



# Laser depilation as adjuvant therapy in prevention of recurrence of pilonidal sinus disease: initial experience of a district general hospital in the UK

ASD Liyanage, Y Woods, MA Javed, C Deftly, H Shaban, R Kalaiselvan, R Rajaganeshan

Whiston Hospital, St Helens and Knowsley NHS Trust, Rainhill, Prescot, UK

## ABSTRACT

**INTRODUCTION** Pilonidal disease is a chronic condition involving the sacrococcygeal area. It can have a significant impact on quality of life, social activities and occupation. Surgery is the mainstay of treatment. However, laser depilation has been proposed as an adjunct to surgery and has shown improved results in some studies. We present our experience of laser depilation in the treatment of pilonidal disease in a district general hospital setting in the UK.

**MATERIALS AND METHODS** A prospectively maintained database of all consecutive patients who received laser depilation after elective surgery for pilonidal disease was analysed. Patients were offered a minimum of two sessions of laser depilation. The primary outcome measure was disease recurrence. Evidence of new symptoms or signs of pilonidal disease after one year from the latest surgical intervention was defined as recurrent disease. Data are presented as medians with interquartile ranges.

**RESULTS** A total of 64 patients underwent laser depilation after elective surgery between 1 June 2013 and 1 June 2018; 57 were eligible for final analysis. Sixty-five per cent of patients received six or more sessions of laser treatment. There were no short- or long-term complications related to laser depilation. Patients who had more than two sessions of laser depilation showed an improved recurrence rate. Overall, recurrence rate in our series was 12% at a median follow-up of 172 weeks.

**CONCLUSION** Laser depilation is a safe and effective adjunct to surgery in minimising the recurrence of pilonidal disease. Patients with primary pilonidal disease and those who are undergoing minimally invasive surgery may also benefit from adjuvant laser depilation. Further high-quality control trials are required to assess its efficacy and safety.

## KEYWORDS

Pilonidal sinus – Pilonidal disease – Laser depilation – Laser hair removal

Accepted 3 February 2020

## CORRESPONDENCE TO

Aloka Liyanage, E: alokaliyanage@yahoo.co.uk

## Introduction

Pilonidal disease is a common condition involving the sacrococcygeal area, believed to be caused by impaling shafts of loose hairs under the skin due to friction,<sup>1</sup> thereby forming a network of sinus tracts and cysts. Subsequent infection of these sinus tracts clogged with keratin debris and hairs can cause a debilitating chronic inflammation with relapses characterised by pain, discharge and abscess formation. Pilonidal disease affects around 25 per 100,000 people, with the incidence being highest in young males of working age, at a ratio of 5:1.<sup>2</sup> Owing to its chronic debilitating course, the disease can have a significant impact on the personal lives, social activities and economic productivity of affected individuals.

Many surgical approaches have been proposed in treating pilonidal disease to date, but recurrence is still a major concern with each modality. Recurrence can be from incomplete excision of the primary disease, allowing it to progress further, or formation of new disease via the

same pathological process. Current surgical options include incision and drainage of acute abscess, conventional excisional surgery with or without primary closure and minimally invasive techniques. Minimally invasive approaches include sinotomy, sinusectomy, trephining and the more recent advent of endoscopic pilonidal sinus treatment (EPSiT).<sup>5</sup>

Minimally invasive techniques, although, primarily designed to address postoperative morbidity, have also shown to reduce recurrence rates. Meinero *et al* quote a 5% recurrence rate after EPSiT in their series.<sup>4</sup> However, in our experience at Whiston Hospital, recurrence after EPSiT as a primary treatment modality was 35% after a median follow-up of 52 weeks.<sup>5</sup> Because of these high recurrence rates, a number of adjuvant treatments have been suggested by various groups and have shown improved results. Laser hair removal is one such modality that has been used in minimising recurrence after surgical treatment for pilonidal disease. We present our initial

experience of laser hair removal as an adjunct to surgery in the treatment of pilonidal disease.

