

Pilonidal sinus (Jeep's disease): an improved model of care

A pilonidal sinus or sacrococcygeal fistula, is a cyst, abscess or sinus tract located at the natal cleft of the buttocks, that often contains hair and/or an epithelialised sinus tract that delays wound healing. This paper discusses 20 patients with pilonidal sinuses who were analysed over a three-year period. Ten cases had a new treatment regimen applied while 10 cases were treated with traditional therapy. The former group resulted in full healing in nine out of 10 cases, as opposed to three of 10 in the traditionally treated group. Although the sample size is too small to make definitive recommendations, certain observations can be drawn.

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KEY WORDS

Pilonidal sinus
Hypergranulation
Nanocrystalline silver
Alginate
Foam

A pilonidal sinus (PS) or sacrococcygeal fistula, is a cyst, abscess or sinus tract located at the natal cleft of the buttocks. The cyst often contains hair and/or an epithelialised sinus tract that contributes to delayed healing of the wound (Buie, 1944; Harris and Rolsad, 1994; Gould, 1997; Bannerjee, 1999; da Silva, 2000; Al-Khamis et al, 2010). Pilonidal means 'nest of hair', and is derived from the Latin words for hair ('pilus') and nest ('nidus'). The sinus tract may open

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cutaneously to discharge exudate, cystic contents or frank pus from an underlying abscess that collects deep to the skin surface within the depths of the natal cleft (Bascom, 1983). The pathology may arise due to an open cleft that becomes lined with epithelium and hair collections along the passage of the tract. These collections of hair may form localised

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'whorls' which sit beneath the surface of the epithelialised tract, or grow from the surface of the tract epithelium deep within the natal cleft (Buie, 1944; Harris and Rolsad, 1994; Gould, 1997; Bannerjee, 1999; da Silva, 2000; Al-Khamis et al, 2010).

Most authorities would agree that once the tract is epithelialised and developed as a distinct layer, or once collections of hair are present and serving as a constant irritation factor, wide surgical debridement is the

treatment of choice (Al-Khamis et al, 2010). However, many cases develop non-healing tracts or ulcers in the natal cleft without a definitive epithelialised tract, or following previous surgery where the wound is left open. The authors suggest that the appearance of this tissue often resembles that of hypergranulation (Figure 1), with the pathogenesis of both sharing common features. Thus, hypergranulation tissue occurs as a result of friction, bacterial colonisation or infection and moist exudative wound milieu, a situation not unlike that of pilonidal sinus. Current practice involves the use of proflavine, Sorbsan® (Aspen Medical), Betadine® (Mölnlycke Health Care), packs and daily (Savlon) soaks (Gould, 1997; Bannerjee, 1999). The results of these different regimens have been found to be inconsistent and inconvenient to the patient, as healing outcomes were disappointing and the process involved multiple dressings daily (Harris and Rolstad, 1994).

This paper introduces a new treatment regimen to control or eliminate the pathophysiological responses described above. The regimen comprised debridement followed by nanocrystalline silver alginate dressing (to manage exudate and infection), a secondary foam dressing (to absorb exudate and apply minor pressure) in a patient-friendly routine involving minimal active patient participation in dressings.

Material and methods

A three-year audit was undertaken at the Doncaster and Bassetlaw Foundation Trust Hospitals throughout 2006–2009. The aim of the evaluation was to observe whether the change in practice and dressing regimen had an impact on the recurrence rate of pilonidal sinus complications. Twenty non-pre-selected consecutive patients with pilonidal sinus were included. The first group of 10 patients had already been treated and were selected for historical comparisons. The next 10 cases were subjected to the new multimodality treatment regimen. As this product was already on the specialist hospital formulary and in regular use, ethical approval was not needed for the evaluation, as this was merely matching the most appropriate treatment with the patient. The decision to use the product from theatre was taken by the consultant responsible for the patients. Retrospective data was obtained from patient case notes and further information collected through a patient telephone questionnaire, specifically created for the audit.

Treatment regimen (Figure 2)

The new treatment regimen involved:

- ▶▶ Debridement of hypergranulation tissue—sharp debridement or curettage is preferable
- ▶▶ Nanocrystalline silver alginate dressing (Acticoat® absorbent, Smith & Nephew) — the calcium facilitates clotting, the alginate provides exudate control and the nanocrystalline silver has a broad antimicrobial spectrum
- ▶▶ For the excess moisture, a secondary foam dressing — Allevyn® Adhesive Sacrum dressing (Smith and Nephew) — was applied (this also applied minor uniform compression, distributed pressure and prevented friction)
- ▶▶ The patient was instructed to have a daily shower. Dressing changes were initially done twice-weekly to manage the excess exudate, followed by weekly dressing changes once the exudate levels had decreased
- ▶▶ Patients were educated with respect to pain management, hair removal, signs and symptoms of clinical



Figure 1. Pilonidal sinus treatment progression from hypergranulating wound base to full healing.

infection, and secondary dressing changes where necessary.

