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Effectiveness of Antibiotherapy, VAC, and Ostomy in the Treatment of Perianal Abscess: Analysis in a Large Sample of 181 Cases

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Abstract

Objective: To examine the effects of VAC and ostomy in the treatment of perianal abscess and their relationship with the characteristics of the abscess and comorbidities.

Methods: Demographic characteristics of patients and characteristics of abscess, VAC, ostomy, hospital stay and complications were examined retrospectively. The Statistical Package for Social Sciences version 26.0 software (IBM Corp.; Armonk, NY, USA) was used. Descriptive methods were used. Data were compared with Fisher Freeman Halton Exact test, Kruskal Wallis and Bonferroni Dunn test. Significance was evaluated at the $P < .05$ level.

Results: Of the total 181 cases, 56.9% (n = 103) were male, their age was 45.33±14.27 years. Uncomplicated recovery in 77.3% (n = 140) of cases; local complications developed in 19.9% (n = 36), systemic complications/mortality in 2.8% (n = 5). Abscesses were perianal+urogenital in 11,6%(n = 21); size was 3.53±2.70 cm. 34,3% (n = 62) had comorbidity, and 11.6% (n = 21) had a fistula. Age, perianal+urogenital location, large abscess, and comorbidities were associated with complications (P= .015, P = .001, P = .048, P = .001,respectively). Fistula-complication relationship wasn't significant (P = .671). Extended antibiotics were used in 17,1% (n = 31); ostomy in 7.2% (n = 13); 3.3% (n = 6) had VAC. Extended antibiotics and ostomy were associated with complications, but VAC wasn't (P = .001, P = .001, P = .240, respectively). Secondary healing occurred in 96,7% (n = 175), and primary closure/flap-graft repair in 3.3% (n = 6) of the cases; complication rates were similar (P = .066). The hospital stay was 5.55 ± 9,72 days, and longer in cases with ostomies, VACs, and those with complications (P = .045).

Conclusion: The prognosis in perianal abscesses is affected by age, comorbidities, and characteristics of the abscess. Extended antibiotics and ostomy were associated with complications and long hospitalization. Despite obvious local benefits, VAC doesn't provide sufficient benefit when a negative prognosis is predicted. This shows that some new methods can be given a chance alongside VAC in perianal abscesses, which continues to be a serious problem today.

Keywords: Perianal abscess, Fournier's gangrene, VAC, diverting ostomy, antibiotherapy

Introduction

Perianal abscess is the most common subtype of anorectal abscesses. If left untreated, it can progress to the ischioanal or intersphincteric space, causing pelvic sepsis (Fournier's gangrene), systemic infection, and mortality, therefore it should be considered. Among the risk factors are conditions that primarily affect wound healing negatively, including immunosuppression, HIV, and diabetes. Additionally, hemorrhoids, fissures, trauma and foreign bodies, fistulizing Crohn's disease, and Hidradenitis suppurativa also have an important place in the etiology.[1-3] However, it has been reported that it is more common in those with a high body mass index, around the age of 40, and in males.[4,5]

The primary approach in treatment is surgery. Effective drainage and debridement in a short time are important in terms of prognosis. Inadequate or delayed drainage may cause recurrences or fistula formation.[2] In addition, the addition of antibiotics effective against gram-negative and anaerobic bacteria is recommended in patients with comorbidities to prevent progression to Fournier's gangrene or sepsis, which is known to have a mortality rate of up to 50%.[1,3] Classical treatment starts with the decompression of the abscess cavity, purging, and separating the septations. Needle aspiration is another surgical method. However, although it seems to progress without incision and with a shorter wound healing process, it has high recurrence rates and is mostly not preferred except in selected pediatric cases and simple perianal abscesses.[6,7] In some cases, diversional ostomy is added to the surgical treatment to prevent contamination of the open wound after debridement with fecal contents and for ease of management. It is stated that it provides case-based benefits, but there is not enough data that it reduces the rate of sepsis and mortality.[8] Similarly, the VAC (Vacuum Assisted Closure) technique is preferred in some cases with extensive tissue loss and deep pouches after debridement; however, the publications on its benefits in reducing mortality aren't as clear as its local benefits.[9]

