ORIGINAL RESEARCH

Study on the effect of antibiotic treatment on the formation of anal fistula and recurrent perianal abscesses

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ABSTRACT

Background: Anal fistulae and perianal abscesses represent distinct yet interconnected manifestations of the same underlying clinical condition. The present study was conducted for assessing the effect of antibiotic treatment on the formation of anal fistula and recurrent perianal abscesses. Materials & methods: A cohort of 200 patients presenting for incision and drainage of perianal abscesses was selected for participation in this study. Patients were randomly assigned to one of two groups, with 100 individuals in each: the Treatment group and the Non-treatment group. The Treatment group was administered a 7-day course of oral metronidazole (500 mg every eight hours) and ciprofloxacin (500 mg every twelve hours), in addition to standard care, while the Non-treatment group received only standard care without antibiotics. Followup assessments were conducted over a period of three months. All the results were compiled in Microsoft excel sheet and were subjected to statistical analysis using SPSS software Results: Fistula formation was seen in 23 percent of the patients of the treatment group and in 51 percent of the patients of the non-treatment group; on comparing statistically, significant results were obtained. Mean age among the patients with fistula formation was significantly higher in comparison to the patients with non-fistula formation. Also; fistula formation was significantly higher among males and smokers. While evaluating the odds ratio, it was seen that antibiotic coverage was found to be a significant factor involved with decreasing the incidence of fistula formation. Conclusion: Postoperative prophylactic antibiotic therapyhas been noted to significantly contribute to the prevention of fistula in-ano development. Therefore, it is recommended to administer a one-week regimen of postoperative antibiotics following the initial incision and drainage of a perianal abscess. Key words: Anal fistula, Antibiotic, Perianal

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INTRODUCTION

Anal fistulae and perianal abscesses represent distinct yet interconnected manifestations of the same underlying clinical condition. While some cases may resolve spontaneously, the likelihood of recurrence is significantly heightened in the absence of appropriate surgical intervention. Perianal abscesses typically arise from the proctodeal glands, which are situated within the intersphincteric plane and extend through the internal sphincter via their ducts. These abscesses may either rupture into the anal canal, resulting in complete resolution, or they may propagate through submucosal, intersphincteric, or transsphincteric pathways, ultimately leading to the formation of fistulae.¹ Superficial infections can give rise to submucosal or subcutaneous abscesses. When an abscess breaches the external sphincter, it manifests as

an ischiorectal abscess. Conversely, if an intersphincteric abscess ascends beyond the levator muscles, it can evolve into a pelvirectal abscess. The infection's semicircular and predominantly posterior progression may result in the development of a horseshoe abscess or fistula.^{2, 3}

Superficial abscesses, including subcutaneous, submucosal, and ischiorectal types, typically present with characteristic symptoms such as pain, swelling, tenderness, and fever. Due to their anatomical positioning, these abscesses often induce discomfort during ambulation and sitting, with proximity to the anal canal frequently causing painful defecation. In contrast, deep abscesses, such as intermuscular and pelvirectal abscesses, may not exhibit the usual symptoms. Occasionally, patients may experience diffuse pelvic pain and elevated body temperature.⁴

Diagnostic modalities, including physical examination, rectal-digital examination, computed tomography (CT), magnetic resonance imaging (MRI), or endosonography, have been shown to provide valuable insights into the presence of deeper abscesses. The clinical presentation of perianal fistulae varies according to the degree of inflammation. Mild fistulae may discharge pus, serous fluid, or, in rare cases, fecal matter, leading to symptoms such as pruritus ani, itching, and skin maceration. Severe manifestations are infrequent and typically arise when spontaneous closure of the fistula results in recurrent abscess formation.5, 6

At present, there are no established protocols that require the administration of antibiotics following incision and drainage procedures. The use of antibiotics is primarily reserved for specific circumstances, such as the presence of extensive cellulitis, immunocompromised states, diabetes, and cardiac conditions involving artificial valves. There remains considerable debate surrounding the causes and prevention of recurrence in perianal abscesses, particularly concerning the influence of antibiotics on the formation of fistula in ano.⁷ Hence; the present study was conducted for assessing the effect of antibiotic treatment on the formation of anal fistula and recurrent perianal abscesses.

