Anorectal Abscesses Bacteriology and the Antibiotics Susceptibility Testing

Hussein A. Al- Aljasmawy*; Maha K. Ali**

*Department of Surgery, Hilla Teaching General Hospital, Babylon, Iraq.
** Department of Microbiology, Hilla Teaching General Hospital, Babylon, Iraq.

Abstract

Background: Anorectal abscesses are a common surgical problem, and the most common disease of the anorectum.
Objectives: to identify the microorganisms commonly causing the anorectal abscess and the drugs of chioce for treating these infections.
Materials and Methods: the patients who were admitted in Hilla Teaching General Hospital during a period of one year from December 2001 to December 2002 were prospectively studied. The aspirated pus was cultivated aerobically and the isolated microorganisms were tested for their sensitivity to commonly prescribed antibiotics.
Results: fifty two patients 42 males and 10 females were studied. The most frequently isolated micro-organisms were *Proteus vulgaris* (30.76%), *Esch.Coli* (13.46%) and *Klbesiella spp*. (9.61%). The sensitivity pattern was that the cephalosporin's and aminoglycosides (Gentamycin) were the most potent antibacterial against Proteus and Staph aureus.
Conclusion: Anorectal abscesses are most commonly caused by *Proteus vulgaris* and *Staph aureus* which mainly respond to cephalexin and gentamycin.
Key Words: Anorectal Abscess, Microbiology, Antibiotics.

الخلاصة

أن الخراجات التي تصيب منطقة الشرج والمستقيم هي مشكلة جراحية كثيرة الحدوث وتعتبر المرض الأكثر الذي يصيب المنطقة الشرجية. في هذه الدراسة تمت معالجة اثنان وخمسون مريضا في مستشفى الحلة التعليمي العام ولمدة سنة للفترة من كانون الأول 2001 إلى كانون الأول 2002 . الغرض من الدراسة هو عزل الجراثيم المسببة لهذه الخراجات والتعرف على حساسيتها للمضادات الحيوية الشائعة الاستعمال. ان أكثر بكريا تم عزلها كانت هي (*Proteus vulgaris*) بنسبة30،76 بالمئة ثم (*Staph. aureus*) بنسبة21،15بالمئة ثم (*Esch.Coli*) بنسبة 46و13بالمئة ثم (*Klbesiella spp*) بنسبة61و9 بالمئة. كما لوحظ طبقا للزرع وفحص الحساسية ان معظم هذه البكتريا تستجيب للمضادات الحيوية الشائعة الاستعمال كا لكفلين والجنتامايسين .

Introduction

Abscess is a localized collection of pus within a pyogenic membrane while fistula is an abnormal communication between any two epithelial surfaces [1,2]. The pathogenesis of these two apparently separate conditions (abscess and fistula) is often the same, abscess is the acute phase and the fistula the chronic phase [2,3]. In addition to that the incidence of perianal fistula can be detected in 50 percent of the cases [4].

Anorectal abscess is one of the common surgical problems of the anorectal region involving several potential spaces around the anorectum filled with areolar tissue or fat which can become infected and abscesses can form [5]. The locations of these abscesses in a descending order of frequency are a-peri-anal abscess (60%) b-Ischio-rectal abscess (30%) c-submucous abscess (5%) [6].

Although the true incidence and etiology of anorectal abscess are not known, there are two theories in anorectal abscess formation. The abscess is either arise from infections originating in blocked crypts and then fistulized forming abscess cavities or that the discontinuities in anorectal mucosa are seeded with faecal bacteria then infection starts from the site [7]. However, most patients who present with perianal abscess have no predisposing factors and most abscesses are cryptoglandular, initiated by blockage of the anal gland ducts [8].

The most common micro-organisms causing anorectal abscesses are: *Esch. coli* 60% *Staph. aureus* 23% in addition to pure culture of bacteroids, streptococcus or proteus strains are also found[6]. The importance of bacteriology in anorectal abscess is that a fistula is much more likely if bacterial culture of the pus discloses bowel organisms. For this reason bacteriology in anorectal sepsis used as an indicator of anal fistula and except in bacteroid species pus from anorectal sepsis should routinely be sent for bacteriology [9].