With this study, perianal abscess and Fournier's gangrene, which continue to progress with high mortality rates despite today's conditions and various treatment approaches, will be examined. The aim is aimed to analyze the etiological factors, the characteristics

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of the abscess, the treatment approach, the complication and mortality rates, together with our 5-year case experience, and to review what would be more beneficial for reducing mortality in light of the data.

Methods

The study was conducted retrospectively examining the cases of those who applied for perianal abscess and underwent intervention in the last 5 years. Age, gender, presence of comorbidities that would delay wound healing, characteristics of abscesses, antibiotherapy preferences, and the procedure applied after debridement were recorded. Length of hospital stay, recovery at the end of treatment, complications, and mortality were noted, and the relationship between them were discussed. Informed consent was obtained from all cases included in the study. Ethics committee approval was received for this study from the ethics committee of İstanbul University-Cerrahpaşa (Approval no: E-83045809-604.01.01-539446, Date: November 18, 2022). In the study, perianal abscess cases treated by hospitalization were discussed; daily interventions, non-perianal abscesses, abscesses that were detected and intervened only by physical examination without obtaining quantitative data with the help of radiological methods, and cases where all the required data couldn't be obtained or who didn't have permission to use their data were excluded from the study.

While the individual characteristics of the cases were revealed, their age and gender, as well as the presence of at least one additional disease or condition in their medical history, such as immunosuppression, diabetes, Crohn's disease, or Hidradenitis Suppurativa, which have a known causal relationship with the abscess and wound healing process, were expressed as having or not having comorbidities that would delay wound healing. The largest diameter of the abscess and its location, as expressed in ultrasonography and/or computed tomography images taken at the time of admission, and whether its location was only perianal or perianal+urogenital, were recorded. In addition, operation notes recorded in the hospital databases indicated that in all cases where a perianal fistula was found to accompany the abscess during the debridement of the abscess, an attempt was made on the fistula. In these cases, the characteristics of the abscess, as well as the size and location of the abscess, were documented as the presence or absence of an accompanying fistula. Since the examination findings and interventions obtained by the operator during the procedure are qualitative, the characteristics of the fistula and the interventions performed are not included in detail. However, it was observed that in all cases, drainage and debridement were performed for the abscesses, no needle aspiration was performed in any of them, and antibiotic treatment was added to all of them. These approaches, based on the clinical experiences of the physicians in the institution, constitute the limiting aspects of this retrospective study. In addition, by examining the available data, it is seen that in some cases, antibiotherapy consisted only of the combination of ciprofloxacin and metronidazole, while in other cases it is extended; Antibiotherapy was examined in two categories: standard dual therapy (ciprofloxacin and metronidazole) and extended antibiotherapy.

It was observed that, in some of the cases, secondary healing was preferred with dressing, and in some cases, repair with primary or flap graft was preferred, and they were examined in two categories. In addition, it was observed that some of them used the VAC technique for a period of time during the healing process, and some of them used diversion ostomy, and the data were recorded. The duration of hospitalization of the patients after the procedure and the outcome of the treatment were recorded in three separate categories: complete recovery, local complications, systemic complications, and/or mortality development. The collected data, treatment duration, and treatment outcome were examined comparatively and discussed in terms of causality.

Statistical Analysis

The Statistical Package for Social Sciences version 26.0 software (IBM Corp.; Armonk, NY, USA) was used. While evaluating the data, descriptive statistical methods (mean, standard deviation, median, frequency, ratio, minimum, maximum) were used. Fisher Freeman Halton Exact test was used to compare qualitative data, Kruskal-Wallis test was used for comparisons of groups of three or more that didn't show normal distribution, and Bonferroni-Dunn test was used for pairwise comparisons. Significance was evaluated at the $P < .05$ level.

