

Comparison of depression, anxiety and long-term quality of health in patients with a history of either primary closure or Limberg flap reconstruction for pilonidal sinus

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OBJECTIVE: Pilonidal sinus is characterized by high operative morbidity mainly due to wound problems. We aimed to compare the quality of health, comfort and psychological status in patients who underwent surgery for pilonidal sinus.

METHODS: A total of 205 pilonidal sinus patients operated on with either primary closure or Limberg flap reconstruction were compared in terms of depression, anxiety, and long-term quality of health by using Short Form 36, Beck Depression Inventory, and Beck Anxiety Inventory scales.

RESULTS: There were 107 patients in the primary closure group with a mean follow-up of 29.6 ± 7.7 months and 98 patients in the Limberg flap group with a mean follow-up of 34.1 ± 7.3 months. In the SF-36 analysis, the mental health and bodily pain scores (59 ± 6 and 56 ± 11 in the primary closure group and 62 ± 8 and 61 ± 10 in the Limberg flap group) were significantly higher in the Limberg flap group ($p=0.014$ and $p=0.002$, respectively). The mean Beck Depression Inventory (19 ± 6.13 vs. 16 ± 4.90 $p<0.001$) and Beck Anxiety Inventory (19 ± 6.27 vs. 16 ± 4.90 $p<0.001$) scores were lower in the Limberg flap group.

CONCLUSION: Limberg flap reconstruction produced better quality of health scores according to the SF 36, especially in terms of mental health and bodily pain. There was a higher tendency towards anxiety and depression in the primary closure group.

KEYWORDS: Pilonidal Sinus; Primary Closure; Limberg Flap; Quality Of Health; Depression; Anxiety.

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INTRODUCTION

Pilonidal sinus is acute or chronic inflammation of the subcutaneous fatty tissue, particularly occurring in the region of intergluteal cleft, which usually appears in the adult population. The aims of treatment are the complete excision of the affected tissue and closure of the resulting defect. For this purpose, various surgical procedures have been proposed, but there is still no consensus on the best technique (1). To be considered described the best technique, a surgical procedure should have a minimal inpatient stay, minimal time off work, minimal inconvenience, low

recurrence rates, minimal operation time, and minimal cost (2). Primary closure and Limberg flap after the excision of the disease have been used widely in the last few decades and are considered the best methods based on the literature because they partially achieve the above criteria (3).

In the past, the aim of treatment was focused on complete excision of the disease with a minimal recurrence rate. Increasing the quality of health and comfort of the patient has recently been included in the treatment aims. For this reason, several reports regarding the quality of health have been published in the medical literature, and more than thirty universal quality of health scales and more than 300 disease-specific quality of health scales are used and are widely accepted (4-9).

Complaints about long-term psychological status, quality of health and comfort in patients surgically treated for pilonidal sinus and increases in the cost and duration of the treatment procedure due to patient dissatisfaction led us to plan this study. There are few studies on quality of health after pilonidal sinus surgery in the literature (10). However,

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these studies reflect short-term quality of health results, and long-term results are still not available. This study was planned to compare long-term quality of health, patient comfort and psychological status of pilonidal sinus patients who were operated on with either primary closure or Limberg flap reconstruction, by using Beck Depression Inventory (BDI) scale, Short Form 36 (SF-36) and Beck Anxiety Inventory (BAI) scales.

■ MATERIALS AND METHODS

A total of 205 pilonidal sinus patients operated on with either primary closure (107 patient) or Limberg flap reconstruction (98 patients) in the Department of General Surgery between January 2008 and December 2010 were included in the study. Our clinical approach to the pilonidal sinus patients consists of a complete excision of the diseased area and closure of the wound in a tension-free manner in appropriate patients. Patient selection for the above surgery types depends on various factors, such as the size of the affected area, location of the sinus tissue and its extensions, distance between the pits at each end, history of a previous surgery, and tension of the wound. If infection or abscess was detected, simple drainage and antibiotic treatment was used and the surgery was postponed until 8 weeks later.

