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Successful Treatment of Pilonidal Disease by Intense Pulsed Light Device

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Abstract

Background. Pilonidal disease is foreign body reactions accompanied by chronic inflammation that most commonly arises in the hair follicles of the natal cleft or other hair-bearing areas. Today, surgical intervention remains the treatment of choice. But surgical treatment is an invasive method with a high failure rate and recurrence.

Objectives. The authors' objective was to assess the efficacy of intense pulsed light (IPL) device on pilonidal disease.

Material and Methods. This case series study was carried out between 2008 and 2012 on patients with pilonidal sinus in Qazvin university of Iran. All patients received 6 session treatments with IPL hair removal with 4–6 weeks interval until most of the hair was removed. This was repeated 2.5 ± 0.3 years after treatment. In cases with acute phase pilonidal sinus histopathological examination was done.

Results. IPL hair removal procedure was performed on 30 patients with their ages ranging from 16 to 41 years, with a mean (SD) of 23.1 (6.2) years. In this study 13 patients were presented with acute and 6 patients were presented with chronic phase. 11 patients had a positive history of one surgical treatment and presented recurrences. The overall recurrence rate after IPL treatment in this study was seen in 4 (13.3%) patients. The histopathological examination of our study showed that the hair fragments create a foreign body type granulomatous inflammatory reaction. This process could be triggering factor of the disease.

Conclusions. IPL hair removal in affected area could be an alternative treatment to surgery or a choice treatment post surgery to decrease recurrence rate (*Adv Clin Exp Med* 2014, 23, 2, 277–282).

Key words: intense pulsed light, pilonidal disease.

Pilonidal disease is a foreign body reaction accompanied by chronic inflammation that most commonly arises in the hair follicles of the natal cleft or other hair bearing areas [1]. Usually in the last part of the second decade of life, after the onset of puberty, sex hormones affect the pilosebaceous glands, with the hair follicles becoming distended with keratin, and it is then that pilonidal sinus predominantly seen and is rare after the age of 40 years or before puberty [2]. Although the origin of the problem is unknown but the reports claim that genetic, hormonal stimulation of special sweat gland, obesity, personal hygiene and hirsutism are risk factors [3, 4]. The etiologic agent remains in question, as does the optimal

treatment and current accepted treatment options vary from traditional conservative treatments to aggressive surgery. The ideal therapy should be directed to treat the underlying etiological factor and would be a quick cure that allowed patients to return rapidly to normal activity, with minimal morbidity and a low risk of complications. Unfortunately, surgical treatment is an invasive method with a high failure rate and recurrence [5].

In recent years, reports of intense pulse light (IPL) in the pilonidal sinus have shown a beneficial effect by decreasing the risk of recurrent pilonidal sinus [6–8]. After a thorough review of the literature, the use of the IPL hair removal in

the treatment of pilonidal sinus has been limited. Therefore, the aim of this study is to investigate the efficacy of IPL device on pilonidal disease.

Methods

The research was performed on 30 patients with pilonidal sinus at the laser therapy clinic of Qazvin University of Medical Sciences, Iran, from May 2008 to May 2012.

The inclusion criteria were defined as patients with early acute phase, chronic course and recurrent symptom after at least one surgical treatment. Early acute phase involved patients with the onset of symptoms, usually pain and discharge. Occasionally a painless lump or swelling may be discovered by the patient while washing, or the characteristic midline pits may be found during a routine physical examination. Patients were classified as chronic if presenting chronic pain and discharge, often with a history of up to 2 years [1]. On examination, a single, or occasionally, multiple sinuses may be seen. Tufts of hair or other debris, such as clothing fibres, are often visibly found in the sinus. Localised oedema, swelling and inflammation may be present masking the underlying sinus. Recurrent pilonidal sinus was defined as reinfection in neighbouring hair follicles or chronic infection from entry of hair or debris into a postoperative wound. Patients who use photo sensitizer drugs like Tetracycline and Doxycycline,

are pregnant, or have acute pilonidal abscess (localised fluctuant swelling and painful) were excluded from the study. All patients signed an informed consent form. The study protocol was approved by the ethics committee of the university before its initiation and the protocols used conformed to the ethical guidelines of the 1975 Helsinki Declaration.

