

A Literature Review on Pilonidal Sinus Disease

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ABSTRACT

Pilonidal sinus disease occurs in the sacrococcygeal region and it is an infection of the skin and subcutaneous tissue. The disease is characterized by natal cleft suppurative due to hair follicles infection. The disease becomes chronic subsequent formation of a subcutaneous abscess occurs because of persistent folliculitis. Hair thus enters the abscess cavity and provokes a foreign body tissue reaction and discharge through a midline sinus follow. The disease usually occurs in puberty stage to the early 30's, especially in males. This review aims to present the historical background, epidemiology, etiology, followed by treatment modalities, both conservative as well as surgical methods are focused.

KEY WORDS: Pilonidal sinus disease, abscess, subcutaneous, puberty, infection, folliculitis

I. HISTORICAL BACKGROUND

Pilonidal sinus (PNS) disease is a congenital condition from where the word pilonidal is derived from the term Latin "pilus" means hair and "nidal" means nest, means a small hole or tunnel in the subcutaneous tissue with a tuft of hair embedded in granulation tissue which communicates with the skin surface by a track lined usually by squamous epithelium which is continuous with the epidermis [1].

The term was first officially described by Abraham Wendell Anderson in 1847 in the form of a letter written to the editor of the Boston Medical and Surgical Journal [1]. The term was first used by Richard Manning Hodges in 1880, when he appeared before the Boston society for medical improvement [2]. Herbert Mayo was the first to describe a disease that involved a hair-filled cyst at the base of the coccyx in 1833 [3]. At the time of World War II, the condition was widespread and was termed as "Jeep seat" and "Jeep riders", which was described by Louis Buie in 1944. A large number of people who rode in jeeps and bumpy vehicles led to irritation and pressure on the coccyx which caused this condition [4].

This condition is presented in the form of acquired chronic infection of the natal cleft skin and subcutaneous tissue that manifests acutely or with intermittent symptoms over several years. A PNS is a condition that is common among men and in young adults. Pilonidal sinus disease is a disease of young people, usually men, which can result in an abscess, draining sinus tracts, and moderate debility for some [5]. The aim of this article explains the etiological factors, epidemiology and management of the disease, both conservative and surgical.

II. EPIDEMIOLOGY

Pilonidal sinus affects 0.7% of the population approximately [6]. Over the past 50 years, the incidence of PNS has been gradually increased [7,8]. Earlier in a Norwegian study the disease was reported with an incidence rate of 26 per 100,000 population in U.S [9] and 48 per 100,000 in Germany [10]. This condition typically affects the teenagers to young adults up to the 3rd decade, among Caucasians due to hair characteristics and growth patterns [9,11,12]. The prevalence is at least twice as frequent in men as in women, usually presenting between 21 years in male and 19 years in female; the disease occurs exceptionally before puberty or after 60 [9,13,14].

Therefore, pilonidal disease represents a significant disease burden, affecting people in their most productive years with huge socioeconomic implications. The socio-economic burden associated with the disease is substantially high, as it is affecting young males and having a considerable time off normal activities following surgery, together with its significant recurrence rate [15].

III. ETIOLOGY

Pilonidal sinus disease is considered to be of congenital in origin, but studies first conducted by Patey and Scarffs in 1946 revealed PNS as an acquired aetiology, suggesting that pilonidal sinus disease results from the suction of hair from

surrounding soft tissue and skin, ultimately leading to a foreign body reaction and foreign body granuloma [16,17,18]. They firstly recognized that sacrococcygeal PNS is most common in young adults when they experience hair growth in puberty stage. Secondly, they identified that, occupation plays a major role with reports of occurrences between the fingers of sheep shearers, dog groomers and barbers [19]. Obesity, positive family history, hirsute body character, local irritation or trauma and a sedentary life style are some of the risk factors [9,16].

Moreover, two main acquired theories were considered: the follicle theory of Bascom that postulated that pilonidal disease as originating from a stretched midline hair follicle of the epidermal skin layer are a result of follicle occlusion, inflammation and rupture, where after hairs are able to intrude into enlarged pits, advising against resecting deep tissue during surgery [11,18]; and the penetrating theory of Karydakis and Stelzner described the etiology by considering three main factors- the loose hair or foreign body (H), applies some force causing deposition of hair into the sinus (F) and the third factor is skin vulnerability, refers to the local tissue susceptibility. This was incorporated in a mathematic model following review of over 6000 patients [17,20].

Pilonidal Disease = Hair (H) × Force (F) × Vulnerability (V)

Karydakis reported loose hairs, burrowing into otherwise normal tissue, inducing a foreign body reaction leading to secondary pits and cyst formation [21].

