When considering how to treat pilonidal sinus, physicians should keep in mind that this condition is more than merely a particular form of foreign body granuloma. The ideal method of treatment for pilonidal sinus should be the one having minimal postoperative morbidity, excellent cosmetic results, minimal tissue loss, rapid resumption of daily activities, low cost, and a low recurrence rate. However, although numerous operative and non-operative treatment methods have been described, no approach comprises all of these features. Numerous treatment options have been proposed for the pilonidal disease, including shaving, removal with open packing, incision and drainage, excision with primary closure, phenol application, cryosurgery, excision with marsupialization, and recently, flaps surgery.

The management of pilonidal sinus disease will depend on patient assessment, examination and history of the condition. A disease-specific history and physical examination should be performed, emphasizing symptoms, risk factors, and the presence of secondary infection.

Conservative therapy can fairly control pilonidal sinus disease in the office outpatient setting while assuring a near-normal work status and should be preferred over excisional operations at the outset.

Keywords: Pilonidal sinus, conservative, wound, healing, recurrence, hair removal.

INTRODUCTION

Pilonidal sinus disease is a chronic, common and disabling condition that predominantly affects the natal clefts of the buttocks. It is now accepted as an acquired disease that results from the penetration of shed hair shafts through the skin. The pathology occurs with an incidence of about twenty-six per 100,000 population and seems mostly in young males, with a (male: female) ratio of approximately 3 or 4:1. Although it affects mainly the most active portion of society, creating a considerable health and economic burden, the best disease management strategy for pilonidal sinus remains unclear. A variety of operations have been described: from minimal surgical methods including phenolization of the track, minimal excision or laying open, marsupialization and elliptical, medial or paramedial excision with primary closure, to specialized flap procedures like the rhomboid and rotation, amongst others.

The ideal management strategy should be simple with minimal tissue loss and a low recurrence rate. Nonetheless, a shorter hospital stay is warranted while the postoperative disability from active life should be minimal. It should also consider affordable cost and excellent cosmesis. That is the reason simple methods such as pit excision and the mechanical clearance of sinus, and various chemical treatments, have gained wider acceptance in the management of pilonidal sinus.

MR imaging can demonstrate the site and nature of sepsis in patients with pilonidal sinus with the same accuracy as that for fistula in ano. MR imaging can be performed by using a 1.0-T superconducting magnet and body coil, with patients in the supine position. For pilonidal sinus disease, MR imaging can give an approximate specificity of 100%, the sensitivity of 86%, a positive predictive value of 100%, and a negative predictive value of 93%. A natal cleft sepsis that reaches the subcutaneous tissues overlying the coccyx and sacrum, and the absence of intersphincteric sepsis or enteric opening, is suggestive of pilonidal sinus disease rather than fistula in ano.

The advent of echography in the diagnosis of this disease was reported providing some useful information using a 13 and 18 MHz linear probes and 20 MHz mechanical array. The latter is mainly used for the evaluation of fistulous cavities/passageways under the skin. Echo-
graphy has demonstrated pseudocystic formations but no real walls, with high levels of internal echoes, compared to the hair follicles, genuine macrocalcifications with one or more cavities or passageways near the skin, without internal vascularization. Echographic data can be rapidly obtained, and can prove useful for surgeons for better management of the patients.

A colorectal surgeon needs to know the dimensions, location, borders, and branches of the pilonidal sinus cavity to plan the operative strategy. Palpation of the suspected tract and methylene blue instillation are typically used to estimate the limits of diseased tissue. However, most operative findings do not match the actual borders. Evaluations with the utilization of a 7.5-MHz linear probe on a LOGIQ 5 pro-ultrasound scanner, and using power Doppler mode at times, has been found to be more accurate in identifying the sinus tract, branches, and its borders. This investigative method can be employed while deciding upon a surgical intervention for pilonidal sinus patients.

Other investigations like dermoscopy and fine needle aspiration cytology have also been found to be of some use in the diagnosis and management of the disease.