MATERIALS & METHODS

The present study was conducted for assessing the effect of antibiotic treatment on the formation of anal fistula and recurrent perianal abscesses. A cohort of 200 patients presenting for incision and drainage of perianal abscesses was selected for participation in this study. The inclusion criteria stipulated that participants must be over 20 years of age and have a confirmed diagnosis of a perianal abscess. Exclusion criteria encompassed individuals with a history of prior surgical intervention in the anal region, those with concurrent fistulas, inflammatory bowel diseases, or any other significant comorbidities. Diagnosis of the perianal abscess was established through a combination of the patients' medical histories, physical examinations, and assessments conducted under general anesthesia. All abscesses that did not exhibit spontaneous drainage were surgically incised, thoroughly drained, and left open to facilitate healing, without the use of drains. Anoscopy was performed during the procedure to exclude the presence of any existing fistulas. Patients were randomly assigned to one of two groups, with 100 individuals in each: the

Treatment group and the Non-treatment group. The Treatment group was administered a 7-day course of oral metronidazole (500 mg every eight hours) and ciprofloxacin (500 mg every twelve hours), in addition to standard care, while the Non-treatment group received only standard care without antibiotics. Follow-up assessments were conducted over a period of three months. A fistula in-ano was identified as an internal opening diagnosed during follow-up, based on a history of chronic symptoms and the presence of a communicating tract between the skin of the perianal area at the incision site and the anal canal, which may or may not have exhibited discharge by the third month of follow-up, confirmed through digital rectal examination and anoscopy. All identified fistulas were subsequently validated in the operating room. Follow-up evaluations were conducted, and abscesses were classified as perianal (subcutaneous), inter-sphincteric, or ischiorectal.Body mass index (BMI) was categorized according to the classification of the World HealthOrganization as <18.5, 18.5 to 25, 25 to 30, and < 30 kg/m². All the results were compiled in Microsoft excel sheet and were subjected to statistical analysis using SPSS software. Chi-square test and univariate analysis was done for evaluating the level of significance.

RESULTS

200 Patients were randomly assigned to one of two groups, with 100 individuals in each: the Treatment group and the Non-treatment group. The Treatment group was administered a 7-day course of oral metronidazole (500 mg every eight hours) and ciprofloxacin (500 mg every twelve hours), in addition to standard care, while the Non-treatment group received only standard care without antibiotics. Mean age of the patients of the treatment group and non-treatment group was 42.9 years and 45.7 years respectively. Majority proportion of patients of both the study groups were males. Fistula formation was seen in 23 percent of the patients of the treatment group and in 51 percent of the patients of the nontreatment group; on comparing statistically, significant results were obtained. Mean age among the patients with fistula formation was significantly higher in comparison to the patients with non-fistula formation. Also; fistula formation was significantly higher among males and smokers. While evaluating the odds ratio, it was seen that antibiotic coverage was found to be a significant factor involved with decreasing the incidence of fistula formation.

Table 1: Development	of	' fistula
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Fistula development	Treatment group	Non-treatment group	Total
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Yes	23	51	74
No	77	49	126
Total	100	100	200
p-value	0.001 (-	



Graph 1: Incidence of fistula formation

Tabl	e 2: Com	parison of	details a	mong pa	atients on	the	basis o	of fistula	devel	opmen	t

Variable	Fistula formation			p-value	
	Yes (n=74)		No (n=126)		
	Number	Percentage	Number	Percentage	
Mean age (years)	52.7		52.7 31.9		0.0012 (Significant)
Males	60	81.08	90	71.43	0.0071 (Significant)
Females	14	18.92	36	28.57	
BMI < 18.5	13	17.57	29	23.02	0.776
BMI 18.5 to 24.9	21	28.38	39	30.95	
BMI 25 to 29.9	12	16.22	28	22.22	
BMI > 30	28	37.84	30	23.81	
Smokers	53	71.62	33	26.19	0.0027 (Significant)
Alcohol abusers	23	31.08	31	24.60	0.128
Abscess- Perianal	18	24.32	33	26.19	0.618
Abscess- Ischiorectal	22	29.73	42	33.33	
Abscess- Intersphincteric	34	45.95	51	40.48	

Table 3: Evaluation of Risk factors of developing fistula

Variable	Odds ratio	p-value
Gender- Male	2.68	0.18
Age	1.23	0.62
BMI	0.86	0.28
Smokers	1.69	0.19
Alcohol abusers	0.38	0.43
Abscess type- Perianal	0.44	0.22
Group – Treatment group	2.12	0.001 (Significant)



