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Laser Ablation Versus Open Karydakis Surgical Excision in Management of Simple Pilonidal Sinus: A Narrative Review

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Abstract

The ideal treatment varies according to the clinical presentation of the disease. Although chronic pilonidal sinus has been surgically treated for more than 100 years, there is still no standard treatment approved by all surgeons. Two main lines are accepted in treatment of chronic pilonidal disease: minimally invasive techniques and definitive surgical modalities in chronic pilonidal sinus. First, midline pits are excised with a small amount of skin and the most distal part of the fistula tract is opened. Thereafter, a radial fiber delivering laser energy is introduced into the sinus tract which is cleaned and sealed by withdrawing the fiber. Healing time is generally longer in techniques involving secondary healing than in techniques with primary closure in the absence of wound complications. In order to reshape and flatten the natal cleft to reduce friction, local warmth, moisture and hair accumulation, several flap techniques have been described to cover the defect after radical excision of the sinus. The Karydakis flap procedure was first described by George Karydakis in 1973 and has frequently been used to treat sacrococcygeal pilonidal sinus disease.

Keywords: pilonidal sinus disease; laser ablation; Karydakis flap; surgical excision; minimally invasive techniques; wound healing

Treatment According to Clinical Presentation

The ideal treatment varies according to the clinical presentation of the disease. First, it is important to divide pilonidal disease into the following three categories, which represent different stages of the clinical course:

Treatment of asymptomatic pilonidal sinus:

Asymptomatic pilonidal disease (PD) may be treated conservatively by shaving the natal cleft, improved hygiene, and mechanical removal of shed hairs. Laser removal of hair in the natal cleft is increasingly popular (Minneci et al., 2018).

Treatment of Symptomatic pilonidal disease:

The mainstay of treatment is surgical. Antibiotics may be indicated in purulent stages before surgery or in rare cases of systemic infection. Prophylactic use of antibiotics in the surgical treatment of pilonidal disease remains unproven (Kallis et al., 2018).

Acute pilonidal abscess:

Incision and drainage are indicated in most cases of acute pilonidal abscess, although needle aspiration followed by antibiotics has been described by some authors. Long-term recurrence- free healing can occur following Incision and drainage (Iesalnieks et al., 2021).

In the previous version of German National Guideline, Definitive excision was recommended as an alternative to simple Incision and drainage in case of small abscesses. However, in the present version of German National Guideline, Incision and drainage is the preferred method for all acute abscesses (Iesalnieks et al., 2021).

Incision and drainage are indicated in most patients with pilonidal abscess. Elective surgery should be performed after resolution of acute inflammation (Iesalnieks et al., 2021).

Chronic pilonidal sinus:

Although chronic pilonidal sinus has been surgically treated for more than 100 years, there is still no standard treatment approved by all surgeons (Rao et al., 2015).

Treatment Options for Chronic Pilonidal Sinus

Before proceeding with any technique, the patient has to be placed in the prone position with the buttocks retracted with adhesive tape and the sacral area carefully shaved and disinfected (Garg and Yagnik, 2021).

Local anaesthesia is achieved by infiltration of about 30 ml of the local anaesthetic solution made up of a mixture of an equal volume of 1% lignocaine with adrenaline, 0.5% bupivacaine and normal saline. The local anaesthetic agent is injected at four points around the pilonidal sinus. Spinal or general anaesthesia are given if local is not sufficient, expected prolonged operative time or the patient does not consent to local. Injection of diluted methylene blue through the orifices of the sinus to mark the subcutaneous tracts is an additional preparational step that may be helpful with some techniques (Garg and Yagnik, 2021).

Two main lines are accepted in treatment of chronic pilonidal disease:

(1) Minimally invasive techniques: Laser Depilation, Phenolization, Fibrin glue application, Cryosurgery, Radiofrequency, Setoning, Pit excision, Endoscopic, Pilonidal Sinus Treatment (EPSiT), Platelet-rich plasma application (Girgin et al., 2012).

(2) Definitive Surgical modalities in chronic pilonidal sinus:

A) Open techniques:

- Excision of sinus tract and laying the wound open.
- Marsupialization.

B) Closed techniques:

- Excision and primary closure.
- Limited excision technique.

C) Flap techniques:

- V-Y flap.
- Karydakis and modified karydakis flap techniques.
- Bascom’s cleft lift procedure.
- Limberg and modified Limberg flap techniques.
- Dufourmental flap
- Double transposition flaps (Z-plasty and Mutaf flaps).
- Gluteus maximus Myocutaneous flap (Arslan et al., 2016).

Laser Ablation

Minimally invasive techniques:

Laser Depilation:

First, midline pits are excised with a small amount of skin and the most distal part of the fistula tract is opened. Thereafter, a radial fiber delivering laser energy is introduced into the sinus tract which is cleaned and sealed by withdrawing the fiber. There are several names for the procedure, the most popular of which are PiLaT (pilonidal laser treatment) and Silac (Iesalnieks et al., 2021).

Open Surgical Excision

Surgical technique pilonidal sinus:

Open techniques:

Healing time is generally longer in techniques involving secondary healing (regardless of whether the sinus is excised or not) than in techniques with primary closure in the absence of wound complications (Mahmood et al., 2020).

Excision of sinus tract and laying the wound open:

Technique:

Patient Preparation: The patient is placed in the prone or jackknife position. The buttocks are taped apart to expose the natal cleft. The operative area is shaved and sterilized. Spinal anesthesia with sedation or general anesthesia is used (Mahmood et al., 2020).

