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ORIGINAL ARTICLE

Standardized pilonidal protocol as rescue therapy for excision-refractory pilonidal disease

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Abstract

Purpose Severe pilonidal diseases have refractory symptoms despite multiple surgeries and optimal therapy remains unclear. We hypothesized that standardized minimally invasive protocol could be an effective rescue treatment.

Methods We prospectively collected data from symptomatic patients who underwent ≥ 1 pilonidal excision prior to presentation at our clinic 2019–2023. We treated these patients with standardized protocol incorporating local wound care, regular manual/laser epilation, and selective debridement/pit trephination.

Results We treated 34 refractory patients (23 males) with median follow-up 405 days. Median age of first symptoms was 17.1 years; presentation to our clinic 20.0 years. Prior to our clinic, 27 received one surgery (cleft lift-2, excision no closure-1, excision primary closure-18, wound vac after excision-3, excision flap closure-3); 7 had two surgeries (excision without closure + cleft lift-1, primary closure after excision twice-3, flap closure after excision twice-2, excision primary closure + excision without closure-1). We treated all patients with regular epilation ± local wound care. 14 (41%) underwent trephination ± debridement. All patients achieved complete resolution after median 52 days. Five (14.7%) recurred and were treated with trephination + debridement-2 or wound care alone-3. Symptom length had no correlation with resolution time, skin type, hair amount.

Conclusions Standardized minimally invasive protocol requiring only selective surgical intervention can treat refractory pilonidal disease with low recurrence rate.

Keywords Pilonidal disease · Recurrence · Protocol · Trephination · Epilation

Introduction

Pilonidal disease is a chronic disease that involves the sacrococcygeal natal cleft and is characterized by intermittent episodes of impacted hair causing acute flares and significant morbidity [1, 2]. The incidence of pilonidal disease is thought to be around 0.7% of the population, and most commonly affects patients 16–25 years old [1]. Acute flares often lead to repeated hospital visits, time away from work or school, and higher healthcare costs [1]. Patients' daily routines, ability to play sports, school attendance, and socializing are also negatively affected by the disease [3].

Surgery for pilonidal disease can be marked by high recurrence rates, poor cosmesis, wound infection, and postoperative discomfort [4]. Many recurrences occur within the first postoperative year and can be as high as 33–44% [2, 5, 6]. However, true recurrence rates may be even higher than previously reported: Recurrent post-surgical cases of pilonidal disease are often excluded from data analysis given their complexity and risk for future recurrence and postoperative complications; some cases recur more than once, even after repeated surgical intervention, leaving patients with treatment-resistant disease [7, 8]. Excluding these refractory cases likely underestimated the true recurrence rate [9].

We had previously demonstrated the efficacy of utilizing laser epilation with minimally invasive trephination to treat pilonidal disease and found that the key to low recurrence rates and morbidity was a standardized protocol that included regular manual and laser epilation, routine wound care, and surgical intervention only if symptomatic [3, 8, 10, 11]. We hypothesized that by implementing a

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standardized protocol with similar principles as a rescue treatment for the most severe or excision-refractory pilonidal disease, we could minimize morbidity, accomplish symptom resolution, and achieve a low recurrence rate for these patients.

Methods

This is a prospective cohort study from 2019 to 2023 and is approved by our Institutional Review Board (#52,040). Patients presented to our Pilonidal Clinic were included for analysis if they had previously received at least one surgical excision procedure for pilonidal disease prior to our care and continued to be symptomatic. Patients were considered symptomatic if they had pain, drainage, or swelling at the gluteal cleft. Patients who underwent only incision and drainage procedure were excluded. We recorded patient characteristics, including age, sex, patient symptoms, disease onset, chronicity of the wound, and surgical history prior to the initial visit at our Pilonidal Clinic. On the initial visit, photographs of the gluteal cleft were taken. Two observers were used to determine hair amount (large, moderate, small, minimal) and Fitzpatrick skin type (I to VI) after reviewing the photographs. Symptom resolution after treatment at our Pilonidal Clinic or any symptom recurrence were noted.