Conservative non-operative management

This is considered for patients without severe symptoms. For minor symptoms like intermittent pain and discharge, it is suggested that a conservative approach should be ideal. This includes regular bathing, shaving the surrounding skin, attempts to prevent the need for surgery and oral penicillin and metronidazole since both anaerobes and aerobes are present on the surface. Conservative therapy is very affordable because of transfer of treatment from the operating room/inpatient setting to the outpatient clinic. Asymptomatic pits do not require treatment.

Meticulous hair control by regular shaving of the natal cleft, removal of hair and scraping of granulation tissue from the sinus is a common practice. However, it needs significant time and an extended period to achieve results. The protocol requires patient education regarding the nature of the condition and the importance of perineal hygiene. Needless to say, simple lateral incision and drainage of acute abscess, meticulous hair control, and avoiding certain exercises such as sit-ups and leg lifts goes a long way in providing a symptom-free period to the patient.

Healing is indicated as an un-inflamed, non-draining natal cleft with shrinkage of the pits.

The role of shaving - Does shaving have a pivotal role in the management of pilonidal sinus disease? Yes, it does control a factor in the disease causation and progression. Hair has three likely pathophysiological roles: retained hair within a ruptured follicle, secondary invasion through an existing enlarged follicle, and mechanical irritation of pilonidal wounds. Hair in the later two roles maintains the adverse environment within the natal cleft. So a scrupulous hair control addresses these predominant roles and helps the patient to pay attention to his perineal hygiene. And in turn, may prevent follicular plugging with keratin.

Trimming, shaving, and plucking are the ways to get rid of the hair. However, many patients find this critical phase of treatment as clumsy, inconvenient and challenging.

Although simple, shaving requires the same attention to detail as any operation. Complete exposure and a good lighting of the natal cleft are essential to ensure complete shaving off all hair within the natal cleft, 5 cm from the anus to the pre and para sacral area. One should not miss even the thin and fine hairs. All the visible hair within the sinus should be picked up without attempting to probe and extract hair within the sinus. Performing the initial shave may need five or more minutes, but the subsequent shaves will take half of this time. The end points of shaving are the disappearance of patient symptoms and resolution of acute inflammation and discharge.

The shaving should be continued if the pits look drier and smaller at each shave. Patient education is critical for a successful outcome. Once educated, the patient can manage this maneuver well and can sense symptoms of recurrence when he resumes weekly shaving and improves his perineal hygiene. Family members can be easily trained to assist the patient in managing recurrence. The average patient requires three to four shavings per episode, with a range from two to eight.

Antibiotics

Bacterial colonization of these sinuses has categorically ranged from 50 to 70%, and typical isolates include Staphylococcus aureus and anaerobes such as Bacteroides. Anaerobes can be isolated in 52% at initial presentation and 64% in recurrent conditions. The utility of antibiotics has been studied in three discrete situations: perioperative prophylaxis, postoperative treatment, also, topical use. However, few randomized trials have not been able to demonstrate any significant improvement in wound healing with a course of antibiotics in an empirical form. Having previously shown an association between anaerobic infection and delay in healing of granulating wounds, studies have suggested that there is no role for empirical antibiotics in the conservative management of pilonidal disease and that antibiotics should be reserved for patients with clinical evidence of infection. Adjunctive use should be considered in the setting of severe cellulitis, underlying immuno-suppression, or comitant systemic illness.

EXPERIMENTAL TREATMENTS

These are considered for patients without severe symptoms. Looking at the diversified presentation of the disease, lack of unanimity towards a gold standard of treatment, varied results of the conventional approaches within different institutions, few experimental procedures have emerged in the management of this disease complex. While they have been used with some success in the experienced hands, they have been a disappointment for others. However, a fair trial of such treatment options
can be given as an attempt to prevent the need for surgery.

**Phenol**

Maurice and Greenwood first described phenol injection therapy (phenolization) in 1964. They suggested that it might supply a cure to the quiescent phase in the treatment of PSD. They suggested using phenol at 80% concentration or in its crystallized form, (The crystallized phenol turns into liquid form at body temperature and fill the sinus). This concentration of phenol solution or the crystallized form was observed to cause destruction in the pilonidal sinus cavities, together with narrowing of the lipoid tissue, sacral fascia and skin.

