P-value is less than 0.05 , indicating that the use of triple antibiotics is more expensive and unnecessary.

The mean hospital study in our study was 4.2 days, while it was between 2.1 to 10.7 days in the other studies [10,12,23,24].

Conclusion

As E-coli and Bacteriods species were the most common micriorganisms that were isolated in the majority of cases of complicated appendicitis, and were sensitive to gentamycin and metronidazole in 90% of the cases . The routine perioperative systemic administration of these antibiotics which cover both these aerobes and anaerobes, and the cost of these two drugs are less than the routine triple antibiotics usually used in these setting, besides, there was not a statistically significant difference in the rate of infection in the two groups. We conclude that these two drugs are cost effective and better than the routine triple therapy in our locality and no deaths occurred in this study.

Acknowledgement

I am greatly thankful for the medical and paramedical staff of the laboratory of STH for their great help , and also to Miss Awring M. A. from the secretary of Anatomy and high education for her great help. I am very thankful to Dr. Shawnim Abdulla Ph.D Science in Statistics and also we owe a lot to Mr. Nizar A.K Msc statistics for their great help.

References

[1]F.H.Faraj. The pattern of acute abdomen in Sulaimani Teaching Hospital. *The Journal. Of Zankoy Sulaimani*. 2000, **3(1)**,54-70.

[2] Datubo-Brown –DD; Adotey JM. Pattern of urgical acute abdomen in the University of Port Harcourt Teaching Hospital.West *Afr.J.Med.*1990,**9**(1), 59-62.

[3]Kim-JP; Kim-SJ; Lee –JH. Surgery in aged in Korea.*Arch-Surg* 1998 ,**133**(1), 18-23.

[4]derson-R; Hoganden-A; Thulin-A. Clusters of acute appendicitis. Further evidence for an infectious etiology. *Int.J. Epidemiol* 1995 , **24**(*4*), 829-33

[5]Miettinen –P; Pasanen-P; Lathenin –J.Acute abdominal pain in adults.*Ann-Chir-Gynecol.* 1995,85(**1**), 5-9.

[6]Madiba-TE; Hafejee-AA; Mbte-DL Appendicitis among African patients at King Edward VIII Hospital. Durban, South Africa.*East Afr.Med.J* 1998 ,75(**2**), 81-4.

[7]Waldschmidt –J. Acute appendicitis in the child. *Zentralbl-Chir*-1998; 123 Suppl **4**:66-71.

[8]Guasco-C; Rouchetto-F; Milani-P. Bacteriology of abdominal pus in 43 cases of acute appendicitis. *G-Batheriol-Virol-immunol.* 1991 , **84**(1-12), 77-88

[9]Gorbach-Sl. Antimicrobial prophylaxis for appendectomy and colorectal surgery. *Rev-Infect-Dis.* 1991 Sep-Oct, 13 Suppl **10**: 815-20.

[10]Neilson-IR; Laberge-JM. Current therapeutic recommendations. *J-Pediatric-Surg.* 1995 ,25 (11), 1113-6.

[11]Jones-MW; Paterson-AG. The correlation between gross appearance of the appendix at appendectomy and histopathological exam. *Ann-R-Coll. Surg.Engl.*1998 ,**70**(2), 93-4.

[12]Ronchetto-F; Azzario-G; Pistono –PG; Guasco-C. Gangrenous and perforating appendicitis in a provincial hospital: a 48-month retrospective study. Clinical and

microbiological aspects, course and postoperative morbidity. *G-Batteriol-Virol-Immunol.* 1990 , **83**(1-12), 27-41

[13]Roland-M. Antimicrobial prophylaxis in elective colorectal surgery and appendicitis. *Scand-J-Infect –Dis*-Suppl.1990,**70,**36-44

[14]Serour-F; Efrati-Y; Klin-J; Gorenstein-A; Vinograd-I. Subcuticular skin closure as a standard approach to emergency appendectomy. Prospective clinical trial. *World –J-Surg.* 1996, **20**(1), 38-42.

[15]Onwuanyi-ON; Evbuomwan-I. Skin closure during appendicectomy: a controlled trial of subcuticular and interrupted transdermal suturetechniques. *J-R-Coll-Surg-Edinb.*1990; 35 (**6**):353-5

[16]Jindal-N; Kaur-GD; Arora-S. Bacteriology of acute appendicitis. *Indian-J-Pathol-microbiol.* 1994,**37**(3), 297-305.

[17]Okoro-IO. The bacteriology of appendicitis and its septic complications in Zaria, Nigeria. *Trop-Geogr-Med.*1990, **42** (1): 13-6

[18]Bennion-RS; Thompson-JE; Finegold-SM. Gangrenous and perforated appendicitis with peritonitis: treatment and bacteriology. *Clin-Ther.* 1990, Suppl **C**;31-44.

[19]Bennion-RS; Baron-EJ; Thompson-JE; Downes-J; Summanen-P; Talan-DA. Bacteriology of gangrenous and perforated appendicitis-revisited.*Ann-Surg.*1990 , **211** (2), 165-71.