Anorectal infections are more common in patients with a coexisting inflammatory bowel disease such as ulcerative colitis(15%), and Crohn's colitis (25%), as well as any cause of immunosuppression such as diabetes mellitus, chemotherapy and immunodeficiency virus(HIV) infection[8].

Aims

The aims of the study is to determine the most common pathogens in anorectal abscesses and their sensitivity to commonly prescribed antibiotics and to study the relation of the disease with other factors such as age, sex, and occupations.

Materials and Methods

1-study design: this was a clinical prospective study has carried out for one year in Hilla Teaching General Hospital.

2-study population: this study including all patients was complaining of anorectal abscesses. After the clinical diagnosis the patients admitted to the hospital, and drainge was done under general anesthesia.

3-Laboratory procedure: Pus aspiration done in all cases before drainge to avoid contaminations. The aspirates were inoculated on:
1-MacConkey's agar plate for aerobic and anaerobic.
2-Two plates of blood agar for aerobic and anaerobic cultures.
3-a choclate agar plate.
The antibiotics susceptibility testing was performed by using discs of the commonly used antibiotics**.**

Results

In this study 52 patients (42 male and10 female) were studied. Perianal region was the common site involved 37 cases (71.16 %) while ischiorectal region was 10 cases (19.23 %), and submucous 5 cases (9.61%). The ratio of male to female was 4.2:1 (table 1). Table 2 shows the most common types of isolated organisms. *Proteus vulgaris* was the predominate causative agent (30.76%), followed by *Staph. Aureus* (21.15%), *Esch. coli* (13.46%) and Klebsiella *spp*.(9.61%). The susceptibility to antibiotics is shown in (table 3). Proteus was found to be sensitive to Cephalothin, Garamycin, Tetracyclin and Chloramphenicol. All the proteus isolates were resistant to penicillin. *Staph. Aureus* was found to be sensitive to Garamycin (100%), ampicillin (99%) and tetracycline (70.2%). *Esch. coli* was found to be resistant to Rifadin while there was

100% sensitivity to Ampicillin, Keflin,Tobramycin and Garamycin. Table 4 shows the distribution of cases according to age. The infection was more predominant (34.6%) at age group of (31-40) years. Distribution of cases according to occupation is shown in table 5. The most commonly affected (35.8%) patient was self-employer. In one patient the anorectal abscess was associated with pulmonary tuberculosis two patients with diabetes and one with pelvic inflammatory disease due to *N .gonorrhoae*.

Discussion

When bacteria reach a high enough extracellular population density in a localized tissue site surrounding host cells die and suppuration results, forming an abscess. The impairment of circulation in the lesion reduces the flow of antibodies, leucocytes oxygen, and nutrients. Under these circumstances of impairment of bacterial multiplications the bacteria are not killed by penicillin or aminoglycosides such bacteria are cured only after drainage, in addition to that. Certain metabolites released by tissue autolysis antagonize the bacteriostatic action of sulfonamides, hence these drugs are ineffective in necrotic lesions [10].

Although additional antibiotic therapy after completion of drainage is not necessary in patients with normal immunological function [11], antibiotics can be given to cure abscess in a cellulitis stage also careful bacteriologic studies and judicious use of antibiotics are important factors in the prevention of morbidity and mortality of anorectal sepsis [12].

Table 1. Types of abscesses according to their sites.

site	No. male	No. female	No. total	Percent(%)
perianal	30	7	37	71.16
ischiorectal	8	2	10	19.23
submucous	4	1	5	9.61
total	42	10	52	100

Table 2. The causative bacterial species isolated from abscess:

organism	No.	Percent (%)
Proteus vulgaris	16	30.67
Staph. aureus	11	21.15
Esch. coli	7	13.46
Klebsiella spp.	5	9.61
total	39	74.89

Table 3. The sensitivity of micro-organisms to antibiotics.

