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Comparison of Karydakis versus midline excision for treatment of pilonidal sinus disease

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Abstract Pilonidal sinus disease is associated with a high rate of recurrence and complications. The Karydakis (KAR) method, whereby an asymmetric subcutaneous flap obliterates the anal crease, has been shown to be effective in adults. The goal of this study is to assess the efficacy of the KAR procedure in the operative treatment of children with pilonidal sinus disease compared to those treated via a midline excision (ME). Sixty-eight cases of pediatric pilonidal sinus excision were reviewed over the past 10 years. Data abstracted included surgical approach, complication rate and recurrence rate. Student's *t*-test or the Chi square test was used for statistical analysis, with $P < 0.05$ being considered significant. An ME was performed in 44 patients; the KAR method was used in 24 patients. Mean age at diagnosis was 14.4 ± 4.2 years for the ME group compared to 15.7 ± 4.3 years for the KAR patients ($P = 0.18$). Mean operative time was significantly longer with the KAR method (58.7 ± 25.6 min) compared to 46.3 ± 18.6 for the primary ME ($P = 0.04$). Despite the increased operative dissection, there was no difference ($P = 0.42$) in early post-operative complication rates between groups (25% in the KAR group compared to 34.8% in the ME group). Initial drainage of an abscess had no significant effect upon the recurrence/complication rate in either group. Recurrence rate alone was lower in patients operated on via the KAR approach 0% versus 11.0% using the ME ($P = 0.153$). Recurrence and complication rates were lower for those patients with a pilonidal sinus treated by the KAR method compared to the ME, but the results did not reach significance. In conclusion, this study does show a potential benefit for children treated with the KAR method for pilonidal sinus. This study mimics the data obtained in adult patients and suggests that a larger study is likely to achieve significance.

Keywords Pilonidal sinus disease · Karydakis method · Abscess

Introduction

The term “pilonidal” is derived from the Latin word pilus, meaning hair, and nidus, meaning nest. Pilonidal disease refers to the condition of trapped hair in an abnormal type of chronic natal cleft skin infection involving skin and subcutaneous tissues [1, 2]. Hodges, who coined the phrase “pilonidal disease” in 1880, believed it to be a congenital condition. More recently, however, many, including Karydakis (KAR), have argued that it is an acquired condition, and have developed treatment options from that perspective [3, 4]. The disease has long been associated with a high rate of complications and/or recurrence. Two of the most widely used and recommended definitive procedures addressing this condition are midline excision (ME) and the KAR procedure. In this latter procedure, an asymmetric subcutaneous flap is made (Fig. 1) which results in a closure of the wound off the midline, and an obliteration of the anal crease [5, 6].

The present study was designed to compare the efficacy of the above two operative methods (ME and KAR) for the treatment of pediatric patients. We hypothesized that the KAR procedure would result in fewer post-operative complications than ME, and a lower recurrence rate.

Methods

We retrospectively reviewed the hospital records of 68 cases of sacrococcygeal pilonidal disease. Of these, 44 underwent the ME procedure, while 24 were treated using the KAR procedure. All patients (excluding those in infancy) who were operated upon between January 1994 and June 2003 were studied. The hospital records were obtained and each case was evaluated for age,

