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TECHNICAL NOTE

Negative pressure-assisted endoscopic pilonidal sinus treatment

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Abstract

Background Endoscopic pilonidal sinus treatment (EPSiT) is a novel minimally invasive option for the treatment of pilonidal sinus disease (PSD). To optimise the postoperative wound management after EPSiT, an ultraportable negative pressure wound therapy (NPWT) device was used. The aim of this study was to assess the clinical outcomes of negative pressure-assisted (NPA) EPSiT.

Methods All patients with PSD treated by EPSIT from November 2017 to October 2019 were managed postoperatively with a commercially available NPTW dressing applied to the wound. All patients were prospectively entered into a dedicated database. Primary outcome measures were healing rate and return to normal activities. Secondary outcomes were postoperative complications and patient satisfaction.

Results Thirteen male patients underwent NPA EPSiT (mean age 27.8 years, range 16–52 years). Two patients had previous surgery for PSD. The mean follow-up was 14 months (range 4–28 months). In two patients, only partial healing of the tract was achieved. One of these required a further successful NPA EPSiT, while the other one refused any other treatment because of the lack of symptoms. Eight patients were very satisfied and 5 were satisfied with this treatment.

Conclusions NPA EPSiT is a simple method for improving postoperative wound management, facilitating a quicker recovery and possibly improving overall patient satisfaction.

Keywords Pilonidal sinus · Pilonidal disease · EPSiT · NPWT · Minimally invasive treatment

Introduction

Pilonidal sinus disease (PSD) is a common disease that mainly affects young men [1]. The reported incidence is around 26 per 100,000 and it occurs more often in males than in females [2]. PSD can negatively affect quality of life due to pain and discharge and involves costs related to the initial treatment and management of recurrent disease [3]. It usually manifests in the sacrococcygeal region and is due to follicular hair retention which is complicated by an infection [4], indeed, the word "pilonidal" means "nest of hair" [5]. A cavity (sinus) in the subcutaneous tissue is always present and it is usually marked by granulation tissue [6]. Several techniques have been developed to treat this disease, both excisional and minimally invasive procedures, but there is still no consensus as to which is the most effective [7]. As a result of the general trend of surgery towards less invasive procedures [8], in 2014, Meinero et al. [9] described a new endoscopic pilonidal sinus treatment (EPSiT), using the same equipment developed for video-assisted anal fistula treatment (VAAFT). This minimally invasive technique avoids wide excision of the diseased tissues and concentrates on the debridement and cauterization of the infected area carried out without performing big incisions [9]. The postoperative management of the small wound involves daily wound washing using a syringe with saline solution for at least 2 weeks [9]. In our patients, to optimise the postoperative wound management after EPSiT, an ultraportable negative pressure wound therapy (NPWT) device was used. The aim of this study was to assess clinical outcomes of negative pressure-assisted (NPA) EPSiT. Primary outcome measures were healing rate and return to normal activities. Secondary outcomes were postoperative complications and patient satisfaction.

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Materials and methods

From November 2017 to November 2019, all patients with pilonidal sinus disease who underwent EPSiT at our institution, were included in the study. All patients were prospectively entered into a dedicated database and the data were analyzed retrospectively.

Surgical technique

All patients provided written informed consent. All cases were performed as elective day cases by an expert surgeon (PG) who had undergone specific training for the EPSiT procedure. The procedures were performed under general anesthesia in the prone position, using two plasters to separate the buttocks. Single shot antibiotic prophylaxis was given to all patients at induction. The procedure followed the steps previously described by Meinero et al. and began with the inspection of the natal cleft to individuate the orifices. When the main external opening were identified, it was incised with diathermy and enlarged to allow the introduction of an 8 mm endoscope (Karl Storz Tuttlingen, Germany). The endoscope was inserted within the tract, the channel for irrigation with glycine/mannitol 1% solution was opened, and the fistulous tract was followed to the most distal opening. During this inspection phase, the anatomy of the sinus was understood. During the operative step, the fistulous tract was first cleaned with endoscopic forceps to remove hair and hair follicles, and then debrided with cautery ablation of the granulation tissue. Gentle brushing of the tract was done to remove necrotic tissue. The fistula tract was abundantly washed. Hemostasis was checked. At the end of the procedure, a SNAP™ [10], PICO [11] or NANOVA™ [12] dressing was applied (Fig. 1).

Postoperative care

The duration of the NPWT was decided on an individual basis according to how wound healing progressed. Postoperative wound checks and dressing changes were arranged once or twice weekly by a dedicated nursing team. For simpler wounds, the patient and his main carer were trained for dressing changes to allow self-management of the wound and reduce hospital attendance. NPWT dressings were changed every 7 days unless there was a loss of suction in which case they were changed earlier. Once NPWT dressing was removed a simple flat dressing was applied if needed until complete wound closure. In the postoperative period, the patients were able to be in a normal decubitus position and were allowed to return to normal activities as soon as tolerated. Patients were allowed to shower with the device on from day 1.

