



Postoperative Empirical Antibiotic Use for Uncomplicated Perianal Abscess and Fistula

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Abstract

Background: Perianal abscesses remain one of the most frequent surgical cases encountered by both general and colorectal surgeons. The use of broad-spectrum empirical antibiotics for perianal abscesses after drainage also remains common, although with questionable benefit.

Objectives: The aim of the study conducted was to evaluate the role and efficacy of intra- and post-operative empirical antibiotic combination with a wide antibacterial spectrum for the treatment of perianal abscess and fistula-in-ano.

Methods: An observational longitudinal study consisted of 150 patients; 50% of them underwent incision and drainage of their perianal abscess. The rest had fistula-in-ano and were treated with fistulotomy. Patients were prescribed a course of empiric antibiotics at the time of diagnosis. The prescribed antibiotic consisted of two regimes. The mechanism of the first regime was based on inhibiting bacterial cell wall synthesis, whereas the second regime included antibiotics inhibiting protein synthesis of the bacteria. Afterwards, analysis of the effect of postoperative use of empiric antibiotics was performed regarding symptom assessment, recurrence rate of abscess, fistula formation, cellulitis, bacteremia and sepsis.

Results: Among 150 patients included in the study, 92% were male and 8% were female. The age range was 20 to 66 years (mean 39.97 ± 0.16 years). Seventy-five of them had perianal abscess and the rest had fistula-in-ano. They were prescribed a course of empiric antibiotics. Patients who had perianal abscess showed an abscess recurrence rate of 10% and 5% after six and twelve months respectively. Perianal fistula formation occurred at the rate of 25% and 5% after six and twelve months respectively when Lincomycin treatment was used. Patients with perianal fistula treated with both fistulotomy and Lincomycin were followed up for six and twelve months. Follow-up showed an 11.42% rate of abscess formation after six months, however no recurrence of fistula was found.

Conclusions: The results of this study concluded that antibiotics administered after incision and drainage had reduced the rate of fistula formation, abscess recurrence, cellulitis and sepsis. Our limited patient sampling does not provide a definite conclusion, although it is clear that fistula formation is of clinical importance in the role of empiric antibiotics in preventing recurrence and merits further study.

Keywords: Perianal Abscess, Antibiotic, Empiric, Fistula

1. Background

Perianal abscess (PA) is the acute manifestation of perianal infection requiring immediate surgery (1, 2). It manifests as severe pain, tenderness and swelling (3). Cryptoglandular infections are the main cause of perianal abscesses, as suggested for the first time in 1878 by Chiari (4). This results in stasis, colonization, suppuration and abscess formation (5). The principal management is incision and adequate surgical drainage (ID) (6). The use of routine intra-operative swab for cultures and sensitivity and the use of broad-spectrum antibiotics for perianal abscesses post-drainage remains commonplace in surgical practice, although the role of antibiotic therapy as an adjuvant to incision and drainage is yet unclear with ques-

tionable benefit (7). Studies performed in 1980 demonstrated that results of pus culture for detecting the type of bacteria was essential in determining further action (8), in the same way that the presence of gut organisms on a swab was sensitive in detecting the presence of anal fistula (9). In addition to that, most surgeons do not tend to review swab culture results (10). The routinely use of antibiotics is not satisfactory and does not improve healing times in Crohn's disease (11). Their use should be limited to the treatment of patients with impaired resistance to infection such as immunosuppression, diabetes and extensive cellulitis (12). Regarding a fistula, it is a tiny tract with the presence of inflammation and infection. Its treatment is usually surgical. Antibiotics, antipyretics and anal-

gesics are provided (13). Antibiotics should be reserved for patients presenting with systemic symptoms such as cellulitis and sepsis (14). Another study demonstrated that certain antibiotics (metronidazole and ciprofloxacin) had merely a short-term benefit in the closure of fistulas (15). Like any type of treatment, treatment for anal fistulas carries a number of risks such as infection, which requires a course of antibiotics (16). Brook and Martin (1980) (17) have described the types of bacteria involved in abscess formation and found a mixture of aerobic and anaerobic bacteria. Enteric bacteria are more common in PAs (18). Lohsiriwat et al., 2010 (19) and Afsarlar et al., 2011 (20) showed that the use of antibiotics reduces the development of fistula-in-ano. Another study found that 98% of positive swab cultures have been sensitive to routine empirical antibiotics (21).

