The evaluation of bacteriology in perianal abscesses of 81 adult patients

ABSTRACT

Objective: Treatment of perianal abscesses requires prompt surgical drainage and antimicrobial therapy. However, we should encourage the selective use of antimicrobial agents on a case-by-case basis, especially because there is no evidence that uncomplicated perianal abscesses can be safely treated only with drainage. For this reason, it is important to identify the causative organisms; therefore, we accessed the microbiological analysis of these patients. **Patients and methods:** In this study, 81 consecutive adult patients with perianal abscesses, who presented at a university hospital in Diyarbakir from January 2004 to December 2006, were included. Clinical and laboratory data, and results of microbiological analysis were recorded. **Results:** All specimens, except seven, yielded bacterial growth. *Escherichia coli*, *Bacteriodes* spp., coagulase-negative *Staphylococci*, and *Staphylococcus aureus* were the most common isolated organisms. **Conclusion:** In contrast to other investigators, this study demonstrated that aerobic organisms are the predominant isolates in these infections.

Keywords: perianal abscess, adult, bacteriology, aerobic bacteria, treatment.

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INTRODUCTION

Perianal abscesses (PAes) are common and important clinical problems. The vast majority of PAes result from obstruction of anal glands, with subsequent retrograde infection. The peak incidence of PA is in the third or fourth decade of life and it is two or three times more common in men than women.[1] The reason for this increased incidence of perianal suppuration in men is uncertain; however, it may be related to increased local androgen conversion in anal glands.[2] This infection may be life threatening in patients who are immunocompromised or who have an underlying malignancy.[3]

Bacteriologic evaluations indicate that gastrointestinal tract (GIT) flora predominate in PAes.[4,5] The predominant anaerobic bacteria are the *Bacteriodes* spp., *Peptostreptococcus* spp., and *Clostridium* spp.; whereas the most commonly isolated aerobic and facultative bacteria are *Staphylococcus aureus*, *Streptococcus* spp., *Enterobacteriaceae*, and *Enterococcus* spp.[5]

The cornerstone of treatment for PAes is surgical drainage, which aims only at controlling inflammation of the adjacent structures. Untreated or inadequately treated local inflammation may damage the anal sphincters.[1] On the other hand, drainage of abscess cavity obtains good bacteriological specimens for culture.

This study describes the experience of a university hospital in the diagnosis of aerobic and anaerobic bacteriological etiology of PAes in adults.

PATIENTS AND METHODS

This study was retrospectively carried out at Dicle University Hospital, Department of General Surgery, between January 2004 and December 2006. Our hospital is the largest (1090 beds) in the city of Diyarbakir in the southeastern Anatolia region of Turkey.

Patients diagnosed with PAes, who underwent incision and drainage, were identified retrospectively. Incision and drainage was performed on 81 consecutive patients. Records were reviewed to identify patients with an acute presentation of PA. Patients who had fistulas with PAes, chronic perianal Crohn's fistulas, perineal and scrotal soft tissue necrosis, or pilonidal abscesses, and who used antibiotic before culture were excluded from the study.

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Age, duration of symptoms at admission, clinical symptoms, results of physical examination, risk factors, location of abscesses, antibiotics administered, and duration of treatment and hospitalization were recorded. In addition, laboratory results, such as white blood cell (WBC) count, erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), and pus culture were performed in all patients.

For specimen collection, the involved site was first scrubbed with povidone-iodine. After local anesthesia with 1% lidocaine injection, pus was collected by percutaneous aspiration or by swabbing the open cavity through a surgical incision. Swab specimens were submitted for aerobic and anaerobic bacteriology in Port-A-Cul transport swab system (BBL Microbiology Systems, Cockeysville, Maryland, USA). However, precise records of all of the transport media used were not always available. Sheep blood (5%), chocolate, and MacConkey agar plates were inoculated for the isolation of aerobic organisms. The plates were incubated at 37° C aerobically (MacConkey agar) and under 5% carbon dioxide (blood and chocolate agar), and examined at 24 and 48 hours. For the isolation of anaerobes, specimens were plated onto prereduced vitamin Kl enriched *Brucella* blood agar (consisting of 5% sheep blood), anaerobic blood agar plates containing kanamycin and vancomycin, and anaerobic blood plates containing *coli*stin and nalidixic acid, and then inoculated into enriched thioglycolate broth. The plated media were incubated in GasPak jars (BBL Microbiology Systems) and examined at 48, 96, and 120 hours. The thioglycolate broth was incubated for 14 days.[6-8] Smears from colonies that grew under either aerobic or anaerobic conditions were stained with Gram-stain. Gram-positive organisms were identified by conventional techniques and Gram-negative organisms were identified with use of Sceptor system (Becton-Dickinson, Maryland, USA). Its susceptibility was evaluated using disc diffusion testing at microbiology laboratory.