Data was input onto Excel spread sheet and analysis was undertaken.

Results (Tables 1 and 2)

Pilonidal sinus operative procedures in this evaluation depended on the status of the wound. For clean, non-infected wounds the surgery aimed at primary closure using either Karydakias flap (lateralisation of final scar and flattening of natal cleft) or a Bascom procedure (flattens out the crease between the buttocks so there is no longer a deep crevice). For infected wounds, after thorough debridement, tracts were laid open and dressings applied. The same technique was instituted for recurrent cases following surgery. Both groups in this evaluation were from the latter treatment method (wound tracts laid open).

Most cases were referred by general practitioners, where conservative treatment and several attempts at antibiotic therapy had failed, or where abscesses had formed. In the majority of patients, mixed anaerobes were isolated from the wounds, and many had hair nests buried within the wound.

Group 1

Out of the 10 cases treated traditionally, only three healed in the time period without further surgical intervention. Out of the remaining seven cases, one case had a recurrence of the lesion in the time period, three went on to further surgery and still had not healed in the 17-week period, and three cases underwent further surgery and healed. Thus, six cases needed further surgery, of which three were successful (additional case had recurrence). All in all, only three cases were successfully treated conservatively without additional

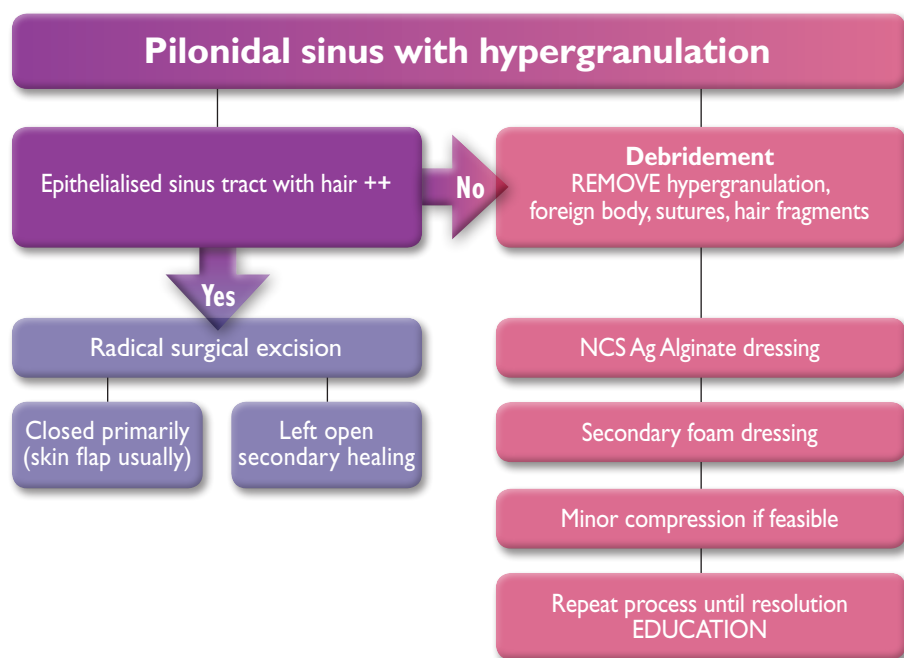


Figure 2. Management of pilonidal sinus.

Table 1
Outcomes for traditional treatment

Patient	Outcome	Additional surgery
1	Not healed	X1 drainage
2	Not healed	X1 drainage
3	Not healed	X1 drainage
4	Healed	None
5	Not healed	X2 recurrent
6	Healed	None
7	Healed	X2 excision
8	Healed	X2 drainage
9	Healed	X2 Bascom procedure
10	Healed	None

Table 2
Outcomes for new treatment regimen

Patient	Outcome	Additional surgery
1	Healed	None
2	Healed	None
3	Not healed	X1 Karydakís, radical excision
4	Healed	None
5	Healed	None
6	Healed	None
7	Healed	None
8	Healed	None
9	Healed	None
10	Healed	None

surgical intervention. This contrasts with the new treatment regimen group where only one patient went on to need additional surgery.

Group 2

This group of patients were treated with the new dressing regimen (n=10) and

full healing occurred without further surgery in nine out of 10 cases (*Figure 1*). The average time to healing was six weeks. In the single case that required further radical surgery, the patient had multiple cysts with numerous epithelialised tracts requiring wide local excision and flap closure to heal.