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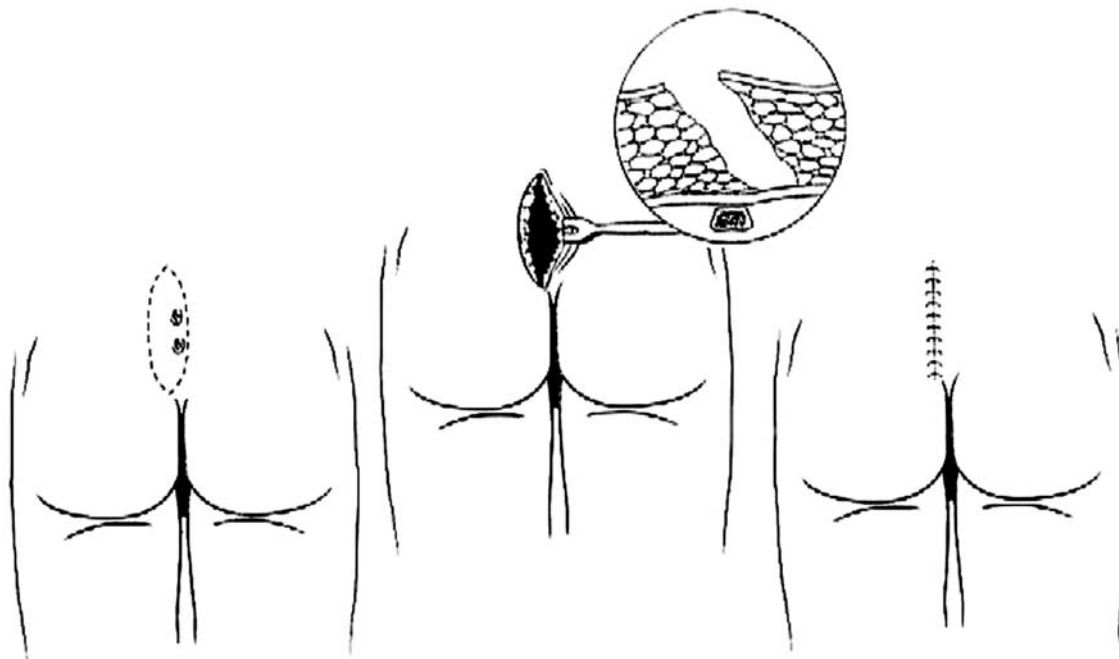


Fig. 1 Diagrammatic description of the KAR. Note the incision encompasses the sinuses of the pilonidal disease, but is center away from the midline. A skin and subcutaneous flap is generated which releases tension and facilitates closure

weight, type of procedure, hospital stay, intra- and post-operative complications (wound dehiscence and/or infection), recurrence of disease, duration of operation, and initial drainage of abscess. Selection of operative procedure was entirely based on the choice of the operating surgeon. Comparisons of costs of care were corrected for inflation over the time that patients were cared for, and adjusted to 2004 US dollars. Results are expressed as the mean \pm standard deviation. Student's *t* test or the Chi square test, with *P* values less than 0.05 considered significant, was used for statistical analysis. The Institutional Review Boards of all hospitals involved approved this study, and no detail that would disclose the identity of the patient is included in this report.

Results

Thirty patients were male while 38 were female representing a range in age from 9 to 29.73 years (mean = 13.8 ± 4.4 years). Mean weight was 78.22 ± 27.13 kg for patients treated with the KAR method and 68.9 ± 28.27 kg for the ME group ($P=0.18$). Weights were moderately high in all patients, exceeding the 85th percentile for both sexes, and exceeding the 95th percentile for both sexes in the KAR group. Mean operative time was significantly shorter ($P=0.04$) in the ME group (46.3 ± 18.64 min) than in the KAR group (58.7 ± 25.62 min) (Table 1). The mean length of follow-up for all patients was 4.12 ± 2.86 years. The rate for any complication was higher in the ME

group (34.8%) than in the KAR group (25%); however, the result was not statistically significant ($P=0.421$). The incidence of wound dehiscence was lower in the KAR group (two cases) compared to the ME group (five cases); however, the difference was not significant ($P=1.0$). The rate of recurrence alone was also higher in the ME group (11.0%) than in the KAR group (0%); however, this did not achieve statistical significance ($P=0.153$).

Length of hospital stay was essentially the same between groups [KAR 0.083 ± 0.28 ; ME 0.021 ± 0.15 ($P=0.251$)] and almost all patients were discharged postoperatively. Three patients (1 ME, 2 KAR) stayed overnight due to complications from anesthesia. Initial drainage of an abscess had no significant effect on complication or recurrence rates for either group. Whether a patient underwent initial drainage of an abscess did not appear to influence the overall outcome. Analysis of all patients yields a complication rate of 38.1% in initially drained patients versus 29.0% in those without a drain ($P=0.579$). Similarly, a recurrence rate of 14.3% was found in initially drained patients versus 4.3% in those without an initial drain ($P=0.167$). Similar results were found if the data were stratified into KAR and ME subgroups.