Standardized treatment protocol (Fig. 1)

All patients were counseled on good hygiene and received local wound care. Local wound care consisted of daily sitz baths and application of Medihoney® (Leptospermum honey, McKesson, Irving, TX, USA) for open wounds or Triad® paste (Coloplast, Minneapolis, MN, USA) for wounds with excess moisture. AQUACEL® Ribbon Dressing was applied over wounds > 1 cm deep.

All patients were started on regular manual and laser epilation. Laser epilation was performed using a LightSheer Quattro™ diode laser (Lumenis, Yokneam, Israel). The laser epilation area comprised of the gluteal cleft at midline and extended 5 cm bilaterally, superiorly to the border of the buttock, and anteriorly to 5 cm from the anus. Laser epilation sessions were conducted at 6–8 week intervals until > 75% hair reduction was achieved. A minimum of six sessions were performed. The percentage of hair reduction was determined using photographs taken at laser epilation sessions and compared to the initial clinic visit photograph. Patients were selected for surgical intervention only when they had an abscess, pits with symptoms (pain, erythema, drainage, or embedded hair), or a granuloma/secondary draining sinus. Patients with abscesses receive incision and drainage procedure, while those with symptomatic pits or a granuloma/secondary draining sinus underwent trephination and excision of the granuloma/secondary draining sinus. Not all patients with an open wound underwent surgical intervention and

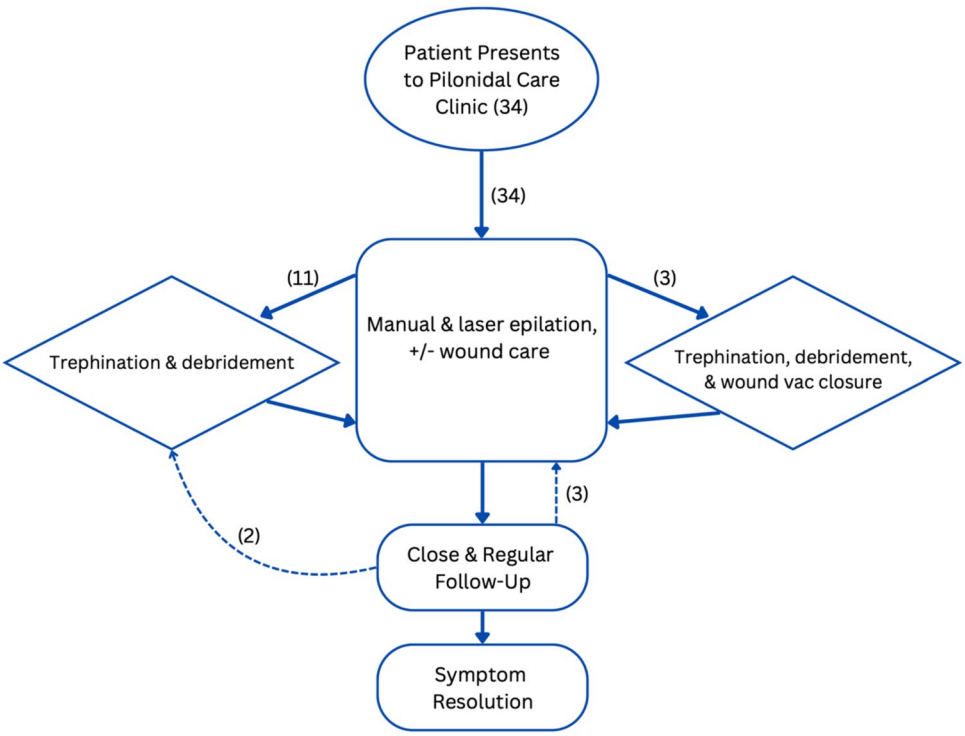


Fig. 1 Flow diagram of the standardized protocol for treating excision-refractory pilonidal disease. Solid lines represent the treatment pathway. Dashed lines represent the treatment management for patients with disease recurrence detected at the follow-up level. Numbers in parentheses represent the total number of patients in each category

only those with wounds > 3 cm were taken to the operating room for debridement. No wound was closed with sutures and wound vac was placed for wounds > 5 cm.

