

Bacterial colonization in uninfected pilonidal cyst and its role in developing recurrence in postoperative period: Prospective study

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Abstract

Aim: To determine the bacterial prevalence and its susceptibility to antibiotics, and additionally, to investigate the relationship between bacterial status and recurrence and complications with regard to whether bacteria reproduce in the cyst cavity in uninfected pilonidal cyst.

Material and Methods: The cases included in the study were those who applied to our clinic due to pilonidal sinus and surgical operation was decided. Before the operation, culture specimen was taken using a sterile swab stick from the cyst hole. The cyst was excised with a safety margin. The excised material was opened under the guidance of the cyst hole and the cavity was entered and samples of cyst tissue and content were collected for culture-antibiogram.

Results: Totally 46 cases were included in our study, Average age was 26 (18-47) years. Limberg flap was performed to 37 (78%) of the cases, and primary repair to 9 (22%) cases. Average follow-up period was 27.1 (sd±7.6) months. Normal bacterial skin flora was determined in 6 (13%) cases and significant bacterial reproduction in 4 (8.6%) cases (*Enterococcus faecalis*, *Streptococcus anginosus*, MRSA, *Streptococcus dysgalactiae*) in the cyst cavity culture. In tissue culture however, skin bacterial flora was observed in 9 (19.5%) cases, while bacterial growth only in 1 case. Recurrence was determined in 3 (3.6%) cases in total. Bacterial growth, and other factors were not associated with recurrence ($p > 0.05$)

Conclusion: In this study, non-infected pilonidal sinus surgery does not require bacterial culture to prevent recurrence.

Keywords: Pilonidal sinus; recurrence; surgery; culture.

INTRODUCTION

Sacral region pilonidal sinus is an asymptomatic disease generally seen at young ages, and characterised by acute abscess formation or chronic inflammation (1). It is the disease of young adults in particular and it affects 1% of the population between 15-30 years (2). Although there is no consensus on the etiology, it is recognised as an acquired disease that can occur due to the penetration of a hair shaft through a fissure in the gluteal area (3). The local or detached hair fragments get stuck in the natal cleft, become traumatized and invade into skin, and resultantly, cause formation of midline pits in the gluteal cleft and development of foreign body reaction in some

cases, which might lead to a secondary infection (4). In addition to depilation of the natal cleft, canal ablation, simple excision and flap reconstruction and surgical procedures involving wide excisions, there are also many non-surgical treatment options (5). As of today, however, standart treatment method is not determined yet (6). Recurrence rates increase up to 67.9% with regard to follow up period, although they vary with respect to the administered therapies (7). Recurrence, and impaired quality of life as well as increased loss of workforce in patients with this disease is the most important problem following the treatment. However, there is no definitive cause of recurrence so far. Various probable causes are currently under investigation. As a matter of fact, wound

Received: 06.05.2019 Accepted: 15.05.2019 Available online: 24.06.2019

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site infection and recurrence are common problems in all treatment options. In this study we aimed to investigate the bacterial prevalence and its susceptibility to antibiotics, and additionally, the relationship between bacterial status and recurrence and complications with regard to whether bacteria reproduce in the cyst cavity content or not in uninfected pilonidal cyst.

MATERIAL and METHODS

Out of the cases who applied to our clinic due to pilonidal sinus, the ones directed to surgical operation were included in our study. The cases were evaluated with regard to age, gender, the day of discharge, postoperative wound site infection, development of seroma-hematoma, flap necrosis, early stage recurrence, anesthesia related complications and additional abnormal conditions. Therapy was started if there was any infection indicated by the culture results. Additional therapy was not ordered in case of no infection. Last control dates of the cases were considered for recurrence. Development of discharge, abscess, and new sinus formation at wound site in the last examination were regarded as recurrence. Detailed informed consent was taken from all cases. Our study was carried out in compliance with Helsinki Declaration. Approval of the Ethical Committee of Health Sciences University, Izmir Bozyaka Training and Research Hospital was obtained (Date: 30.12.2014 & no:1). In the power analysis to determine the sample size ($1b=0.80$, $a=0.05$), the minimum number of samples was determined 44 cases. The statistical analysis of the data was performed in IBM SPSS Statistics Version 22 package program. Groups according to the data Fisher's Exact test or Mann Whitney U statistical analysis was used. $P < 0.05$ was considered statistically significant.