This method was chosen to avoid excision of the sinuses, and it was based on the destruction of the pathologic epithelium of the sinus. Pioneers of the method thought that if the epithelium of the tract could be destroyed, any infection present sterilized, and if all the embedded hair in the tracts removed, then the sinus should heal.

Phenol injection can be given on an inpatient or an outpatient basis. Ideally, the injection should be done at a quiescent phase, and a pre-injection course of a broad spectrum antibiotic may be useful in some cases. Most researchers advocating the use of phenol have reported a success rate between 59% and 95.1% in the first attempt, a recurrence rate of 6.3% to 17.1%. The median healing times was 6.2 to 8.7 weeks while workdays lost were reported as 8.3–11.6 days.

The procedure of phenol injection- The patient is placed in a prone jack knife position. After shaving off the sacral area, the buttocks are held apart with 7-5 cm strapping to expose the sacral area and anal verge. The skin of the area is cleansed with an antiseptic solution and then dried and toweled up in the usual manner. The skin around the sinus is protected by liberal smearing of Vaseline while protecting the anus with Vaseline gauze. By a gentle probing, any loose hairs present are removed with forceps from the sinus and the side tracts. The main sinus tract is then injected with a solution of 80% phenol using a blunt nosed needle, which can fit, into the sinus opening snugly or by introducing an infant feeding tube in the tract. The solution is then injected in the tract gently and taking care to avoid phenol being transfused into the tissue surrounding the sinus and causing a local inflammatory reaction (Fig.1).

The injection is stopped when phenol is seen coming from any of the openings and any excess is quickly wiped away. The solution is made to remain in the tract for one minute, after which firm pressure is applied around the sinus tract to express the phenol and to bring out loose hairs to the surface, which can be picked out. The whole procedure is repeated for two times while at each time allowing the phenol in place for one minute, thereby giving a total exposure time of three minutes. The whole tract is then washed out with saline and curedt. Vaseline gauze and a light dressing are applied to the injected area. The patients are instructed to have frequent baths. Strict hygiene of the area is emphasized during the healing period. After the sinuses have healed, it is advisable to wash the natal cleft after defecation rather than using toilet paper. Particular care must be taken to dust off the loose hairs, particularly after a visit to the barber.

Another study has found even better results using 40% phenol solution on an outpatient basis.

The most common postoperative complications after phenol treatment are sterile abscesses and fat and skin necrosis which have been reported in about 7–16% of patients and is ascribed to leakage of phenol into the surrounding tissues either due to too much pressure at the time of injection, or due to opening up of a false tract during preliminary probing.

Gips et al. reported another minimal surgical treatment for the pilonidal disease. They used trephines for the excision of sinus tracts and bone curette and hydrogen peroxide for cleaning and debridement. Phenol application is less invasive than this method because there is no need for any tissue excision and cavity debridement with a curette, which is chemically done by crystallized phenol.
Use of Polyphenols- Humic substances or natural polyphenols are natural liquid biopolymers, which are the by-products of soil organic matter degradation and are present in the environment. Humic substances have been in use in balneotherapy for a long time, and a similar hypothesis has been applied to use polyphenols in the treatment of pilonidal sinus disease.

Polyphenols are known to remove microorganisms located in the wound bed. They can cover and fill infected cavities, which in turn prevent atmospheric oxygen from reaching the microorganisms. Polyphenols can also prevent the microorganisms from using oxygen present in blood and neighboring tissues produced due to their anti-oxidant actions.

Polyphenols have been claimed to increase the chemotaxis of phagocytes to the diseased area. Additionally they can enhance the capacity of granulocytes to engulf bacteria. Polyphenols also increase the activities of lysosomal enzymes that are transferred into the phagosomes and lyse bacteria. Polyphenols are known to promote wound healing also.