This is our knowledge about the antibiotic usage so far. The advantages of broad-spectrum antibiotics for treating perianal abscesses after drainage and fistulae after fistulotomy as well as its effect on management and outcome remains unknown and with questionable benefit. Therefore, this study was performed to investigate the role and efficacy of postoperative empirical antibiotics for the treatment of perianal abscess and fistula-in-ano analyzing outcome measures regarding remission, recurrence, sepsis, cellulitis and bacteremia.

2. Methods

An observational longitudinal study consisted of 150 patients; 75 of them underwent incision and drainage of perianal abscess at Al-Kindy Teaching hospital and private hospitals in Baghdad from January 2012 to December 2015. The rest (75 patients) had fistula-in-ano and were treated with fistulotomy. The main symptoms of the patients were perianal pain exacerbated by movement and increased perianal pressure from sitting or defecation, discharge of pus, fever, malaise and sleep pattern disturbance. The inclusion criteria were adults aged eighteen years and above who presented with a first attack of perianal abscess (superficial ischio-rectal), absence of identifiable fistula for a duration of 2 to 3 days or anal fistula that is actively draining for at least one month and a negative past history for previous healed anal fistula or perianal skin rupture or infection. The exclusion criteria included patients younger than eighteen years, complex fistula, necrotizing fasciitis, tuberculosis, Crohn's disease, immunosuppression, malignancy and pyodermal skin infections.

2.1. Ethics Statement

The scientific and ethical committee of Al-Kindy medical college-Baghdad university, Al-Kindy teaching hospital

and private hospitals had approved this study. Written informed consent was obtained from all patients.

Patients were assessed by a senior surgeon who also performed the operation, either under general or local anesthesia. The patients underwent a general clinical physical examination in the lithotomy or prone jackknife position in order to inspect the extent of the abscess, to evaluate its induration and the presence of any previous scar tissue and external or internal fistula. Then, the perianal skin was disinfected with alcohol solution followed by the application of 10% povidone onto the skin. Afterwards, a cruciate incision over the abscess was made and drainage was carried out. All necrotic tissues were debrided and all septations were broken down paying attention to not injure the sphincter of the anus. A drain was applied for drainage of the pus and to prevent premature closure of the abscess cavity. Lastly, a protective dressing was applied to absorb any purulent discharge from the abscess cavity and to protect the open wound. Patients were prescribed a course of empiric antibiotics at the time of diagnosis. Patients were discharged from hospital based on the surgeon's decision, received advice for daily dressing and were followed up in the outpatient surgical clinic every two weeks postoperatively. Patients were advised to continue their activities after the surgery.

Patients with intersphincteric fistula were treated with fistulotomy. The preparation of the patients was the same as above. Under anesthesia, the entire fistula track was defined from the internal to external opening with identification and obliteration of the tracks by probing it. The fistula was laid open by cutting out the whole tract after which all infected tissue was curetted. The fistula tunnel was opened and converted to a groove, which allows the fistula to heal from the inside out. The resulting wound is generally not closed and is packed, after which the wound heals by itself. Same as above, patients were discharged from hospital based on the surgeon's decision, received advice for daily dressing and were followed up in the outpatient surgical clinic every two weeks postoperatively.