The addition of antibiotics to routine incision and drainage of abscesses neither improve healing times nor reduce recurrences and is, therefore, not ordinarily indicated. However, unusual appearing abscess cavities or those with extensive cellulites, soft tissue destruction, immunosuppression, diabetes mellitus, prosthetic cardiac valves, previous bacterial endocarditis, and prosthetic devices antibiotherapy began empirically[9] in combinations of third generation cephalosporin, especially ceftriaxone, and metronidazole. These regimens were changed on the basis of sensitivity tests.

Patients were followed-up fortnightly until the end of treatment period, monthly for three months and, thereafter, every month for one year. Relapse was assessed by a recurrence of symptoms and signs of disease.

Isolates of *S. aureus*, coagulase-negative Staphylococci and *Corynebactrium* spp. were considered skin derived organisms. Isolates of *Enterococcus* spp., *Escherichia coli*, *Bacteriodes* spp. and all other *coli*forms were considered GIT derived organisms.

Descriptive and frequency statistical analyses were performed using the Statistical Package for the Social Science (SPSS) for Windows, version 13.0 software (SPSS, Chicago, IL, USA).

RESULTS

In this study, 81 patients with PAes were analyzed. Of the 81 patients, 69 patients (86.4%) were male and 12 patients (13.6%) were female. The mean age of male and female patients was 40.5 ± 11.3 years (range, 21-67) and 35.8 ± 13 years (range, 16-51), respectively.

The clinical characteristics, location of abscess, risk factors, and complications of disease are shown in Table 1. Perianal pain, swelling, and fluctuation were the most common clinical findings. None of the patients was asymptomatic. The location of abscess, in descending order of frequency, was: intersphincteric (38.2%), perianal (25.9%), ischiorectal (23.4%), and suprasphincteric (12.3%). The mean admission time of male and female patients was 5.1 ± 2.4 days (range, 2-15) and 5.4 ± 1.5 days (range, 3-7), respectively.

Laboratory findings of patients, such as ESR, CRP, and WBC count were measured in all patients. ESR ranged 11-69 mm/h (mean, 30.4 ± 13.8 mm/h), 63 patients (77.7%) had ESR > 20 mm/h and 18 had ESR < 20 mm/h. CRP levels were high (mean, 48.5 ± 25.7 mg/dL; range, 7-129 mg/dL), except in three patients. Leukocytosis (≥ 10,200 WBCs/mm^3) was found in 52 patients (64.1%), and 29 patients (35.9%) had normal WBC count.

All except seven specimens (8.6%) yielded bacterial growth. Aerobic bacteria only were isolated in 43 patients (53%), anaerobic bacteria only in eight patients (9.9%), mixed aerobic and anaerobic bacteria in 23 patients (28.4%). A total of 31 anaerobic and 101 aerobic isolates were recovered from 81 abscesses, accounting for 1.6 isolates (1.2 aerobes and 0.38 anaerobes). As can be seen in Table 2, the predominant anaerobic isolates were as follows: *Bacteriodes* spp. (n = 20) and *Peptostreptococcus* spp. (n = 6). The predominant aerobic bacteria were as follows: *Escherichia coli* (n = 36), coagulase-negative Staphylococci (n = 16), *Enterococcus* spp. (n = 11), and *S. aureus* (n = 10). Of the 10 isolates *S. aureus*, 30% were methicillin-resistant *S. aureus* (MRSA).

Incision and drainage was done in all, and antimicrobial therapy was given to 37 (45.6%) patients. Antibiotics were initiated in patients with diabetes mellitus (n = 18), cellulites (n = 9), immunosuppression (n = 6), and soft tissue destruction (n = 4). Duration of therapy varied according to clinical response and presence of focal disease.

A predisposing or underlying condition was present in 28 (34.5%) patients. A single condition was present in 15 patients, two conditions were present in 12, and three were present in two. Diabetes mellitus (22.2%), obesity (8.6%), and malignancy (6.1%) were the most common conditions.

Table 1. Clinical characteristics of patients

	Male n (%)	Female n (%)	Total n (%)
Patients	69 (85.1)	12 (14.9)	81 (100)
Site of abscess			
Intersphinteric	30 (43.4)	1 (8.3)	31 (38.2)
Perianal	16 (23.1)	5 (41.6)	21 (25.9)
Ischiorectal	16 (23.1)	3 (25)	19 (23.4)
Suprasphinteric	7 (10.1)	3 (25)	10 (12.3)
Clinical findings			
Pain	69 (100)	12 (100)	81 (100)
Local swelling	41 (59.4)	9 (75)	50 (61.7)
Fluctuation	30 (43.4)	8 (66.6)	38 (46.9)
Fever	29 (42)	8 (66.6)	37 (45.6)
Erythema	27 (39.1)	10 (83.3)	37 (45.6)
Tenderness	19 (27.5)	6 (50)	25 (30.8)
Chills	14 (20.2)	6 (50)	20 (24.6)
Risk factors			
Diabetes mellitus	14 (20.2)	4 (33.3)	18 (22.2)
Alcohol use	5 (7.1)	0	5 (6.1)
Obesity	4 (5.7)	3 (25)	7 (8.6)
Malignancy	3 (4.3)	2 (16.6)	5 (6.1)
Hyperthyroidism	1 (1.4)	1 (8.3)	2 (2.4)
Recent surgery	1 (1.4)	1 (8.3)	2 (2.4)
Trauma	1 (1.4)	0	1 (1.2)
Chronic renal failure	1 (1.4)	0	1 (1.2)
Steroid therapy	0	1 (8.3)	1 (1.2)
Pregnancy	0	1 (8.3)	1 (1.2)
Complications			
Fistula	19 (27.5)	3 (25)	22 (27.1)
Recurrence	7 (10.1)	1 (8.3)	8 (9.8)
Sepsis	1 (1.4)	0	1 (1.2)

