

LaPSe method: A novel laser assisted surgical technique in the treatment of pilonidal disease

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ABSTRACT

Aim-Background: Our objective is to introduce a novel laser assisted surgical technique in the treatment of pilonidal sinus disease. Laser assisted pilonidal sinus excision (LaPSe) method is a combination of novel diode laser technology and minimally invasive surgical technique. Primary goal is to achieve recurrence rates lower or similar to the classic primary open technique while incorporating the benefits of diode laser technology.

Method: This is a prospective study. A total of 21 patients, 19 males and 2 females, median age 22, underwent laser assisted pilonidal sinus excision surgery for pilonidal disease between January and August 2018. The procedure was performed in a step by step approach under local anesthesia. Follow up was obtained on the tenth post operative day by means of physical examination, and at three and six months, with phone call interview.

Results: Mean operation time was 33, 5 minutes. All patients had an uneventful procedure and were discharged within one hour after the operation. Physical examination on the tenth post operative day showed proper wound healing in all the cases. One patient needed painkillers for the first post operative day. One patient had delayed wound healing that was treated conservatively, with no need for reoperation. Follow up at three and six months was clear for all the patients, with no reported symptoms or signs of recurrence.

Conclusion: LaPSe method is a new laser assisted step wise approach in the treatment of pilonidal disease with very promising preliminary results regarding recurrence and high acceptance rates by the patients in terms of postoperative comfort and functionality.



Keywords: Pilonidal sinus, pilonidal cyst, laser, radial probe, minimally invasive surgery



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INTRODUCTION

Pilonidal sinus disease (PSD) is a common skin and soft tissue infection of the sacrococcygeal region [1]. A common pattern of PSD is hair-containing cysts connected with sinuses that occasionally evolve into symptomatic abscesses. There is no clear mechanism regarding the formation of PSD. At present, and though many theories have been proposed, PSD is considered an acquired rather than a congenital condition, with hair insertion in the coccygeal region as a primary causative incident [2].

The incidence of PSD is approximately 25 per 100.000 population. Males are more commonly affected than females with a 3-4:1 ratio and the average age peak is between 15 and 25 years old [3]. Main risk factors for PSD are Caucasian race, obesity and deep natal cleft with excessive hair growth. Recent reports show a steady increase of PSD over the last decades, for not known reasons [4].

While the treatment of pilonidal disease is traditionally surgical, many different surgical approach techniques have been proposed over the years. Open surgical treatment, primary asymmetric closure and flap techniques have been the most popular among surgeons, mainly due to their lower recurrence rates compared to other [5]. However, the long and discomfort healing period of open surgical approach or the highly invasive flap techniques gave rise to the need of new minimally invasive approaches in the treatment of PSD, such as limited excision, pit picking, phenol treatment and laser treatment [6, 7].

Recently, the successful application of diode laser technology in varicose veins treatment motivated exploration of possible laser applications in the treatment of pilonidal disease [7]. Several reports have been addressing the implementation of diode laser in PSD [8]. Fundamental problem of these reports is the lack of uniformity in the surgical method applied i.e. laser alone, laser and pit picking, laser and surgical excision, thus compromising results and recurrence follow-up.

AIM

This study objective is to introduce a novel laser-assisted surgical technique in the treatment of PSD. Laser assisted Pilonidal Sinus excision (LaPSe) method is a combination of diode laser technology and minimally invasive surgical technique, presented in a step by step approach.

METHOD

This is a prospective study. A total of 21 patients, 19 males and 2 females, median age 22, underwent LaPSe surgery for pilonidal disease between January and August 2018. The operation was performed under local anesthesia. Follow up was obtained on the tenth post operative day by means of physical examination, and at three and six months with phone call interview (table 1).

Surgical terms: **Primary pit (PP)** is a skin lesion on the midline of the natal cleft. **Secondary pit (SP)** is a skin lesion off the

	Patients
Cohort	21 patients
Gender	19 males / 2 females
Age	15-34 years (median 22)
Operation time	28-47 min (mean 33,5)
Energy delivered	619-856 joules (mean 786,4)
Procedure related complications	None
Postoperative pain treatment	1 patient, first post operative day, 1000 mg paracetamol
Complications	1 patient, delayed healing, treated successfully
3 months follow up	no symptoms
6 months follow up	no symptoms

Table 1. Patient's demographics, postoperative results and follow up.

midline, to the left, right or above the natal cleft (figure 1). **Iatrogenic secondary pit (ISP)** is a small circular skin incision performed by the surgeon.