Selected patients were interviewed via electronic mail or through over the phone or face-to-face contact. After obtaining patient consent, the SF-36, BDI, and BAI scales were administered after surgery. Long-term quality of health, patient comfort, and psychological status of pilonidal sinus patients between these two surgical procedures were compared using these questionnaires. Additionally, time of first defecation without any pain was noted for each patient. Patients with psychological problems (posttraumatic stress disorders, anxiety and depression), patients with chronic cardiac and respiratory disease and patients with bullous pemphigoid and atopic eczema were excluded from the study.

Depression symptoms of all patients were measured with the BDI. This scale consists of 21 multiple-choice questions related to symptoms of depression, such as hopelessness and irritability, affected cognition and feelings such as guilt or being punished, along with physical symptoms such as fatigue, weight loss and lack of interest in sex (11). The Turkish version of this scale was validated by Akturk et al. (12). When the test is scored, values ranging from 0 (I do not feel sad) to 3 (I am so sad or unhappy that I can't stand it) are assigned for each answer and the total score is then compared to a key to determine the severity of the depression: a total score of 0-9 indicates "minimal" depression, 10-18 indicates "mild" depression, 19-29 indicates "moderate" depression and 30-63 indicates "severe" depression.

Postoperative anxiety status of all patients was scored using the BAI. This scoring system consists of 21 different questions about how the subject has been feeling in the previous week, expressed as common symptoms of anxiety (such as numbness and tingling, sweating not due to heat, and fear of the worst happening). Each question has the same set of four possible answer choices, which are arranged in columns and are answered by marking the appropriate answer with a cross. The score was calculated based on the sum of points for each question, which ranged between 0 (not at all) and 3 (severely). The BAI has a maximum score of 63. A total score of 0-7 is interpreted as a

"minimal" level of anxiety, 8-15 as a "mild" level of anxiety, 16-25 as a "moderate" level of anxiety, and 26-63 as a "severe" level of anxiety (13). This scoring system, which was created by Beck et al. was validated for our country by Ulusoy et al. (14).

Short form 36 (SF-36) is a widely used measurement of quality of health and is accepted as a "gold standard" test for many diseases. The reliability and construct validity of the Turkish version of the SF-36 was assessed in 1999 by Kocyigit et al. (10). It has 36 items that measure 8 health-related quality of health domains: physical functioning, social functioning, role limitation due to physical problems, role limitation due to emotional problems, mental health, energy and vitality, bodily pain and general perception of health. For each quality of health domain tested, item scores were coded, summed, and transformed into a scale from 0 (worst) to 100 (best) using the standard SF-36 scoring algorithms.

The data were evaluated using the SPSS (Statistical Package for Social Sciences, SPSS Inc., Chicago, IL) for Windows 16 statistical program. All of the results are expressed as means \pm standard deviations and percentiles. In the comparison of groups, student's t test was used for continuous variables and chi square test was used for categorical variables. Analysis of the correlation between the SF-36 and BAI or BDI was performed using the Pearson test. A probability value of <0.05 was considered statistically significant.

■ RESULTS

A total of 205 patients (22 females and 183 males) were included in the study. There were 107 patients in the primary closure group (95 males, 12 females) with a mean age of 26.4 ± 4.5 years and 98 patients in the Limberg flap group (88 males, 10 females) with a mean age of 28.3 ± 4.8 years. The follow-up times were 29.6 ± 7.7 months for the primary closure group and 34.1 ± 7.3 months for the Limberg flap group. There were no statistically significant differences with respect to age ($p=0.78$), gender ($p=0.81$) and postoperative follow-up time ($p=0.23$) between the two groups.

In the analysis of the health quality scoring system, SF-36, the mental health (59 ± 6 and 62 ± 8 , respectively) and bodily pain (56 ± 11 and 61 ± 10 , respectively) scores were significantly higher in the Limberg flap group ($p=0.014$ and $p=0.002$, respectively). However, there was no significant difference between the two groups regarding social and physical functions, the role limitations of these functions, general health situations and scales of energy-vitality. The comparison of the two groups according to the SF-36 scores is summarized in Table 1.

