Semi-closed surgical technique for treatment of pilonidal sinus disease

Georgios Sahsamanis*, Stavros Samaras, Georgios Mitsopoulos, Titos Deverakis, Georgios Dimitrakopoulos, Dionysios Pinialidis

1st Department of Surgery, 401 General Military Hospital of Athens, Greece

**HIGHLIGHTS**

- Ideal treatment of PSD is controversial, despite a number of surgical techniques described in medical literature, due to high recurrence rates.
- This study provides an alternate semi-closed method for treatment of pilonidal sinus.
- Results indicate both a satisfactory aesthetic result for the patient and prompt return to everyday activities.

**ARTICLE INFO**

Article history:
Received 4 October 2016
Received in revised form 8 February 2017
Accepted 8 February 2017

Keywords:
Pilonidal sinus disease
Pilonidal cyst
Semi-closed method
Surgical technique

**ABSTRACT**

**Introduction:** Pilonidal sinus disease (PSD) is a highly debatable disorder regarding its surgical management, despite an assortment of surgical techniques described in the medical literature. The aim of this report is to provide an alternate semi-closed surgical method for treatment of PSD, with early recovery and a satisfactory cosmetic result.

**Methods:** In this retrospective study, 34 patients underwent surgical treatment for primary PSD; 32 male and 2 female. Patients were suffering from primary PSD, with the cyst located in the gluteal midline. Total excision of the cyst was performed, while the skin flaps were fixed on the postsacral fascia using absorbable sutures, leaving the wound semi-closed.

**Results:** Technical success was 100%, with an average operation time of 48.7 ± 3.8 min. No wound dehiscence or infections were recorded postoperatively. One reoperation was performed due to hemorrhage. All patients were discharged on the day after surgery, with a VAS pain score of 1.3 ± 1. Two incidents of late wound dehiscence were recorded at 4th and 6th postoperative day due to strenuous exercise. Patients resumed their work after the 5th postoperative day with no complications. The 6 month follow up was completed in 29 patients, with a VAS cosmetic score of 8.1 ± 0.9. No recurrences were observed during the follow up period.

**Conclusion:** The presented semi-closed technique is a viable alternative for surgical management of PSD. It provides patients with a satisfying cosmetic result, while it allows for early and safe return to everyday activities with less pain experienced.

© 2017 The Authors. Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

1. **Introduction**

Pilonidal sinus disease (PSD) is an acquired chronic disorder located in the natal cleft, with its etiology based on the presence of hair follicles in the gluteal crease [1]. Accumulation of hair over time, along with dirt and sweating of the area, leads to the creation of a subcutaneous cyst in the intergluteal region. Natural progression of the disease leads to the formation of a sinus, as the cyst tries to exude itself [1,2]. A pilonidal cyst can get inflamed thus forming an abscess requiring surgical drainage [3]. PSD shows a preference in young male population with a man to women ration of approximately 4 to 1 [2,4]. It is also associated with certain occupations involving a lot of time sitting, such as truck drivers, students and office workers [5,6]. PSD has a high social impact due to its location and presentation, with pain in the sacrococcygeal region being the most common clinical symptom [5]. In the presence of a sinus, patients may also complain of dirty underwear due to the...
A number of surgical techniques have been described for management of PSD, with no optimal method defined yet. Ideal treatment should aim in less pain, fewer complications, patients’ promptly resume of normal activities, but most importantly low recurrence rates. Some of the most commonly used methods are Limberg’s transposition flap, Karydaki’s flap reconstruction and complete surgical excision of the cyst, with the wound left to heal under primary or secondary intention [7–11].

The aim of this study is to provide an alternate surgical method for treatment of primary PSD. Total excision of the cyst is performed, while the skin flaps are sutured on the postsacral fascia with absorbable sutures, leaving the wound semi-closed. All perioperative data were recorded and presented, along with a 6 month follow up.

2. Methods and materials

From September 2014 to January 2016, 113 patients were treated in our center for PSD. All patients were suffering from simple or complex PSD, with or without the presence of a pilonidal sinus, while 18 of the patients had recurrent disease. Patients included in the study suffered from simple symptomatic, primary PSD, with the cyst located in the gluteal midline. Patient demographics along with inclusion and exclusion criteria are summarized in table (Table 1). Written consent was obtained from all patients prior to the operation.