Polyphenols have been proposed to promote cytokine, interferon and tumor necrosis factor alpha (TNF-α) synthesis for faster healing. This in turn exerts anti-inflammatory actions and causes the wound healing process to proceed better. Theoretically, healthy fibrin formation and collagen synthesis result in better wound healing and consequently in better healing of the sinuses.

Taking into consideration all the above factors, Sodium humate 25% was used as the source of polyphenol in one study. Three polyphenol product forms (Pilonol®) were used altogether to achieve best results.

The area under treatment was first depilated and a teaspoon full of Pilonol solution was poured onto the affected region and was massaged for two to three minutes at bedtime and was covered with a gauze which was left in place until next morning when the previous application was washed out by the Pilonol gel®. This was followed by application of Pilonol cream®. The treatment was continued till complete healing was achieved. Following the treatment, patients were advised to obey general personal hygiene rules, to have frequent baths while keeping the sacrococcygeal region depilated for at least one year. The study claimed a fair outcome of this conservative treatment for pilonidal sinus.

The primary disadvantage of topical polyphenol treatment is the need for regular applications for a long time, which look to be cumbersome and unbearable to many of the patients. Few patients also experienced local reactions in the form of irritation, erythema, burning and ach- ing sensation.

Laser epilation- As it is known that the hair follicles are involved with recurrent bacterial infection in pilonidal sinus disease; various methods of hair removal with different light sources have emerged. Similarly, a pilonidal sinus usually contains hair and extensive vascularization due to inflammation, which theoretically gives the laser waves the efficacy to destroy the deep fistula systems of the sinus without affecting the overlying skin.

It was postulated that permanent destruction of the hair follicles of a certain area could be achieved by transmitting heat to the target hair. Progressive hair damage is possible to achieve using laser treatments, resulting in hair reduction for years of follow-up. In one study, patients were treated with laser epilation using an alexandrite laser (GentLeLase, Candela, Wayland, MA, USA) or with an intense pulsed light device (Epilight, Lumenis, Santa Clara, CA, USA). Hairs were removed in the area of about 4 to 5 cm around the affected area. Treatments were performed at 6- to 8-week intervals for the first three to four sittings and then at every 8 to 16 weeks until remission of infection and removal of most of the hair were achieved. It is also claimed that in patients with recurrent folliculitis, natal cleft laser hair removal resolved the folliculitis and prevented future surgery.

The laser treatment is, however, not cost effective and has not been favored by many because of the lengthy duration involved (Fig.2).
Thread dragging and pad pressure therapy- This is one of the traditional Chinese medicine therapy used for complex fistulas and sinuses. In this procedure, the sinus tract is curetted free of all the debris and hairs. Ten threads are inserted from one end of the sinus tract to emerge from the other and tied. Each day, the part of the threads lying within the tract are pulled out side and cleaned with saline until the size of the wound is reduced and dragging of the thread becomes difficult. Five of the threads are then removed and remaining five are left behind until the wound is reduced further and no more discharge is found (Fig.3). This is followed by application of a pad over the wound with a pressure strapping to accelerate wound healing. This procedure was claimed to have a successful outcome.

Though suture-dragging therapy is less invasive, the sacrum wound cavity healing poses a considerable challenge. It has been shown that either the positive or the negative pressures have been proved to accelerate the wound healing by increasing local blood flow and the rate of granulation tissue formation. Recently, vacuum assisted closure technique has been used by plastic surgeons to accelerate the healing of such chronic or complicated wounds. The VAC is a device which consists of a foam pad while moulds to the internal shape of the wound which is inserted along with a fenestrated plastic tube applied to the center and connected to a vacuum device.

Fibrin glue- In the recent time, treatment of an epithelialized track like the fistula-in-ano has been obliterated with a reasonable success using fibrin tissue glue. The advantage of using fibrin glue to treat fistula-in-ano is that healing of the tract can be achieved without excision of a substantial amount of tissue and disruption to the sphincter complex. Fibrin glue has been proposed as an adjunct to reduce postoperative infection in primary wound closure after wide excision of the pilonidal sinus complex.