The time to walk without pain was significantly higher in the primary closure group (20 ± 4 days and 17 ± 4 day, respectively, $p<0.001$). However, the time to sitting on the toilet without pain was similar for both groups (20 ± 5 days and 19 ± 4 days, respectively, $p=0.13$).

Analysis of BDI and BAI scores indicated that patients in the primary closure group had higher anxiety and depression scores (Table 2). The BDI scores in the primary closure group and the Limberg flap group respectively indicate mild depression in 38 (36%) and 50 (51%) patients, moderate depression in 53 (50%) and 47 (48%) patients and severe depression in 16 (14%) and 1 (1%) patients. In the primary closure group, there were 37 (36%), 50 (47%) and 20 (19%)

**Table 1** - Comparison of Short Form 36 scores between groups.

Variables	PC	LF	p
Physical functioning	64 ± 4	63 ± 4	0.383
Role limitation due to physical problems	57 ± 3	57 ± 3	0.654
Social functioning	54 ± 11	51 ± 12	0.19
Mental health	59 ± 6	62 ± 8	0.004
Role limitation due to emotional problems	54 ± 10	55 ± 12	0.377
Energy and vitality	64 ± 9	64 ± 7	0.945
General perception of health	57 ± 12	56 ± 11	0.426
Bodily pain	56 ± 11	61 ± 10	0.001

PC: Primary closure; LF: Limberg flap; results are expressed as means ± standard deviations.

patients with mild, moderate and severe anxiety symptoms, respectively. In the Limberg flap group, there were 50 (51%), 45 (46%) and 3 (3%) patients with mild, moderate and severe anxiety symptoms, respectively.

There were significantly negative correlations in the analysis of the SF-36 with the BDI and the SF-36 with the BAI for both groups ($p < 0.01$, $r = -0.876$ and $p < 0.01$, $r = -0.896$, respectively, for the primary closure group and $p < 0.01$, $r = -0.737$ and $p < 0.01$, $r = -0.737$, respectively, for the Limberg group).

DISCUSSION

We compared depression, anxiety and long-term quality of health in pilonidal sinus patients who were treated with two commonly performed surgical procedures (primary closure and Limberg flap reconstruction), and found significantly higher scores of mental health and bodily pain in the Limberg flap group. Patients in the primary closure group had higher anxiety and depression scores. Additionally, time to walking without pain was lower in the Limberg flap group.

Different surgical treatment procedures for pilonidal disease have been described, with numerous reports comparing these procedures in the literature. However, information on the comparison of long-term quality of health for the two most common surgical procedures, primary closure and Limberg flap reconstruction, is scarce (10). Although the short-term outcomes of these two procedures have been compared, comparisons of long-term quality of health, patient satisfaction and other psychological factors have not been performed. This study is the first to compare postoperative anxiety, depression and long-term quality of health in pilonidal sinus patients treated with either primary closure or Limberg flap reconstruction and we have presented our preliminary results here. The limitations for this study include study generalizability, the retrospective nature of the study, selection bias and the relatively small sample size.

Several quality of health scoring systems and scales are used for measurement of patient satisfaction (16-18). Ertan

et al. (10) compared pilonidal sinus patients treated with either Limberg flap reconstruction or primary closure and reported higher scores of general perception of health (71 ± 11 vs. 78 ± 14), bodily pain (87 ± 32 vs. 110 ± 33) and social functioning (54 ± 14 vs. 67 ± 18) in the Limberg flap group, while the other scores were similar. Primary closure and Limberg flap were compared with different scales and questionnaires in the literature for different surgical procedures, such as unroofing and marsupialization; better pain and physical functioning scores were reported in the flap reconstruction group (19-21). Karakayali et al. (21) compared unroofing and marsupialization with Limberg flap reconstruction using Cardiff Wound Impact Questionnaire and reported higher quality of health (5.7 ± 1.7 vs. 7.6 ± 1.5) and physical functioning (57.2 ± 16.3 vs. 87.3 ± 16.5) scores in the Limberg flap group. In the present study, evaluation of the SF-36 questionnaire revealed better mental health and bodily pain scores in the Limberg flap group, consistent with the literature.