The affected area in 25 patients was the natal cleft and five female patients were sternal or intramammary area. All patients in this study had Fitzpatrick skin types as II–IV and were treated with IPL device (Ji-sys, South Korea) at a wavelength with 590 to 1100 nm filters and the following parameters 30 to 34 J/cm², 15 mms, and a 30 to 50 mms delay. The hair removal was done on affected area and extending 5 cm laterally (Fig. 1, 2). All patients received 6 session treatments with IPL epilation with 4–6 weeks interval until the removal of most (more than 80%) of the hair. In cases with acute phase pilonidal sinus histopathological examination was performed and antibiotics therapy was carried out for 1 week and in case of remission symptoms, the IPL epilation was done. The affected areas of all patients were evaluated after each treatment session of sign or symptom of recurrence and then once again this was done 2.5 ± 0.3 years after treatments.

Results

IPL hair removal procedure was performed on 30 patients with ages ranging from 16 to 41 years,



Fig. 1, 2. Clinical photographs in a patient who had a history of one surgical treatment with recurring pilonidal sinus before and 1 month after IPL treatment

with a mean (SD) of 23.1 (6.2) years. 13 patients (43.3%) in this study presented with an early acute phase and 6 patients (20%) presented with chronic course. Also 11 patients (36.6%) of all patients (2 male and 9 female) had at least a history of one surgical treatment and presented with recurrences. 10 patients (33.3%) had a positive family history of pilonidal disease.

The overall recurrence rate was seen in 4 (13.3%) patients. Of these 4 patients 1 patient had a relapse of folliculitis after one treatment session. This problem was resolved with antibiotics and the patient is presently well, with ongoing treatments. Also 1 patient had a positive history of surgery and 3 patients did not have any surgery treatments. These patients have received 2 to 5 additional treatments session. All patients had experienced partial to complete remission of symptoms in the treated area and none of them have required further surgical treatment and no side effects or complications were reported to date (Table 1 summarized the results of our study).

Our histopathological examination of excised lesions showed that the hair fragments create a foreign body type granulomatous inflammatory reaction with plentiful multi-nucleated giant cells that are surrounded by fibrous tissue with

lymphoplasmacytic infiltration. Of course in some cases, in sinus wall aspect, epidermal appendages including hair follicles were absent. In these conditions hair shafts present free and deep granulation or scar tissue without epithelial lining. Therefore, when our histopathological results are considered, the role of acquired triggering factor was very important (Fig. 3, 4).

Discussion

Pilonidal sinus was described for the first time by Mayo in 1833 [9]. The origin of pilonidal sinus has been a subject of interest for many years. In the 1950s, it was thought to be of congenital origin, involving the remnant of the medullary canal and the infolding of the surface epithelium or a faulty coalescence of the cutaneous covering in the early embryonic stage [2, 10] but now most authors believe that the condition results from a reaction to

Table 1. Baseline characteristics and outcome in patients with pilonidal sinus treated with the IPL epilation

Characteristic	No. of patients
Number of patients	30 cases (14 male and 16 female)
Age range [mean (standard deviation)]	16–41 years [23.1(6.0)] years
Number of patients presented with recurrent course after surgery	11 cases (9 male and 2 female)
Number of patients presented with early acute phase before IPL treatment	13 cases (4 male and 9 female)
Number of patients presented with chronic course before IPL treatment	6 cases (1 male and 5 female)
Number of patients presented with recurrent course after IPL treatment	case 1: after one treatment 4 patients case 2*: after 1.1 years case 3: after 2.3 years case 4: after 2.6 years * This patient had positive history of pilonidal surgery

