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REVIEW

Pilonidal sinus – challenges and solutions

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Abstract: Although it is clinically asymptomatic in some cases, pilonidal sinus disease may also present as a complicated disease, characterized by multiple sinus tracts, leading to severe impairment of patient quality of life. Although clinical studies of pilonidal sinus have been conducted for approximately a century, the gold standard for treatment is undefined. The ideal treatment requires a shorter hospital stay, requires less wound care, results in rapid recovery, maintains quality of life, and has low recurrence rates. In this review, we aim to discuss the challenges and possible solutions for the management of pilonidal sinus disease.

Keywords: pilonidal sinus disease, surgery, management, complications, recurrence

What is sacrococcygeal pilonidal sinus disease and what causes it?

The history of sacrococcygeal pilonidal sinus disease (PSD) began in the early 19th century. The disease was first reported by Herbert Mayo in 1833 and first defined as "pilonidal sinus" by Richard Manning Hodges in 1880.[1] It is common, particularly in young adults. The disease may be associated with sex hormones because it is most commonly observed between puberty and 40 years of age; furthermore, it may be associated with a more hirsute nature because it is more frequently observed in males than in females.[2,3]

Having treated thousands of PSD cases over 35 years of practice, Karydakis stated that various factors predispose patients to hair insertion, which results in PSD.[4] Factors such as the H-factor (hair), F-factor (forces such as depth and narrowness of the natal cleft), and V-factor (vulnerability) act together and cause first hair insertion, which is followed by the easy insertion of other hairs and, finally, development of PSD. Different from this theorem, Bascom noted that the primary pathology of pilonidal sinus originates from the follicle and the normal follicle becomes a stretched follicle and an epithelial tube over time; a chronic abscess cavity and hair insertion develop secondary to these changes.[5,6] Consistent with this hypothesis, it has been demonstrated that hair was detected in histopathological examinations in only 65% of PSD cases.[7]

PSD is a heterogeneous disease group with varied presentations. Although it may be incidentally detected after an asymptomatic course, it could present as a complicated chronic form that develops fistulization in different gluteal regions.[8] Furthermore, acute abscess formation is a frequently encountered presentation.

Management of sacrococcygeal PSD

The results of surgical treatment for incidentally detected PSD are not superior to the outcomes obtained for chronic fistulized PSD.[7] Thus, observation alone is appropriate

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in asymptomatic patients. Furthermore, the incidence of symptoms in previously asymptomatic patients is not known. Recommendations such as epilation of the gluteal region, cleaning the hairs, and frequent bathing can be administered to reduce the risk of disease progression during the observation period.[9]

Whether primary or recurrent, PSD can present as an acute abscess. Similar to abscesses anywhere on the body, simple abscess drainage can be performed. In addition, curettage and debridement provide greater healing and lower recurrence rates.[10,11] Alternatively, needle aspiration of the abscess can be performed together with antibiotic therapy. It has been demonstrated that an emergency situation can be delayed and treated with elective surgery.[12] Problems caused by abscess drainage, such as functional work loss and slow recovery, can be prevented in 95% of these patients by this approach.

Although clinical studies of chronic pilonidal sinus have been conducted for approximately a century, the gold standard treatment is undefined. Although most investigations have analyzed surgical treatment, the effectiveness of nonsurgical methods has been investigated recently. The absence of an ideal treatment method results in suboptimal outcomes. The ideal treatment entails shorter hospital stays, requires less wound care, results in rapid recovery, maintains quality of life, and has low recurrence rates. However, no current treatment ensures all of these factors. Furthermore, the heterogeneous nature of the chronic disease limits the applicability of a single treatment approach to all patients.[13–16]