Incision and Excision: A midline or elliptical incision is made, encompassing all sinus tracts, abscess cavities, and secondary openings. The pilonidal cyst, granulation tissue, and fibrotic tracts are completely excised down to the presacral fascia. The depth of excision is controlled to avoid excessive tissue loss. The sinus and any lateral sinuses, the surrounding skin and subcutaneous fat are excised in block down to the sacral fascia. The large defect created is packed with gauze soaked with povidine iodine (Mahmood et al., 2020).

Hemostasis and Wound: Management Hemostasis is achieved using electrocautery. The wound is left open to heal by secondary intention. Packing with gauze or a vacuum-assisted closure (VAC) system may be used (Agarwal et al., 2019).

Postoperative Care: Regular wound dressings (daily or as per healing progress). Encourage hygiene and hair removal (shaving or laser depilation). Patients should avoid prolonged sitting and maintain good wound care. Healing usually takes 4–8 weeks, depending on the wound size (Muscat et al., 2024).

Closed Surgical Techniques

Closed techniques:

Excision and primary closure:

The excision and primary closure technique is a well-known easily practiced procedure.

Technique:

The sinus tract is totally excised up to the presacral fascia via an elliptical incision in the midline. Thorough hemostasis is done, and a drain is placed in the resultant dead space. Series of interrupted absorbable sutures are used to suture the deepest tissues. Finally, the skin is closed with vertical non-absorbable sutures. The suction drain is removed when the effluent is less than 20 mL/24 hours (Hemmingsson et al., 2022).

Limited excision technique:

Limited excision of pilonidal sinus is one of the best therapeutic options. The result of this method is comparable with the more aggressive frequently used excisional method, and it has the advantage of having a shorter recovery and better patient satisfaction (Karaca et al., 2013).

The subcutaneous dead space left after the excision should be closed with absorbable polyglactin sutures, each deep suture is passed through the midline of the presacral fascia to avoid seroma formation. Subsequently, the wound at both sides of the sinus should be primarily closed using polypropylene sutures in a mattress fashion (Karaca et al., 2013).

Flap Techniques

(3) Flap techniques:

In order to reshape and flatten the natal cleft to reduce friction, local warmth, moisture and hair accumulation, several flap techniques have been described to cover the defect after radical excision of the sinus. Most flap techniques prevent tension of the wound as well as midline scar tissue (Mutaf et al., 2017).

Karydakis Flap Procedure

Karydakis flap procedure:

The Karydakis flap procedure was first described by George Karydakis in 1973 and has frequently been used to treat sacrococcygeal pilonidal sinus disease (Bali et al., 2015).

Technique:

After positioning and preparing the patient, methylene blue is applied into the sinus orifices to reveal the extension of the tracts. Following that, an asymmetrical elliptical incision is marked to encompass the pilonidal complex. The upper and lower ends of the ellipse are marked at least 2 cm away from the midline with its long axis parallel to it (Idiz et al., 2014).

The area marked is then excised in full thickness up to the sacral fascia, with a straight edge on the side of flap mobilization and a sloping edge on the other side. The tissue on the medial margin is undercut and mobilized across the midline to the contralateral side to create our desired flap. A layer of 1-0 polyglactin sutures is then placed, with the needle being passed into the sacral fascia in the midline and then into the V junction of the flap and secured. A suction drain is placed and brought out laterally (Kumar & Sutradhar, 2014).

A second layer of polyglactin sutures is then placed to secure the flap to the lateral edge of the wound. Skin is approximated using 2-0 nylon mattress sutures and a pressure dressing is applied (Kumar & Sutradhar, 2014).

Modified Karydakis Procedure

Modified karydakis procedure:

It's the same as the classic karydakis procedure. However, in the present modification described by Bessa in 2007, the base of the flap was sutured from its gluteal fascia directly to the lateral edge of the wound without fixation to the sacral fascia, with the aim to flatten the natal cleft even more and avoid creation of another vulnerable midline raphe (Martinez Sanz et al., 2016).

Bascom Cleft Lift Procedure

Bascom cleft lift procedure:

Cleft lift procedure is considered a modified Karydakis technique. With the patient standing, a line is drawn on each buttock where the surface skin disappeared into the chasm. The skin on the left is to be removed, on the right it is undermined and shifted for the repair. If the defect is limited to the small oval, then the skin excision can end at the dashed line on the left. If the defect is so long that it extends near the anus then the incision is turned left as it passes the end of the defect. After extended undermining to rim trails, tapes are removed, and the buttocks are pushed together until the rim trails touch. After complete skin excision, the right fat lies against the left fat. This contact is stabilized with light interrupted sutures. To close the skin, the edges are pushed together at the left rim trail and stitched. Patients are repaired under general anaesthesia. Suction drain is removed after 1 day and patient is discharged (Immerman, 2021).

Surgical Treatment of Recurrent Pilonidal Sinus

C) Surgical treatment of recurrent pilonidal sinus:

The choice of operation differs according to the condition of patient wound and surgeon opinion. In these complex patients, excision of the pilonidal sinus is combined with a flap closure and modification of the midline natal cleft. These

procedures include rhomboid flaps, Z-plasty, the Karydakis procedure, Bascom's cleft lift procedure, V-Y plasty, gluteus maximus myocutaneous flaps and skin grafting (Cai et al., 2022).

Conclusion

The ideal treatment varies according to the clinical presentation of the disease.

Although chronic pilonidal sinus has been surgically treated for more than 100 years, there is still no standard treatment approved by all surgeons (Rao et al., 2015).

First, midline pits are excised with a small amount of skin and the most distal part of the fistula tract is opened. Thereafter, a radial fiber delivering laser energy is introduced into the sinus tract which is cleaned and sealed by withdrawing the fiber (Iesalnieks et al., 2021).

The Karydakis flap procedure was first described by George Karydakis in 1973 and has frequently been used to treat sacrococcygeal pilonidal sinus disease (Bali et al., 2015).

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