Cost comparison

Traditional practice involved daily dressings by district nurse in patients' homes, with dressing products and nursing time for at least eight weeks. Seven out of the 10 patients treated with the traditional dressing regimen required further surgery (totalling 11 surgeries). Revised practice with the new treatment regimen involved weekly or twice-weekly dressing changes in clinic or at the GP practice. One out of the 10 patients required further surgery. Even without taking into account the costs of additional surgery needed in the traditional group, the new treatment regimen involving twice-weekly dressing changes demonstrated a substantial cost-saving over traditional dressings, which were often changed 2–3 times daily.

Discussion

Ingrown hair is a commonly proposed cause for pilonidal cysts or abscesses. Increased pressure on the coccyx region from excessive sitting is thought to predispose people to the condition (Mentes et al, 2006). The condition was widespread in the United States army during World War II. More than 80,000 soldiers having the condition required hospitalisation (Buie, 1944). It was termed 'jeep seat' or 'jeep riders' disease', because a large portion of people who were being hospitalised for it rode in jeeps, and prolonged rides in the bumpy vehicles were believed to have caused the condition due to irritation and pressure on the coccyx. Certain factors can make one more susceptible to developing pilonidal cysts. These include obesity, inactive lifestyle, occupation or sports requiring prolonged sitting, excess body hair, stiff or coarse hair, poor hygiene and excess sweating (<http://dermnetnz.org/acne/pilonidal-sinus.html>).

There appears to be uniformity to the approach to established epithelialised tracts with hair collections. Wide surgical debridement with or without local flap cover is indicated. There still remains controversy concerning surgical management — should the wound be left open to heal by secondary intention, or should it be closed primarily by definitive

flap closure? Much of the literature, including a recent Cochrane review, tends to favour the latter approach in terms of primary healing, but highlights the increased possibility of recurrence where stitches were used (hence a local flap with stitches out of the pressure areas is probably preferable) (Al-Khamis et al, 2010). The definitive answer on surgical management is yet to be written. However, the trend for successful management appears to be aggressive, well-planned flap surgery with the ultimate flap scar designed to avoid placement in the midline. These non-midline approaches appear to be the current surgical methods of choice (Basterzi et al, 2008; Mahdy, 2008).

Much of this controversy and discussion related to definitive surgical treatment revolves around the different schools of thought on the pathophysiology of pilonidal sinus (Bradley, 2006). Some believe that pilonidal sinus originates as an excess keratin deposition in a hair follicle in the natal cleft that becomes inflamed and infected (Bascom, 1983). The inflamed follicle eventually ruptures and presents as an abscess (Bascom, 1983; Bradley, 2006). Rather than the primary cause of the disease, proponents of this theory regard hair as a 'secondary invader' (Bradley, 2006).

Others believe that the pilonidal sinus originated from a congenital tract existing in some patients that is complicated by hair growth acting as the primary irritant and setting the stage for infection (Berry, 1992; Bradley, 2006). This led to the practice of radical excision of hair and tracts, with far more extensive surgery being practiced than proponents of the first theory. However, this theory has been mostly discounted, as the majority of congenital tracts dissected appeared to be situated more caudal than typical pilonidal sinus and did not contain hair (Berry, 1992). Thus, the extent of excision needed in these cases has still not been resolved — removal of epithelialised pits and hair follicles within the tract is necessary but excision right down to fascia is still debated, although it would appear that primary surgical closure (Linberg flap) provides the best

long-term results (Basterzi et al, 2008; Mahdy, 2008). With this background of differing surgical approaches, there are still many cases that present to wound clinicians with open wounds either secondary to unsuccessful surgery or as primary non-healing wounds, cysts

An additional benefit of the combination is that the absorbent dressings can remain in place for up to seven days. The secondary foam dressing also provides a stable coverage free from movement at the cleft site, thus preventing friction at the wound interface.

or abscesses in the region with minimal hair or epithelialised tracts. In either case, debridement should remove residual epithelium and foreign material and dressings should be selected directed against the pathophysiologic causative factors. The authors suggest that close examination of the tissue in the bed of pilonidal sinus, often closely resembles hypergranulation tissue with common pathophysiologic causes of both conditions, namely:

- ▶▶ Moisture
- ▶▶ Bacterial colonisation or infection
- ▶▶ Movement or friction at the wound interface.