Primary PSD most frequently begins as a single-follicle disease and advances by incorporating other hair follicles. Later, the disease may fistulize to the gluteal region unilaterally or bilaterally. Because the size of the defect after surgical excision and method used to close this defect are directly associated with the clinical outcomes, the treatment approach varies according to the development stage of the disease.[17,18] There is no staging system that has been defined for PSD. Although different authors have developed classification systems, these classifications have generally considered clinical presentations of the disease, independent of its progressive course.[19,20] An ideal classification system should differentiate an acute abscess from chronic sinus disease, asymptomatic from symptomatic, and primary from recurrent. According to our institutional approach, we classify the chronic disease that is restricted to the midline as single/multiple-pit disease, whereas we classify the disease outside the midline as unilateral/bilateral; therefore, different treatment protocols exist for each disease stage. Furthermore, together with this staging approach, it is possible to share more accurate data among investigators, and the ideal treatment for each stage can be determined. As this staging approach becomes widespread in clinical practice, an ideal treatment approach can be developed.

Which technique should be used in surgical treatment?

The application of a single treatment approach to all cases with chronic symptomatic PSD would result in suboptimal outcomes. An individualized approach is desirable to avoid both overtreatment and undertreatment. To date, a comparative clinical study of stage-based treatment approaches has not been performed. The only consensus from several studies is that off-midline treatment is more appropriate.[14]

The two Cochrane meta-analyses that were published in 2007 and 2010 compared primary closure and secondary healing: the first meta-analysis included 18 studies and the second included 26 studies by adding eight more to the first analysis.[21,22] Although wound healing was faster in the primary closure group, recurrence rates were higher. Neither approach was clearly superior.

Primary closure after removal of diseased tissue is the most common approach in clinical practice. Both edges of the wound are approximated. However, approximation of wound edges at the midline would cause high pressure and more traction. Thus, different off-midline and flap techniques can decrease wound tension, prevent separation, and avoid associated complications in the early stages of recovery.[23,24] Furthermore, the flattening of the natal cleft is an important issue.[25–27] Elimination of negative pressure and a vacuum effect in the midline, which are risk factors for PSD, may decrease future recurrences. Thus, in addition to off-midline treatment, flattening of the midline may help guide treatment choice.

The techniques that meet these criteria may be classified as advancing flaps and rotation flaps. The Karydakis flap, Bascom flap, and V-Y flap are classified as advancing flaps.[28–30] Rotation flaps included the Limberg flap, modified Limberg flap, Dufourmentel flap, Z-plasty, and gluteus maximus fasciocutaneous flap.[31–34] Outcomes of randomized studies for these techniques are presented in Table 1. Different endpoints have been used in the studies, and the superiority or noninferiority of each technique is mentioned. Overall, no evidence demonstrates definite superiority of one method over the others.

Symptomatic PSD sometimes can be presented as single-follicle disease. In those cases, flap procedures can be considered an aggressive approach. Therefore, minimally invasive techniques such as sinusectomy or a

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Table 1 Outcomes of randomized studies comparing different techniques

Authors	Year and country	Methods	n	Anesthesia	Operative time (minutes)	Hospital stay (days)	Return to work (days)	Complication (%)	QoL or pain score	Recurrence (%)	Cost	Evaluation of cosmesis
Akca et al[44]	2005	Primary closure	100	General	45	5	19	24	VAS	11	NR	NR
	Turkey	Limberg	100	General	60	2	9.5	3		0		
Ertan et al[45]	2005	Primary closure	50	NR	NR	4.6	28.5	32	SF-36 + VAS	12	NR	NR
	Turkey	Limberg	50	NR		3.4	15.8	8		2		
Gencosmanoglu and Inceoglu[24]	2005	Modified lay-open	73	General	36±12	NR	3	2.7	NR	1.4	NR	NR
	Turkey	Primary closure	69	General	34±7	NR	21	13		17.4		
Fazeli et al[34]	2006	Z-plasty	72	NR	NR	2.8	11.9	15.3	McGill Pain Questionnaire	4.2	NR	Scar photo
	Iran	Secondary intention	72	NR		1.6	17.5	22.3		4.2		
Ersoy et al[46]	2009	Karydakis	50	Spinal	NR	NR	15	26	VAS	NR	NR	NR
	Turkey	Limberg	50	Spinal		NR	14	8		NR		
Nordon et al[47]	2009	Simple Bascom	29	Local	NR	NR	2 weeks	NR	NR	8	NR	NR
	United Kingdom	Bascom cleft closure	26	Local + general		NR	2 weeks	NR		0		
Can et al[48]	2010	Modified Limberg	77	Spinal + local	52.8±16	4.8±2.6	NR	12.9	Questionnaire for satisfaction	5.4	NR	NR
	Turkey	Karydakis	68	Spinal + local	40.4±2.5	5.5±2.2	NR	10.3		4.8		
Muzi et al[49]	2010	Modified primary closure	130	Local	28±7.7	8 hours	8.6±2.1	10.7 (infection)	VAS	3.8	NR	NR
	Italy	Limberg	130	Local + general	60±6	4.9±2.1	8.4±1.6	3 (infection)		0		
Lorant et al[50]	2011	Primary closure	39	Local + general	NR	NR	NR	7.7 (infection)	VAS	10.2	NR	Scar size
	Sweden	Lay-open	41	Local + general		NR	NR	2.4 (infection)		2.4		
Guner et al[27]	2013	Limberg	61	Spinal	36	1.4	NR	19.6	SF-36 + VAS	1.6	NR	NR
	Turkey	Bascom cleft closure	61	Spinal	29	1.2	NR	19.6		0		

