

Pilonidal Sinus Laser Assisted Closure: A New Promising Minimally Invasive Therapy

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Abstract

Introduction:

Pilonidal sinus disease affects over 26 per 100,000 people with an incidence of 1.1% among Caucasian males. The disease results in approximately 13,000 admissions to hospital per year and significant effects on the personal and working lives of this mainly young patient cohort. Traditional treatment options have included variations of either (a) excision with primary closure, or (b) excision and healing by secondary intention. Recently, however, there has been a trend away from excisional surgery as it involves the additional costs of wound management and often a prolonged stay in hospital. Medical lasers have been established for use in the endoscopic management of proctological conditions and have now been used in the minimally invasive treatment of pilonidal sinus disease.

Materials and methods:

A large case series of sinus laser-assisted closure (SiLAC) of pilonidal disease undertaken by a single surgeon over a 3 year period was analysed. 70 consecutive patients with recurrent pilonidal disease were treated with SiLAC using a continuous Biolitic Diode laser system to induce ablation of pilonidal sinus tracts. All patients received were reviewed post-operatively after 4 – 8 weeks and again after 6 months. Patients were assessed for healing, abscess formation, discharge, pain, cosmetic issues and any other post-operative complications.

Results:

8 out of 70 patients were lost to follow up. 51 (82.25%) of the remaining 62 patients achieved complete healing without any ongoing pain or discharge. Of these 11 patients 4 received re-SiLac and achieved healing. 7/11 patient with recurrence received traditional excisional surgery. None of the patients required readmission to hospital for complications.

Conclusions:

These outcomes demonstrate that minimally invasive SiLAC treatment of pilonidal sinus disease represents a feasible, safe and cost-effective alternative to traditional excisional surgery. In our opinion, these data justify further studies, including multi-centre clinical trials.

INTRODUCTION:

Pilonidal sinus disease is a subcutaneous infection that occurs in the natal cleft area. It was first described by Mayo in the 19th century [1]. The most accepted aetiology is obesity, excessive hair, deep cleft between the buttocks and job involving prolonged sitting. In World War II, it was detected to be particularly common amongst the jeep drivers. Buie [2] coined the term “The Jeep Disease”. The incidence of this condition is four times common amongst males than

in females.

There are various treatment options like, laying open, excision with or without closure. The closure of the wound can be in the midline off midline like in Karydaki's procedure, Limberg's flap and its modifications. These traditional operations require prolonged hospital stay often with drains and extensive involvement of clinicians and nursing staff in the post operative period. There is no ideal

operation for this condition. In our opinion, the aim of preferred surgery should be short hospital stay, low complication rate, minimal post operative discomfort, acceptable healing rates, good cosmetic results and quick return to work [3-7].

In the recent years, there has been increase in the minimally invasive surgery for pilonidal sinus disease in the form of Epsit (endoscopic pilonidal sinus treatment and VAPS (Video assisted ablation of pilonidal sinus). There are other options like injection of fibrin glue or phenol. The lasers have been used with 80 % success rate in Europe and elsewhere [8-13].

In our trust, we used LHP (laser haemorrhoidoplasty with mucopexy) with very encouraging results (14). As we already have the laser equipment with fully trained staff, we decided to try lasers for other proctology conditions. Based on study by Dessily et al [12] from Belgium, we aimed at evaluating the safety, feasibility and effectiveness of SiLaC (Pilonidal sinus laser assisted closure).

MATERIALS AND METHODS:

From April 2019 till October 2022, all patients attending outpatient's clinic for pilonidal sinus disease were offered various treatment options along with SiLaC. The patients who opted for SiLaC were given further information about the procedure including risks and complications. Informed consent was obtained either in the outpatient's clinic and on the day of surgery. When the disease was extensive or recurrent an MRI of natal cleft area was performed preoperatively. Occasionally on the day of surgery patients were found to have an acute abscess in such case planned surgery was abandoned and incision and drainage of abscess was performed. After surgery patient were asked to present to accident and emergency in case of complications. The demographic, operative use of energy and follow up data were recorded. In total 70 patients were treated using laser therapy during the stated period.

All the patients were treated with single session of laser therapy under general anaesthesia. No patients were given antibiotics during or after the procedure. The patients were placed in lateral position for the ease of anaesthesia. We find prone positioning quit time consuming and probably unnecessary. The patient's lower back was shaved with a disposable shaver. The top buttock was strapped to expose natal cleft area. A careful note was made about any pit marks previous surgeries and abscesses. A stab or cruciate incision was taken over any pit marks and previous abscess sites. The

incisions were explored and evaluated to see extent of the tract by a fistula probe. Any loose hairs were meticulously removed from the tracts.