Acticoat™ (Smith & Nephew) is a nanocrystalline silver product that utilises nanotechnology to release clusters of extremely small and highly reactive silver particles. The smaller the particles of silver, the greater the wound area that it reaches (Wright et al, 1998; Wright et al, 1999; Yin et al, 1999). A unique property of nanocrystalline silver is that it dissolves to release Ag⁰ clusters and Ag⁺ and Ag³⁺, whereas other silver sources release only Ag⁺ (Wright et al, 1998; Burrell et al, 1999). This difference in the dissolution of properties of nanocrystalline silver dressings appears to alter the biological properties of the solution, including both antimicrobial and anti-inflammatory activity (Wright et al, 1998; Burrell et al, 1999). *In vitro*,

nanocrystalline silver dressings have been demonstrated to be effective antifungal agents (Wright et al, 1999), antibacterial agents (Wright et al, 1998; Yin et al, 1999; Burrell et al, 1999), and antibacterial agents for antibiotic resistant bacteria (Fan et al, 2002). *In vivo* studies have shown that nanocrystalline silver is effective at preventing infections (Fan and Bard, 2002) and healing wounds (Wright et al, 1998; Burrell et al, 1999; Wright et al, 1999; Yin et al, 1999; Fan and Bard, 2002). Nanocrystalline silver anti-inflammatory efficacy has also been demonstrated, both in clinical studies and *in vivo* studies (Wright et al, 1998; Burrell et al, 1999; Yin et al, 1999).

Alginates are made of soft, non-woven fibres derived from seaweed. Alginates absorb wound exudate and form a gel-like covering over the wound. Most alginates absorb many times their own weight (Thomas, 2000). Used in wounds with moderate to heavy exudate, they are especially useful for packing these exuding wounds. Acticoat Absorbent (Smith & Nephew) is an absorbent alginate dressing incorporating nanocrystalline silver on both sides of the dressing to provide antimicrobial protection and absorbency. It is an absorbent alginate, fast-acting and long-lasting. The nanocrystalline provides an effective antimicrobial action with proven levels of protracted silver release (Roberts, 2008).

The advantage of the combination is a broad antimicrobial spectrum (nanocrystalline silver) reducing the risk of colonisation and infection, together with effective exudate management and a dressing that conforms to the wound contour. Additionally, the calcium alginate fabric encourages haemostatic activity by inducing a degree of clotting of actively bleeding vessels. This could be an added advantage in pilonidal sinus where debridement of the fragile granulation tissue is often followed by minor active bleeding — this is a relative advantage as the literature has not borne out major haemostatic efficacy (Henderson et al, 1998). An additional benefit of the combination is that the absorbent dressings can remain in place for up to seven days. The secondary foam dressing

also provides a stable coverage free from movement at the cleft site, thus preventing friction at the wound interface.

In choosing this combination for a pilonidal and hypergranulation wound dressing regimen, the authors looked to prevent the causes of both conditions, i.e. excess moisture, critical colonisation or true infection, and friction/movement at the wound interface. Once foreign material is removed, the absorbency, antimicrobial efficiency, haemostatic effect and the pressure applied by the secondary dressing of this combination appeared to promote healing in these cases.

As with other multifactorial pathologies, it is wise to introduce a treatment regimen that is aimed at all steps in the pathogenesis rather than one step. Thus, in the past, silver nitrate may have been used to remove the tissue, but this did not address the exudate, infection or friction and thus recurrence was common. The guidelines and approach to the management of hypergranulation tissue has a common basis with that of pilonidal sinus (Widgerow and Leak, 2010). Independently, the authors formulated an approach to dealing with hypergranulation tissue. When considering pilonidal sinus, the authors immediately identified a commonality of logic and approach to that of hypergranulation tissue, and the guidelines listed here are a result of that collaboration. The study results demonstrate the efficacy of this approach, not only in healing the wounds, but in preventing recurrence.

Conclusion

Pilonidal sinus can be a difficult condition to treat — the challenges involve removal of abnormal granulation tissue, healing of the wound and prevention of recurrence. Surgical management is mandatory where established epithelialised tract with hair growth complicate the process. In pilonidal sinus cases following surgery where the wound is left to close secondarily, an aggressive conservative approach is needed. The authors found the approach of debridement,

nanocrystalline silver alginate and foam used with careful patient instruction, to be a successful regimen for treatment of this difficult condition. The combination provides for removal of abnormal granulation tissue, management of exudate, sepsis and friction, making recurrence an unlikely event. **WUK**

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Key points

- ▶▶ Results of different treatment regimens for pilonidal sinuses are inconsistent in terms of healing outcomes and patient acceptance.
- ▶▶ Debridement, SILCRYST silver and a hydrocellular foam were chosen as a new treatment pathway for this study.
- ▶▶ Change of practice in terms of wound coverage and audit of recurrence rates and complications can improve outcomes.
- ▶▶ As with other multifactorial pathologies, strategies for treatment of all steps in the pathogenesis of the condition should be optimised.