The prescribed antibiotics were selected that cover G+ and G-bacteria, divided into two regimes according to their mechanisms of action:

1- Those inhibiting bacterial cell wall synthesis: Penicillin; Ampiclox (Ampicillin 250 mg and Cloxacillin 250 mg) capsule four times a day orally (Ajanta Pharma Limited-India) and Augmentin (Amoxicillin 875 mg and Clavulanate 125 mg) tablet thrice daily orally (Smithkline Beecham PLC-UK) + Metronidazole (Flagyl) (500 mg thrice daily) orally (Sanofi-France). The other antibiotic used is a Cephalosporin which was of the fourth generation Cephalosporin (Cefepime, one gram twice daily) by slow intravenous infusion (Bristol-Myers Squibb-USA) or a third

generation Cephalosporin (Ceftriaxone, one gram twice daily intravenously (Roche-Switzerland) or Cefixime 400 mg capsule once daily) orally (Medico Labs-Homs-Syria) or first generation Cephalosporin (Cephalexin 500 mg capsule four times a day) (Glaxo Wellcome- UK) orally with metronidazole (500 mg thrice daily) (Sanofi-France) orally for seven days.

2- Antibiotics which inhibit protein synthesis of the bacteria include Lincocin 600 mg twice daily orally (Upjohn- United States). Other antibiotics used were Gentamicin 80 mg twice daily intramuscularly (Roussel-France) + metronidazole (500 mg thrice daily) (Sanofi-France) orally. Clindamycin HCL 150 mg (two capsules four times daily) (Taj pharmaceuticals -India) orally for seven days.

Analysis of the effect of postoperative use of empiric antibiotics after 6 and 12 months was performed by the same senior surgeon and consisted of observation of the recurrence rate of abscess, assessing rate of fistula formation by clinical examination, MRI and ultrasound, cellulitis, complications from antibiotic use, for example, diarrhea associated *C. difficile* colitis, allergy and resistance to antibiotics, bacteremia and sepsis after ID of perianal abscess and fistulotomy. These factors were used to assess the benefits of using empiric antibiotics postoperatively in reducing the recurrence rate of abscess and fistula formation. The limitations, however, are the small sample size and the follow-up of the patients.

2.2. Statistical Analysis

Data was statistically analyzed using:

Descriptive statistics: frequencies for tables, percentages, mean and standard deviation. Calculations were performed using MiniTab statistical software program 13.20.

3. Results

Among 150 patients included in the study, 92% were male and 8% were female. The age range was 20 to 66 years (mean 39.97 ± 0.16). Patients were experiencing anal pain, swelling and tenderness since 4 to 10 days (6.93 ± 0.23). Half of them had perianal abscess and the other half had fistula-in-ano as shown in [Table 1](#). The patients with diabetes mellitus, whether on diet or oral hypoglycemic drugs, formed 9.33% of the total group (14/150).

Sixty-one (81.33%) patients with perianal abscess were prescribed a course of empiric antibiotics at time of diagnosis and seven days postoperative on discharge. The prescribed antibiotic regime to patients with perianal abscess was regime 2 consisting of the inhibition of protein synthesis of the bacteria; this group represented 52% (No. =

Table 1. Patients' Demographic Data

Demographic Data	No. = 150
Age (years)	
Mean \pm SEM	39.97 \pm 0.16
Range	(20 - 66)
Sex	
Males, No. (%)	138 (92.00)
Females, No. (%)	12 (08.0)
Duration of symptoms, No. (%)	
Mean \pm SEM	6.93 \pm 0.23
Range	(4 - 10)
Duration of follow-up (months)	
Mean \pm SEM	6.32 \pm 0.40
Range	(1 - 12)
Patient diseases	
Perianal abscess, No. (%)	75 (50)
Fistula-in-ano, No. (%)	75 (50)
Concurrent disease, No. (%)	
Diabetes mellitus	9.33% (14/150)

39). Patients treated with Lincomycin 600 mg represented 26.66% (No. = 20) followed by Garamycin 80 mg + metronidazole (500 mg) (13.33%) and Clindamycin 150mg (12.00%). The other regime of antibiotic treatment (regime 1) played a role in inhibiting bacterial cell wall synthesis and includes penicillin (24%) and cephalosporins (24%). The type of Penicillin used was Ampiclox (Ampicillin 250 mg and Cloxacillin 250 mg) + metronidazole (500 mg), constituting 12% followed by Augmentin (Amoxicillin 875 mg and Clavulanate 125 mg) + metronidazole (500 mg) (12%). Regarding cephalosporins, the Ceftriaxone, one gram) + metronidazole (500 mg) is used (8%) then Cefepime (one gram)+ metronidazole (500 mg), Cefixime 500 mg capsule) + metronidazole (500 mg) and Cephalexin 500 mg)+ metronidazole (500 mg) that represents (5.33%) as shown in [Table 2](#).

