



# Minimally Invasive Pilonidal Excision: Preliminary Report

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## Abstract

**Background** The aim of this study was to report on the application of a minimally invasive technique to the radical extirpation of primary and recurrent pilonidal disease. This technique does not require specific equipments, is ordinarily performed under local anesthesia on an outpatient basis, and provides optimal cosmetic results.

**Methods** A total of 187 patients including 68% of patients with previous pilonidal surgery and 12% cases of extensive disease underwent surgery as day case. The series was thus reviewed in terms of perioperative data, time off daily activities, time to complete wound healing, and recurrence.

**Results** Overall, the incidence of postoperative complications was 9%, with 2% being the relative rate of >grade I complications. The median time off school/work was of 2 days, while the median time to complete wound healing was 35 days. At a median follow-up of 16 months, the overall rate of disease recurrence was 5, 6%.

**Conclusions** This analysis demonstrates that minimally invasive pilonidal excision is an effective option for pilonidal disease, also in the case of recalcitrant or extensive disease.

## Introduction

Surgical excision is the standard treatment for chronic PD [1–5]. For decades, the etiology of pilonidal disease (PD) was thought to be congenital, and surgical treatment has traditionally involved wide excision of the entire subcutaneous tissues down to the sacrococcygeal fascia [1, 3, 5]. PD is now widely considered to be an acquired disorder [2, 3], and a number of less invasive procedures have been proposed along the last decades that offer a high rate of cure and minimize the number of hospital admission [1–5]. Still, the optimal treatment for PD is still undecided [1, 3].

Recently, different techniques of sinusectomy showed promising outcomes, though mostly limited to selected patients with primary and localized disease. After extensive experience with the procedure popularized by Gips et al. [2, 3], we modified the original technique of minimally invasive sinusectomy with the aim of widening its range of application to recalcitrant and extensive pilonidal disease.

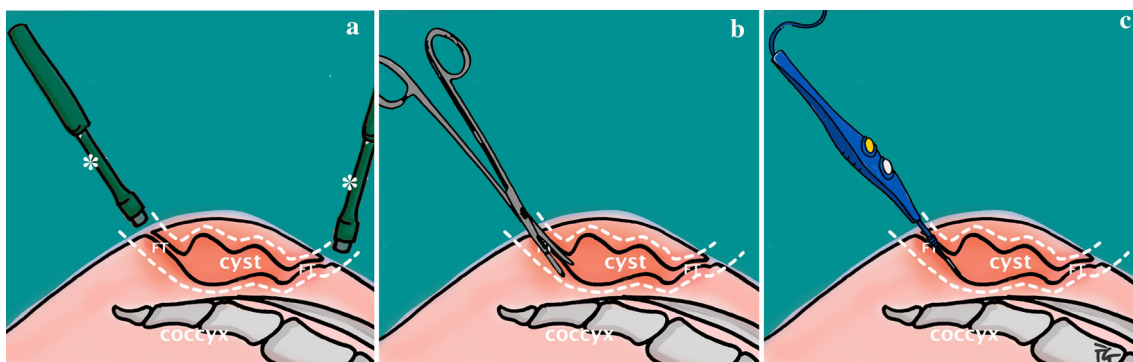
## Methods and surgical technique

One hundred and eighty-seven consecutive, unselected patients who received surgery during the period between January 2017 and February 2019 were included in the analysis. There were no exclusion criteria or specific contraindications to the technique due to the extent or severity of the disease. A procedure-specific informed consent was obtained for each patient. Our modified procedure of Gips et al. [2] is outlined in Fig. 1.

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**Fig. 1** Illustration of minimally invasive pilonidal excision (MIPE). Two or more large-bore trephines are used to excise peripheral fistulous tracts (FT) and reach the pilonidal cyst (a). All underlying

diseased tissues are excised together with neighboring healthy fat tissues with trephines (asterisks), scissors, and monopolar electrocautery (b and c). Dotted white lines describe the area to be extirpated

The patient lies prone; the buttocks are held apart with strapping to provide adequate operative exposure. Firstly, local anesthetic is injected superficially and circumferentially to the diseased area. An anesthetic injection is next performed deeply, at the level of the sacrococcygeal fascia. This maneuver promotes the dissection of the subcutaneous tissue from the fascia, which ordinarily is not affected by the disease. The extent of the disease is thus appraised carefully. Median pits are then identified, and each pit is excised with small skin trephines (usually of diameter 2 mm). Two or more large-bore trephines (usually 8 mm) are next used at the peripheral extremities (either median or lateral) of the disease to excise any fistulous tract and reach the pilonidal cavity within the subcutaneous tissue (Figs. 1 and 2). In the case of pilonidal diseases with multiple median orifices without lateral tracts, large-bore trephines are used to enter the pilonidal cavity in the midline. In the presence of long-tract fistulas, either median or lateral, some further entrances (general 1 or two) are made between the peripheral incisions (Fig. 3). Accessing from the distal entrance, all underlying diseased tissues are now removed together with neighboring healthy fat tissues with a combination of trephines, scissors, and monopolar electrocautery. The subcutaneous tissue is detached ventrally and then laterally, proceeding along the fistula toward the

next entrance. No lateral incisions are made. In some cases of extensive fistulas with chronic abscesses, two or more trephine openings are jointed by linear incisions to ease the extirpation of all diseased tissue. These linear incisions are thus sutured (Fig. 3). The surgical field is generously irrigated with saline. Trephine skin openings are left open. Patients are kept in the supine position during a 1–2 h observation before discharge. Postoperatively, no regular medication is prescribed and daily activities are encouraged. Patients are instructed to sleep supine and wash with running water the surgical area several times a day. Regular epilation of the sacrococcygeal region is also recommended for at least 1 year following surgery.

