Outcomes in the repair of pilonidal sinus disease excision wounds using a parasacral perforator flap

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ABSTRACT

INTRODUCTION The ideal treatment for pilonidal sinus disease has yet to be defined. There are many approaches described in the literature.

METHODS Thirty-five consecutive patients who underwent wide excision of pilonidal sinus disease had the wound repaired using a parasacral perforator flap. Outcomes were assessed by case notes analysis and follow-up telephone and postal questionnaires.

RESULTS There were ten minor complications including six minor wound edge dehiscences. There were two ischaemic complications, with one flap loss. There were 3 recurrences of pilonidal disease at a mean follow-up of 33 months, giving a 5-year recurrence free rate of 86%. Of the patients questioned, all would recommend the procedure to someone else despite 69% being dissatisfied with the cosmetic outcome.

CONCLUSIONS This series indicates that the parasacral perforator flap technique is able to repair pilonidal sinus excision wounds successfully with minimal morbidity and a low recurrence rate at a mean of follow-up of 33 months. The study suggests that it may be a technique best reserved for recurrent cases of pilonidal sinus disease. Patients feel the procedure is successful despite reservations regarding the cosmetic outcome.

KEYWORDS

Pilonidal sinus disease – Parasacral perforator flap

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Pilonidal sinus disease is an unpleasant, chronic relapsing condition that is difficult to cure. There is a wide variety of treatments with mixed results. Laying open of the sinus with healing by secondary intention¹ reduces recurrence rates but requires a prolonged recovery period. Alternatively, the defect may be closed directly or asymmetrically.² However, these techniques predispose to tension at the repair site, which may lead to healing problems.

Closing the defect with local flaps reduces dead space, provides tension free closure, obliterates the natal cleft and lateralises scars, all factors that may be important in reducing complications.³ The rhomboid flap is well represented in the literature but the size of the defect that can be closed (and therefore the extent of the disease that can be excised) is limited. V-Y advancement,^{4–7} fascial⁸ and perforator-based flaps^{9–12} have all been reported to offer advantages over local transposition flaps. Nevertheless, the ideal method for treating pilonidal sinus excision wounds is yet to be defined.

Garrido *et al* described the parasacral perforator flap for closure of pilonidal sinus wounds in five patients.¹³ The flap introduces large amounts of vascularised tissue after wide excision of the disease with low donor site morbidity; the

natal cleft is flattened and the scar is lateralised. Since 2003 the senior author has used a flap modified from this technique. This paper presents the outcomes of 35 patients with predominantly recurrent disease, treated by wide excision and repair with this perforator flap.

Methods

Thirty-five consecutive patients underwent parasacral perforator flap repair of a pilonidal sinus excision wound between January 2003 and May 2009. The senior author performed all procedures. Information for analysis was obtained from the case notes by the first author.

The location of the perforator is described with the cranial end of the natal cleft as 12 o'clock with the patient prone. Complications were divided into major and minor; partial or total flap loss was considered a major complication and all others being minor.

A telephone survey was carried out to determine recurrence rates and to assess patient satisfaction with the repair. A postal questionnaire was sent to those patients who were unobtainable after two telephone calls.

Figure 1 Planning the flap: The perforators are identified and marked and a template is made of the proposed defect (A); the flap is outlined based on the selected perforator using the template (B); the planned flap (C)

Figure 2 Partial necrosis of a flap: The flap is returned to the donor site (A) and advanced as a V-Y flap the following week (B)

Figure 3 Total flap loss: The first flap is excised and replaced with a second flap the following day after the first became irretrievably ischaemic.

Surgical technique

All procedures are performed under general anaesthesia. Patients receive 1.5g of intravenous cefuroxime and 500mg metronidazole at induction. Suitable perforators are identified using a Doppler probe and marked on the skin. A perforator at 12 o'clock relative to the proposed excision defect is ideal as this facilitates flap transfer without islanding the flap on the perforating vessels but any nearby vessel can be used.

The disease extent is determined by injecting sinus openings with methylene blue. The proposed area for excision is marked and the flap is planned 'in reverse' (Fig 1).

The long axis of the flap is between 45° and 90° to the excision defect. This enables the donor site scar to be hidden in underwear and reduces the arc of rotation. The long axis of the flap is ideally designed parallel to the muscle bundles of the gluteus maximus. This facilitates dissection by enabling fascial septa to be split one at a time and allows straightforward identification of the perforating vessels.

Diseased tissue is excised to the presacral fascia and sent for histology. The excision is taken beyond the methylene blue stained areas. Normal skin is excised if necessary to facilitate inclusion of a suitable perforator.

Occasionally, a dominant perforator cannot be identified, in which case the flap can be based on a septum containing multiple small perforators. Where two candidate perforators are found, microvascular clamps are used to determine the best vessel.

Both the donor site wound and flap are closed, with 2/0 PDS® (Ethicon Inc, Somerville, NJ, US) sutures to the deep fascia and Monocryl® (Ethicon Inc) subcuticular sutures. Drains are not used.