Patient follow-up

If surgical intervention was performed, patients were seen within 1–2 weeks post operatively. Patients were followed every 6–8 weeks for laser epilation. Recurrence was defined as the return of any of the following more than 4 weeks after surgical excision or resolution of symptoms: pain, drainage, erythema, abscess, treatment with antibiotics or incision and drainage procedure. Recurrent patients were treated with local wound care, pit trephination, or incision and drainage procedures. Complete resolution was defined as being symptom-free for at least 30 days.

Data analysis

Data were analyzed using Prism (GraphPad, Boston, MA, USA) to assess correlation, Pearson's coefficient, and the coefficient of determination. The line of best fit was derived by fitting the data using a linear regression model.

Results

Demographics, previous surgery, and follow up

Of the 361 patients treated at our Pilonidal Clinic from 2019 to 2023, 34 patients (11 females, 23 males) with excision-refractory disease had received one or more surgical excisions prior to presenting to our clinic without symptom resolution. At initial presentation to our clinic, the symptoms included pain, drainage, bleeding, or persistently non healing wound at the gluteal cleft. The median time from outside hospital presentation to initial visit at our clinic (disease non-resolution) was 306 days [interquartile range (IQR):132–1018]. The median age when symptoms started was 17.1 years (IQR: 14.6–19.1); the median age when presented to our clinic was 20.0 years (IQR:17.3–23.3). Of the 34 patients, 11 had Fitzpatrick skin type II, 7 had Fitzpatrick skin type III, and 16 had Fitzpatrick skin type IV. Eight patients had a large amount of hair, 6 had moderate amount, 13 had small amount, and 7 had minimal amount. Prior to presentation at our clinic, 27 patients had received one surgery [cleft lift (two patients), wide excision with no closure (one patient), wide excision with primary closure (18 patients), wound vac after excision (three patients), flap closure after excision (three patients)] while seven patients had two surgeries [excision without closure + cleft lift (one patient), primary closure after excision twice (three patients), flap closure after excision twice (two patients), primary closure after excision + excision without closure (one patient)] (Table 1). Patients were followed a median of 405 days (IQR:175–637) after presenting to our clinic.

Intervention and symptom resolution

All patients were treated with regular manual and laser epilation with or without local wound care in the clinic: While 20 patients (59%) only had this treatment, 14 (41%) also underwent trephination and debridement procedure in the operating room under our care, including three that received wound vac therapy (Fig. 1). All patients had their symptoms completely resolved with a median time of 52 days (IQR:42–70) after presentation to our clinic (Fig. 2A). The distribution of symptom resolution time for our patient cohort is shown in Fig. 2B.

Symptom length

There was no significant correlation between symptom length prior to presentation (disease non-resolution) to our clinic and any of the three factors analyzed: (1) time to complete symptom resolution ($r = 0.077$, $p = 0.67$), (2) Fitzpatrick skin type ($r = 0.091$, $p = 0.61$), (3) hair amount ($r = 0.204$, $p = 0.25$) (Fig. 3).

