

The treatment of pilonidal disease: guidelines of the Italian Society of Colorectal Surgery (SICCR)

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Abstract The Italian Society of Colorectal Surgery (SICCR) has prepared clinical practice guidelines to help its members to optimize the treatment of pilonidal disease, a very common condition, especially among young people, and therefore of great importance on a socioeconomic level. The SICCR committee of experts on pilonidal disease analyzed the international literature and evaluated current evidence. Nonoperative management includes gluteal cleft shaving, laser epilation as well as fibrin glue and phenol injection: reported healing rates and recurrence incidence are satisfactory but the majority of studies are small series with low-quality evidence. Surgical therapy which can be divided into two categories: excision of diseased tissue with primary closure using different techniques or excision with healing by secondary intention. On the whole, no clear benefit is demonstrated for one technique over the other.

Keywords Pilonidal disease · Pilonidal sinus · Pilonidal cyst · Pilonidal abscess · Recurrence · Gluteal cleft

Introduction

The Italian Society of Colorectal surgery (SICCR) with the purpose of ensuring the highest treatment standards according to current evidence available in the literature, instructed a committee of experts to draft clinical practice guidelines on the treatment of pilonidal disease, a condition of great socioeconomic impact.

This pathology, which is widespread, especially among young adults, has an estimated incidence of about 26 cases out of 100,000 [1] and affects males twice as often as females. Onset in individuals over 30 is rare [2].

Originally described in the early 1800s, it was during the Second World War that “pilonidal disease” became a common term as it was the cause of about 80,000 hospitalizations among soldiers, earning the nickname of “jeep rider’s disease” [3, 4].

The etiology of pilonidal disease remains a controversial issue. Initially a congenital origin was the main hypothesis, whereas the latest evidence is in favor of an acquired cause, due to the obstruction of hair follicles in the natal cleft [5].

Many studies have identified the following risk factors: male gender, obesity, sitting for long periods of time, repetitive trauma to the sacrococcygeal region, excess body hair and poor hygiene [6, 7].

Other factors, such as body mass index, cigarette smoking and the lack of preoperative antibiotic prophylaxis have been associated with an increased rate of postoperative complications [6–8].

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Methods

The authors have updated the Clinical Practice Guidelines of the American Society of Colon and Rectal Surgeons (ASCRS) [9] with an analysis of the literature up to December 2011. A search of MEDLINE, PubMed, Embase and Cochrane Database, from January 2012 to May 2015, was performed using the following keywords: pilonidal disease, pilonidal sinus, pilonidal cyst, pilonidal abscess, recurrence, gluteal cleft, natal cleft. Grades of recommendation were adapted from those published on Chest in 2006 by Guyatt et al. [10].

Evaluation and diagnosis

Patients with pilonidal sinus often present with severe pain and swelling in the sacrococcygeal area associated with an abscess with or without secretion of pus from one or more pits on the natal cleft. They may complain of a persistent secretion, often painful, from a chronic sinus fistula.

Whatever the presentation may be, the painful nature of the condition causes significant morbidity and, although many patients tolerate the symptoms for a long period before seeking treatment, they often miss many days of work or school [11]. Initial evaluation is based on the patient's medical history, focusing on risk factors for pilonidal disease and symptoms associated with the sacrococcygeal region. A careful assessment of the perineum is fundamental together with an anoscopy in order to exclude the presence of anal fistulas and other conditions such as Crohn's disease, hidradenitis suppurativa and infectious processes such as tuberculosis, syphilis and actinomycosis. Usually no further radiological or laboratory investigation is needed [12].

Nonoperative management

1. *If there is no abscess, gluteal cleft shaving may be used as a primary or adjunct treatment measure.*

Grade of recommendation: 1C.

Shaving along the intergluteal fold and surrounding region can be used as a first-choice treatment in cases without abscess or as a standard component of the postoperative treatment in order to prevent recurrence. It has been shown to obtain a reduction in the length of hospital stay and the number of surgical procedures [9–14].

Good results are also obtained with laser epilation [15].

2. *Phenol and fibrin glue injection might be used in select patients with chronic pilonidal disease.*

Grade of recommendation: 2C.

Phenol injections in single or multiple applications can be performed under local anesthesia in outpatient clinics with minimal discomfort and disability. Success rates vary from 60 to 95 % [16].

The application of fibrin glue can be considered as the first-line treatment in patients with chronic disease, after curettage of fistula tracts or of the cavity left after removal, achieving a high degree of patient satisfaction and an early return to normal activities [17].

3. *Antibiotics have a limited role in both chronic and acute disease. Their use does not improve either cure or recurrence rates but is advisable in patients who are immunosuppressed, have severe cellulitis or have important concomitant systemic diseases.*

Grade of recommendation: 1C.

The use of antibiotics has been evaluated in three situations: perioperative prophylaxis, postoperative treatment and topical use.