The patient is nursed on his or her side for the first 24 hours, mobilised and discharged on the second post-operative day when possible.

Results

Thirty-five consecutive patients underwent perforator flap reconstruction between 2005 and 2009. The demographic details and analysis of the procedures are summarised in Table 1. Nine patients had been referred with primary pilonidal disease. Of the remainder, the median number of previous procedures was 2 (range: 1–7), with excision and primary closure being the most common previous procedure. The largest flap measured 5cm by 23cm and survived entirely. The most common location of the perforator supplying the flap was at the 12 o'clock position.

The complications are summarised in Table 2. There were no donor site complications.

There were two cases of flap ischaemia. In one the flap was returned to its donor site on the first post-operative

Table 1 Summary of patients and procedures (range)	
Average age (years)	28 (17–52)
Male-to-female ratio	32 : 3
Mean duration of disease prior to flap surgery (months)	38 (6–120)
Mean length of procedure (hours)	2.3 (1.5–3.75)
Mean length of stay (days)	2.5 (1–5)
Mean flap width (cm)	3.8 (2.8–6.0)
Mean flap length (cm)	12.6 (5.0–23.0)

Table 2 Summary of complications	
Minor complications	Number of cases (n=35)
Post-operative haematoma	1
Wound infection	3
Superficial wound dehiscence	6
Major complications	
Ischaemia with partial necrosis	1
Ischaemia with total flap loss	1

tive night and subsequently advanced as a V-Y flap seven days later (Fig 2). In the second case, the flap was found to be ischaemic on the second post-operative day. It was excised and replaced with a contralateral flap, which healed uneventfully (Fig 3).

Histology was available for 28 cases; 27 demonstrated pilonidal sinus disease and one hidradenitis suppurativa.

Three patients developed recurrent disease. One patient presented eleven months post-operatively with bleeding from the tip of the flap. This was excised and the flap advanced achieving primary healing; histology showed a focus of recurrent disease. A second patient had recurrent symptoms along one edge of the flap 16 months post-operatively. Excision and W-plasty were performed and histology reported ‘foreign body reaction to residual hair shafts from previous pilonidal excision’. This is included as a recurrence. The third patient had persistent symptoms almost immediately following surgery. Although histology from the primary procedure showed hidradenitis suppurativa, this patient was also included as a recurrence.

Fourteen patients completed the questionnaire by telephone and two by post. Four patients had no issues with the appearance of the flap. The remaining patients commented on buttock asymmetry, numbness in the flap and bulging of the flap. Two patients found the flap uncomfortable when lying against a hard surface. However, all patients said that they would recommend the procedure. This was especially so in the case of recurrent disease; one patient felt the procedure had ‘changed my life’.

Documented follow-up was available for 25 patients. The mean duration of follow-up was 33 months (range: 6–89 months). As disease recurrence is dynamic and a function of time, we used a Kaplan–Meier curve to illustrate the ‘survival rate’ of the procedure. This gave a five-year disease free rate of 86% (Fig 4).

Discussion

The many surgical options for pilonidal sinus disease are testament to the absence of an ideal treatment. Treatment requires wide excision to minimise disease recurrence. However, such wounds can be challenging to repair. Allowing wound healing by secondary intention avoids a reconstructive procedure but increases the time to healing and

burdens the patient with a prolonged period of dressings. Direct closure of wounds has been shown in a recent Cochrane review published in 2010 to have a higher recurrence rate compared with open treatment.¹ This may be because of the need to produce a wound that closes rather than to excise the disease and deal with the defect that results. Tension across a midline scar was also implicated in a higher rate of post-operative morbidity. Direct closure procedures, which lateralise scars, were shown to have lower infection rates, faster healing times and a lower recurrence rate.

A local flap fills the defect, provides tension free closure and avoids a midline scar. It therefore seems to offer advantages over direct closure techniques. The rhomboid flap has gained popularity and is straightforward to design, raise and inset. However, the flap is usually a random pattern, which limits the size of flap that can be raised and thus the defect that can be repaired. Recently, it has been taken with an identified perforator in its base, transforming it into a (small) parasacral perforator flap.⁹

Larger defects have been repaired with V-Y flaps with mixed results. In a prospective randomised controlled trial

Figure 4 Kaplan–Meier survival curve for recurrence of pilonidal sinus disease following perforator flap repair, showing a disease free incidence of 86% at five years

Figure 5 Examples of later post-operative results with different degrees of hirsutism

comparing V-Y advancement with two primary suture methods, Nursal *et al* found no differences in recurrence rates, complications or patient satisfaction with an average follow-up duration of 29.7 months.¹⁴ In a retrospective comparison, Unalp *et al* found a lower recurrence rate with rhomboid flaps compared with V-Y flaps at four years.¹⁵

Perforator flaps offer great versatility in design and movement. The sacrococcygeal area has many perforating vessels on which flaps may be raised.¹⁶ The parasacral perforator flap is based on one of these vessels. The flap blood supply is robust, the largest flap in our series being 23cm long. The one flap loss we experienced was probably due to technical error in pedicle dissection or inset under tension rather than an inherent problem with the flap's blood supply.