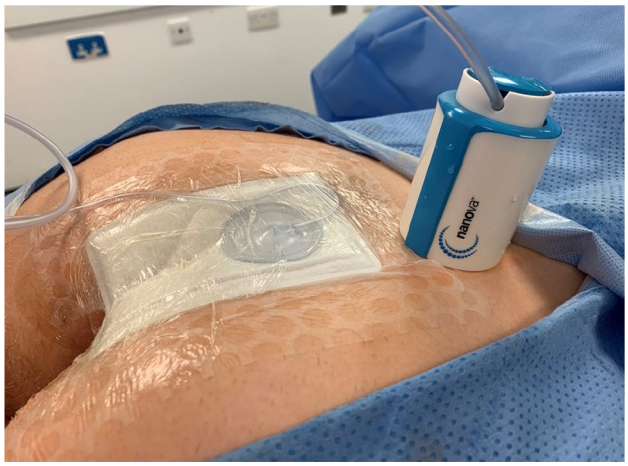

Fig. 1 The NANOVA NPWT dressing in place. *NPWT* negative pressure wound therapy

Follow-up

Patients were reviewed in the outpatient clinic 2 weeks after the operation and the following visits were scheduled until complete healing. Postoperative complications, symptoms and physical examination findings were recorded. A visual analogue scale (VAS) was used to assess postoperative pain, which was defined as mild with a score between 1 and 3, moderate from 4 to 6 and severe from 7 to 10 [13]. Recurrence was considered as the return of symptoms after the complete healing of the wound. Finally, the level of satisfaction with the procedure was investigated (0: very dissatisfied, 1: dissatisfied, 2: neutral, 3: satisfied, 4: very satisfied).

Statistical analysis

Continuous data were analyzed as means (with SD and range) and median (with range). Categorical data were analyzed as frequencies and percentages.

Results

A total of 13 patients underwent EPSiT (Table 1). Two patients had had previous surgery for PSD. SNAP™ [10], PICO [11] or NANOVA™ [12] dressings were used in three, four and six cases, respectively. One week after the operation, ten patients (76.9%) reported a VAS ≤ 3 (mild pain) and three patients (23.1%) complained of moderate pain ($4 \leq$ VAS ≤ 6). The negative pressure dressing was changed a median of 2 times (range 1–4) once a week

Table 1 Patient characteristics

Characteristic	Value
Patients enrolled	13
Male/female	13/0
Age (years)	Mean 27.8 ± 11.1
	Median 24 (range 16–52)
Recurrent PSD	2 (15.4%)

PSD pilonidal sinus disease

Table 2 Postoperative outcomes

VAS score (1 week after surgery)	*N* (%)
1–3 (mild pain)	10 (76.9)
4–6 (moderate pain)	3 (23.1)
7–10 (severe pain)	0 (0)
Follow-up (months)	Mean 14.2 ± 9.2
	Median 9 (range 4–28)
Healing outcomes	*N* (%)
Complete healing	11 (84.6)
Incomplete healing	2 (15.4)
Recurrence	0 (0)
Return to daily activities (within 1 week)	12 (92.3)
Level of patient satisfaction	*N* (%)
4: Very satisfied	8 (61.5)
3: Satisfied	5 (38.5)
2: Neither satisfied or dissatisfied	0 (0)
1: Dissatisfied	0 (0)
0: Very dissatisfied	0 (0)

VAS visual analogue scale

with a median duration of dressing changes of 2 weeks. Twelve patients (92.3%) returned to their daily activities by 1 week after the operation. No early postoperative complications were reported. The mean length of follow-up was 14.2 ± 9.2 months (median 9 months, range 4–28 months). Complete healing was achieved in 11 patients (84.6%). In two patients (15.4%), only partial healing of the tract was observed. One of them was successfully treated with redo EPSiT and NPWT, while the other refused any other treatment because of the lack of symptoms. Regarding the level of satisfaction with the procedure, five patients were satisfied and eight were very satisfied with this treatment (Table 2).

Discussion

Overall, minimally invasive treatments for PSD have several advantages such as less pain, fewer complications, shorter hospital stay, and early resumption of daily activities. Minimally invasive treatments like the injection of fibrin glue or phenol are blind procedures and do not allow complete hair removal. In contrast, during EPSiT, the curettage is performed under direct vision, achieving a better debridement [14]. In terms of postoperative complications, EPSiT is safe when compared with conventional surgical procedures [3]. Even if there is controversy about the recurrence rates reported in the literature which range from 0% [15, 16], as in our experience, to 27% [17], EPSiT can be used to treat complex PSD with a low risk of severe complications [17] and can be safely re-done with a high success rate [18]. Moreover, in our experience, it was interesting to note that the persistent fistula tract of our patient treated with redo EPSiT was smaller than that found during the first EPSiT. This may suggest that the persistence of PSD should not be considered a complete failure, especially when the first EPSiT allows a significant reduction of the length of the tract in complex cases.