When used for perioperative prophylaxis, Sondenaa et al. [18, 19] did not highlight significant differences in infection and healing rates between the use and non-use of single dose i.v. cephalosporin in primary closure procedures. The administration of postoperative systemic antibiotics has been shown to have variable results: one study compared the use of clindamycin for 2 weeks with controls in primary closure procedures without showing any difference in healing rates [20], while another study showed a moderately shorter healing time using metronidazole for 14 days after open procedures [21].

A systematic review of the literature [22], with 1172 enrolled patients, showed no difference in healing time when single-dose prophylaxis was compared to no prophylaxis or to a long course of antibiotics.

Concerning the use of topical antibiotics there are limited and conflicting data: one study reports encouraging results by “packing with an absorbable gentamicin-impregnated collagen-based sponge” with significant healing rates (86 vs 35 %) compared to controls after surgery for chronic disease or acute abscess drainage [23]. Adversely, no benefit was reported when gentamicin collagen sponges or gentamicin-soaked sponges were employed [22–25].

Operative management

1. *Pilonidal abscess should be treated with incision and drainage regardless of whether it is a primary or recurrent episode. Lateral incision can shorten healing time.*

Grade of recommendation: 1B.

For a pilonidal abscess with or without associated cellulitis, the mainstay of treatment is adequate surgical

drainage [9]. Up to 42 % of patients fail to heal after simple incision and drainage, and for those healing initially, surgical treatment eventually becomes necessary in 15–40 % [16, 26]. Definitive treatment of abscesses by excision and primary closure plus antibiotics leads to initial failure in 30 % and recurrence in a further 30 % [27]. In a randomized controlled trial (RCT) of patients undergoing incision and drainage with or without curettage of the abscess cavity and removal of the inflammatory debris, curettage was associated with significantly greater complete healing at 10 weeks (96 vs 79 %, $p = 0.001$), and a lower incidence of recurrence up to 65 months postoperatively (10 vs 54 %, $p < 0.001$) [9, 28]. Matter et al. [29] compared drainage alone with excision for acute abscess. Recurrence rates were 55 and 41 %, respectively, but time off work was halved in the drainage-alone group. In a retrospective pilot study, Webb et al. [30] suggested that abscesses drained with a lateral incision heal much earlier than those drained in the midline (difference of mean 26 days and median 24 days; $p = 0.02$).

2. *No clear benefit has been shown for open healing over surgical closure. When closure of pilonidal sinuses is the desired surgical option, off-midline closure should be the standard management. Drain use should be individualized.*

Grade of recommendation: 1B.

The surgical treatment of chronic pilonidal disease is generally divided into two categories: excision of diseased tissue with primary closure (including various modifications and flap techniques) versus excision with a form of healing by secondary intention (including marsupialization) [9, 31]. The 2010 Cochrane systematic review [11] included all RCTs comparing open with closed surgical treatment for pilonidal sinus published between 1985 and 2009. Seventeen studies compared open-wound healing with surgical closure: the authors concluded that no clear benefit was shown for one technique over another. There were significantly longer healing times for open groups (range: 41–91 days) versus primary closure (range: 10–27 days). Surgical site infection rates did not differ between treatments. However, when midline closure was compared with off-midline, a significant difference was found in favor of off-midline closure [32]. Open healing was associated with a significantly lower recurrence rate than primary surgical closure, with open technique reducing the risk of recurrence by 35 % when compared with a closed one. When off-midline procedures were compared with midline closures, the former were found to be associated with significantly fewer recurrences (10.5 vs 1.7 %) [11]. On the whole, most surgical outcomes showed a difference in favor of off-midline surgical closure. A significant clinical advantage was found with primary wound

closure over open healing when return to work was investigated [33, 34]. Only one study [35] calculated costs associated with the operation, bed charges, dressings and income loss and found that primary midline closure was less costly than open healing. There was little evidence of any difference between open healing and closed techniques in terms of postoperative pain. In one study [34], pain levels were significantly lower after open healing compared with closed surgery at 1 week; however, this difference diminished at 3 months. Operative time was significantly shorter with an open approach than with closed surgery [11].

More recently, a meta-analysis of RCTs compared the results of different open healing and primary closure approaches for chronic pilonidal sinus [36]. In trials comparing a conservative lay-open-wound sinusotomy or sinusotomy versus radical en bloc excision with an open wound, all outcomes favoured the limited approaches although the recurrence rates did not differ. In studies comparing midline versus off-midline primary closure, wound infection and dehiscence were significantly higher after midline closure. In RCTs, comparing sinusotomy/sinusotomy versus primary closure, the recurrence rate was significantly lower after the former.