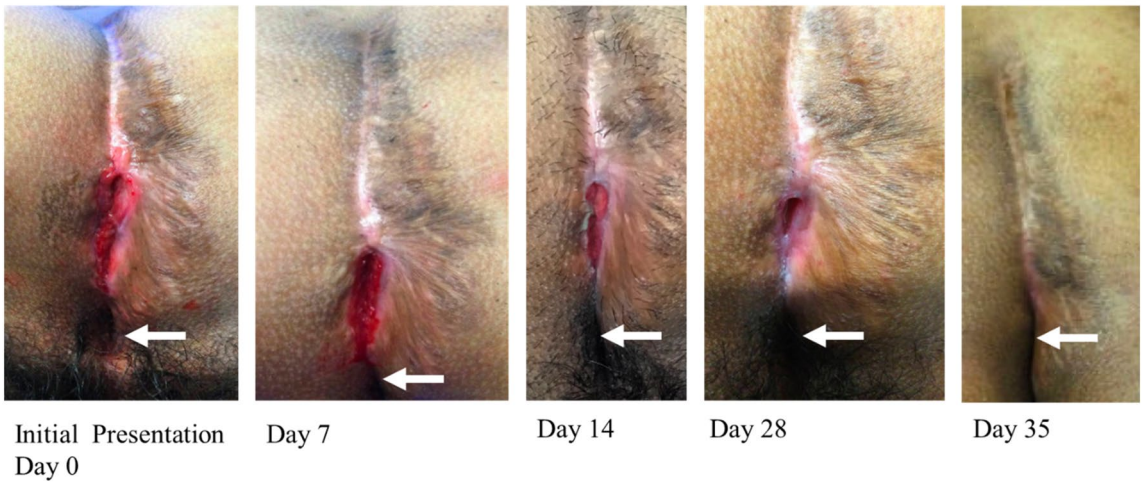
Recurrence

After being treated by our protocol, five patients (14.7%) recurred, and three of these five patients were initially treated without surgical excision. Even after recurrence, three patients achieved symptom resolution with wound care alone and two underwent trephination and debridement (Fig. 1).

Table 1 Surgical procedures prior to presentation at our clinic

One Surgery (27 patients total)	
Excision, primary closure	18 (67%)
Excision, wound vac	3 (11%)
Excision, flap closure	3 (11%)
Excision, no closure	1 (4%)
Cleft lift	2 (7%)
Two Surgeries (7 patients total)	
1. Excision, primary closure, 2. Excision, primary closure	3 (43%)
1. Excision, flap closure, 2. Excision, flap closure	2 (29%)
1. Excision, primary closure, 2. Excision, no closure	1 (14%)
1. Excision, no closure, 2. Cleft lift	1 (14%)

(A)



(B)

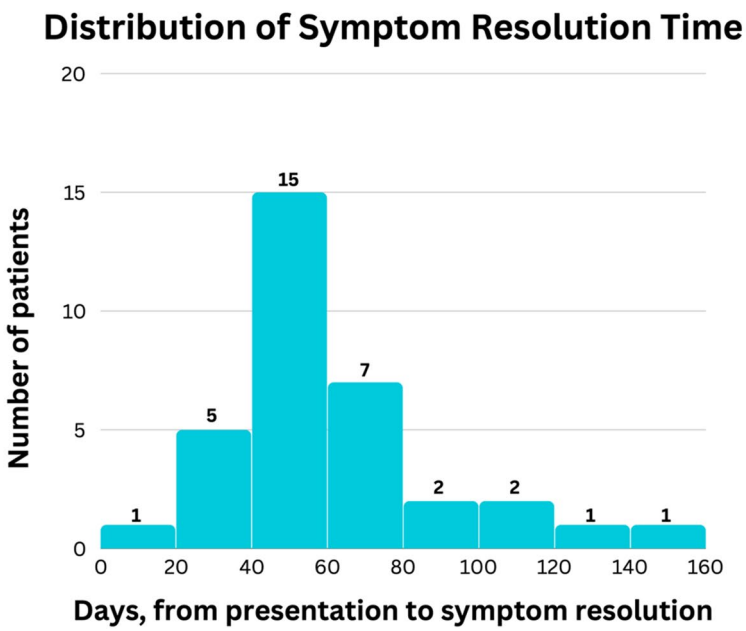


Fig. 2 **A** Example of one patient with symptomatic refractory gluteal cleft wound treated by our standardized protocol. This patient received local wound care and underwent regular manual and laser epilation without additional surgical intervention. By day 35 after initial presentation to our clinic, the wound and symptoms had resolved completely. Arrow indicates the anus. **B** Histogram showing the distribution of symptom resolution time for our patient cohort