Conflicting results about the time to sitting on the toilet without pain are present in the literature. A shorter time to sitting on the toilet in patients treated with flap reconstruction was reported in a study comparing flap reconstruction and primary closure (22), while other studies comparing different techniques with flap reconstruction reported longer times to sitting on the toilet without pain in the flap reconstruction group (23). The time to sitting on the toilet without pain was similar for primary closure and Limberg reconstruction in the current study.

Better scores for time to walking without pain after flap reconstruction compared to primary closure have been reported in the literature (3). In our study, we found a shorter recovery time in walking without pain in the flap reconstruction group (17 ± 4 days vs. 20 ± 4 days, respectively).

In a neurosurgery patient cohort, the SF-36, BAI, and BDI scales were used for the assessment of long-term quality of health after cavernous sinus and spinal surgery (24). BAI and BDI scales were also used by Ear Nose and Throat and Orthopedic specialists after treatments for hearing loss and trauma (4,25,26). An increased length of hospital stay was

Table 2 - Comparison of BDI and BAI scores, time to walking without pain, and time to sitting on a toilet without pain between groups.

Measurement	PC	LF	p
BDI	19 ± 6.13	16 ± 4.90	<0.001
BAI	19 ± 6.27	16 ± 4.90	<0.001
Walking without pain	20 ± 4.32	17 ± 4.70	<0.001
Sitting on toilet without pain	20 ± 5.47	19 ± 4.18	0.132

PC: Primary closure; LF: Limberg flap; BDI: Beck depression inventory; BAI: Beck anxiety inventory; results are expressed as means ± standard deviations.



noted in patients with higher depression and anxiety scores after colorectal surgery compared patients with lower scores (27). To the best of our knowledge, there has been no study comparing depression, anxiety and long-term quality of health using the BDI, BAI and SF-36, scales after different surgical treatment procedures for pilonidal disease. This study is the first to compare these results in patients treated with either primary closure or Limberg flap reconstruction.

Regardless of the surgical procedure, almost half of the patients were inclined to anxiety and depression in the study. While the mean BDI score in the Limberg flap reconstruction group indicated mild depression, the primary closure group was inclined to severe depression. Moreover, the BAI scores revealed mild anxiety in the Limberg flap group and moderate anxiety in the primary closure group. Comparison of the BDI and BAI scores was statistically significant (Table 2).

Pilonidal sinus is one of the most common diseases in adults and is treated mainly through surgical approaches. Because pilonidal sinus treatment may cause high depression and anxiety after surgery, we speculate that more serious problems might be observed in patients with longer recovery periods.

Considering these results, the following are suggested:

- 1- The follow-up period could be increased, and the need for psychological support may be considered.
- 2- Surgeons could pay more attention to choosing the optimal surgical procedure with a minimal inpatient stay, minimal time off work, minimal inconvenience, low complication and recurrence rates, and low post-operative pain and tension for the patients.
- 3- Further studies comparing depression, anxiety and long-term quality of health are needed to determine best surgical technique for pilonidal disease.
- 4- Preoperative assessment of depression, anxiety and quality of health in patients with pilonidal sinus could be useful for both the evaluation and the comparison of preoperative psychiatric status due to the disease itself with postoperative psychiatric status after a surgical procedure.

This pioneering study shows that while we surgeons determine the best surgical technique for patients with pilonidal sinus, we have to consider patient satisfaction and long-term quality of health.

■ AUTHOR CONTRIBUTIONS

Duman K, Ozdemir Y, Yucel E and Akin ML performed the data collection, manuscript draft, study conception and design, acquisition of the data, and analysis and interpretation of the data. Yucel E, Ozdemir Y and Duman K performed critical revision and final approval of the version to be published.

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