bacteria	total	Amps	r	Cep.s	r	Gents	r	Tobrs	r	Tetra	s	r	Pene	s	r	Refa	s	r	Chlo	s	r
Proteus vulgaris	16	8	8	16	0	16	0	11	5	16	0		0	16		*	*		12	4	
Staph.aureus	11	10	1	8	3	11	0	*	*	8	3		8	3		*	*		*	*	
E. coli	7	7	0	7	0	7	0	7	0	*	*		0	7		0	7		*	*	
Klebsiella.spp	5	4	1	3	2	5	0	5	0	0	5		1	4		5	0		5	0	
Pseudomonas	4	0	4	0	4	2	2	0	4	*	*		0	4		4	0		0	4	
Enterobacter	4	4	0	0	4	4	0	0	4	0	4		4	0		4	0		*	*	
No growth	4	-	-	-	-	-	-	-	-	-	-		-	-		-	-		-	-	

Table 4. The distribution of cases according to age.

Age(years)	No.	Percent (%)
0-10	4	7.69
11-20	14	26.92
21-30	8	15.38
31-40	18	34.62
Above 40	8	15.38
total	52	100

Table 5. The distribution of cases according to occupation

Occupation	No.	Percent (%)
child	2	3.85
Teacher	2	3.85
Farmer	4	7.69
Self-employer	28	53.85
House wife	5	9.62
Student	2	3.85
Not known	9	17.31
total	52	100

Table 6. The distribution of cases according to the associated diseases:

Associated disease	No.	Percent (%)
Tuberculosis	1	1.92
Diabetes	2	2.89
Pelvic inflammatory disease(GC)	1	1.92

In this study we used the discs of the common widely available, and relatively cheap antimicrobials, and we found that these essential antibiotics cover all the common pathogens causing perianal abscesses. In further studies, the use of antibiotics extended to the local application of antibiotics as clindamycin or gentamycin in the abscess cavity with primry suture of the abscess[13].

To compare our study with other studies, there is a lot of lacking in studying this subject. Microbiological examination of 540 patients with anorectal abscess showed that *Escherichia coli*, Bacteroides, Bacillus, and Klebsiella species were significantly more prevalent in patients with fistula ($P<0.01$), and coagulase-negative Staphylococci and Peptostreptococcus species were significantly more prevalent in patients without fistula ($P<0.01$) which means that acute anorectal sepsis due to colonization of "gut-derived" microorganisms rather than "skin-derived" organisms is more likely to be associated with anal fistula [14]. For this reason bacteriology of anorectal sepsis can be used as indicator of anorectal fistula which is the common complication of anorectal abscesses [15], and the presence of *Esch. coli* or bacteroids may indicate underlying fistula. In another study Hamalainen et al showed that abscesses growing bowel derived organisms, especially *Esch. coli*, were most susceptible to fistula formation[16] .

In this study the common age group was(31-40) years old (34,62 %). In further studies, perianal sepsis is common even in infants with a feature quite different from those of older children and adults, that in infant the gender is exclusively male with low incidence of post drainage fistula formation[17]. As a general, in age younger than 40 years significantly increased risk of chronic anal fistula or recurrent anal sepsis after a first-time

episode of perianal abscess [18].

Regarding associated diseases, tuberculosis still should be considered as an etiologic factor in acute anorectal sepsis and even miliary tuberculosis can be presented as an acute perianal abscess[19]. In this study two cases of diabetes, one case tuberculosis and one case of pelvic inflammatory disease were reported while there were no inflammatory bowel diseases crohn's disease, ulcerative colitis or AIDS which may be due to the low incidence of these diseases in our country. So that all patients with anorectal sepsis should have complete medical and surgical assessments at the time of their first admission[20] .

Conclusions

1- The most common micro-organisms at anorectal absesses were *Proteus vulgaris* (30.76%) and *Staph aureus* (31.15 %).
2- the Cephalothin and gentamycin are likely to cover the above micro-organisms while tetracycline and ampicillin can be used as a good alternative.
3- Male is more than female (4.2:1 ratio).