All procedures were performed by DP, an experienced in pilonidal disease general surgeon (>10 operations/month). Preoperative workup included shaving of patients’ sacrococcygal region. The operation was conducted with the patient in prone position and the buttocks laterally retracted with adhesive tape for better exposure of the gluteal crease. After scrubbing the area with povidone iodine, local anesthetic (15 cc of lidocaine 2%) was administered. The pilonidal cyst was located through palpation, and a fusiform incision was performed, containing the cyst and any visible sinuses located in the intergluteal region. After cutting deep to the postsacral fascia, dissection of the cyst was gently performed with the help of the index finger, to avoid damage both to the fascia and the surrounding soft tissues (Fig. 1a, 1b, 1c). The cyst was completely excised, and any possible hemorrhage was controlled either with ligation or electrocauterization. The defect cavity was washed with hydrogen peroxide and further inspection of the cavity’s lateral wall was performed through palpation, to detect any possible sinuses. The two skin flaps were fixed on the postsacral fascia with continuous subcutaneous suturing, using a 2-0 monofilament absorbable suture (Fig. 3a). The semi-closed wound was washed with povidone iodine and a compression bandage was applied containing a fucidine swab (see Fig. 2).

One dose of iv antibiotics (clindamikine 600 mg) was administered in all patients postoperatively. Mobilization commenced approximately 6 h after operation, while all patients were discharged on the 1st postoperative day, after inspection and change of the wound dressing with a povidone iodine gauge (Fig. 3b). At discharge, patients were asked about their overall postoperative

| Table 1 | Patients’ demographics and inclusion – exclusion criteria. |
|---|---|
| Gender (male/female) | 32/2 |
| Age | 24.4 ± 4.5 |
| Duration of symptoms (months) | 18.5 ± 10 |
| Patients with visible sinus | 28 |
| Inclusion criteria | |
| Primary disease | |
| Symptomatic disease | |
| Pilonidal cyst located in the gluteal midline | |
| Exclusion criteria | |
| Recurrent disease | |
| Presence of abscess | |
| Pilonidal cyst located lateral of the gluteal crease | |
| Patient’s refusal | |

Fig. 1. a, b, c. A. Marking of the incision containing the pilonidal cyst and 2 visible sinuses. B. Dissection of the cyst from the postsacral fascia. C. Complete excision of the cyst.
pain with the application of a visual analog scale (VAS). A score of zero reflected no pain at all, while maximum pain was recorded with a score of 10. Discharge instructions included daily dressing changes for 10 days and shaving of the intergluteal hair every 10 days for a duration of 6 months. Patients were also instructed to resume normal activities after the 5th postoperative day, and avoid strenuous exercise for approximately 15 days. Follow up checks were conducted at 10 days, 1 and 6 months. At 6 month follow up, patients were questioned about their overall satisfaction regarding healing of the wound and the tissue scar formed. Answers were recorded using a VAS, with a score of 10 reflecting the most satisfactory result.

3. Results

A total of 34 patients met the inclusion criteria and were eligible for surgery using the aforementioned semi-closed surgical technique. 32 were male, while only 2 female patients were treated. Average age was 24.4 ± 4.5 years. Patients were suffering from pilonidal disease for an average of 18.5 ± 10 months. Visible sinuses were observed in 28 patients. All procedures were successfully completed with no intraoperative complications, while average operation time was 48.7 ± 3.8 min (Table 2).

Postoperative pain, wound dehiscence, and inflammation were observed and recorded. A mean VAS score of 1.3 ± 1 was recorded regarding patient’s postoperative pain. Oral analgesic (paracetamol 500 mg) was administered in 3 patients after surgery, due to pain in the sacral region. No incidents of wound dehiscence and no cases of wound inflammation and fever were reported. One reoperation was performed a couple of hours after initial surgery, due to hemorrhage located in the lower axis of the incision.

Follow up was completed in 29 patients (85.2%). 2 patients experienced late wound dehiscence (4th and 6th postoperative day), due to inability to comply with postoperative instructions. They both reported strenuous exercise prior to the incident. In those two patients no reoperation was performed, the skin flaps were left unsutured, and the wound was left open to heal by secondary intention. No case of infection was recorded throughout the follow up period. Rest of the patients resumed normal activities after the instructed period with no complications. During the 6 month follow up no recurrence was observed, while an average score of 8.1 ± 0.9 was recorded in the VAS regarding patients’ wound closure satisfaction. Patients who experienced wound dehiscence also completed their follow up, with good healing and no recurrence.