IV. TREATMENT

Treatment is broadly divided into two categories: conservative and surgical techniques. Conservative measures are generally performed under local anesthesia, whereas excision most often requires locoregional or general anesthesia [22,23]. Conservative techniques are more preferred to excision because they are simple to perform and avoid surgical excision.

Conservative treatment

Phenol treatment

This primary non-operative treatment of pilonidal disease with phenol was first proposed by Maurice and Greenwood in 1964, as it has sclerosing properties [24]. Nitrofurantoin was applied to protect the surrounding tissue, before applying phenol to the opening sinus [25]. It has

been used in liquid and crystallized forms. After making cutaneous orifices the phenol is left in place for 1 to 3 minutes, then aspirated, the remaining debris are removed by compression of adjacent tissues and finally the sinus is rinsed with saline. It is advocated to inject two or three times, and hence the skin must be protected from burns [26]. Benefits of phenol application decreased time to complete wound healing, less operative procedure time, time to resume daily activities; and, visual analog pain scores and analgesic use and overall success rate of 67% [27]. Drawbacks include a higher risk of treatment failure with a history of abscess drainage, greater than three sinus openings and 8.3% recurrence rate using 80% phenol on a study of 143 patients; the volume of the sinus tract and the number of sinus orifices were risk factors affecting recurrence [28,29].

Laser Depilation

In most cases, laser therapy is an adjunct to surgery and concluded laser hair removal after surgery decreased the overall recurrence rate of 0-28% [30]. Laser depilation should be routinely offered to all patients suffering from pilonidal disease. Studies have authenticated that the effectiveness and safety of laser epilation, which requires multiple treatment [31,32]. Pain was the most frequent side effect [33]. Laser hair removal often requires multiple treatments. Some hair removal products may be irritating to the anal mucosa or cause rashes [34,35].

Fibrin Glue and Thrombin rich products

Both have also been used for the treatment of pilonidal disease, either as a primary treatment or as adjuncts to surgical techniques. Fibrin glue as a treatment for pilonidal sinus disease has been reported as an alternative to conventional surgery. In a clinical service evaluation, fibrin glue in addition to surgical excision, obliterates the dead space and 75% of patients (45/57) were satisfied with their treatment and 45% (31/57) had returned to normal activities within a week [36,37].

A review study determined that the effectiveness of fibrin glue, alone as monotherapy or as a surgical adjunct, was uncertain [38]. Fibrin glue as an adjunct to the Limberg flap may reduce healing time, postoperative pain, and time to return to normal activities but with a possible incidence of postoperative seroma. The authors concluded that the evidence is uncertain and the 4 RCTs identified had small numbers and were at risk of bias resulting in low-quality evidence for outcomes of

time to healing and adverse events. Future well-conducted studies may be warranted to further assess the role of fibrin glue.

Platelet rich plasma (PRP):

Another recent non-operative method was the administration of PRP which contains concentrated growth factors. Concentrated growth factors have been reported to accelerate wound healing process and regenerative factors [39].

Surgical treatment

Simple incision and drainage are the two effective surgical management techniques for pilonidal disease. However, surgical management of chronic and recurrent disease are uncertain. No single procedure is superior to the complexity of treating this disease when compared with the number and variety of published techniques [40]. Because of the lack of control groups or short-term follow-up most of the studies are weighed down, even though some of the studies have been put forward insisting one excisional treatment over other. In addition, recurrent pilonidal sinus disease after operative intervention presents a difficult challenge with long-term recurrence rates between 10 and 30% reported [41-43]. Recurrence can occur in two forms: Early and late. The cause of early recurrence is due to failure to identify one or more sinuses at operation, whereas secondary infection, residual hair or debris not removed at operation, inadequate wound care or insufficient attention to depilation are the reasons for late occurrence [44]. The main surgical methods are classified into one of four categories:

- Incision and drainage
- Wide excision and healing by secondary intention
- Excision and primary closure
- Excision with reconstructive flap techniques.

Incision and drainage:

This is a simple procedure, where by in the abscess just off the midline, an elliptical incision is made. The opening of the wound should be sufficient to allow packing of the entire wound cavity. Curettage to remove dead or infected tissue in the wound improves the rate of healing, with 90% completely healed at one month, compared to just 58% healed at 10 weeks in the absence of curettage [45].

Healing by secondary intention has the advantage of allowing free drainage of infected material and debris. However, the patient will require regular wound care and the discomfort of

packing until the wound has closed. In a retrospective study mean number of days off work following incision and drainage was 20[46].