Results

The study was conducted with a total of 181 cases, with 43.1% (n = 78) female and a mean age of 45.33 ± 14.27 years. Complete recovery was observed in 77.3% (n = 140) of the cases without complications; local complications occurred in 19.9% (n = 36), and systemic complications/mortality occurred in 2.8% (n = 5) (Table 1). When the relationship between demographic characteristics and treatment success was examined, it was found that the mean age of the cases with complications was higher ($P = .005$); however, there was no significant difference between gender and treatment success ($P = .134$). Additionally, 34.3% (n = 62) of the cases had at least one comorbidity that could delay wound healing, and 11.6% (n = 21) also had a fistula. There was a significant relationship between comorbidity and complication rates ($P = .001$); however, the presence of a fistula did not significantly affect the complication rates ($P = .671$).

In 88.4% (n = 160) of the cases, the abscess was in the perianal region, while in 11.6% (n = 21) it was located in the perianal+urogenital region. It was found that urogenital localization was more common in cases with complications ($P = .001$), and systemic complication/mortality rates in urogenital abscesses were higher than local complications ($P = .031$) and uncomplicated recovery ($P = .001$). The largest size of the abscess collection was between 1 and 25 cm, with an average of 3.53±2.70 cm, and it was determined that large abscess sizes were associated with increasing complication rates ($P = .001$). Abscess sizes were compared among those with systemic complications/mortality, those who recovered without complications ($P = .048$), and those who developed local complications ($P = .001$); it was also found that abscess sizes were higher in patients with local complications than in those who recovered without complications ($P = .022$).

Drainage and debridement were applied to all abscesses (n = 181) and antibiotics were added to the treatment; 82.9% of them (n = 150) were given a ciprofloxacin and metronidazole combination (standard dual therapy), and 17.1% (n = 31) of them had extended antibiotherapy. In cases with systemic complications/mortality, compared to local complications ($P = .001$); a higher rate of local complications compared to those who fully recovered ($P = .016$) with extended antibiotherapy. Ostomy was performed in 7.2% (n = 13) of the cases, and the VAC technique were applied in 3.3% (n = 6). In cases with systemic complications/mortality, ostomy was more common ($P = .001$); however, it was found that the rates didn't show a statistically significant difference in the use of VAC ($P = .240$).

At the end of the process, secondary wound healing with dressing was preferred in 96.7% (n = 175) of the cases, and repair with primary closure/flap-graft was applied in 3.3% (n = 6). Complication rates were similar in both cases ($P = .066$).

Table 1. Demographic Characteristics, Prognostic Factors, and Treatment Success with Treatment Method in Perianal Abscess Cases