Note: Continuous data were presented as mean ± SD or median values for operative time, hospital stay and return to work columns.
Abbreviations: NR, not reported; QoL, quality of life; SF-36, 36-item short form health survey; VAS, visual analog scale; n, number.

pit-picking technique would be a better approach to avoid overtreatment.[5,35] Minially invasive techniques can be performed under local anesthesia as a day-case procedure and provide early recovery with acceptable morbidity.

Recurrent disease requires different management than primary disease

Recurrent disease is defined as a PSD case that has undergone curative therapy, completely healed, and recurred. Although unhealed wounds are defined as recurrent disease by some authors, these two are different clinical entities.[16,36–38] The treatment of recurrent disease is more difficult than that of primary disease. The anatomical changes following prior treatment, the removed tissue, and the invasiveness of the current disease dictate the preferred treatment approach.[26,39] Recurrent cases are separately evaluated from primary cases in our institutional algorithm. After the assessment of multiple factors, the appropriate approach is determined. Although the application of flap techniques is recommended in the literature, favorable results can be obtained with minimally invasive treatments in an individualized approach.[25,27] Because it is difficult to define the progressive course of the primary disease for the recurrent disease, there is a requirement for a different classification system.

Nonsurgical treatment

Among the nonsurgical treatment options, crystallized phenol application is frequently used.[40,41] Although it requires a long recovery period, it could be used in both primary and recurrent cases because it results in earlier return to work, low morbidity, and high success rates. However, there is a requirement for further studies on this subject. No randomized trials on this subject exist, and long-term results are unknown. Some studies have reported successful results after cryosurgery with liquid nitrogen or fibrin glue application after cleaning the sinus content.[42,43] However, these studies are limited in number and methodologically weak.

Conclusion

Achieving the ideal management of PSD requires:

1. A staging system. It is necessary to define a staging system consistent with the varied clinical presentations of the disease, resulting in a stage-specific treatment approach. Furthermore, by applying different treatment approaches to different stages, data sharing among investigators would improve.
2. Primary endpoints for future clinical studies. Although several clinical studies evaluate recurrence rates, a low recurrence rate alone is not sufficient to determine the ideal treatment. Similar to recurrence rate, early morbidity plays an important role. Therefore, in future clinical studies, data such as complication rates, work loss, cosmetic results, quality of life, and cost should be evaluated in addition to recurrence rates.
3. A definition of ideal treatment. Currently, there is no standard, recommended treatment for all patients with PSD. An individualized approach that assesses the extent of disease, social status, and expectations of the patient would be ideal. The gold standard for treatment would not only produce excellent cosmetic results, but also remove predisposing factors for PSD by flattening the natal cleft and enabling tension-free repair.

Disclosure

The authors report no conflicts of interest in this work.

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