Of the 81 patients, 24.6% had an uneventful recovery and were discharged from hospital on the first or second postoperative day. For the other patients, the mean duration of hospital stay was 5.1 ± 3.6 days (range, 4-7). Complications occurred in 31 patients (38.2%). These included anal fistula in 22 (27.1%), sepsis in one (1.2%), and recurrence of abscess in eight (9.8%). A patient, who had sepsis caused by *E. coli*, had a serious underlying disease like acute lymphocytic leukemia. All patients except him eventually recovered from their infection.

Table 2. Isolated microorganisms from perianal abscesses

Microorganisms	n (%)
Anaerobic organisms	
Bacteroides spp.	20 (15.2)
Peptostreptococcus spp.	6 (4.5)
Fusobacterium spp.	4 (3)
Propionibacterium acnes	1 (0.8)
Total	31 (23.5)
Aerobic organisms	
Escherichia coli	36 (27.3)
Coagulase-negative *Staphylococci*	16 (12.1)
Enterococcus spp.	11 (8.3)
Staphylococcus aureus	10 (7.6)
MRSA	3 (2.3)
MSSA	7 (5.3)
Klebsiella pneumoniae	4 (3)
Pseudomonas aeruginosa	4 (3)
Enterobacter cloacae	3 (2.3)
Group A β-hemolytic *Streptococci*	3 (2.3)
Proteus mirabilis	2 (1.5)
Corynebacterium spp.	2 (1.5)
Total	101 (76.5)
Total	132

MSSA, Methicillin-sensitive *S.aureus.*

DISCUSSION

PAes are more common in men than women.[10] In this study, male/female ratio was 5.7 and it was similar in studies by Lunniss and Philips[11] and Toyonaga *et al*. In pediatric population, the male predominance is even more pronounced.[13] On the other hand, the vast majority of PAes, however, are treated in the outpatient setting, and the true incidence is hard to define. The mean age of patients was 39.8 and it was similar to other studies.[5,12,14]

Most aerobic and anaerobic organisms isolated from the PAes are of GIT and skin flora origin.[5] The isolation of anaerobic bacteria together with aerobic organism at that site is not surprising, since anaerobes are the predominant organisms in GIT where they outnumber aerobes in a ratio of 1,000:1.[15] Several authors have studied the bacteriology of PAes. In the present study, we found that the incidence of GIT and skin-derived microorganisms was 78% and 22%, respectively and it is similar to other studies.[11,12]

The result of this study supported that GIT-derived organisms, such as *E. coli, Bacteriodes* spp. and *Enterococcus* spp., and skin-derived organisms such as coagulase-negative Staphylococci and *S. aureus* were significantly more frequent. However, *Peptostreptococcus* spp. was one of the predominant anaerobic isolate in this study. These organisms are known potential pathogens which predominate in the normal GIT flora,[12] but its relation to the etiology of PA is not well known yet. For this reason, further investigations are needed. On the other hand, Albright *et al*.[16] found that 23% of PAes contained MRSA, but in this study the percentage was 2.1%. This study demonstrated that aerobic organisms are predominant isolates in these infections. This finding was similar to other studies,[17,18] but it was not supported by the studies of Brooks *et al*.[4,5,15] and Nicholls *et al*.[19]

Surgical drainage is the main therapy for PAes. This is important because the abscess environment (the abscess capsule, the low PH, and the presence of binding proteins or inactivating enzymes) is detrimental to the effectiveness of antimicrobial agents.[5] Although antimicrobial drugs may prevent suppuration if given early or prevent spread of an existing abscess, they cannot be substituted for surgical drainage.

CONCLUSION

This study suggests that a relatively large percentage of PAes consist of aerobic organisms. In contrast to other investigators, we have not found anaerobic organisms to be the predominant isolates in this type of infections. In conclusion, as the abscess resolves with proper drainage, antibiotics are never required. However, we encourage the selective use of antimicrobial agents on a case-by-case basis, especially because there is no evidence that uncomplicated perianal abscesses can be safely treated only with drainage. On the other hand, we stated that drainage culture must be done, because resistance to antimicrobials and virulence of aerobic and anaerobic bacteria vary; knowledge of the specific types of bacteria recovered from PAes may have important clinical implications. This study is limited by its retrospective design, so prospective further investigations with large numbers are needed.

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