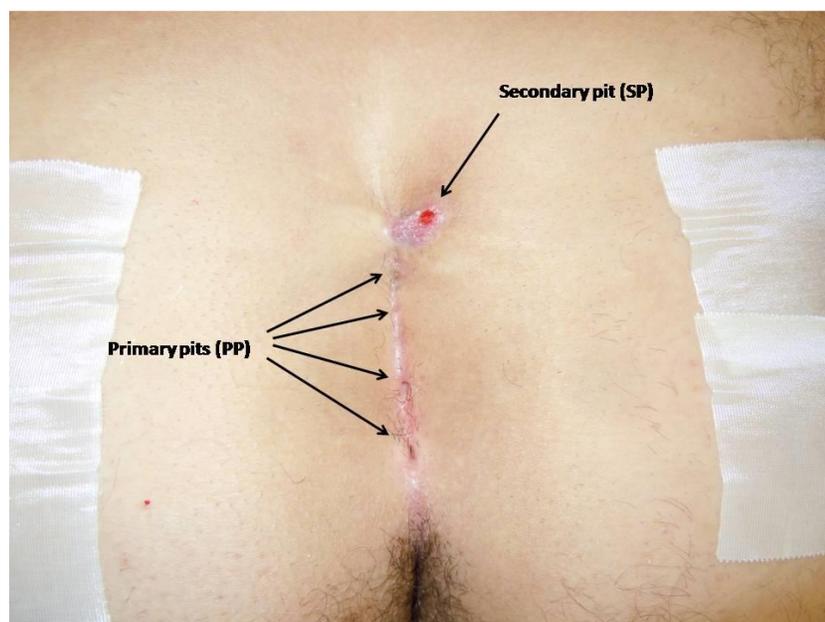


Figure 1. A 33 years-old male with pilonidal sinus disease. Four primary pits (PP) and one secondary pit (SP) are depicted.

Surgical technique: The patient is placed in the prone position. The gluteal regions are tacked apart exposing the natal cleft. After skin disinfection with povidone iodine 10% solution, a thorough examination of the coccygeal region is performed. Local anesthesia is applied in the area with a solution of 1:1 lidocaine 2% / ropivocaine 0,75% 20ml. First step is, starting from the lowest, to identify all the PP's on the midline of the natal cleft and SP's outside the natal cleft. Next, by using a proper metal probe through the existent PP's and SP's, with or without instillation of hydrogen peroxide, a thorough identification of pilonidal sinus network is performed. Then, a thin laser fiber with a circumferential laser beam of 360 degrees is inserted in the sinus network and energy is delivered at 1470 nm wavelength. Next, we perform a circular incision with a few millimeters diameter around every PP and SP if present. If a sinus has a blunt tip outside the natal cleft, an ISP is opened over the far most end.



Figure 2. Surgical excision of the sinus network is being performed, starting from the lowest primary pit (PP).



Figure 3. Complete excision of the sinus network.

With the use of a sharp scissor, a surgical excision of PP's and SP's along with the sinus tracts involved is performed through the skin openings (figure 2, 3). Finally, the laser fiber is inserted and laser energy is delivered throughout the surgical site (figure 4). Sterile gauze dressings are applied.

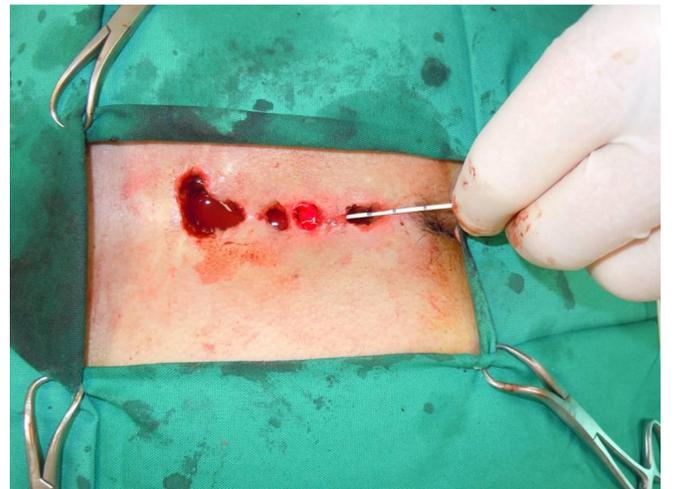


Figure 4. Insertion of the radial laser probe, 1470 nm, and delivery of energy throughout the surgical excision site.

RESULTS

Twenty one patients underwent LaPSe surgery for pilonidal disease. Mean operation time was 33,5 minutes. Mean energy delivered by laser probe was 786,4 joules. All patients had an uneventful recovery and were discharged within one hour after the operation. Physical inspection of the surgical site on the tenth post operative day was as expected for all the patients, with proper progression of healing. One patient reported mild discomfort in the first post operative day and received paracetamol 1000 mg pos. Another patient was examined on the thirty-fourth day for delayed healing of one excision site. The patient was given proper advice and with conservative measures, after fourteen days, a complete closure of the skin had been achieved (table 1). Follow up at three and six months was clear for all the patients, with no reported symptoms or signs of recurrence (figure 5).



