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Modified Limberg flap technique in the treatment of pilonidal sinus disease in teenagers

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ABSTRACT

Background: Pilonidal sinus disease (PSD) is most common in young adults but can also affect teenagers. Although many techniques have been used to treat pilonidal sinus disease in adults, few studies have compared treatment methods for the condition in teenagers. In this study, we aimed to compare the modified Limberg flap technique with the excision and primary closure technique, both of which are used routinely in adults and teenage patients.

Materials and methods: This study was a retrospective review of 40 teenaged patients who underwent surgery in a single pediatric surgery center over ~2 years. The patients' age, gender, body mass index (BMI), number of sinuses, surgery technique and any complications were recorded. The patients underwent excision and primary repair or rhomboid excision and a modified Limberg flap.

Results: Of the 40 patients, 22 (55%) were female, and 18 (45%) were male. The mean age of all the patients was 15.20 ± 1.31 (12–17) years. The average number of sinuses was 3.18 ± 0.90 (1–5). Of the patients, 52.5% (n = 21) had a high body mass index. These patients were obese (n = 4) and overweight(n = 17). Pilonidal sinus excision and primary repair were performed in 8 (20%) of the patients, while the remaining 32 (80%) underwent the modified Limberg flap technique. Complications were observed in 87.5% of the patients undergoing excision and primary repair, and in 15.6% of those who underwent the modified Limberg flap technique. Recurrence was observed with only the primary repair technique (37.5%).

Discussion: When compared with adults, teenage pilonidal sinus disease occurs more frequently in females. In this study, no correlation existed between the number of sinuses, symptoms, BMI and postoperative complications. Based on the results of this study, the modified Limberg flap technique has a low complication rate when used to treat pilonidal sinus disease in teenagers.

Pilonidal sinus disease (PSD) is a chronic disease which generally affects young adults. Although the disease has been reported in many body parts (for example; umblicus, finger), the most common region is the sacrococcygeal area [1]. To date, few published studies on the condition have included teenagers, but recent reports have indicated an increase in the incidence of PSD in this age group. [2–4].

Although many surgical methods have been proposed, the optimal method has not yet been described. Recurrences and many complications can be observed after surgery in young adults [5,6] but few studies have been reported on the treatment of PSD in teenagers [2–4,7]. We have operated on 40 patients over the last 2 years and believe that the incidence of PSD is increasing. In this study, we compared the results of the excision and primary closure technique and the modified Limberg technique.

2. Materials and methods

Approval for this study was received from the local ethics board and from the families of all the patients, who were fully informed of the nature of the study. This was a retrospective study of 40 teenage patients who underwent surgery for PSD between January 2012 and October 2013 in the Division of Pediatric Surgery at the Sakarya Education and Research Hospital, Turkey.

The patient's age, gender, body mass index (BMI), number of pilonidal sinuses, the duration of symptoms, the surgery technique performed and postoperative complications were reviewed from the patient records. BMI cards devised for Turkish children were used to calculate the BMI. According to the BMI chart, children were catagorized as normal weight (5% to <85%), overweight (85% to <95%) or obese (≥95%) [8,9].

All patients underwent a preoperative anesthetic consultation during which the patient and family selected the anesthetic technique in conjunction with the anesthetist. All patients were reexamined by their surgeon one day prior to surgery. The surgical site was shaved just prior to surgery. Antibiotic prophylaxis (cefazolin 50 mg/kg) was given preoperatively.

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The first eight patients had primary excision and closure, but we encountered a high rate of complications and recurrences. Therefore, the last 32 patients received a rhomboid excision and Limberg flap.

2.1. Surgical procedure and postoperative follow-up

All operations were performed by two pediatric surgeons under general and spinal anesthesia. Patients were placed in the prone position and the surgical area of the sacrococcygeal region was exposed by lateral traction using adhesive tape, then cleaned with 10% povidone-iodine. The extent of the sinus tract was identified by injecting methylene blue into the sinus openings.

2.2. Excision and primary repair

The excision site was marked about 1 cm away from the openings of the sinuses; then an elliptical incision was made that extended to the presacral fascia. The sinus was then excised en bloc through to the presacral fascia with the use of electrocautery. To close the dead space, 2-0 vicryl sutures were placed between the fascia and the surrounding tissues. The subcutaneous tissue was closed using 4-0 vicryl and the skin was sutured using 3-0 polypropylene.

2.3. Rhomboid excision and the modified Limberg flap technique

First, the area was marked as described for the original Limberg flap technique (Fig. 1A), but then a rhomboid-shaped excision was performed by transposing the first area 1–2 cm laterally from the midline, a deviation from the original technique. The incision line was marked as described in Fig. 1B. A rhomboid-shaped excision of the sinus tract was performed en bloc and was then extended down to the presacral fascia using electrocautery. Next, the skin, subcutaneous tissue, and fascia of the gluteal muscle were prepared along with the Limberg flap. After checking for bleeding, one Hemovac drain was placed in the presacral fascia. The deep layers of the Limberg flap, the subcutaneous layer, and the skin were closed with 2-0 vicryl, 4-0 vicryl and 3-0 polypropylene, respectively (Figs. 2 and 3).

Postoperatively, patients could take fluids orally 3 h. Patients were mobile 12 h after surgery and the Hemovac drain was removed on the fourth postoperative day or when the drainage decreased to 10 cc/day. One day after the drain was withdrawn, the patients were discharged from hospital and advised not to sit directly on their incision for 15 days, but to use an inflatable ring cushion or to sit sideways; they were told that they could sit normally on the incision after 1 month. The skin sutures were removed on the 14th postoperative day. Heavy sports were not allowed for 3 months, and patients were advised to shave the hair in the gluteal area for 6 months after the operation. Patients were initially followed-up once per month for 6 months, then once every 3 months for 1 year (Fig. 4).

Fig. 2. Intraoperative flap migration.

Any complications observed in the patients were recorded. Dehiscence of the wound was considered secondary to infection or suture removal. Patients were also asked about any numbness in the gluteal area.

2.4. Statistical analysis

The Kolmogorov–Smirnov test was used to evaluate whether the distribution of variables was normal. Therefore, two independent sample t-tests were used to compare the continuous data between groups. The Mann–Whitney U test was used to compare the continuous data between groups with small sample sizes ($n < 10$). The continuous variables were presented as means ± standard deviations. Spearman's correlation coefficients were used to determine the correlations between the time before presenting at the hospital and the number of sinuses. A value of $p < 0.05$ was taken to indicate statistical significance. Analyses were performed using commercial software (IBM SPSS Statistics 20, SPSS Inc., an IBM Co., Somers, NY).

3. Results

Of the 40 patients in the study, 22 (55%) were female and 18 (45%) were male. The average age of all the patients was 15.20 ± 1.31 (12–17). Regarding the age distribution, the average age of the female teenagers was 14.77 ± 1.38 (12–17), while it was 15.72 ± 1.02 (14–17)

Fig. 1. A, Original Limberg flap; B, modified Limberg flap.

Fig. 3. Early appearance of modified Limberg flap.