Discussion

In this study, we investigated the impact of our standardized protocol on treating recurrent pilonidal disease. Our protocol included local wound care, regular manual and laser epilation, and minimally invasive surgical excision. The 34 patients selected for our study represented the most severe, treatment-refractory pilonidal cases and had a median symptom duration of 306 days prior to presentation to our clinic. We achieved a healing rate of 100%, and these patients were symptom-free after a median of 52 days after initial presentation to our clinic. There was no correlation between symptom duration (disease non-resolution) and time to symptom resolution, suggesting that our protocol was effective as a rescue therapy regardless of the disease duration. Having endured previous surgeries, including cleft

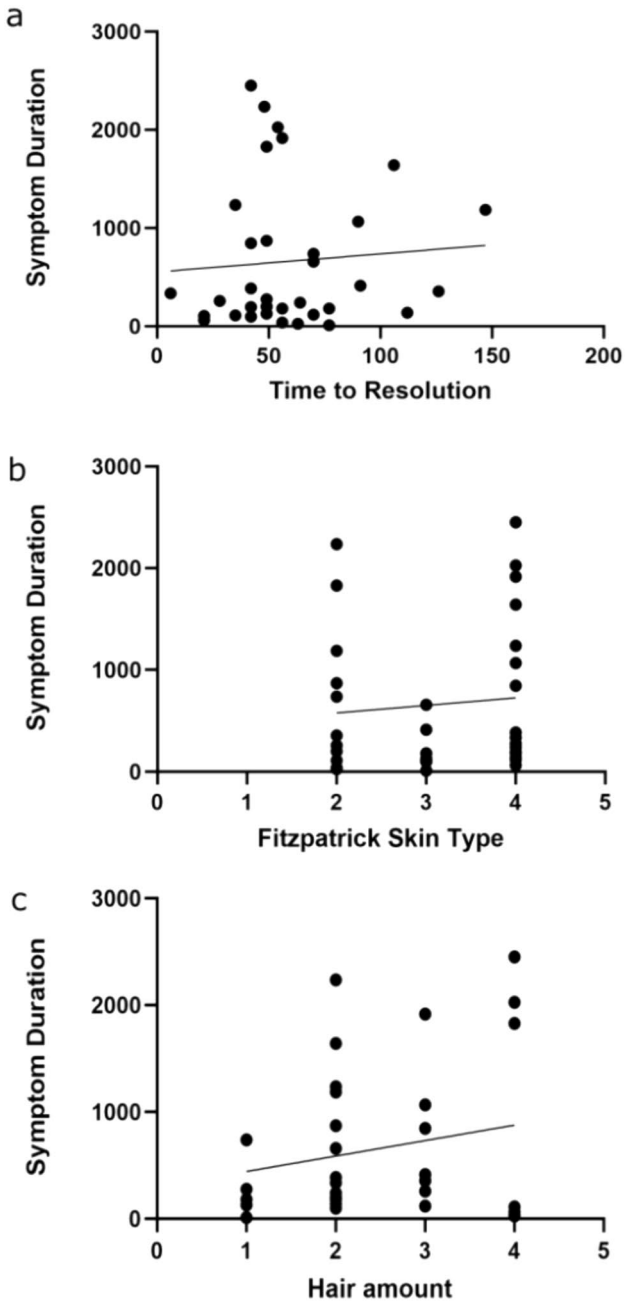


Fig. 3 Correlation of symptom length (disease non-resolution, days) with **A** time to resolution, **B** Fitzpatrick skin type, and **C** hair amount. Dots represent individual patients

lifts or wide excision with flap reconstruction, these patients presented with a more complex anatomy and more resistant disease than the typical pilonidal patient. Our standardized pilonidal protocol was effective in treating these challenging, chronic, and recurrent pilonidal patients with a recurrence rate of 14.7%.