[20]Rose-M; Steendahl-E; Kay-L; Larsen-T. Relevance of cultures for the antibiotic treatment in
acute perforated appendicitis. *Ugeskr-Laeger.*1993, 20; **155**(51), 4173-6

[21]Martinez-De-Jesus-FR; Gallardo-Hernandez-R; Morales-Guzman-M; Peres-Morales-AG. Delay in hospitalization, diagnosis and surgical intervention ;1995, **60**(**1**): 17-21

[22]McCahill-LE; Pellegrini-CA; Wiggins-T; Helton-WS. A clinical outcome and cost analysis of laparoscopic versus open appendectomy. *Am-J-Surg.* 1996 ; 171 (**5**): 533-7.

[23]el-Sefi-TA; el-Awady-HM; Shehata-MI; al-Hindi_MA. Systemic plus local metronidazole and
cephazolin in complicated appendicitis: a prospective controlled trial.*J-R-Coll-Surg-Edinb.*1989 ,**34**(1), 13-6.

[24]Haussler-B; Schrader-WE; Witt-K. Incidence of appendectomy and length of hospital stay in a region of West Germany.*Soz-Praventimed.*1989,**34**(3), 131-5

لیکۆڵینەوە لەسەر ڕۆڵی بەکتریا لە ئاوسانی ئاڵۆزی ڕیخۆڵە کوێرە لەشاری سلیمانی

فاروق حسن فرج و فلاح حمە ئەمین

کۆلێجی پزیشکی/ زانکۆی سلێمانی / هەرێمی کوردستان - عێراق

پوختە

ئامانجی ئەم لیکۆڵینەوەیە ئەوەیە بۆدەست نیشانکردنی ڕۆڵی بەکتریا لە ئاوسانی ئاڵۆزی ڕیخۆڵە کوێرە لە شاری سلیمانی دا.وە ئەم لیکۆڵینەوەیە لەسەر ٥٠ نەخۆش کراوە کە ٢٩نێرو ٢١مێ بوون وتەمەنیان لە ٩-٦٠سالّ بووە .تێکڕای تەمەنیان ٢٥,٧ سالّ بووە وەلێکۆڵینەوەکە لەبەشی نەشتەرگەری نەخۆشخانەی فیرکاری لە سلیمانی لە؟ ئەیلولی ١٩٩٥تا٣٠ تشرینی یەکەم ١٩٩٦ ئەنجام دراو، ئەم نەخۆشانە کراون بە دوو گروپی ٢٥ کەسییەوە وە گروپی یەکەم ٣ دەرمانی دژی میکرۆبیان وەرگرتوە پیش نەشتەرکەری کە بریتی بووە لە: میترۆنیدازۆل (فلاجیل),گرامایسین,ئەمپسلین, وە گروپی دووەەم تەنها دەرمانی بەکەم و دووەمیان وەرگرتوە وە بۆزانینی ئایا تا چەند ئەم دەرمانانە لەم کاتەدا کاریگەربووە وە بەکتریای ئی کۆلای وەبەکتریۆید (E.coli,Bactriods)لەزوربەی حاڵەتەکاندا هەبووە وە ئەودەرمانانەی سەرەوە ڕێژەی ماکەکانی ئەم نەخۆشیە کەم دەکاتەوە وەهەروەها نەخۆش کەمتر لە نەخۆشخانە ئەمێنێتەوە ,وەهیچ نەخۆشێك نەمردووە سەرجەمی خەرجی ئەم نەخۆشانە کەم دەکاتەوە

دراسة البكتريا في حالات التهاب المعقد للزائدة الدودية في السليمانية

فاروق سن فرج وفلاح حمه امين

كلية الطب / جامعة السليمانية / اقليم كردستان - العراق

الخلاصة

ان الهدف من هذه الدراسة هو لتحديد دور البكتريا في حالات التهاب المعقد للزائدة الدودية في منطقة السليمانية .وان هذه البكتريا في حالات التهاب المعقد للزائدة الدودية في منطقة السليمانية . / وان هذه الدراسة شملت٥٠ مريضا مصابابالتهابالمعقدللزائدة الدودية وكان عدد الرجال ٢٩وعددالنساء ٢١ ومن الاعمار ٩-٦٠ سنة ومعدل أعمار المرض ٢٥,٧ سنة واجريت الدراسة في قسم الجراحة من المستشفي التعليمي في السليمانية في الفترة ١ ايلول-١٩٩٥ لغاية ٣٠تشرين الاول ١٩٩٦ وقسمت المرضى الى مجموعتين وان كل مجموعة شملت ٢٥ مريضا، وان المجموعة الاولى اعطيت لهم ٣ مضادات حيوية قبل العملية و هي فلاجيل (ميترونيدازول)، كرامايسين, امبسلين بينما اعطي دواءين (فلاجيل و كارامايسين) للمجموعة الثانية . لمعرفة فيما اذا كانت ادوية كفوءة لتقليل مضاعفات هذه التهابات وتبين ان البكتريا: Bacteriods, E.coli هي من اهم الجراثيم الموجودة في هذه الحالات المعقدة وان استعمال الادوية آنفة الذكر تقلل نسبة مضاعفات وفترة بقاء المريض في المستشفى .

ولم تسجل حالات وفاة في هذه الطريقة من المعالجة وان هذه الطريقة تقلل من مضاعفات المرضى وتقلل تكاليف معالجتهم ولذلك يساهم في تحسين اقتصاد البلد.

وەرگیرا لە ٢٠٠١/١/٢٥دا وەپەسەندکرا لە ٢٠٠٢/٩/١٦.

Received 25 /1/2001 .Accepted 16/9/2002.