## Materials and methods

We analysed a prospectively maintained database of all consecutive patients from 1 June 2013 to 1 June 2018 who underwent elective surgery for pilonidal disease and subsequently enrolled for laser hair removal. We offered adjuvant laser depilation for selected patients with primary pilonidal disease (when they were overtly hirsute) and for almost all patients with recurrent pilonidal disease (irrespective of the extent of hirsutism). We did not use a hirsutism scoring tool to stratify the selection criteria of laser depilation.

Primary outcome measure was disease recurrence, which was defined as development of new symptoms (pain, discharge and abscess formation) or signs (pits, discharging sinuses) of pilonidal disease after one year from the last surgical intervention. Secondary outcome measures were healing rates and short- and long-term complication rates pertaining to laser depilation. Healing was defined as the absence of discharge or pain spontaneously or on palpation without any clinical evidence of pits, sinuses, inflammation or induration in the sacrococcygeal area for a minimum period of one year from the last surgical intervention.

Pilonidal disease severity was categorised based on the Wysocki classification (Table 1). Those with types 1–2 were classified as uncomplicated pilonidal disease and those with types 3–4 were considered to have complex disease. Recurrence rates were based on the last surgical intervention performed prior to depilation, in case patients had multiple procedures. Patients who were under 16 years of age, American Society of Anesthesiologists (ASA) grade IV and above, previous history of photosensitivity and those with acute pilonidal abscess were excluded from the study. Follow-up data were available until 1 June 2019.

**Table 1** Wysocki classification<sup>a</sup>

Type	Definition
1	Only midline pits or sinuses (all above tip of coccyx, no prior surgery, no abscess drainage)
2	Any midline disease with secondary sinus/es or abscess scar/s (all above tip of coccyx, no prior definitive surgery, may have had simple abscess drainage)
3	Any midline or secondary disease extending below tip of coccyx (no prior definitive surgery, may have had simple abscess drainage)
4	Any disease after treatment with definitive intent (includes wide excision for abscess)

<sup>a</sup> Source: International Pilonidal Society

## Laser depilation therapy

With the availability of a dual wave (755–1064nm) alexandrite laser machine, all six Fitzpatrick skin types were suitable for depilation. Individualised treatment sessions were given at an outpatient laser clinic (spot size 12–15mm, pulse width 20–40ms and energy settings at 18–25joules/cm<sup>2</sup>) by trained technicians. The usual protocol was to offer laser treatments in two sessions six to eight weeks apart. Subsequent treatments were decided at follow-up assessments.

## Funding and costs

The NHS St Helens Clinical Commissioning Group fund laser depilation for patients undergoing treatment for pilonidal sinuses to reduce recurrence. Up to six cycles of treatments are being funded in compliance with this criterion. For patients who do not meet the above criterion, funding is only available if an individual funding request application proves exceptional clinical need. Average cost of laser depilation per session can vary from £85 to £135 per session depending on the extent of hair distribution (Midlands and Lancashire Commissioning Support Unit, Criteria Based Clinical Treatments, Version 1.6. 2018).

## Follow-up

Surgical follow-ups were arranged at intervals of one, two and three-weeks postoperatively at a dedicated telephone clinic conducted by a nurse clinician and thereafter at six to eight weeks, six months and one year in a general surgical clinic. Response to laser depilation was monitored at a dedicated laser clinic at four- to six-week intervals.

## Statistical analysis

Data were analysed using SPSS Version 22. Data were compared using Fisher's exact test and a *p*-value less than 0.05 was considered significant. Data were presented as median and interquartile ranges (IQR).

## Results

A total of 64 patients were enrolled to receive laser hair removal after surgery for pilonidal disease. Of these, 57 patients qualified for final analysis as the remaining patients did not complete the required minimum of two sessions of laser depilation at the time of analysis. Fifty-four patients were male (male to female ratio 54:3). The median age was 25 years (IQR 16–46 years) and the majority (91%) of them were ASA grade 1. Ten patients (18%) were current smokers and 8 (14%) had a body mass index over 30. The majority (68%) of patients received six or more treatment sessions of laser hair removal. Median follow-up was 172 weeks (IQR 52–232 weeks).