Our primary focus of treatment for pilonidal disease was diligent wound care and regular manual/laser epilation for all patients. Surgical intervention was reserved for those with abscesses, large wounds, or those with persistent functional impairment despite conservative management. Our treatment strategy departs from the traditional approach of more aggressive surgical intervention for persistent pilonidal disease [6, 12, 13]. Typically, patients that received wide excision and flap reconstruction had extensive disease thought to be unlikely to resolve with minimally invasive techniques such as Gips procedure [6, 13–15]. We found that despite having previously received wide excision and various flap reconstruction procedures, most of our study patients could achieve symptom resolution without additional surgical procedure. Our standardized protocol aggressively mitigates the impact of hair and skin vulnerability in patients with refractory pilonidal disease by applying local wound care and regular manual/laser epilation. Laser epilation has been shown in randomized clinical trials to reduce the recurrence of pilonidal disease [16]. Based on our study coupled with previous prospective studies, we believe laser epilation should be implemented as a standard treatment for recurrent pilonidal disease [8, 10, 16].

Due to the significant morbidity of excisional procedures with and without reconstruction, there has been a recent shift towards the use of minimally invasive approach [12]. Minimally invasive trephination was associated with a fast recovery, minimal wound healing complications, and significant improvements to the quality of life of adolescents with pilonidal disease [3, 17]. Our protocol has adopted minimally invasive trephination and selective wound debridement to treat recurrent pilonidal disease. In 2002, Bascom and Bascom described their cleft lift technique to treat surgery refractory pilonidal disease for when simple treatments fail, large primary disease, or complex unhealed wounds [13]. Their study had an estimated primary healing rate of 70.9% with zero recurrences and median follow-up of 20 months [13]. Subsequent studies utilizing the cleft lift procedure had found healing rates of approximately 60%, with recurrence of 5.3–5.8% with follow up ranging from 9 to 12 months [18, 19]. Despite having a recurrence rate of 14.7%, our protocol has resulted in 100% healing rate with follow up of 13 months; some of our patients had failed prior cleft lift or multiple flap closure procedures, suggesting that patients in our study might had more severe disease than those described in the literature. Importantly, 59% of our patients achieved symptom resolution without additional surgical intervention, eliminating the significant morbidity associated with a cleft lift or flap closure.

Despite being one of the first to evaluate the impact of minimally invasive treatment protocols on chronic refractory pilonidal disease, our study had limitations: Although our clinic had a wide and diverse referral base drawn from different geographical, social, and ethnic communities, this was a single institution study. Our study lacked a control group or randomization to allow for direct comparison of our

protocol with alternative treatment procedures. Our median follow-up period was 405 days; while a sizable proportion of recurrences occur within the first 12 months, longer follow-up period may uncover more recurrences. Furthermore, we had a small sample size, since we focused on the most challenging cases of pilonidal disease. Nevertheless, our findings suggest that a minimally invasive protocol is a reasonable approach for managing excision-refractory pilonidal disease.

Conclusion

Although previous pilonidal care had focused on aggressive surgical intervention for treating recurrent pilonidal disease, we showed that a standardized protocol centered on local wound care, regular manual/laser epilation, and a minimally invasive approach could heal the most severe, surgically refractory cases.

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Data availability The datasets generated and analyzed during the current study are not publicly available due to patient privacy but are available from the corresponding author on reasonable request.

Declarations

Conflict of interest The authors declare that they have no competing interests.

Ethics approval This study was approved by the Stanford University Institutional Review Board (#52040), and all experiments were performed in accordance with relevant guidelines and regulations. Informed consent was obtained from all subjects and/or their legal guardian(s).

Consent for publication Not applicable.

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