However, after complete healing about 10–15% will have abscess recurrence. In single incision and drainage procedure, 40–60% will go on to develop a PNS requiring further surgery. Pits or sinuses can be excised as part of the initial incision and drainage procedure, but these can be obscured by oedema and are often overlooked [21]. The recurrence rate can be reduced to 15% if a second procedure to excise pits and sinuses is performed after five to seven days (11).

Wide excision and healing by secondary intention

An elliptical wedge of skin and subcutaneous tissue down to the pre-sacral fascia, a wide excision is made and designed to remove all the hairdebris and the tissue those are inflamed allowing the wound to granulate from its base [47]. The excised dimensions should be of sufficient width at both the opening and base of the wound to allow packing which make it easy. The base itself should be relatively flat and comparable in size to the opening of the wound. A narrow V-shaped wound without a flat base is more difficult to pack and has the tendency to bridging and subsequent infection. The procedure necessitates general anesthesia and hospital stay for a one or two days postoperatively. The principal advantage is low recurrence rate but the disadvantages are a lengthy healing time (8–10 weeks) and high direct and indirect costs associated with inpatient care, follow-up wound care and days lost from work [48].

A modification of the standard excision is 'marsupialization', which has been shown to have a better outcome. The main objective is to reduce the effective wound healing area thus reducing the healing time. The skin edges are sutured to the sides of the wound, but they are not excised. The mean healing time in patients who underwent this procedure was shown to be four weeks with a recurrence rate of less than 13% [49].

Excision and primary closure

When compared to healing by secondary intention, closure of the wound is more acceptable cosmetically and is of short healing time and time off work [50-52]. It needs one-week bed rest with [53], recurrence rate 18% [54]. However, this benefit may be offset by potential higher risk of recurrence and wound infection [52]. In a

prospective randomized trial failure of primary healing was significantly associated with early recurrence of disease [55], whereas in the same study the use of preoperative antibiotics did not influence the recurrence rate. Furthermore, when an infection occurs, the wound must be laid open and healing time is longer than if the wound had been treated by secondary intention initially. Interestingly, healing by secondary intention had a higher recurrence rate which indicates that patients with long term follow up may favour primary closure.

Excision with reconstructive flaps

These procedures are usually performed by a plastic surgeon and are more technically demanding and their use is generally restricted to recurrent pilonidal disease. This is because in order to overcome the hazards with the healthy tissue followed by the removal of diseased tissue (16). Moreover, the theory behind these procedures aim to flatten the natal cleft to reduce friction and reduce local warmth, moisture and hair accumulation.

In 1987 John Bascoms method (Cleft-Lift), he put forward a method to incise, drain and curette abscess through a lateral incision combined with excision of midline pits and a small amount of surrounding tissue (11). A section of the abscess cavity wall opposite the incision, is raised as a flap to close the defect between the midline pits and the abscess cavity. This is accomplished by suturing the flap to the underside of the skin bridge formed between the incision and the midline

In 1973 George Karydakakis technique, he put forward a method of raising a flap to overlap the midline with the scar sited to one side to reduce postoperative hair entry(21).It was found that a reduced meantime of wound healing, return to work, rate of wound complications and recurrence were all significantly undergoing the Karydakakis flap, but a prolonged operative time; pain was more on the first operative day, but was significantly reduced after one week[56].

Apart from the above-mentioned rhomboid /Limberg flaps were used which has a decreased recurrence rates and hospital stay, time to perform was longer and improved wound healing [57]. Alternatively, two local advancement flaps can also be used; Z-plasty flap uses both skin and muscle to close the defect following excision [58] and V-Y flap can be used unilaterally or bilaterally and serves to eliminate the gluteal cleft (16). These

techniques require general anaesthesia and have a good long-term outcome.

V. CONCLUSION

PNS is a severe inflammatory condition, most common in young aged adults by the formation of abscess in the cleft of sacrococcygeal area, which is filled with hair debris and dirt, followed by an infection, severe pain arises with the oozing of pus and blood. Individuals more prone to this disease are those who have a sedentary life style, obese, hirsute, local irritation, poor hygiene, heredity and hyperhidrosis.

Even though conservative treatment is less time consuming, frequent repetition, increased recurrence rate and risk of cellulitis or abscess formation, which led to surgical methods. Surgical management should be done under a surgeon having up-to-date evidences and interest upon this disease. Apart from all the treatment modalities, certain principles for wound healing along with patient education plays a key role. The outcomes vary with different surgical treatment and so no surgical procedures satisfies all requirement for an ideal treatment plan. Therefore, long-term follow-up is one of the important factors in managing PNS as the recurrence followed by surgery is increased.

Hence incision and drainage are recommended for PNS, and excision and healing by secondary intention are the optimal methods for treatment which has low recurrence rate, but more healing time and absence of work for most chronic abscess.

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