			Treatment Success			
		Total (n = 181) n (%)	**Full Recovery (n = 140) n (%)**	**Local complications (n = 36) n (%)**	**Systemic comp./ mortality (n = 5) n (%)**	***P***
Age (year)	Median (Min-Max)	43 (20-86)	42 (20-81)	46 (23-86)	62 (58-70)	[a]**.005****
	Mean ± SD	45.33 ± 14.27	43.79 ± 13.79	48.97 ± 15.05	62.0 ± 4.90	
Gender	Female	78 (43.1)	61 (43.6)	17 (47.2)	0 (0)	[b]**.134**
	Male	103 (56.9)	79 (56.4)	19 (52.8)	5 (100)	
Largest size of abscess-collection (cm)	Median (Min-Max)	3 (1-25)	3 (1-17)	3 (2-8)	7 (4,5-25)	[a]**.001****
	Mean ± SD	3.53 ± 2.70	3.18 ± 2.12	3.86 ± 1.80	10.90 ± 8.37	
Location of abscess	Perianal	160 (88.4)	134 (95.7)	25 (69.4)	1 (20.0)	[b]**.001****
	Perianal+ urogenital	21 (11.6)	6 (4.3)	11 (30.6)	4 (80.0)	
Comorbidity that could delay wound healing	There is	62 (34.3)	35 (25.0)	22 (61.1)	5 (100)	[b]**.001****
	None	119 (65.7)	105 (75.0)	14 (38.9)	0 (0)	
Presence of fistula	There is	21 (11.6)	16 (11.4)	4 (11.1)	1 (20.0)	[b]**.671**
	None	160 (88.4)	124 (88.6)	32 (88.9)	4 (80.0)	
Antibiotic	Standart dual	150 (82.9)	128 (91.4)	22 (61.1)	0 (0)	[b]**.001****
	Extended	31 (17.1)	12 (8.6)	14 (38.9)	5 (100)	
Diverting Ostomy	There is	13 (7.2)	5 (3.6)	3 (8.3)	5 (100)	[b]**.001****
	None	168 (92.8)	135 (96.4)	33 (91.7)	0 (0)	
VAC technique	There is	6 (3.3)	3 (2.1)	3 (8.3)	0 (0)	[b]**.240**
	None	175 (96.7)	137 (97.9)	33 (91.7)	5 (100)	
End of treatment	Secondary Healing with Dressing	175 (96.7)	137 (97.9)	34 (94.4)	4 (80.0)	[b]**.066**
	Repair with primary closure/ Flap-Graft	6 (3.3)	3 (2.1)	2 (5.6)	1 (20.0)	
Hospital stay (day)	Median (Min-Max)	2 (1-63)	2 (1-52)	4,5 (1-63)	30 (7-32)	[a]**.001****
	Mean ± SD	5.55 ± 9.72	3.73 ± 7.14	9.97 ± 13.58	24.80 ± 10.62	
Diverting Ostomy	Median (Min-Max)	21 (7-37)	18 (7-25)	18 (16-37)	30 (7-32)	
	Mean ± SD	21.07 ± 9.61	15.8 ± 7.13	23.6 ± 9.46	24.8 ± 9.49	
VAC technique	Median (Min-Max)	27-37 (9-63)	25 (9-52)	37 (27-63)	-	
	Mean±Sd	35.5 ± 17.86	28.6 ± 17.74	42.3 ± 15.17		

[a]Kruskal-Wallis test, [b]Fisher-Freeman Halton Exact Test, ***P* < .01.

In the examination made in terms of the connection between the incidence of complications and mortality in cases where ostomy was applied, the VAC technique was used and repair was performed with primary closure/flap-graft at the end of the treatment. It was noted that primary closure/flap-graft repair was preferred in 2 of the 13 cases in which diverter ostomy was applied; local complications were observed in one of them, and complete recovery was achieved in the other. It was noted that 5 of the 6 cases in which the VAC technique was used were repaired with primary closure/flap-graft; 2 of them had local complications, and 3 of them had complete recovery. It was noted that both diverting ostomy and VAC techniques were used in 2 cases; primary closure/flap-graft repair was preferred in these 2 cases, local complications were observed in one of them, and complete recovery was achieved in the other. It was observed that diverting ostomy was applied in 5 of the cases that developed systemic complications/mortality; 4 of them had secondary wound healing, and 1 had primary closure/flap-graft repair.

The duration of hospitalization is between 1-63 days, and the general average is 5.55±9.72 days, while it is 21.07±9.61 days in cases where diverting ostomy was applied and 35.5±17.86 days in cases where the VAC technique was applied. However, these

figures were higher in cases with complications, and the duration of inpatient treatment in patients who developed systemic complications/mortality was found to be higher compared among those with local complications (P = .001).