Superficial wound healing problems and infection are common post-operative complication. Three out of 35 patients (8.6%) developed a wound infection in this series. This compares favourably with the literature with wound infection rates ranging from 0.9%¹⁷ to 10.7%¹⁸ for various flap repairs. In Garrido *et al*'s original series, one of the five patients developed an infection.¹⁵ In our series, 6 out of the 35 patients (17.1%) developed wound edge dehiscence. Again, this is reported frequently, with rates of 3.0–12.5% for various flap reconstructions.^{14,17,19,20} These rates are perhaps not surprising given the anatomical location and the need for early post-operative mobilisation, which may predispose to movement across the wound edges. Other factors influencing wound healing such as smoking were not assessed in this study.

Recurrence rates for this disease are an important endpoint. We recorded three recurrences in our patients. One was histologically proven at 11 months. The second was a possible recurrence (detected by telephone survey) in a patient with hidradenitis suppurativa. The histology for the third suggested foreign body reaction to retained hair shafts from previous surgery, which we interpreted as a recurrence. Recurrence will occur if the disease is not completely removed or if new disease develops. The former may be prevented by clear delineation of the disease with the use of methylene blue dye. Its use has been shown to halve the long-term recurrence and has been recommended as an integral part of any pilonidal sinus excision procedure.²¹ We have found the dye very helpful in visualising the extent of resection required, particularly near the anal margin, where great care must be taken to remove affected tissue without damaging the anal sphincter.

Recurrence due to a new disease will arise if factors predisposing to the condition remain after treatment. These factors include a deep natal cleft and midline scar. Flap repair flattens the natal cleft and lateralises the scar, thereby reducing recurrence.^{19,22,23} However, we have noticed that the natal cleft appears to reform following surgery. This is probably because although the buttocks are taped apart during surgery to provide adequate access to the diseased natal cleft, once the flap is in situ and the tension on the buttocks is released, a new cleft can develop. This observation may cast doubt on the theory that a flattened natal cleft is related to rates of recurrence.

Hirsutism has also been implicated in the aetiology of pilonidal sinus disease.²⁴ However, the role of depilation remains unclear. Some evidence suggests that removing hair may increase recurrence rates following surgery.²⁵ We do not advise depilation following surgery and only remove hair intra-operatively to facilitate the procedure (Fig 5).

The literature reports a wide range of follow-up times and recurrence rates for pilonidal sinus disease following treatment. In a study of 205 military patients followed for a median of 14.8 years, Doll *et al* found a bimodal peak of disease recurrence following excision and primary closure with early recurrences occurring in the first four years.²⁶ They suggested that a follow-up duration of at least five years is required to detect 75% of recurrences.

Nevertheless, it is difficult to compare recurrence rates between series when a variety of flaps or other closure methods have been employed as there are a number of variables that influence recurrence rates, as indicated above. We tried to overcome these difficulties by calculating a survival curve for the parasacral perforator flap, with disease recurrence as the endpoint. Our series indicated a five-year disease free rate of 86% with disease recurrence most often appearing in the first year (2 out of 3 cases).

Nine patients in this series had been referred with untreated pilonidal disease. Of the remainder, the median number of previous procedures was 2 (range: 1–7) and the average duration of disease prior to perforator flap surgery was 38 months (range: 6 months – 10 years). Although this study cannot compare outcomes between primary and secondary pilonidal sinus patients, it could be argued that this

procedure represents a good option in primary pilonidal sinus surgery. The minor complication rate was similar in the two groups (3/9 primary patients, 6/26 secondary patients) and the flap repair may offer a single, curative procedure. However, these factors must be weighed against the time needed for the operation (mean: 2.3 hours) and the hospital stay (mean: 2.5 days). Further study is needed to clarify the role of perforator flap repair in primary pilonidal disease.

The cosmetic outcome for the flap was felt by the authors to be good and no patient reported issues at the final follow-up visit. It was interesting to learn, therefore, that for 11 of 16 patients (69%) interviewed this was not perceived to be the case. While these patients were grateful for relief from pilonidal disease, they felt that the appearance was an issue when questioned directly. The fact that none of the patients had sought advice with respect to this suggests that either the issue was a minor one or that they did not realise that there may be options for cosmetic revision. We now recommend that patients are informed of the potential cosmetic outcome from surgery and that there is the possibility for future revision before final discharge. All patients are now shown post-operative photographs to inform them of the likely cosmetic outcome.

Conclusions

The ideal procedure for treating pilonidal sinus disease is not clear but complete excision of the affected areas, flattening of the natal cleft, avoiding midline scars and a tension free repair of the wound with well vascularised tissue appear to be essential features of any treatment for this disease. The need to flatten the natal cleft may not be as important as the literature suggests. This series of 35 patients shows that the parasacral perforator flap offers a reliable option for treating recurrent pilonidal sinus disease. However, its role in the management of primary disease remains to be defined.

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