Some 44 (77%) patients had recurrent disease (Table 2) at the time of their last surgical intervention. According to Wysocki classification, 42 (74%) patients had types 3 and 4 disease (Table 3) and were categorised as complex disease. With regards to surgical intervention (Table 4), 41 (72%) patients underwent conventional surgical treatments

(excisional surgery with or without flap reconstruction) and 16 (28%) had minimally invasive surgery (EPSiT). Eighteen patients had flap reconstructions (seven lotus petal, three Bascom, two Limburg and six Karydakis).

Patients with recurrent pilonidal disease showed 14% re-recurrence after laser depilation, whereas those with primary pilonidal disease showed only 8% recurrence rate. Interestingly, there was no significant difference in the healing or recurrence rates between simple (Wysocki 1 and 2) or complex (Wysocki 3 and 4) pilonidal disease following laser depilation. Recurrence rate in patients who had minimally invasive surgery (EPSiT) was 6%, while that in the conventional surgical group was 15%. However, this difference did not reach a statistical significance.

Furthermore, recurrence rate among patients who had three or more sessions of laser depilation showed significantly low recurrence rate (7%; Table 5) compared with those who had only two sessions of laser depilation (36%; *p*-value 0.0208). Overall, we observed a 12% recurrence rate following laser hair removal of our patient population at a median follow-up of 172 weeks. In our previous series,<sup>5</sup> we could only achieve an overall healing rate of 77% in patients with pilonidal disease after EPSiT

**Table 2** Primary compared with recurrent pilonidal disease (Fisher's exact value = 1)

Disease type	Healed		Recurred	
	(n)	(%)	(n)	(%)
Primary (n = 13)	12	92	1	8
Recurrent (n = 44)	38	86	6	14

**Table 3** Simple compared with complex pilonidal disease (Fisher's exact value = 1)

Disease type	Healed		Recurred	
	(n)	(%)	(n)	(%)
Simple: Wysocki 1 and 2 (n = 15)	13	87	2	13
Complex: Wysocki 3 and 4 (n = 42)	37	88	5	12

**Table 4** Endoscopic pilonidal sinus treatment (EPSiT) conventional surgery (Fisher's exact value = 0.6599)

Surgery type	Healed		Recurred	
	(n)	(%)	(n)	(%)
EPSiT (n = 16)	15	94	1	6
Conventional (n = 42)	38	85	6	15

**Table 5** Effect of number of sessions of laser depilation on outcomes (Fisher's exact value = 0.0208)

Sessions	Healed		Recurred	
	(n)	(%)	(n)	(%)
2 (n = 11)	7	64	4	36
≥ 3 (n = 46)	43	93	3	7

as a primary treatment. In the current series, a 94% healing rate was observed in the EPSiT group with adjuvant laser hair removal. Closer inspection of the seven patients who experienced recurrence after laser hair removal revealed that four patients were diagnosed to have recurrent disease later than three years from their last surgical intervention.

## Discussion

It is now widely accepted that pilonidal disease is caused by retention of follicular hairs in the natal cleft, resulting in a chronic foreign body reaction and formation of epithelialised tracts and midline pits.<sup>6-7</sup> Chronic inflammation of these sinus tracts clogged with keratin debris and shafts of hairs causes pain, discharge and episodes of acute abscess formation. Currently, a variety of surgical options is available to treat pilonidal disease including minimally invasive treatments, but recurrence is the most concerning problem in these treatments.