Discussion

Perianal abscesses should be intervened without delay, as they can progress to necrotizing soft tissue infection if not intervened in the early period.[8] The severity of the abscess is related to the location and size of the abscess, the age of the patient, and the presence of comorbidities that will delay wound healing, which can guide us in determining the treatment strategy. In a study of 203 cases, the mean age of men and women was 45.9 ± 7.8 and 48.1 ± 8.3 (P = .08), and a male dominance of 72.4% (P = .8) was mentioned.[10] In our study, male predominance with a rate of 56% (P = .134) and the mean age of 45.33 ± 14.27 years indicate that perianal abscess applications have similar demographic characteristics. The mean age was 43.79 ± 13.79 years in the group that recovered without complications, 48.97 ± 15.05 in those with local complications, and 62.0 ± 4.90 years in those with systemic complications/mortality (P = .005), which strongly indicates that increasing age is associated with complications.

It is known that the presence of comorbidity, especially immunosuppression, which may adversely affect wound healing, is a negative prognostic factor, and as a reflection of this, studies that were mostly composed of cases without comorbidity are prominent in the literature.[11,12] In addition, some studies have been done on perianal fistula, which is known as one of the comorbid factors; it was reported that perianal fistula was detected in 68.8% of the cases in a retrospective study of 80 cases and in 53% of the cases in a study of 90 cases, and inadequate intervention for the fistula, not the presence of fistula, caused recurrence.[13,14] In our study, it was observed that there was a significant relationship between the presence of comorbid factors such as comorbidity and complications (P = .001). The presence of fistula, which we examined in a separate category, was detected in 11.6% of the cases and all of them were intervened during the drainage of the abscess. In our study, the relationship between the presence of fistula and complication wasn't significant (P = 0.671); unlike fistula, the characteristic of the abscess is strongly associated with both the complication and the severity of the complication and mortality; large abscess size (P = .001) and urogenital extension (P = .001) were found to be associated with high complication and mortality rates. Many literature data, ranging from old cases requiring treatment of urogenital abscesses that may lead to cystostomy or even lower extremity amputations, to recent case reports in which the difficult treatment process of complex perirectal abscesses with urethral extension is described, support the relationship of urogenital location with negative prognosis and complications.[15,16]

The general approach to abscess management starts with aggressive surgical debridement as soon as possible; this involves meticulous wound care and antibiotic supplementation according to the situation to prevent progression to conditions such as recurrence, fistula, and perianal sepsis.[2,17] Although there are publications that mention antibiotic treatment in addition to drainage and the potential side effects of antibiotics in abscesses with only certain characteristics, in our study, antibiotic treatment with abscess drainage and debridement was given in all cases. Although the retrospective nature of the study is thought to be a potential limiting factor that prevents us from directing the treatment and approach, especially antibiotics, this issue has been mentioned in many studies in the literature; it was emphasized that the results were based on evidence of moderate certainty. It was stated that it was not clear whether there was a difference in terms of infection risk, side effects, closure, or surgical intervention.[17,18] As stated in the studies, more studies and high-evidence data are needed for prospective studies in which trials such as antibiotic-free follow-up can be performed due to difficulties arising from subjective findings and the possibility of incomplete treatment in a group of cases not ethically appropriate. However, although there is no proven data on whether antibiotics are absolutely necessary or not, it is mentioned that antibiotics should be added to the treatment in selected cases, and there are even case studies mentioning antimicrobial photodynamic therapy trials in perianal abscesses.[17,19] In our study, clinical findings, comorbidities, and abscess size-localizations in the cases may have influenced the decision to follow up the cases with antibiotics. Among these, 31 cases (17.1%) who required extended antibiotherapy were examined with a higher rate of complications; even when complications are examined, it is seen that systemic complications/mortality occur at a higher rate than local complications (P = .016). It is thought that the possible reason for this situation isn't antibiotics, but rather because they are critical cases that require extended antibiotics.