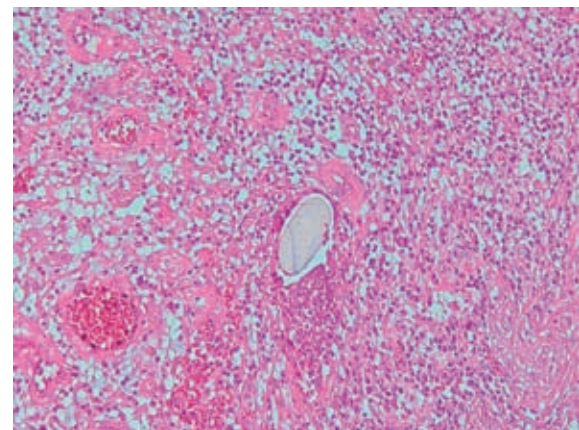


Fig. 3. Acute phase, Infiltration of inflammatory cells associated with the hair shaft Hematoxylin and eosin stain, X 100

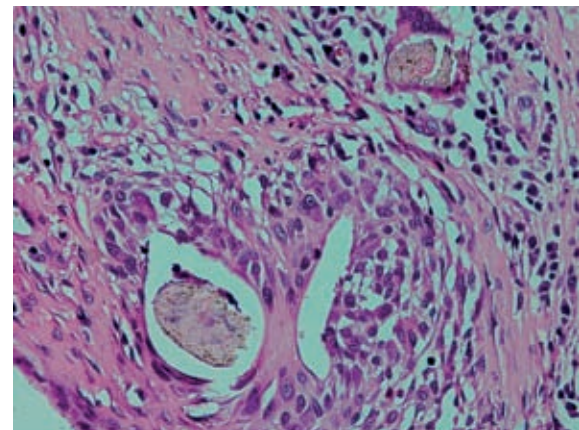


Fig. 4. Subacute phase, inflammatory reaction and foreign body granuloma Hematoxylin and eosin stain, X 400.

hairs embedded in the skin and that this is the triggering factor of the disease [2, 3, 10]. In our study we showed that the hair fragments create a foreign body type granulomatous inflammatory reaction. This process, attention to another study, can be performed, triggering the factors of the disease.

The clinical presentation of this disease varies from a fever or small dimple to a large painful abscess. Of course, the most common manifestation of acute pilonidal disease is a painful fluctuant mass in the sacrococcygeal region [11]. In this condition another differential diagnosis was considerably varied from an anal fistula, boils, carbuncles or infected sebaceous cysts to an ischiorectal abscess. Also, the sacrum osteomyelitis and tuberculosis, as an important condition, may be mistaken and must be kept in mind even if ruled out by radiologic studies.

Unfortunately, even after the abscess was resolved, either by itself or with antibiotics, many patients develop recurrent infections and an inflammation of the sinus tracts. The recurrent disease causes episodes of fistula formation, secretion, pain, drainage, terminal abscess [12, 13] and extremely rare complications with malignant transformations [14]. The main pathophysiology of these changes similar to Marjolin's ulcer, are chronic inflammation and resulting ominous processes of tissue damage and repair [15]. Therefore, some of the authors believe that for an accurate diagnosis and treatment in cases with recurrent pilonidal sinus, attention to bacteriological and pathological examination can help to exclude the special organism such as Actinomycosis or tumoral lesions, epithelial inclusion dermoid cysts, chordomas and teratomas [16, 17].

Today, surgery remains the treatment of choice. Different surgical techniques vary from excision with primary closure or open packing to excision with skin grafting and flap reconstruction [18–20]. Although the surgical treatment is associated with unsatisfactory results, including the risk of 1–2 weeks of significant pain [21], 2–10 days of hospitalization [12], 2–8 weeks of healing [12] and a 2 to 3 week of recovery period [22, 23], the recurrence rate is 30–40% after emergency surgery and 5–20% after chronic pilonidal sinus [24].