Surgical Procedure and Culture Sampling: Surgical site was locally shaved at the operating room. Cefazolin sodium 0,5 g IV was administered to all cases 30 minutes before the operation and at postoperative 12th hour. All cases were operated under spinal anesthesia and in the prone Jackknife position. Gluteus traction was ensured by the help of the wide adhesive tapes fixed on the side of the operating table thus, intergluteal sulcus was revealed. In order to reduce the likelihood of any contamination from anal region, a gauze soaked with polyvinyl iodine was placed onto this area. Operation site was cleansed 3 times by 10% polyvinyl iodine and then covered sterile. Before the operation, culture specimen was taken using a sterile swab stick from the cyst hole. The cyst was excised with a safety margin. The excised material was opened under the guidance of the cyst hole and the cavity was entered and samples of cyst tissue and content were collected for culture-antibiogram. Either limberg flap or primary closure was implemented to the cases, with respect to the condition of the pilonidal cyst. The samples taken were cultured on 5% sheep blood agar and EMB (Eosin

Methylene Blue) media, incubated at 37°C for 24-48 hours, and then evaluated. Identification of pathogenic bacteria isolated in cultures and relevant antibiogram procedures were then applied to the plates with bacterial growth. The absence of bacterial growth was confirmed after re-evaluation at 48 hours of incubation. The operations were conducted by surgeons with at least 5 years of experience on pilonidal sinus. Exclusion criteria were determined as: age under 18 years, having infected pilonidal sinus, having marsupialization, and having antibiotherapy due to pilonidal sinus or another reason in the last 15 days.

RESULTS

In our study, 46 cases were included where 38 (83%) were male and 8 (17%) were female. Average age was 26 (18-47) years. Limberg flap was applied to 37 (78%) and primary repair to 9 (22%) of the cases. Average hospital stay was 1 (1-3) day(s). In 3 cases with complications rehospitalization was decided due to postspinal headache and all three cases were discharged at second day. Necrosis, hematoma, seroma and such problems were not observed in the wound site, in any of the cases. Average follow up period was 27.1 (sd±7.6) months. Skin flora bacteria were determined in 6 (13%) and bacterial reproduction in 4 (8.6%) cases in cyst cavity culture. In tissue culture however, normal bacterial flora of skin was determined in 9 (19.5%) cases whereas pathogenic bacterial growth was observed in only 1 case. The details of the bacterial growth observed in tissue and cyst cavity cultures are displayed in Table 1.

Table 1. Distribution of reproductions in the cultures

| Reproduction in cyst cavity (n, %) | Reproduction in tissue culture n, %) |
|------------------------------------|--------------------------------------|
| Enterococcus faecalis (1,%2) | Gram (-) bacilli (1,%2) |
| Streptococcus anginosus (1,%2) | Skin flora bacteria (9, %19.5) |
| *MRSA (1,%2) | |
| Streptococcus dysgalactiae 1,%2) | |
| Gram (-) bacilli (1,%2) | |
| Skin flora bacteria (6,%13) | |

*Methicillin-resistant Staphylococcus aureus

Recurrence was determined in totally 3 (6.5%) cases. Recurrences were observed at 3rd, 12th and 14th months. In only one of the cases with recurrence, bacterial growth was observed in both cyst cavity and tissue culture specimens. Neither skin flora bacteria nor pathogenic bacteria was determined to reproduce in the other two cases with recurrence. When analysed with regard to the other factors that can be related to recurrence, age, gender, smoking and diabetes, bacterial growth in cultures, BMI and operation type were not found to have any effect on developing recurrence ($p>0.05$, Table 2).

Table 2 Analysis of the factors considered to be related with recurrence

| | | No recurrence % | Recurrence % | P |
|-----------------------------------|-----------------------------|-----------------|--------------|------|
| Gender | male / female | 19 (8/35) | 0 (0/3) | 0.42 |
| Smoking | yes/no | 42 (18/25) | 66.6 (2/1) | 0.41 |
| Diabetes | yes/no | 14 (6/37) | 33.3 (1/2) | 0.37 |
| Bacterial reproduction in culture | yes/no | 13 (5/38) | 33.3 (1/2) | 0.29 |
| Reproduction including skin flora | yes/no | 35 (15/28) | 33.3 (1/2) | 0.96 |
| BMI | >30 / ≤30 | 16 (7/36) | 66.6 (2/1) | 0.46 |
| ASA (1/2) | 1/2 | 44 (19/24) | 33.3 (1/2) | 0.72 |
| Operation type | Limberg flap/primary repair | 79 (34/9) | 100 (3/0) | 0.39 |

Abbreviations: BMI: body mass index, ASA: "American Society of Anesthesiologists"

DISCUSSION

Recurrence rates vary with respect to the applied therapies for pilonidal sinus, and are reported in the literature at considerably wide ranges. The primary reason for such wide ranges may originate from the differences of follow-up periods (7). In a meta analysis, recurrence rate of the cases with primary closure was determined to be 67.9% at the end of 240 months of follow-up. In the analysis of randomized and non-randomized studies, general recurrence rates were determined as 2% in 12 months, 4.4% in 24 months, 10.8% in 60 months and 26.9% in 120 months, at average. In the randomized studies however, 60 months of recurrence rate was determined as 20.3 % (7). The lowest and highest rates were reported as 1.9% and 67.9% in the literature (7,8). For this reason, we have the opinion that the real rate of recurrence is not definitely known. In our series however, the rate of recurrence was considerably low (6.5%) in spite of 27 months of follow-up.