Data recorded on preoperative patients' characteristics were age, sex, BMI, comorbidities, and previous treatments. Extensive disease was defined as the presence of multiple (>2) and bilateral fistulous tracts or chronic abscesses. Postoperative complications are reported according to the Clavien–Dindo classification, while wound healing time was defined as complete epithelialization over the surgical openings. To determine possible differences between homogeneous samples, univariate analysis was performed running a Fisher's exact test for categorical variables. A two-tailed  $p$  value of 0.05 or less was set as probability level of statistical significance.

**Fig. 2** Minimally invasive pilonidal excision (MIPE)



**Fig. 3** Minimally invasive pilonidal excision (MIPE) in a typical case of complex, recalcitrant pilonidal disease



## Results

One hundred and twenty-seven patients (68%) had previous surgery for PD, including incision and drainage, conventional surgical excision, endoscopic treatment, or sinusectomy. Overall, there were 23 patients (12%) with extensive disease presenting with multiple fistulous tracts and/or chronic abscesses (Fig. 3). Median operative time was 20 min (range 10–50), and there were no serious perioperative complications. One hundred and eighty-one patients (97%) were discharged on the same day of surgery. 31% of patients (58 patients) required analgesics postoperatively for a median of 1 day (1–7), with no statistical difference between patients with primary PD or recurrent/extensive disease ( $p = 0.23$ ). Overall, the median return to daily activities was 2 days (range 0–15). A total of 17 patients (9%) had postoperative complications of which 14 were grade I complications (7.5%). Of note, 14 patients experienced immediate, in-hospital postoperative bleeding which was successfully treated with compression alone in 13 cases (grade I complication), while 1 patient required surgical hemostasis under local anesthesia (grade IIIa). No significant bleeding occurred during the postoperative course, after discharge. Three patients had surgical site infection (SSI) at the first postoperative outpatient control (7 days after surgery), whereby two cases required treatment with oral antibiotics (grade II). Patients with uncomplicated, primary PD did not differ significantly from patients with extensive and/or recurrent disease on postoperative morbidity ( $p = 0.24$ ). The median time to complete wound epithelialization was 35 days and ranged between 7 and 90 days (Figs. 4 and 5). Extensive and/or recurrent PD patients had longer time to complete wound healing than patients with primary PD, although without statistical difference ( $p = 0.1$ ). At a median follow-up of 16 months (range 2–31), 5, 6% of patients (10 out of 179 patients with available data) had evidence of disease recurrence at a median of 4 months following surgery. Of these, two patients underwent repeat surgery within the study period. From a total of 103 patients with 1-year

follow-up data, the incidence of disease recurrence was 5.8% (6 patients). Overall, the relative incidence of disease relapse did not differ between patients with primary and recurrent/extensive disease (2.6% vs. 5.7%,  $p = 0.27$ ).

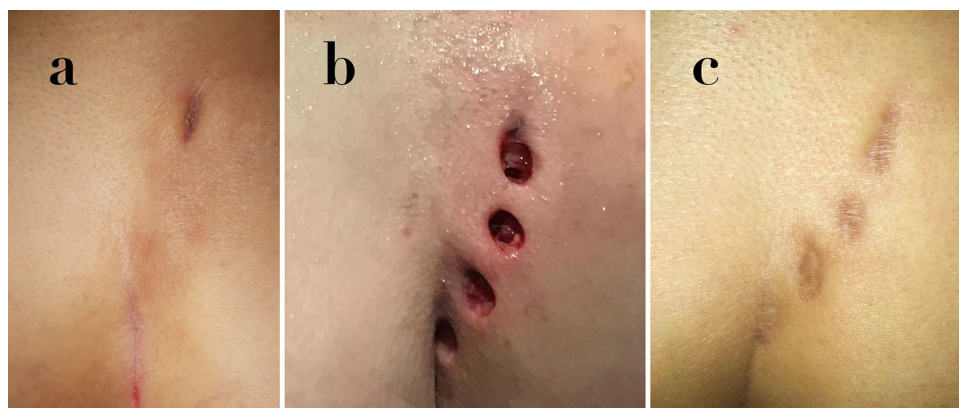
Main patient characteristics and surgical outcomes are summarized in Table 1.