[Table 3](#) demonstrates the patients with fistula-in-ano (50%) who were treated with empiric antibiotics that inhibit protein synthesis of the bacteria (52%). Lincomycin 600 mg was used in treatment constitutes (46.66%) followed by Clindamycin 150 mg (5.33%). The other regime used was antibiotics which inhibit the cell wall synthesis (24%) and includes Penicillin and cephalosporins.

These patients were followed up for a period of six to twelve months as shown in [Table 1](#). The outcome measures of this empiric antibiotic treatment are shown in [Table 4](#).

Table 2. Regimes of Empiric Antibiotic Treatment of Patients with Perianal Abscess According to Their Mechanisms of Action

Regime No. 1	No.	%
1- Antibiotics which inhibit cell wall synthesis	36	48.00
A- Penicillin	18	24.00
1- Ampiclox (Ampicillin 250 mg and Cloxacillin 250 mg)+ metronidazole (500 mg)	9	12.00
2- Augmentin (Amoxicillin 875 mg and Clavulanate 125 mg)+ metronidazole (500 mg)	9	12.00
B- Cephalosporins	18	24.00
1- Cefepime (one gram) + metronidazole (500 mg)	4	05.33
2- Ceftriaxone, one gram) + metronidazole (500 mg)	6	08.00
3- Cefixime 500 mg capsule) + metronidazole (500 mg)	4	05.33
4- Cephalexin 500 mg) + metronidazole (500 mg)	4	05.33
Regime No. 2	No.	%
2- Antibiotics which inhibit protein synthesis	39	52.00
1- Lincomycin 600 mg	20	26.66
2- Garamycin (80 mg) + metronidazole (500 mg)	10	13.33
3- Clindamycin 150 mg	9	12.00

Table 3. Regimes of Empiric Antibiotic Treatment of Patients with Fistula-In-Ano According to Their Mechanisms of Action

Regime No. 1	No.	%
1- Antibiotics which inhibit cell wall synthesis	36	48.00
A- Penicillin	18	24.00
1- Augmentin (Amoxicillin 875 mg and Clavulanate 125 mg)+ metronidazole (500 mg)	18	24.00
B- Cephalosporins	18	24.00
1-Ceftriaxone (one gram)+ metronidazole (500 mg)	18	24.00
Regime No. 2	No.	%
2-Antibiotics which inhibit protein synthesis	39	52.00
1- Lincomycin 600 mg	35	46.66
3- Clindamycin 150mg	4	05.33

About 26.66% of the patients with perianal abscess who were treated with Lincomycin had a recurrence of the abscess at a rate of 10% and 5% after six and twelve months respectively. Development of fistula during the follow-up of perianal abscess postoperatively was 25% and 5% after six and twelve months respectively. Other regimes of empiric antibiotics are shown in Table 4. About 10% of the patients developed diarrhea following the use of Lincomycin and Clindamycin, which was probably due to pseudomembranous colitis and it stopped shortly after cessation of antibiotic administration and was further not of clinical significance.

Out of the patients with perianal fistula, 46.66% of them were also treated with the empiric regime of Lin-

comycin. Follow-up for six and twelve months did not show any fistula recurrence but did show a percentage of 11.42% of abscess formation occurring after six months, as demonstrated in Table 5. The only complication due to antibiotic use was diarrhea. About 5.71% of the patients developed diarrhea following use of Lincomycin and Clindamycin, which was probably caused by pseudomembranous colitis due to *Clostridium difficile*. The diarrhea stopped shortly after cessation of the antibiotics and was further not of clinical significance.