Open excision and healing by secondary intention may result in poor quality of life for patients owing to the need of frequent dressing changes and close observation. Many new materials (including hydrocolloids, calcium alginate, and hydrofibre) have been utilized to improve the detersion, budding and epithelialization stages of wound healing [37, 38]. There is still no clear evidence indicating what the best material is for this kind of dressing [39]. Spyridakis et al. [40] evaluated whether platelet-derived growth factors could speed up the wound healing process. Results from a controlled trial using 52 patients indicated that postoperative treatment with local infusion of growth factors can shorten patient recovery time.

The need for drainage in primary closure techniques has been questioned in several studies [41–43]. In fact, the advantage of clearing the dead space and so improving the normal healing process and accelerating scar formation may be counterbalanced by the fact that the use of drainage prevents the complete closure of the bottom of the operative cavity, favouring blood and serum collection [44]. Recently Milone et al. [45] carried out a systematic review of the literature to identify the association between the use of a drain and the incidence of infection and recurrence after surgery. The results of a meta-analysis did not show a significant improvement of evaluated outcomes. In a RCT, the first on this subject, Biter et al. [46] compared negative-pressure wound therapy (NPWT) with standard open-wound care after surgical excision of pilonidal sinus disease. NPWT resulted in a higher wound healing rate in the

first 2 weeks after surgical excision. However, no significant benefit of NPWT was seen with respect to time to complete wound healing and time to resumption of daily activities. Moreover, it may require many days of hospital stay.

3. *Pilonidal sinus pathology varies considerably in severity; therefore, it is appropriate to vary the treatment. Conservative and minimally invasive techniques can be successfully employed in patients with mild-to-moderate disease.*

Grade of recommendation: 1C.

The plea for conservative surgical treatment of pilonidal sinus disease was first suggested in 1946 [47] and has been the main treatment strategy over the last 60 years [48]. For patients with mild-to-moderate disease, simplified non-excisional surgery was proposed by Buie [48, 49] who treated chronic disease by simply laying open the sinus and marsupializing the wound. Subsequently Lord and Millar [50] emphasized the importance of completely excising the skin pits by removing cutaneous lozenges of about 1 cm², together with fistulous tracts (subtotal excision). In a prospective series of 217 consecutive patients treated with local anesthesia in an outpatient setting, Teterycz et al. [51] reported a recurrence rate of 5.7 % (follow-up = 2 years), a mean time to return to work of 12.3 days and a mean time until wound healing of 33.7 days. Bascom [52] modified this conservative procedure adding the cleaning of the abscess through a lateral incision away from midline. More recently, Gips et al. [53] reported the results of a new technique which utilizes trephines of various diameters to excise the pits and to debride underlying cavities and tracts: recurrence rates after 1, 5 and 10 years were, respectively, 6.5, 13.2 and 16.2 %. The relatively high recurrence rates after simple pit-picking operations are tempered by the ease and success of a repeat procedure (85 % of all patients cured by one operation, 95 % by a second) [5]. These procedures are usually done as a day case, require minimal care in the community and are associated with a rapid return to work. Moreover, they do not preclude carrying out more extensive procedures in case of recurrence. A new video-assisted minimally invasive technique was presented in 2014 by Meinero et al. [54] with a small series of 11 patients, using a fistuloscope which allows a thorough removal of hair and debris and a complete cauterization of granulation tissue under direct vision.

4. *Hirsute patients with extensive primary disease and deep natal clefts or with recurrent disease or unhealed midline wounds may require flap-based procedures.*

Grade of recommendation: 1B.

As suture in the midline of the nates is associated with a number of wound-related complications with recurrence

rates as high as 22–41 % [52, 55], a large variety of flap-based treatment strategies have been introduced in the last 30 years. The aim is to lateralize and flatten the natal cleft [34] while simultaneously providing healthy tissue coverage of the defect without the risk of suture line tension. These techniques, which eliminate the essential causative factors of pilonidal sinus disease, have been mostly chosen to treat hirsute patients with extensive primary disease and deep natal clefts or with recurrent disease or unhealed midline wounds. The Karidakis off-midline advancement flap uses a mobilized fasciocutaneous flap secured to the sacrococcygeal fascia with lateral suture lines [9]. In a study conducted by Karidakis [56] from 1966 to 1990 on 7471 patients, 95 % of whom were followed up for 2–20 years, the mean length of hospital stay ranged from 1 to 3 days. The majority healed rapidly with a mean time off work of 9 days and 75 (1.0 %) developed recurrence. In Petersen's meta-analysis [32] evaluating the results of 74 publications with a total of 10,090 patients, Karidakis' asymmetric closed technique was recommended as providing better results than the simple closure in the natal midline and being less sophisticated than the full-thickness plasty techniques. In the technique of rhomboid excision with the Limberg rotating flap, all sinuses are excised down to the presacral fascia with rotation of a fasciocutaneous flap which flattens the natal cleft [57]. However, owing to the reported early complications, including maceration, infection and tissue separation, related to the proximity to the natal cleft, the lower part of the flap incision was lateralized just by 1.0 cm from the midline, creating the "modified" Limberg flap procedure [58, 59]. A recent meta-analysis of RCTs [60] concluded that both an off-midline primary repair (Karidakis) and the Limberg flap repair are superior to primary midline suture, reducing disease recurrence ($p = 0.07$), wound infection ($p = 0.001$) and dehiscence ($p = 0.01$).