Figure 5. A 20 year old male patient before and 30 days after the operation, with complete healing of the area.

DISCUSSION

Since the first report of PSD in 1833, there have been hundreds of published studies regarding the treatment of pilonidal disease. The reason for that is mainly the high rate of recurrence after surgical operation. In a recently published meta analysis, a total of 89583 patients were included, and the overall recurrence rate was 10,8 % at 60 months [9]. Disappointingly, the overall recurrence rate reached 60% at 240 months, thus justifying the many different surgical approaches proposed over the years.

On the contrary, the lowest recurrence rates can be seen in primary assumetric closure, such as Karydakis / Bascom and other flap techniques [10,11]. Common ground in all of them is the appliance of highly invasive surgical methods with an elongated postoperative healing period. Therefore surgeons usually choose to perform these techniques in complicated cases with multiple recurrences.

In this paper we propose a novel laser assisted surgical technique that combines the benefits of advanced laser technology along with minimally invasive surgical technique. The published laser treatments so far to our knowledge, use laser energy only to destroy the sinus track [8,12]. That is not effective to our opinion, because the sinus track is randomly expanding as the disease progresses, with narrow sections, that can't be reached by the laser probe or wide spaces that can't be burned adequately by laser beam, leading to high recurrence rates. Additionally, primary pits in the midline that are not active at the moment, stay intact, and

that is another reason for recurrence to our opinion.

LaPSe method overcomes these potential pitfalls. At the beginning of the operation we use radial laser energy to burn and shrink the accessible sinus tracks, making them more easily removable. After that we completely remove all the primary pits on the midline and associated sinus formations. If there is a blunt sinus end outside the natal cleft, we perform iatrogenic secondary pit entrance, in order to remove and burn more adequately the area. Furthermore, LaPSe method fulfils two basic technical parameters as stated by Karydakos and Bascom [13]. The first is the avoidance of extensive incisions in the midline and the second parameter is the rise of the natal cleft as we remove the sinus network underneath it. Finally, the use of the radial laser probe after sinus excision adequately destroys all the remnant sinus wall fragments that could be causes of possible recurrence.

Last but most important of all the advantages of LaPSe operation, is the fact

that it has a painless postoperative recovery, and the person returns back to his everyday practice, the same day. Furthermore, the preliminary results of the short duration follow up are more than promising. As the cohort increases we will soon have adequate follow up reports in one and two years, consequently.

CONCLUSIONS

In conclusion, LaPSe method is a new laser-assisted step wise approach in the treatment of pilonidal disease with very promising preliminary results regarding recurrence and high acceptance rates by the patients in terms of postoperative comfort and functionality.

Conflict of interest: The authors declare that they have no conflict of interest, they have full control of all primary data and they agree to allow the journal to review their data if requested.

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LaPSe method: μια νέα χειρουργική τεχνική με την υποβοήθηση laser για την θεραπεία της κύστης κόκκυγος

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ΠΕΡΙΛΗΨΗ

Η κύστη κόκκυγος είναι μια χρόνια φλεγμονή των μαλακών μορίων της ιεροκοκκυγικής χώρας που χαρακτηρίζεται από την ύπαρξη συριγγίων και κύστεων που συνήθως περιέχουν τρίχες. Είναι μία επίκτητη νόσος και προσβάλλει συνήθως νεαρούς άνδρες μεταξύ 15 και 30 ετών. Διάφορες χειρουργικές τεχνικές έχουν αναπτυχθεί για τη θεραπεία της νόσου σε μία προσπάθεια να μειωθούν τα υψηλά ποσοστά υποτροπής αλλά και να βελτιωθεί η μετεγχειρητική ποιότητα ζωής των ασθενών. Ιδιαίτερα δε τα τελευταία έτη, χρησιμοποιείται το νέας τεχνολογίας διοδικό laser με ίνα περιμετρικής εκπομπής 360 μοιρών χωρίς όμως να συνδυάζεται με χειρουργική αφαίρεση βλαβών, με αποτέλεσμα να υπάρχει αυξημένο ποσοστό υποτροπών. Η παρούσα μελέτη παρουσιάζει μία νέα μέθοδο υποβοηθούμενης με laser χειρουργικής θεραπείας της κύστης κόκκυγος (LaPSe method). Εικοσιένα ασθενείς υποβλήθηκαν στη συγκεκριμένη χειρουργική επέμβαση για κύστη κόκκυγος, από τον Ιανουάριο μέχρι τον Αύγουστο του 2018. Όλοι οι ασθενείς είχαν πλήρη επουλωση χωρίς σημεία ή συμπτώματα υποτροπής της νόσου, στους τρεις και έξι μήνες μετά την επέμβαση.



Λέξεις ευρητηρίου: κύστη κόκκυγος, laser, ελάχιστα επεμβατική χειρουργική



Παραπομπή

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