Average return to work period was reported as 8.4 days, average wound healing time was between 21-72 days and recurrence rate was 4.47% in a meta analysis where they analysed the treatment procedure of the wound open plus curettage (9). In another meta-analysis analysing primary closure, however, they concluded that radical excision and midline primary closure should not be applied, sinusotomy/sinusectomy or excision and off-midline closure were more advantageous (10). In a meta-analysis where primary closure and flaps were compared, it was reported that wound disintegration was more in primary closure, however recurrence rates were similar (11). Major non-surgical therapies such as plasma therapy (12), negative pressure wound therapy (13), phenol application (14), fibrin glue (15) are quite popular these days. In our study, primary excision based therapies were implemented. These therapies can also be performed by considering the comparative studies with new approaches. Moreover, limberg flap was applied to all three cases with recurrence, in our study. No recurrence was observed in the cases with primary closure.

In the study of Ardelt et al. (1), they analysed culture results taken after pilonidal sinus abscess drainage.

Reproduction was determined in 84.93% of the primary cases, in the cultures taken from totally 96 cases. The number of bacteria reproduced was 168, out of which 107 was anaerobic and 61 was aerobic. In the recurrent pilonidal sinus, however, 58 types of bacteria were identified in the analysis of 23 cases. The ratio of anaerobic to aerobic bacteria was determined as 30/28. In addition, the dominance of anaerobic and Gram-negative bacteria was noted in primary pilonidal sinus cases, whereas the dominance of aerobic/facultative anaerobic and Gram-positive bacteria was determined in recurrent pilonidal sinus cases. They emphasized that both anaerobic and aerobic bacteria are involved in pilonidal sinus abscesses (1).

In the investigation of Sondena et al., which was similar to our study, culture specimens were preoperatively taken from the cases. They applied cloxacillin to one group, cefoxitin to another, but no prophylaxis to the third group. In the wound cultures, they determined the reproduction rates before and after prophylaxis as 54% against 42% in cloxacillin group, as 44% against 52% cefoxitin group and as 50% against 45% in no prophylaxis group. And in that study, wound site infection and wound disintegration rates were found to be similar (8). In accordance with the literature, reproduction occurred in 43% of the cases, including skin flora bacteria, in our study as well.

Type of surgery and follow up period were highlighted as the causes of pilonidal recurrence (7). Antibiotic prophylaxis in the treatment of PS disease is still controversial. It was stressed in a meta-analysis that, big scale, randomized, double blind and placebo controlled studies were required to clarify that issue (16).

As a result of 7 years of follow up in another prospective randomized study, it was revealed that what indeed affected recurrence was not preoperative antibiotic prophylaxis but rather, early phase wound site problems (17). And it is not still clear in the literature which prophylaxis would be implemented, if ever it should (1, 15). On this topic, it is recommended to carry on research by prospective randomized studies on the necessity of prophylaxis and the choice of correct antibiotic as well as postoperative antibiotic usage (15). In our practice, we prefer to use

prophylaxis with cefazolin sodium preoperatively and 12 hours after the operation. Although not proved, body mass index, smoking, diabetes are under consideration with regard to recurrence (5). In our study too, the factors of smoking, BMI, diabetes and ASA were not found to be effective factors in recurrence. Another recommendation as a precaution against recurrence is regular shaving and hygiene (5). In our cases, regular shaving was recommended in 2 weeks period routinely.

Our limitations were the small sample size and tissue culturing which was not carried out in anaerobic environment.

CONCLUSION

This study showed that non-infected pilonidal sinus surgery does not require bacterial culture to prevent recurrence. However, we need further studies with larger case series on this subject, involving the reproduction of anaerobic bacteria as well.

Competing interests: The authors declare that they have no competing interest.

Financial Disclosure: There are no financial supports

Ethical approval: Approval of the Ethical Committee of Health Sciences University, Izmir Bozyaka Training and Research Hospital was obtained (Date: 30.12.2014 & no: 1).

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