The optical fibre (Leonardo Dual 45 laser 1470nm Biolitec Germany, single radial fibre) was probed with light guidance from incision till the end of the tract. While firing the laser energy the fibre was pulled out at the approximate rate of 1mm/sec. We call this preparatory stage. The purpose of this was to destroy any loose hair, debris and epithelium of the tract. After this step the tract was curetted to remove any burnt hair, epithelium and debris. We think this is the crucial step of the surgery. In the treatment phase, again the optical fibre was re-inserted into the tract and slowly withdrawn at the same speed as in preparatory phase and a gentle pressure was applied from top to seal the tracts. The incisions were left open to drain any discharge. If the wounds were >1cm they were loosely packed with absorbable dressing material. The amount of energy used and tract lasered were recorded in all cases. We felt there was no need to exceed 150 joules / cm of the tract treated.

The wound was infiltrated as a field block with generous amount (40-60 mls) of levobupivacaine 0.25%. The patients were asked to take simple over the counter analgesia like paracetamol and ibuprofen. The patients were allowed to have showers from next day onwards.

Post operatively, these patients were reviewed in clinic at 6-8 weeks. They were asked to attend accident and emergency for any complication. They were also provided useful contact numbers in case of emergency. At the time of their first outpatient's clinic appointment if they were found to have any discharge or incomplete healing, they were given further follow up appointment. If they were symptom free with acceptable cosmetic results then they were discharged.

The statistical analysis was performed using descriptive analysis. Mean was used for normally distributed data and the median was used for categorical data.

RESULTS:

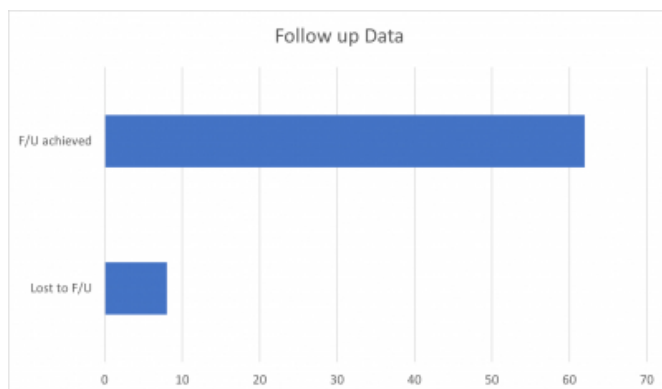
The patient demographic data and characteristics are presented in the following table.

Table 1

The Variables	Number (%)
Age (mean)	31
Gender: Male/female	49/21 (70/30)
Smoking (n, %)	27/43 (38.57/61.43)
BMI (kg/Sq M) mean	29
Previous history of abscess (n, %)	70 (100%)
Previous surgery (n, %)	4 (5.71%)
Number of Pit marks (Median Range)	2 (1-6)
Energy used in Joules (Median, range)	421 (116-1400)

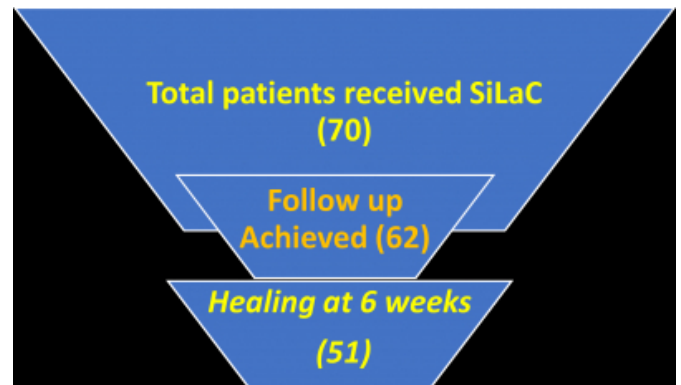
A total of 70 patients were in the study originally. Of which 8 patients were lost to follow up. 49 out of 70 were males which is in line with other studies. The average age of patients was 31 years. All patients had a history of previous abscess in the natal cleft area. 4 patients had previous surgery for pilonidal disease and 2 of these patients had Limberg's flaps surgery in the past.

Chart 1



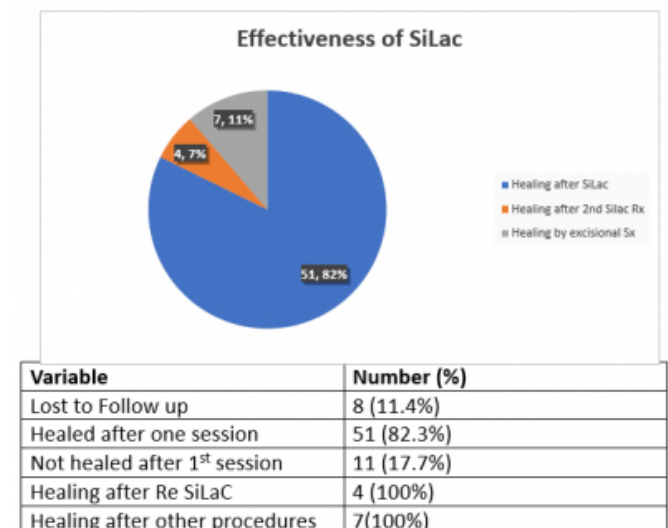
Of the 62 patients who were followed up 51 (82.2%) achieved complete healing in the follow up. Only 3 patients needed additional follow ups to decide whether they have complete healing or not. None of the patients were re-admitted for complications like pain, bleeding or abscess formation.