In recent years, several randomized trials have evaluated differences between Limberg and Karidakis flaps [61–65]. The two flap procedures seem to be relatively equal, but in one study [62] the Karidakis flap was associated with a higher infection rate. When short-term results were compared, the modified Karidakis flap was associated with a significantly shorter operative time and a higher patient satisfaction rate, particularly regarding the cosmetic outcome [64]. Moreover, the Karidakis flap is generally felt to be an easier procedure to learn [9].

The "cleft lift" method also creates a flap-based coverage with closure of the midline, flattening the natal cleft. First described by Bascom to treat recurrent or refractory pilonidal sinus [65, 66], it is now chosen as a primary operation mostly for extensive disease in hairy patients with deep natal clefts [48]. This technique uses thinner skin flaps than Karydakis' and avoids any excision of the

abscess or secondary openings. Several case series have reported healing rates of over 80–95 % in both the primary and recurrent settings [9]. In a recent prospective series of 139 patients with recurrent disease or unhealed midline wounds following primary excisional surgery treated with the “cleft lift” technique, 72 % were treated as day cases and 38 % under local anesthesia. After a mean follow-up of 13.5 months, 5.3 % had recurrence requiring surgery [67]. In their prospective RCT, Guner et al. [68] have compared the Limberg flap and Bascom cleft lift techniques showing in the latter shorter operative time and better quality of life during the early postoperative period.

The V–Z advancement flap, Z-plasty and parasacral perforator flap techniques have also been successful in treating complex or recurrent disease with >90 % healing and low recurrence rates reported in case series [69–71]. These procedures generally require general anesthesia, may be technically demanding, require prolonged hospitalization and failures may be difficult to correct [48]. Moreover, in two studies, cosmesis was judged unsatisfactory by a high percentage of patients [72, 73].

Management of recurrent pilonidal disease

1. *The presence of an acute abscess rather than chronic inflammation, as well as prior treatment, is an indication for sinus excision*

Grade of recommendation: 1C.

Recurrence rates associated with various surgical procedures can vary from 0 to 40 % [9]. Adolescence, sinus number, cavity diameter, failure to use intraoperative methylene blue injection, local anesthesia and primary closure are considered the main risk factors for recurrence [74, 75].

Disease is considered to be “recurrent” when:

- the surgical wound had completely healed postoperatively
- patient had not sustained any trauma in the coccygeal region after complete wound closure
- at least one hard or two soft-recurrence criteria are met [76]

Early recurrence is usually due to a failure to identify one or more sinuses during surgery. Late recurrence is mostly due to secondary infection caused by residual hair or debris in the pilonidal dimple that was not removed at operation, as well as to inadequate care or insufficient attention to depilation [26].

The decision-making process regarding treatment for recurrent disease should essentially be guided by factors such as the presence of an acute abscess or chronic inflammation as well as by prior treatment. On the whole, randomized data showed good results for these challenging

patients after various flap procedures, excision with primary closure and excision with secondary intention [9]. Surgeons should not forget that in some cases of recurrence, there can be underlying disease such as inflammatory bowel disease, immunosuppression and cutaneous neoplasm [9].

Conclusions

In recent years, several authors have proposed different classification systems, mainly based on the anatomical pathology of the disease, aiming to compare the results of the various surgical procedures according to the type and complexity of pilonidal disease being treated. Tezel [77] proposed a classification of the disease into five types according to a “navicular area” concept. Awad et al. [78] created a scoring system based on preoperative patient characteristics, to make surgical choices easier. Zinicola et al. [79] suggested a division of surgical procedures into those which remove the sinus track only and those which also remove healthy tissue from around the sinus track.

Irkorucu et al. [13] proposed a classification system based on the anatomical distribution of pits in relation to the natal cleft and according to different clinical presentations. This aids the surgeon in choosing the best surgical technique.

Choosing between various treatment options should also be based on patient and surgeon preferences. Patients need to be appropriately and thoroughly informed about all aspects of the operative and postoperative course including the complication and recurrence rates associated with technique. Surgeons should explain the advantages and disadvantages of different approaches and discuss the desired goals of therapy [80]. When performing flap-based procedures, an explanation of the potential cosmetic outcome resulting from surgery should not be left out and the patient’s final satisfaction should be measured using structured questionnaires. Surgeon experience and confidence in performing the different techniques should be part of the decision equation [11].

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all participants included in the study.

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