Hirsutism, obesity and smoking are strongly associated with the pathogenesis of pilonidal disease. As modern surgical techniques are efficient in eliminating the underlying primary pathological process, recurrence of pilonidal disease could principally be linked to the persistence of the causative factors than suboptimal extraction of the underlying disease process. Hirsutism is the most significant aetiological factor, so recurrence could be attributable to chronic retention of hair and long-lasting pressure effect on the terminal sacrococcygeal hair follicles.<sup>5</sup> Meinero *et al* concluded that late recurrence could be considered a new primary disease by extrapolating the above theory.<sup>4</sup> Long-lasting or permanent hair removal in the gluteal area would therefore minimise the risk of recurrent disease.<sup>8-9</sup>

Laser hair removal is not a novel adjunct in treating pilonidal disease; it is by far the most used adjuvant treatment that has been used for depilation since 1996.<sup>10</sup> In the past, it was effective only on Fitzpatrick skin types I-IV. However, with the advent of new laser technology, all skin types can now be treated effectively and are better tolerated. Several studies have been reported on the efficacy of its use in the treatment of pilonidal disease, however, high-quality data are still limited.

In our series, the overall recurrence following laser hair removal at a median follow-up of 172 weeks was 12%, whereas published studies have reported recurrence rates of 3-17%. Interestingly, the recurrence rate of patients

with uncomplicated pilonidal disease (Wysocki 1 and 2) was similar to that of complex disease (Wysocki 3 and 4) in this series. Wysocki classification does not consider the number of previous operative interventions in categorising the disease severity so its true reflection of the disease complexity is questionable. There is a need for a universal morphological classification system for pilonidal disease that can accurately reflect the true complexity of the disease. This would help to facilitate future studies in search of unanswered questions around this challenging clinical problem.

Currently, there is no uniform agreement on the optimum schedule for laser treatment sessions and the need for top-up treatments in pilonidal disease. In our series, we observed that the recurrence rate had an indirect relationship with the number of laser treatment sessions. This observation reiterates the need for multiple treatment sessions (within the limits of tolerance) of laser depilation to achieve favourable results in a selective group of patients. The risk of late recurrence in pilonidal disease also highlights the need for prolonged follow-up arrangements and individualised top-up treatments. However, the financial implications of such long-term follow-up periods need to be further evaluated with cost-benefit analysis. Smaller sample size, selection bias, lack of controlled group and the heterogeneity in the study population are major drawbacks in this study.

## Conclusion

Laser hair removal is a safe and effective adjunct to surgery in minimising the recurrence of pilonidal disease.

Laser hair removal may have most of its therapeutic benefit in patients with primary pilonidal disease and those who are undergoing minimally invasive surgery. Carefully designed controlled studies are required to further assess the efficacy and safety profiles of laser depilation.

## References

1. Karydakos GE. Easy and successful treatment of pilonidal sinus after explanation of its causative process. *Aust N Z J Surg* 1992; **62**: 385–389.
2. Søndena K, Anderson E, Nesvik I, Søreide J A. Patient characteristics and symptoms in chronic pilonidal sinus disease. *Int J Colorectal Dis* 1995; **10**: 39–42.
3. Kalaiselvan R, Bathla S, Allen W *et al*. Minimally invasive technique in the management of pilonidal disease. *Int J Colorectal Dis* 2019; **34**: 561–568.
4. Meinero P, Stazi A, Carbone A *et al*. Endoscopic pilonidal sinus treatment (EPSiT): a prospective multicentre trial. *Int J Colorectal Dis* 2019; **34**: 741–746.
5. Kalaiselvan R, Liyanage ASD, Rajaganeshan R. Short-term outcomes of endoscopic pilonidal sinus treatment. *Ann R Coll Surg Engl* 2020; **102**: 94–97.
6. Bascom J. Pilonidal disease: origin from follicles of hairs and results of follicle removal as treatment. *Surgery* 1980; **87**: 567–572.
7. Stelzner F. [Causes of pilonidal sinus and Pyoderma fistulans sinifica]. *Langenbecks Arch Chir* 1984; **362**: 105–118.
8. Sadick NS, Yee-Levin J. Laser and light treatments for pilonidal cysts. *Cutis* 2006; **78**: 125–128.
9. Downs AM, Palmer J. Laser hair removal for recurrent pilonidal sinus disease. *J Cosmet Laser Ther* 2002; **4**: 91.
10. Ghnam WM, Hafez DM. Laser hair removal as adjunct to surgery for pilonidal sinus: our initial experience. *J Cutan Aesthet Surg* 2011; **4**: 192–195.