Chart 2



We notice 11 patients who had incomplete healing or recurrence of symptoms. 4 out of 11 patients opted for re-SiLaC and achieved complete healing in next follow up appointment. Remarkably 10 out of 11 patients were smokers. In other words, recurrence rate in smokers was 37% (10/27). 7 opted for different surgical options like excision or Flap surgery. At the end of study period all patients achieved complete healing without recurrence. If we consider re-SiLaC total 55/62 (88.7%) had a success with laser ablation.

Table 2



Variable	Number (%)
Lost to Follow up	8 (11.4%)
Healed after one session	51 (82.3%)
Not healed after 1 st session	11 (17.7%)
Healing after Re SiLaC	4 (100%)
Healing after other procedures	7(100%)

DISCUSSIONS:

In the UK, although pilonidal the sinus this is not the very common disease, it's effects on quality of life and psychology are enormous. As pilonidal sinus disease affects young population it can have damaging effects on their career aspirations, university education and relationships. In our study the age and sex distribution were consistent with previous studies. Until recently there were no minimally invasive options for pilonidal sinus disease, the main Stay of

the surgical treatment has been excision of affected tissue and some or other form of closure. The skin flap techniques like Karydaki's procedure, Limberg's flap or V-Y plasty or Z plasty are generally reserved for recurrent or more complex disease. The wound dehiscence ranges from 3 to 15%, which we consider is a big morbidity following such operations.

In 2010, C Kayaalp showed that phenol application can produce up to 70% healing rates (4). In 2012, Handmer (15) et al provided a systematic review of use of fibrin glue for pilonidal sinus as a minimally invasive approach. It showed some early encouraging results. Dessily published his results of SiLaC with 94% success rate in 200 patients (12).

A systematic review of laser treatment of pilonidal sinus by Romic et al, a total of 971 patients were included with primary healing rate of 94.4 percent with complication rate of 10% among all the patient treated (16). In our group complication rate was virtually zero the recurrence rate was 18%. The recurrence rate in smoker was 37%. It makes a strong point to emphasize the importance of stopping smoking prior to the surgery. A study published in the colorectal disease journal by Pappas showed that (Sinus laser treatment) SiLaC has low recurrence rate to other minimally invasive options (17).

We do recommend use of MRI scans in assessing the recurrent disease (18). The surgical option no matter what we are going to use is bound to fail if we don't map the disease completely. We may miss out on side branches or tributaries contributing to the tracts. it is especially important to map the disease pre-operatively in recurrent disease.

The advantage of laser surgery is it is simple operation less traumatic, day-care setting and good acceptable cosmetic results. It has lower requirement for post-operative care, fewer or no complications and acceptable failure rate. More importantly this surgery's impact is less on patient's employment, studies and relationship. It reduces the burden of post-operative wound care. It can be easily taught over a few sessions to any reasonable surgical trainee.

Even if the recurrence happens it can still be managed by application of lasers again, if the patient wishes for it. For those patients who do not want to try laser again the usual surgical option in the form of excisional surgery like Karydaki's procedure or Limburg's flaps are still available. In our series we have shown that the recurrent disease can be successfully managed and 100% of the patient achieved cure

at the end of study period.

We believe that this procedure needs further refinement in the form of use of brush to clean the tracts or use of ophthalmic scoops to curette the tract to remove debris. We have recently seen use of double ring laser fibre with emission of laser energy at 2 rings which has been successfully used for fistula in ano. It may increase the success rate as it reduces skip areas.

These early still early days in the minimally invasive therapy for pilonidal sinus disease. Hopefully in future large, well-controlled studies like PITSTOP (19) should provide some evidence-based approach to patient selection and treatment stratification.

CONCLUSIONS:

Our data proves that we can achieve good results with SiLaC treatment. As we achieved almost 90% success rate if we include second treatment with SiLaC for healing. So, we can safely say, it is very safe, feasible and effective. Also, we could offer other modality of treatment in case laser treatment did not work.

These are quite a remarkable result considering how blind the procedure is. However, we understand that these are early days of laser treatment for pilonidal sinus. We need more robust studies with randomised trials to back it up.

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