4. Discussion

Surgical management of PSD is a challenging and demanding procedure. Despite many techniques described in current medical literature, recurrence rates remain high [12,13]. In our experience, this is probably due to incomplete excision of the cyst or sinuses during the operation, or patient’s poor compliance with postoperative directions. It is vital to point out the importance of hair shaving around the sacrococcygeal region postoperatively. New hair can accumulate during healing, especially if the wound is left open to heal by secondary intention, leading usually to recurrence [14,15]. Patients should also be instructed to wash the surgical site daily, since dirt and sweating predispose to recurrence and poor healing results.

Table 2
Operative data and follow up results.

| Operation Time | 48.7 ± 3.8 |
|----------------|-----------|
| Return to Work | 7.2 ± 1.2 |
| Complications  |           |
| Wound dehiscence| 2 (5.8%) |
| Infection      | 0 (0%)    |
| Use of Analgesics| 3 (8.8%) |
| Haemorrhage    | 1 (2.9%)  |
| VAS pain score | 1.3 ± 1   |
| VAS cosmetic score | 8.1 ± 0.9 |
| Completed follow up | 29 (85.2%) |
| Recurrence     | 0 (0%)    |
In a recent study, Arslan et al. [8] presented a modified primary closure technique for treatment of PSD in 54 patients. Average operation time was 52.2 ± 10.3 min, while infection, hematoma and wound dehiscence rates were 16.7%, 7.4% and 3.7% respectively. Tokac et al. [9] compared the results of a modified Limberg flap operation and Karydakis flap operation. There was no significant difference in operation time (approx. 43 min), complications (approx. 6%) or recurrence (approx. 5%) between the two methods. The modified Limberg flap operation provided patients with earlier return to normal activities (20.61 ± 7.89 days) and a more satisfactory cosmetic result than Karydakis’s flap procedure. In another study, Jamal et al. [11] treated 25 patients regarding PSD with cyst excision and the wound left open to heal by secondary intention. Although a few incidents of postoperative pain were recorded, required healing time was significant high (120.08 ± 31.59 days).

The presented semi-closed technique provides a viable alternate method for treatment of PSD. No need for general or spinal anesthesia along with early discharge renders it cost effective. The small incision results in less postoperative pain experienced by the patients and a better cosmetic result. Only 3 patients requested the administration of analgesics postoperatively, while the average VAS pain score was 1.3 ± 1. Dissection of the pilonidal cyst from the postsacral fascia with the index finger is important in avoiding injury and bleeding, while it allows for better exposure of the fascia, in order to apply the subcutaneous sutures (Fig. 4). Suturing the skin flaps on the fascia plays a three part role. Initially it achieves hemostasis of the wound, while postoperatively it prevents wound infection. Lastly it provides a satisfactory cosmetic result for the patient, with no transposition of the intergluteal cleft. In our study, no incidents of infection were recorded, while all patients were satisfied with the aesthetic result (VAS score of 8.1 ± 0.9). We recommend the use of absorbable sutures for the skin flaps, since their removal could be strenuous and painful for the patient. One case of bleeding was recorded, which led to reoperation. Manipulations on the lower axis of the incision should be carefully performed, to avoid damage on the external anal sphincter.

Postoperatively, patients need to be alerted of the tension created due to the subcutaneous sutures. Although early mobilisation and return to normal activities is advised, patients should be instructed to avoid strenuous exercise for a period of at least 15 days. In our study two incidents of late wound dehiscence were reported during the 4th and 6th postoperative day due to strenuous activity, in which the wound was left to heal by secondary intention and no reoperation.

This study indicates that the presented semi-closed technique is a viable alternate option for treatment of PSD. It provides patients with a satisfactory cosmetic result, while it allows for an early and safe return to their normal activities. Our study was limited by the selection criteria, since only patients with primary disease and the pilonidal cyst located in the gluteal midline were treated. It also had a limited follow up period, although no complications or recurrences were recorded. Further studies are needed to assess the method’s efficacy, broaden the inclusion criteria, and perhaps convert this method to an outpatient procedure further reducing its costs and avoiding hospital admission.

Ethical approval

This study was a retrospective data analysis, so ethical approval was not required.

Funding

Nothing to declare.

Author contribution

GS contributed on manuscript writing, study design, data collection and analysis, while he supervised the manuscript preparation process. SS GM, TD and GD contributed on data collection and analysis, while he supervised the manuscript preparation process.