References

1- G Garcea , T Lioyd, M Jacobs, Acope, A Swaun , D Berry . Role of microbial investigations in the management of non-perineal cutaneous abscesses . Postgrd.Med J 2003 ;79:519-521
2- Heid Nelson and Roger R.Dozois . Anus . In: Courtney M. Towsnend Jr. , MD. Sabiston Text Book Of Surgery ,16th edition , W.B.Saunders company 2001; 47:983 .
3- Hyman N. Anorectal abscess and fistula . Prim. care, 1999;26(1):69-80
4- De Lorenzi D., Chirurgische klinik, Standdspital waid, Zurich . Anorectal Abscess and fistula. .Ther Umsch, 1997 ;54(4): 197-201 .
5- Fielding MA, Berry AR . Management of perianal sepsis in a district general hospital. J. R .Coll . Surg . Edinb.1992 ; 37 (4): 232-4.
6- Norman S. Williams . The anus and anal canal. In : R. C.G. Russel M.S. FRCS, Normans S. Williams MS FRCS, Christopher J. K. Bulstrode Mch FRCS. Baily and Loves Short Practice of Surgery, 24th edition, International Students Edition 2004; 72:1263-1265.
7- Thomas Stites, Dennis P. Lund. Common anorectal problems. Semin Pediatr Surg, 2007; 16(1): 71-78
8- M.G. Dunlop. Anorectal Conditions. In: O.James Garden, Andrew W.Bradbury, John L.R. Forsythe, Rowan W.Parks . Principles and Practice of Surgery, 5th edition,International edition 2007; 21: 329
9- Nicholls G, Heaton ND, Lewis AM. Use of bacteriology in anorectal sepsis as an indicator of anal fistula. JR Soc Med.1991 May; 84(5):319.
10- Bernard D. Davis. Chemotherapy of bacterial disc. In Harper and Row, Microbiology, America, 3rd edition, 1998; (5):579.
11- Nunoo-Mensah JW, Balasubramaniam S, Wasserberg N, Artinyan A, Gonzalez-Ruiz C, Kaiser AM, Beart RW Jr, Vukasin P. Fistula-in-ano: do antibiotics make a difference? Int J Colorectal Dis. 2006 ;21(5):441-3.
12- Don R. Read , Herand Abcarian . Supralevator abscess: Diagnosis and Treatment . Dis Colon Rectum, 2006 ; 30(3): 456-461 .
13- Mortensen Jens, Kraglund Karsten, Klaerke Mikael, Jaeger Gitte, Svane Soren , Bone Jorgen . Primary suture of anorectal abscess: A randomized study comparing treatment with clindamycin vs. clindamycin and Gentacoll(R), Dis Colon Rectum, 1995 ; 38 :398-401
14- Toyonaga T, Matsushima M, Tanaka Y, shimojima Y, Matsumura N, Kanyama H . Microbiological analysis and endoanal ultrasonography for diagnosis of anal fistula in acute anorectal sepsis. Int J Colorectal Dis .2007; 22(2):209-13 ..
15- G Nicholls, N D Heaton, A M Lewis. Use of bacteriology in anorectal sepsis as an indicator of anal fistula: experience in a distinct general hospital**.** J R Soc Med. 1990; 83(10): 625–626.
16- Hamalainen, Kari-Pekka J., Sainio A.P. Incisence of fistulae after drainage of acute anorectal abscesses. Dis Colon Rectum 1998; 41(11): 1357-1361.
17- Fracis Serour, Eli Somckh, Arkadi Gorenstein . Perianal abscess and fistula in ano in infants:a different entity? Dis colon

Rectum, 2005;48(2) :359-363.
18- Hamadani Ali, Haigh Philip, Liu In-Lu, Abbas Maher. Who Is at risk for developing chronic anal fistula or recurrent anal sepsis after initial perianal abscess? Dis Colon Rectum, 2009 ; 52 (2) : 217-221
19- O'Donohoe, M. K. M.B., B.Ch., B.A.O., B.Sc.; Waldron, R. P. M.Ch., F.R.C.S.I.; O'Malley, E. M.Ch., F.R.C.S.I., F.A.C.S. Miliary tuberculosis presenting as an acute perianal abscess: Report of a case. Dis Colon Rectum. 2009;52 : 697-698.
20- Winslett, M. C. F.R.C.S.; Allan, A. M.D.,F.R.C.S.; Ambrose, N. S. M.S., F.R.C.S. Anorectal sepsis as a presentation of occult rectal and systemic disease. Dis Colon Rectum, 2009; 52: 597-600 .