In the treatment of abscesses, it is not clear whether frequent dressing changes and other additional treatments after debridement affect the healing time, recurrence, or other outcomes. As stated in a retrospective study of 64 cases, the treatment approach is based on local practices, and more clinical research is needed to evaluate the success of treatment.[20] Crohn's cases with severe perianal fistulization are shown as the primary indication for ostomy, which is one of the preferred interventions after debridement. However, it was emphasized that it should be applied for selected cases according to disease severity and sphincter damage.[8] In our study, ostomy was performed in 7.2% of the cases, and complications and mortality were observed at higher rates in these cases (P = .001). From another perspective, diverter ostomy was applied in 5 of the cases that developed systemic complications/mortality, and primary closure/flap-graft repair could be performed in only 1 of them. It was noted that only 2 of the 13 cases in which diverter ostomy was applied could be repaired with primary closure/flap-graft. These results show parallelism with the literature data; however, this is thought to be due to the fact that they are in a more negative clinical condition and more need for ostomy, rather than complications and mortality related to ostomy. Similarly, the VAC technique, which provides efficient wound care by reducing edema in the tissue and increasing blood supply, can be used in cases with extensive tissue loss and deep pouches. It is mentioned that it can be preferred.[9] In our study, in which the VAC technique were applied in 3.3% of the cases, it was found that the rates of local complications were high in these cases, but there was no severe systemic complication/mortality (P = .240). In addition, the fact that repair could be performed with primary closure/flap-graft in 5 of the 6 cases in which the VAC technique was used, and that 3 of them had complete recovery and 2 had local complications, shows that VAC treatment facilitates local wound healing and wound closure.

However, in one of the 2 cases in which the VAC technique, primary closure/flap-graft repair, and diverting ostomy were applied together, complete recovery was achieved in one, while local complications were observed in the other. Although this is an insufficient number to obtain a generalizable result, the local benefits of VAC and the failure to demonstrate the effectiveness of ostomy in this regard suggest that ostomy combined with VAC treatment doesn't have an extra advantage.

However, it is noteworthy that neither the VAC technique nor the diverting ostomy provides an advantage in terms of hospital stay,

and this duration is significantly higher in cases where the VAC technique was applied. In addition, it was found that these values were higher in cases with complications, and the inpatient treatment duration of cases with systemic complications/mortality was higher than those with local complications (P = .001). However, due to the small number of cases in which the ostomy and VAC technique were applied in our study, it is difficult to make a definitive conclusion between complication rates and hospital stay.

Skin grafts and musculocutaneous flaps aimed at wound closure, along with dressings, topical treatments, and treatments such as hyperbaric oxygen and VAC treatments that promote open wound healing, are mentioned in studies as having no demonstrable superiority over each other. The treatment should occur after the cornerstone of treatment—aggressive surgical debridement—and the septic risk is under control; many studies support this information.[20] In our study, complication rates were found to be similar in the 96.7% group in which secondary wound healing was preferred and in the 3.3% group who underwent primary closure/flap-graft repair (P = .066). This is in line with the literature data, suggesting that comorbidities and factors related to the process rather than the outcome of treatment play a role in the development of recurrence and complications.

Conclusion

In perianal abscesses, the prognosis is affected by the characteristics of the patient and the abscess; extended antibiotics and ostomy were associated with high complications and long hospital stays. The increased local complication rates and the need for prolonged hospitalization of the VAC technique limit the applicability of this method. This brings along the search for a method that provides local tissue healing but has fewer disadvantages. New methods, such as photodynamic therapy, which suppresses target cell death and infectious and inflammatory pathways in the tissue by creating reactive oxygen species, and hyperbaric oxygen therapy, which increases phagocytic activity and stimulates angiogenesis and re-epithelialization by tissue over-oxygenation, are thought that it may be beneficial in the presence of comorbidities that impair wound healing, such as diabetes.[5,17]

Availability of Data and Materials: The data that support the findings of this study are available on request from the corresponding author.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of İstanbul University-Cerrahpaşa (Approval no: E-83045809-604.01.01-539446, Date: November 18, 2022).

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