Graph 2: Risk factors involved in fistula formation

DISCUSSION

The standard approach to managing anorectal abscesses involves incision and drainage. A significant concern associated with this procedure is the potential for subsequent fistula development, which can occur in 5% to 83% of patients and negatively impact their quality of life. While performing a fistulotomy concurrently may prevent the formation of a fistula during the drainage of an anorectal abscess, internal openings are only identified in 10% to 34.7% of primary anorectal abscess cases. It has been suggested that inadequate drainage of an abscess may lead to a persistent chronic infection in the surrounding tissue, resulting in a nonhealing tract that can evolve into a fistula.^{7, 8} Antibiotics have been considered beneficial in addressing this chronic infection. Nevertheless, there has been no randomized controlled trial evaluating the efficacy of therapeutic antibiotics following the incision and drainage of anorectal abscesses. The primary objective in treating anorectal abscesses is to eliminate cryptoglandular sepsis and eradicate epithelialized tracts.9- ¹¹Hence; the present study was conducted for assessing the effect of antibiotic treatment on the formation of anal fistula and recurrent perianal abscesses.

200 Patients were randomly assigned to one of two groups, with 100 individuals in each: the treatment group and the non-treatment group. The Treatment group was administered a 7-day course of oral metronidazole (500 mg every eight hours) and ciprofloxacin (500 mg every twelve hours), in addition to standard care, while the non-treatment group received only standard care without antibiotics. Mean age of the patients of the treatment group and non-treatment group was 42.9 years and 45.7 years respectively. Majority proportion of patients of both the study groups were males. Fistula formation was seen in 23 percent of the patients of the treatment group and in 51 percent of the patients of the nonstatistically, treatment group; on comparing significant results were obtained. Mean age among the patients with fistula formation was significantly higher in comparison to the patients with non-fistula formation. Also; fistula formation was significantly higher among males and smokers. While evaluating the odds ratio, it was seen that antibiotic coverage was found to be a significant factor involved with decreasing the incidence of fistula formation. A previous study in patients with anorectal abscesses suggested that antibiotics may be protective against fistula formation (Nunoo-Mensah JW et al).¹²Sözener

Ulas et al. conducted a prior investigation examining the impact of antibiotic therapy on the development of fistulas subsequent to the incision and drainage of anorectal abscesses. In this study, participants were randomly allocated to receive either a placebo or a combination of amoxicillin and clavulanic acid for a duration of 10 days following the drainage procedure. Out of 334 individuals screened for eligibility, 183 were enrolled in the trial (92 in the placebo group and 91 in the antibiotic group). Data suitable for perprotocol analysis were obtained from 151 patients (76 from the placebo group and 75 from the antibiotic group), with a mean age of 37.6 years; among them, 118 (78.1%) were male. Over the course of a one-year follow-up, 45 patients (29.8%) developed anal fistulas. Specifically, fistula formation was observed in 17 patients (22.4%) within the placebo cohort and in 28 patients (37.3%) within the antibiotic cohort. The likelihood of fistula development was notably higher in patients with ischiorectal or intersphincteric abscesses compared to those with perianal abscesses. The findings suggested that antibiotic treatment following the drainage of an anorectal abscess does not confer any protective benefit against the risk of fistula formation.¹³Mocanu V et al performed a systematic review and meta-analysis of the current literature to determine the role of antibiotics in prevention of anal fistula following incision and drainage of anorectal abscesses. A comprehensive literature search was performed utilizing the Medline, EMBASE, Scopus, Cochrane Library, and Web of Science databases, covering the period from 1946 to April 2018. The search employed the terms "perianal OR anal OR fistula-in-ano OR ischiorectal OR anorectal AND abscess AND antibiotics," and was restricted to studies involving human subjects published in English. The literature review and data extraction adhered to PRISMA guidelines. Ultimately, six studies encompassing 817 patients were selected for the systematic review. The average age of participants was 37.8 years, with 20.4% being female, and the follow-up duration varied from one to 30 months. The antibiotic regimens differed across studies, with treatment durations ranging from five to ten days. Among the patients, 358 (43.8%) received management without antibiotics, while 459 (56.2%) were treated with antibiotics. The incidence of fistula formation was 16% in the antibiotic group compared to 24% in the non-antibiotic group. The meta-analysis indicated a statistically significant protective effect associated with antibiotic treatment. Consequently, antibiotic therapy following the incision and drainage of anorectal abscesses is linked to a 36% reduction in the odds of developing a fistula.¹⁴

CONCLUSION

Postoperative prophylactic antibiotic therapyhas been noted to significantly contribute to the prevention of fistula in-ano development. Therefore, it is recommended to administer a one-week regimen of postoperative antibiotics following the initial incision and drainage of a perianal abscess.

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