Other patients were treated with other regimes of antibiotics. None of the patients, neither with perianal abscess nor fistula-in-ano, developed cellulitis, sepsis or bacteremia. Thus, these results demonstrate that empirical

Table 4. Outcome Measures of Different Postoperative Empiric Antibiotic Regimes Used in the Treatment of Patients with Perianal Abscess

Types of Empiric Antibiotics Used	Patients with Perianal Abscess	Recurrence Rate of Abscess After 6 Months	Recurrence Rate of Abscess After 12 Months	Fistula Formation After 6 Months	Fistula Formation After 12 Months	Cellulitis And Sepsis	Bacteremia	Complication Due to Antibiotic Use (allergy, <i>C. difficile</i> Colitis, Antibiotic Resistance)
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Lincocmycin 600 mg	20 (26.66)	2 (10.00)	1 (5.00)	5 (25.00)	1 (5.00)	0 (0)	0 (0)	2 (10.00)
Clindamycin 150 mg	9 (12.00)	0 (0)	0 (0)	9 (100.00)	0 (0)	0 (0)	0 (0)	2 (10.00)
Garamycin 80 mg) + metronidazole (500 mg)	10 (13.33)	5 (50.00)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Ampiclox (Ampicillin 250 mg and Cloxacillin 250 mg) + metronidazole (500 mg)	9 (12.00)	3 (33.33)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Augmentin (Amoxicillin 875 mg and Clavulanate 125 mg) + metronidazole (500 mg)	9 (12.00)	0 (0)	3 (33.33)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Ceftriaxone, one gram) + metronidazole (500 mg)	6 (08.00)	0 (0)	3 (50.00)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Cefepime, one gram) + metronidazole (500 mg)	4 (05.33)	1 (25.00)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Cephalexin 500 mg) + metronidazole (500 mg)	4 (05.33)	0 (0)	1 (25.00)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Cefixime 500 mg capsule) + metronidazole (500 mg)	4 (05.33)	0 (0)	0 (0)	0 (0)	1 (25.00)	0 (0)	0 (0)	0 (0)
Total	75							

antibiotic use leads to the prevention and decrease of recurrence of perianal abscess and fistula formation.

4. Discussion

Anorectal abscess is a potentially debilitating and devastating condition that may result in considerable discomfort and fever. Extensive research in the field of peri-

Table 5. Outcome Measures of Different Postoperative Empiric Antibiotic Regimes Used for Treating Patients with Fistula-In-Ano

Types of Empiric Antibiotics Used	Patients with Fistula-In-Ano	Abscess Formation After 6 Months	Abscess Formation After 12 Months	Fistula Recurrence After 6 Months	Fistula Recurrence After 12 Months	Cellulitis and Sepsis	Bacteremia	Complication Due to Antibiotic Use (Allergy, <i>C. difficile</i> Colitis, Antibiotic Resistance)
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Lincomycin 600 mg	35 (46.66)	4 (11.42)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (5.71)
Clindamycin 150mg	4 (05.33)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Augmentin (Amoxicillin 875 mg and Clavulanate 125 mg) + metronidazole (500 mg)	18 (24.00)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Ceftriaxone, one gram) + metronidazole (500 mg)	18 (24.00)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Total	75							

anal treatment and antibiotic usage has been investigated. There is however, a controversy; one study reported that routine swab cultures are unnecessary and do not affect treatment or outcome and that the use of postoperative empiric antibiotics may reduce the rates of recurrence of abscesses and fistulae (21). Others have shown that antibiotics are not effective in the treatment and prevention of abscesses or fistulae. We agree that antibiotics are not effective in the treatment and prevention of abscesses, including perianal abscesses, as a whole, but we are however investigating the role of empiric antibiotics in recurrence of abscess after incision and drainage. Management of perianal diseases has been mentioned in the guidelines of the American society of colon and rectal surgeons (ASCRS) in 2011 (22) which reported that a perianal abscess should be treated by incision and drainage and that antibiotics have a limited role in the treatment of uncomplicated anorectal abscess and may be considered in patients with significant cellulitis, underlying immunosuppression or concomitant systemic illness. In our study, empiric Lincomycin used in patients with perianal abscess (26.66%), showed an abscess recurrence rate of 10% and 5% after six and twelve months respectively while fistula formation after six and twelve months was 25% and 5% respectively. Despite the small sample size, other regimes of empiric antibiotics showed a higher recurrence rate and