In one of the pilot study, plugging the sinus tract with fibrin glue was performed as the sole treatment for pilonidal sinus. The pilonidal pits were identified under general anesthesia, and all the debris were removed from the pits. The sinus tracks were thoroughly curetted or brushed through the midline pits with a small Volk-mann’s spoon or cytology brush to remove the epithelium of the sinus. The pits were then injected with fibrin glue (Tisseel®, Baxter Healthcare Ltd, Newbury, UK). One to two ml of glue was injected into the sinus tracts to occlude as much of the sinus complex as possible (Fig.4). This was done as an outpatient treatment with a regular follow-up. Five of the six patients treated with this technique had their sinuses healed.

However, this procedure is suggested as the first-line treatment of patients who have no history of infection and having only one sinus.

Endoscopic pilonidal sinus treatment

Recently, a new video-assisted minimally invasive technique using a fistuloscope has been proposed. The outer opening is excised, and the fistuloscope is introduced through the small hole. By directly visualizing the anatomy of the tract, all the hair and debris can be removed which is followed by ablation of the offending tissue under direct vision (Fig.5). No significant complications have been reported with the advantage of less pain and no recurrence in the first six months of therapy. The aesthetic results too were better than conventional procedures. In a pilot project, the tract after ablation through fistuloscope was obliterated with a bioprothetic plug to achieve better results. Four patients, which were analyzed by this additional maneuver, were successfully
treated achieving complete healing in all cases. There were no reports of infection or recurrence during a limited follow-up.

CONCLUSIONS

Conservative treatments for the pilonidal disease have gained popularity because of the high morbidity associated with the surgical procedures of pilonidal disease. Conservative non-operative treatment for this disease constitutes meticulous hair control by shaving the natal cleft, better perineal hygiene; various experimental procedures described above and at times, limited lateral incision and drainage of acute abscesses. Implementation of the conservative treatment strategy has resulted in a substantial decrease in the admission rates of pilonidal disease patients in the hospitals.

The efficacy and failure rate varies between institutions and the surgeons, and the most optimal type of conservative treatment is required to be tailored to suit the individual patient.

A proportion of patients who are not suitable for conservative measures or who have the severe, worsening, or recurrent disease should be offered a surgical reconstructive procedure by a surgeon familiar with these techniques.

SUMMARY

NEHIRURŠKI TRETMAN PILONIDALNOG SINUSA

Kada se razmišlja o tretmanu pilonidalnog sinusa, lekari treba da imaju na umu da ova bolest nije samo poseban oblik granuloma oko stranog tela. Idealan metod lečenja podrazumeva bi minimalan postoperativni morbidity, odličan kozmetski rezultat, minimalni gubitak tkiva, brzi povratak dnevnim aktivnostima, nisku cenu i nisku stopu recidiva. Međutim, brojne djela sada opisane metode operativnog i neoperativnog lečenja ovog obojenja ne ispunjavaju sve ove uslove u potpunosti. Predlažu se brojne metode lečenja, uključujući bijanje, eksziciju sa timponadom rane, inciziju i drenažu, eksziciju sa primarnom suturom, aplikacijom fenola, krioahirurgiju, eksziciju sa marsupijalizacijom i na kraju, hirurški tretman uz rekonstrukciju rane pomoću režnjeva. Strategija lečenja pilonidalnog sinusa zavisi od stanja pacijenta, trajanja tsegoba i fizikalnog pregleda. Treba detaljno uzeti anamnezu i obaviti specifičan fizikalni pregled bolesnika sa akcentom na simptomatologiju, faktore rizika i prisustvo sekundarne infekcije. Konzervativnom terapijom, ambulantno, može se prilično kontrolisati pilonidalna bolest uz osiguranje skoro normalnog radnog statusa i trebalo bi dati prednost ovoj metodi u odnosu na ekszicione operacije na samom početku bolesti

Ključne reči: Pilonidalni sinus, konzervativno, rana, curenje, recidiv.

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