Conflict of interest

All authors declare that they have no conflict of interest.

Guarantor

Georgios Sahsamanis and Dionysios Pinialidis.

Consent

Written consent was obtained from all patients prior to the operation.

Registration of research studies

Research registry UIN: 1694.

Acknowledgements

This work has been reported in line with the PROCESS criteria. Agha RA, Fowler AJ, Rammohan S, Barai I, Orgill DP and the PROCESS Group. The PROCESS Statement: Preferred Reporting of Case Series in Surgery. International Journal of Surgery 2016; 36(Pt A): 319–323 [16].

Fig. 4. Postsacral fascia after excision of the pilonidal cyst. Better exposure of the fascia allows for better application of the sutures.
References

[1] S. Petersen, G. Aumann, A. Kramer, D. Doll, M. Sailer, G. Hellmich, Short-term results of Karydakis flap for pilonidal sinus disease, Tech. Coloproctol. 11 (3) (2007) 235–240.

[2] I. McCallum, P.M. King, J. Bruce, Healing by primary versus secondary intention after surgical treatment for pilonidal sinus, Cochrane database Syst. Rev. 4 (2007) CD006213.

[3] S.L. Jensen, H. Harling, Prognosis after simple incision and drainage for a first-episode acute pilonidal abscess, Br. J. Surg. 75 (1) (1988) 60–61.

[4] S. Chintapatla, N. Safarani, S. Kumar, N. Haboubi, Sacrococcygeal pilonidal sinus: historical review, pathological insight and surgical options, Tech. Coloproctol. 7 (1) (2003) 3–8.

[5] A.E. Humphries, J.E. Duncan, Evaluation and management of pilonidal disease, Surg. Clin. N. Am. 90 (1) (2010) 113–124. Table of Contents.

[6] A. Harlak, O. Mentes, S. Kilic, K. Coskun, K. Duman, F. Yilmaz, Sacrococcygeal pilonidal disease: analysis of previously proposed risk factors, Clinics 65 (2) (2010) 125–131.

[7] P. Garg, M. Garg, V. Gupta, S.K. Mehta, P. Lakhtaria, Laying open (deroofing) and curettage under local anesthesia for pilonidal disease: an outpatient procedure, World J. Gastrointest. Surg. 7 (9) (2015) 214–218.

[8] S. Arslan, E. Karadeniz, G. Ozturk, B. Aydinli, M.C. Bayraktutan, S.S. Atamanalp, Modified primary closure method for the treatment of pilonidal sinus, Eurasian J. Med. 48 (2) (2016) 84–89.

[9] M. Tokac, E.G. Dumlu, M.S. Aydin, A. Yalcin, M. Kilic, Comparison of modified Limberg flap and Karydakis flap operations in pilonidal sinus surgery: prospective randomized study, Int. Surg. 100 (5) (2015) 870–877.

[10] M.Z. Sabuncuoglu, A. Sabuncuoglu, O. Dandin, M.F. Benzin, G. Celik, I. Sozen, et al., Eyedrop-shaped, modified Limberg transposition flap in the treatment of pilonidal sinus disease, Asian J. Surg. Asian Surg. Assoc. 38 (3) (2015) 161–167.

[11] A. Jamal, M. Shamim, F. Hashmi, M.I. Qureshi, Open excision with secondary healing versus rhomboid excision with Limberg transposition flap in the management of sacrococcygeal pilonidal disease, JPMA J. Pak. Med. Assoc. 59 (1) (2009) 157–160.

[12] M.K. Urfan, F. Kucukel, K. Topgul, I. Ozer, S. Sari, Rhomboid excision and Limberg flap for managing pilonidal sinus: results of 102 cases, Dis. colon rectum 45 (5) (2002) 656–659.

[13] A. Shafik, Electrocauterization in the treatment of pilonidal sinus, Int. Surg. 81 (1) (1996) 83–84.

[14] G.E. Karydakis, Easy and successful treatment of pilonidal sinus after explanation of its causative process, Aust. N. Z. J. Surg. 62 (5) (1992) 385–389.

[15] J. Bascom, Pilonidal disease: origin from follicles of hairs and results of follicle removal as treatment, Surgery 87 (5) (1980) 567–572.

[16] R.A. Agha, A.J. Fowler, S. Rammohan, I. Barai, Orgill DP and the Process Group, The process statement: preferred reporting of case Series in surgery, Int. J. Surg. 36 (Pt A) (2016) 319–323.