fistula formation. The other group consisted of patients with fistula-in-ano and about 46.66% of them were treated with the empiric regime of Lincomycin. Follow-up for the detection of complications during six and twelve months showed no fistula recurrence but did display abscess formation in 11.42% of the patients after six months. Thus, we agree with the principles outlined by the ASCRS, suggesting that incision and drainage is still the mainstay of treatment. In addition, our results support the fact that administering preoperative empiric antibiotics decreases the resulting fistula and number of recurrences resulting from incision and drainage of the perianal abscess. Hence is it to say that empirical antibiotic usage prevents fistula formation and the prognosis of anal fistula (23). Fistula formation is worrisome for both the patient and the surgeon and the requirement for repeated surgical intervention may prolong the patient's hospital stay and increase the costs. Various studies have demonstrated that the recurrence of anorectal abscesses and frequency of anal fistula development range between 25% and 50% (24), which is higher than found in our study. This may be due to the type of antibiotic used postoperatively, duration of treatment, sample size, sample patients' criteria and selection. It has been found that patients' criteria are important; patients with neutrophil counts less than 500 - 1000/mm³ and/or lack of fluctuance on examination have been successfully

treated with antibiotics alone in 30% to 88% (25) while this was found to be 50% in patients with perianal abscess and 50% in patients with fistula in our study. The cause of recurrence could be explained due to technical reasons such as inadequate drainage and an unnoticed abscess (26). A study by Akkapulu et al. in 2015 showed that age, sex, types of abscess, presence of fistula or drain usage were not associated with recurrence (27). The American Heart Association recommends preoperative usage of antibiotics before any operation in patients with prosthetic valves, previous bacterial endocarditis, congenital heart disease and heart transplant recipients (28).

Postoperative antibiotic use is important because of the emergence of community-acquired methicillin resistant *Staphylococcus aureus* in anorectal abscesses (29). In our study, Lincomycin used in the treatment for abscess and fistula postoperatively as empiric antibiotic resulted in less recurrence of abscess or fistula development. This also prevents or treats bacteremia, cellulitis and sepsis. Another regime used antibiotics which inhibit bacterial cell wall synthesis like Ceftriaxone and Cefepime. Cheng and Tsai, 2010 (23) showed that the most common aerobic bacteria were *E.coli* and anaerobic bacteria were *B. fragilis*. *E.coli* were sensitive to amoxicillin-clavulamic acid (84.6%), cefazolin (84.6%), ciprofloxacin (69.2%). For anaerobic bacteria (*Bacteroides* species and *Clostridium perfringens*), the antibiotic sensitivity rates were determined to be 100% for metronidazole. They found that fistula development at the 12-month follow-up were 11.42% and 0% in patients who had mixed flora and a pure aerobic infection. Thus, this study is in agreement with our study regarding empirical use of antibiotics and that the first choice of oral antibiotics for the treatment of perianal abscess should be metronidazole combined with a cephalosporin. Ommer et al., 2012 (30) showed that antibiotics should be used in the presence of immunosuppression. A randomized, controlled, multi-center clinical trial study showed that the use of antibiotics could not prevent the development of fistulas after ID of PA (31). Therefore, antibiotics should be combined with surgical measures. Assessment of perianal abscess and fistula was done by dynamic-contrast enhanced MRI, which is the most important advantage of this technique (32) and the DWMRI, which is a useful technique for evaluating activity of fistulas with abscess. Regarding perianal fistula, visibility is greater with combined T2WI and DWMRI than T2WI alone (33).

5.1. Conclusions

The results of this study conclude that antibiotics administered after incision and drainage reduce the rate of fistula formation, abscess recurrence, cellulitis, sepsis and

bacteremia without any side effects of the drugs such as antibiotic resistance and diarrhea. In this study, administration of the empiric antibiotics was well tolerated and has shown a good response. Thus, in the role of empiric antibiotics in preventing recurrence, fistula formation is of clinical importance.

Footnotes

Conflicts of Interest: There is no conflict of interest.

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