To determine if the longer operative time in the KAR group or increased numbers of complications and recurrences in the ME group influenced the cost of care, an analysis of these costs was done. In-patient expenses were significantly higher for the KAR procedure ($P=0.001$), mean hospital costs were $\$4,717 \pm 961$ and $\$4,103 \pm 729$ for the KAR and ME groups, respectively.

Table 1 Demographic variables and complication and recurrence rates comparing Karydakis (KAR, $n=24$) versus midline excision (ME, $n=44$)

Variable	KAR (Mean \pm SD)	ME (Mean \pm SD)	<i>P</i> value
Age (years)	15.69 \pm 4.29	13.79 \pm 5.52	0.156
Weight (kg)	78.22 \pm 27.13	65.59 \pm 31.29	0.101
Hospital stay (days)	0.08 \pm 0.28	0.02 \pm 0.15	0.251
Operation duration (min)	58.65 \pm 25.62	46.32 \pm 18.64	0.040
Variable	KAR <i>N</i> (%)	ME <i>N</i> (%)	<i>P</i> value
Complication rate	6 (25)	16 (36.4)	0.421
Recurrence rate	0 (0)	5 (11.4)	0.153

This most likely relates to the increased operative time for this procedure. However, when the total charges for in-patient and out-patient services were examined, there was no significant difference ($P=0.968$) between the groups: \$5,157 \pm 1,219 versus \$5,134 \pm 2,316 for the KAR and ME groups, respectively. This suggests that the greater cost of care for complications and recurrences in the ME group, with resulting increased physician visits and treatments, balanced out the higher initial cost of the KAR procedure.

Discussion

Ideally, definitive treatment of pilonidal disease should be cost-effective, require little or no hospitalization, be associated with minimal discomfort and wound care, and have a low recurrence rate [7, 8]. Two procedures currently employed for the treatment of pilonidal disease are ME and KAR.

Our study found that operative times were significantly longer for the KAR method. However, the overall difference was small, with the KAR method averaging 12 min longer than ME. Essentially both the KAR and ME procedures are performed on an out-patient basis. Only 3 patients out of 68 stayed overnight at the hospital, all due to anesthesia complications and not indigenous to the surgery itself. Although it is possible in the short-term that ME is slightly less expensive to perform than the KAR method, the KAR procedure is associated with fewer complications and recurrences. This reduction in post-operative problems appears to justify any potential small difference in terms of immediate cost benefits.

The rate of complications, such as wound infection and dehiscence, is an important variable, as is the rate of recurrence observed in both methods. It was found that KAR had lower rates of both complication and recurrence in comparison to ME, but statistical significance was not achieved. It seems likely that this study's small sample size limited its statistical power and that a larger series of patients may prove a lower complication rate for the KAR procedure. A power analysis, assuming proportions equal to our study, showed that a significant difference ($\alpha=0.05$, $\beta=80\%$) in complication rates would be found by a study reviewing approximately 300 cases, while achieving a significant difference

in the recurrence rate would take as little as 100 cases. Thus, the trend reflected in this study suggests that the KAR method shows a greater benefit to the pediatric patient than an ME. Other studies confirm this trend in adult patients, such as Petersen et al. [6], who performed a meta-analysis of 74 studies and concluded lower complication and recurrence rates for the KAR procedure compared to other methods. A study of adult pilonidal disease by Anyanwu et al. [9] showed similar results to our study with no post-surgical complications using the KAR method in 27 patients. The KAR method is consistently associated with fewer recurrences than ME, which is attributed to the fact that the KAR method produces a shallow midline furrow, without scarring and/or suture holes. This is believed to leave the patient less susceptible to hair penetration than a midline wound [10–12]. The finding of essentially identical costs of care for both procedures suggests that the increased operative time for those undergoing a KAR procedure is offset by the reduction in complications and recurrences. We recommend that the KAR procedure be the treatment of choice for pilonidal sinus disease in pediatric patients.

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