One of the fundamental steps of the procedure is having at least one external opening to introduce the scope and allow the debridement and cleaning of the tract. Traditionally, the postoperative management of this small wound involves daily wound washing using a syringe with saline solution once or preferably twice a day for at least 2 weeks [9]. However, the position of these wounds makes this process awkward and unpractical for the patient who cannot self-medicate the wounds. Therefore, the management of EPSIT wounds can be quite demanding with extensive nursing involvement. Some studies have reported that the time to complete healing can vary from 29 ± 12 days [19] or even to several months with cases of unhealed wounds that may require an additional surgical procedure [16]. The use of negative pressure after EPSiT was described by Eastment in 2019 [20], however, the authors did not specifically explore the beneficial effects on wound management and the patient's quality of life. Generally speaking, NPWT seems to prevent bacterial contamination of surgical wounds [21], improve blood [22] and lymphatic flow [23], reducing edema [24], hematoma, or seroma formation [25]. As a result, NPWT appears to prevent surgical site infection (SSI) and wound dehiscence [14]. We preferred to use NPWT in this study for several reasons. First, the barrier property is particularly useful to protect the post-EPSiT wounds from faecal bacteria contamination [14]. Second, it avoids the necessity of the daily wound cleansing that is often associated with an unpleasant feeling and not always well tolerated by the patients. Furthermore, this procedure is unpractical for the patient and usually requires some form of assistance or nursing care and can delay patient's return to normal daily activities with increased cost to the healthcare and social system. In contrast, the NPTW dressing changes depend on the level of exudate and no more than once or twice weekly dressing changes are usually required. In easier cases, these can be easily performed by a well-trained caregiver.

Finally, the NPTW devices are small enough to be worn on a patient's leg, arm, or belt and hidden under everyday clothing. Three different NWTP devices were used in our study in the attempt to achieve the optimal NAP EPSiT. All three offer the option to use different size of dressings to snug fit the surgical wounds. PICO and NANOVA absorb the exudate into the dressing while the SNAP has an external canister were the drainage is collected. The PICO is an electronic device with internal batteries and fitted with an electronic alarm to signal the loss of suction or the malfunction of the device. On the other end, the SNAP and NANOVA are based on a mechanical pump, manually activated to generate the vacuum action of the device. They do not have an electronic alarm and the suction function can be assessed visually. The absence of a battery-powered pump makes SNAP™ [10] and NANOVA™ [12] systems completely silent. Based on our own experience as well as patients and nurses' feedback, we found that the device that performed best and best tolerated was the NANOVA. This was the smallest, lighter and most portable of the three, less intrusive and very easily handle for the patient. Furthermore, NANOVA™ is slightly cheaper compared to the other two devices. NANOVA™ has an approximate cost of £110. SNAP has an approximate cost of £130 and finally PICO has a cost that may vary between £125 and £145. It must be taken in consideration that costs may vary by country and order volume; however, in our practice, we found NANOVA™, the cheapest and our preferred option.

We appreciate that using three devices may have introduced some bias and the use of a single device for the purpose of the study might have been better. However, this study was a pragmatic study and represents a snapshot of our initial experience with the use of NWPT in association with the EPSiT technique. The procedures were performed with the intention of combining the possible advantages of NWPT with those of the EPSiT. We used three different devices in our study and we did not have any preference at the beginning of our experience. Towards the end of the study period preference was given to the device considered best suited for the purpose.

The main problem with the NPA EPSiT is the application of the dressing for some of the wounds especially close to the anus where an airtight seal may be difficult to achieve. In these specific cases, an experienced nurse may be required to help with the dressing application. In our experience, only one patient had difficulties with the application of the dressing and with maintaining the negative pressure needed: this is the only patients who required more frequent changes. Given that this was a study with a small number of patients, it would have been challenging to assert that the negative pressure device has an added value to the conventional EPSiT as far as healing rate and time to heal. Indeed, the main objective of using NPWT was to simplify the management of the postoperative wound and not shorten the healing time or improve the healing rate which, however, could be added benefits. To assess the impact on healing time and healing rate will take a much larger comparative trial.

Conclusions

NPWT is a simple and practical option that helps to optimize postoperative wound management after EPSiT, facilitating a quicker recovery and with the potential of further improving outcome. The less demanding postoperative wound management together with a quicker return to normal activities is also likely to offset the cost of the device.

Funding None.

Availability of data and materials Data available, if required.

Code availability Not applicable.

Declarations

Ethical approval Not needed.

Conflicts of interest The authors declare that they have no conflict of interest.

Consent to participate This was a retrospective analysis of a prospectively collected clinical data on a specific cohort of patients. Patients were consented for the procedure but there was no specific consent for the study.

Consent for publication Not needed.

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