## Discussion

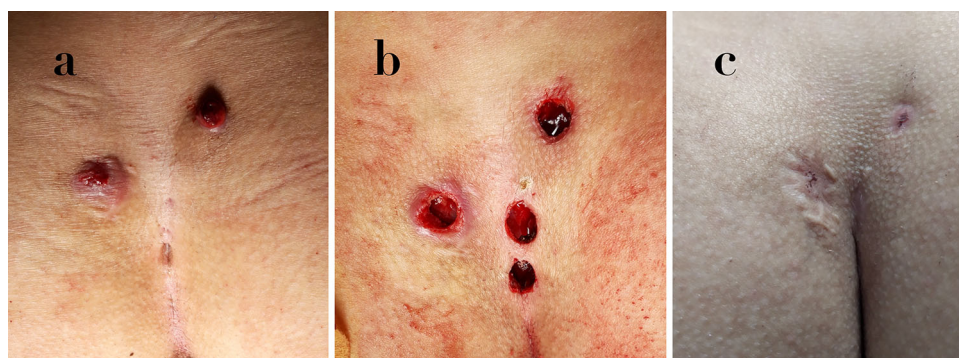
Conventional extirpation with or without primary midline or asymmetrical closure is still the most performed procedure worldwide for PD [1, 3]. This procedure often requires general anesthesia and prolonged postoperative care. Also, it is associated with high rates of complications and recurrence and a cosmetic result that can be devastating, with a great impact on public health [1, 3]. In line with the acquired theory of pathogenetic process of PD, several surgical alternatives have been described in the past decades, providing the possibility to avoid wide *en bloc* excisions [2, 5–9].

Despite minimally invasive techniques still have not obtained large-scale adoption, the data provided by few specialized surgical teams are promising and suggest significant advantages over conventional excision [4, 5]. Kalaiselvan et al. [4] recently investigated the current role of minimally invasive surgery for PD. The authors included 10 studies with a total of 820 patients in their systematic review. As for postoperative complications, minimally invasive techniques (including sinusectomy, sinusotomy or endoscopic treatment) resulted in better outcomes as compared to conventional excision with or without advancement flap (Risk Ratio 0.59). Importantly, there was a risk ratio of 0.35 favoring minimally invasive methods over conventional surgery in terms of disease recurrence. Of note, there was no statistical difference between the relative rates of recurrence following endoscopic treatment versus other minimally invasive surgery (sinusectomy and sinusotomy) [4].

**Fig. 4** Surgical site preoperatively (**a**), immediately after the procedure (**b**) and at the 6-month follow-up (**c**)



**Fig. 5** Surgical site preoperatively (**a**), immediately after the procedure (**b**) and at the 6-month follow-up (**c**)



**Table 1** Baseline patients' characteristic with main surgical outcomes

Patients	187
Male/female	151/36
Age (median)	26 (range 14–48)
Previous surgery	68% (126 patients)
Extensive disease	12% (23 patients)
Same-day surgery	97% (181 patients)
Time off work/school (median)	2 (range 0–15)
Postoperative complications	9% (17 patients)
Grade I	7.5% (14 patients)
Grade II	1% (2 patients)
Grade IIIa	0.5% (1 patient)
Time to complete wound healing (median)	35 (range 7–90)
Recurrence	5.6% (10 out of 179 patients)
Primary, limited PD	5.2% (2 out of 38 patients)
Recalcitrant/extensive PD	5.7% (8 out of 141 patients)

The present analysis demonstrates that this technique of minimally invasive sinusectomy can be considered an effective option in the treatment of both primary and recurrent PD. It results in excellent surgical outcomes, with a limited rate of minor complications. As supported also by a growing number of comparative analyses, wound-related

outcomes, including cosmetic results, are significantly superior to those obtained with conventional procedures [1–3, 6–8]. Moreover, the procedure does not require special and expensive equipments, thus providing optimal outcomes at *low cost*. In addition, the possibility to perform surgery under local anesthesia, as same-day surgery limits

also hospital costs and the relative costs associated with off-work time. Even if the time to wound healing is longer than that of other techniques that entail closed wounds, the presence of few, small surgical openings bring to minimal local discomfort and result in no significant restriction from daily activities [1, 3, 6]. Actually, the median return to activity of 2 days in our series compares favorably with recent data on both minimally invasive and traditional surgeries [6, 7].

Some limitations to the present analysis are to be acknowledged. First, despite the analysis of an unselected, consecutive series of patients from a prospectively maintained database, it has a retrospective nature and lacks a comparator group. Secondly, although the median follow-up, ranging from 2 to 31 months, is likely to reflect adequately the general trend, an actual estimation of long-term data is not available for the entire series.

Definitive conclusions can not be drawn on the basis of the current knowledge essentially due to the paucity of high-level evidence upon the argument [5, 7–9]. Nevertheless, our report demonstrates that this technique of minimally invasive sinusectomy can be considered to treat both primary and recalcitrant PD competently, also in the case of extensive disease.

### Conflict of interest

The authors declare no conflict of interests.

**Authors' contributions** All authors have contributed to the work in terms of conception and design, acquisition of data, analysis, and interpretation of data. FG wrote the paper. EC contributed essentially in terms of acquisition of data. FG, EC, and ADC contributed equally in revising the manuscript and approving its final version.

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### Compliance with ethical standards

**Conflict of interest** The authors declare that they have no conflict of interest.

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