IPL systems deliver a band of wavelengths that are directed at the skin and may be selectively absorbed by melanin or water. Absorption of light by melanin may destroy the melanin directly and this method could be of use as an alternative treatment. Of course, IPL is to be viewed in contrast to monochromatic light emitted from lasers that are often considered as a cheaper alternative to lasers, although there are few studies that compare their treatment efficacy [25]. However, IPL systems are

less specific than lasers in their delivery of light energy to the required melanin. But this system may offer more flexibility than some lasers in the selection of pulse durations or in the ability to deliver trains of pulses that may limit thermal damage to the surrounding cutaneous tissue. The FDA approved this method for permanent hair reduction. In fact the IPL can create an optional thermolysis and is very effective in the hair of people with skin types I–IV Fitzpatrick.

The use of the IPL hair removal in the treatment of pilonidal disease has not been well studied. In a case report in 2006 [7] 5 patients with recurrent pilonidal sinus treated with either a diode laser or IPL. Results of this study showed 80% of patients do not have any recurrence period for 7 months to more than 36 months. One patient experienced a recurrence after 36 months, which was longer than his previous remission. These results suggest laser and IPL are alternative techniques to surgical intervention, as they may provide longer period intervals between disease and decrease recurrences. Also, to evaluate the effect of alexandrite laser and IPL hair removal in pilonidal disease, 6 men were treated with laser epilation in 2005 [26]. In this study most patients had a history of at least one surgical treatment in the area (natal cleft), and all patients had experienced recurrent symptoms for many years. An alexandrite laser was mostly used, although, occasionally, an IPL device was used. In conclusion, in this study, all patients had experienced complete remission and none of them had demonstrated complications or required surgical intervention.

In another novel study that was published in 2011 [27] to evaluate the efficacy of IPL hair removal after surgical intervention, 34 patients with recurrent pilonidal sinus were treated with IPL device for hair removal. In this study patients required from 3 to 8 IPL therapy sessions with 5 ± 1 weeks intervals. The mean follow up was 3.8 months. No major morbidity was reported. Improvement was achieved in all cases with progressive loss of hair in the intergluteal cleft. All patients were satisfied with no recurrence.

In our study we used the setting of IPL for epilation in patients with early acute, chronic and recurrent patients of pilonidal disease. As described in previous sentences, most studies on the use of IPL was performed on patients who have at least one surgical experience and then pilonidal sinus was recurrent. But in this study we used IPL epilation in patients with pilonidal sinus as a first line before surgery. The overall recurrence rate was 13.3% (4 patients) after a mean follow-up period of 2.5 ± 0.3 years in our study. All patients had partial to complete remission of the follicular

infection and none of them have required any further surgical intervention until this moment and no side effects were reported to date.

These results suggest that the IPL technique is an alternative treatment to traditional surgical intervention, in early acute, chronic and recurrent symptoms. These results suggest that decreasing hair in the area of pilonidal sinus reduces the rate of recurrence. Using an IPL for removal of surrounding hair with or after surgical excision of a pilonidal cyst represents a favorable alternative to surgical intervention alone. Because the etiology of pilonidal cysts appears to involve ingrown hairs and a nidus of bacterial overgrowth, effective treatment using laser and light sources may help prevent the initial pathology of the cysts. The likely mechanism of action is secondary to decreased inflammation in the setting of diminished

hair density. Ultimately, removal of hair by IPL in areas prone to cyst formation may obviate the need for surgical treatment and may make it possible to secondarily prevent pilonidal cysts from appearing.

In conclusion, the advantages of the IPL hair removal includes: safe, easy, quick, nearly painless, performed on the outpatient basis, done almost always without local anesthesia, simple to teach, cheaper than a laser and no long lasting morbidity. On the other hand, the surgical method in addition to cost, the side effects of anesthesia, long-term recovery and higher recurrence of disease will be formation deformed scar at the site and IPL epilation in affected area could be an alternative treatment to surgery or a choice post surgery treatment to decrease the recurrence rate in patients with sufficient compliance for multiple sessions.

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