

Multiple Z-Plasty in Pilonidal Sinus—A New Technique under Local Anesthesia

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Abstract

Background: Pilonidal sinus is a common surgical condition. Though benign, it causes a lot of distress with its associated morbidity and financial loss to the patient. Many procedures have been tried, ranging from nonsurgical to surgical methods (both conservative and radical ones). It is well known that recurrences are low when the scar is away from the midline.

Materials and Methods: The author has described a new technique of multiple Z-plasty for the treatment of pilonidal sinus that has been effective in the cure of this problem. This article reports a prospective, nonrandomized noncomparative preliminary clinical study of 115 cases of pilonidal sinus operated on by the author over 14 years.

Results: The results were compared with the results of other methods mentioned in the literature. There were only two recurrences.

Conclusions: The author proposes that multiple Z-plasty can be considered as an option in the surgical treatment of pilonidal sinus.

Pilonidal sinus is one of the minor surgical conditions which, though appearing trivial to the patient, nevertheless involves a radical surgical procedure entailing a considerable stay in hospital, discomfort, and loss of earnings.^{1,2} It is responsible for much morbidity, and its treatment places a burden on hospital and community resources.^{3,4} Hairy body, sweat, obesity, male sex hormone, dark skin, stiff hairs, prolonged sitting, and poor hygiene are some of the factors implicated in this disease.

As many as 20 techniques have been described in the literature, but still the optimum treatment remains a topic of debate. In pilonidal sinus, lesser treatment is better than more. The condition is often self-limiting, and non-operative methods can occasionally be curative. Thus, though apparently innocuous, it is a difficult problem with a not-so-simple solution.

It is well known that techniques that place the scar away from the midline have the lowest recurrence rates.⁵

Single Z-plasty is one such procedure used to treat chronic pilonidal sinus. There have been many series describing single Z-plasty to treat chronic pilonidal sinus.^{6–8} Here the author describes his experience with a new technique of multiple Z-plasty that has not been reported in the literature.

MATERIALS AND METHODS

All healthy patients with chronic pilonidal sinus willing to undergo surgery constituted our series. Those with acute pilonidal abscess, unhealed midline wound, and medical co-morbidity were excluded. The patients with active infection were treated with a course of antibiotics to bring the infection under control. Some of the early cases were operated under regional anesthesia (spinal anesthesia in 2 cases, epidural anesthesia in 5 cases), whereas most of the later cases, as surgical experience increased, were operated under local anesthesia (108 cases). Sedation



Figure 1. Chronic pilonidal sinus—methylene blue instilled.

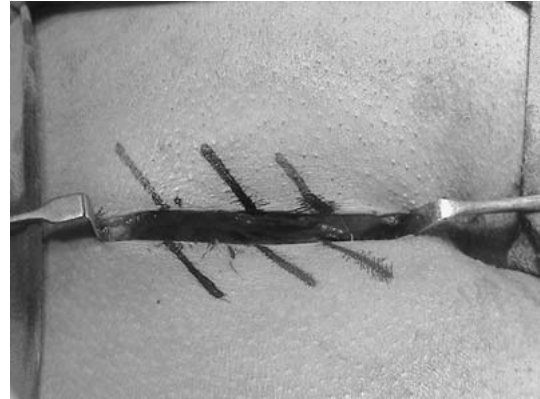


Figure 3. Multiple Z-plasty markings done.



Figure 2. Elliptical incision to core the tract.



Figure 4. Multiple Z-plasty cuts taken.

with injection midazolam or pentazocine was used in apprehensive patients. Injection amoxicillin–clavunate 1.2 g was given intravenously at the start of the surgery. The patient was put in a prone jackknife position with a pillow below the belly to raise the hips. The buttocks were strapped apart so as to expose the operative area. Shaving was undertaken just before the surgery. The operative area was suitably prepped and draped. Methylene blue was instilled through the mouth of the sinus to stain the tract (Fig. 1). Complete excision of the tract appears to be the key to the success of this surgery. Therefore the importance of injecting the dye in the tract to stain the complete tract. The area was then infiltrated with 2% lignocaine with adrenaline through a 26-gauge 1½-inch needle. The mouth of the sinus was encircled with an elliptical incision and the tract was cored out (Fig. 2). All congenital pits were also cored, as it is thought that these pits are the precursors of a sinus. All the sinuses were completely cored, with care taken not to enter the tract at any time. This achieves complete excision of the diseased tissue, which is the key to the success of the operation. Excision is done to the depth of the disease, which in some cases may be to the postsacral fascia. Hemostasis

is meticulously achieved with a bi-polar diathermy. Skin hooks are applied at either ends of the wound, and traction is applied. Appropriate markings for Z-plasty are made, with an optimum angle of 45 degrees, taking into consideration the principles of plastic surgery (Fig. 3). The number of cuts depends on the length of the wound and usually varies from 2 to 5. The cuts are deepened to the subcutaneous fat, and the flaps are undermined and mobilized (Fig. 4). Extensive undermining is avoided to prevent the risk of devitalization of the flaps. The flaps are then suitably interdigitated (Fig. 5). The subcuticular tissue is sutured with 4-O polyglycolic acid, and the skin is sutured with fine interrupted sutures of 5-O nylon. The apex of the flaps is sutured by partly subcuticular mattress sutures to prevent necrosis. A Redivac drain is used whenever the situation demands, and it is removed above the wound (Fig. 6). A hematoma would lead to breakdown of the wound, a weak scar, and a possible relapse of the condition. A polyvinyl polymer aerosol spray (Healex) is applied to protect the wound from contamination. A diclofenac suppository was put in at the end of the procedure. This was followed by oral ibuprofen–paracetamol tablet thrice daily for 2–3 days.



Figure 5. Flaps interdigitated.



Figure 6. Suturing near completion.

The patient is put on a liquid diet for 2 days, and bowel movements are discouraged until then. The patient is nursed in a prone position for the first few days and then gradually moved out of bed. Sitting in bed is discouraged until the 15th day. The patients were discharged from the hospital by the 5th postoperative day. The sutures are removed by the 10th day. Follow-up schedule is 7 days, 15 days, monthly for 3 months, and then every 3 months for 3 years.

Absence of pain, swelling, discharge, and complete skin epithelization are taken as an index of cure with a minimal follow-up period of 18 months.

RESULTS

A total of 115 patients were operated from January 1992 to January 2004 of which 7 were recurrent pilonidal disease. However 14 patients were lost to follow-up. (All 14 patients were lost to follow-up after the suture removal, with wound infection in one case.).

The average duration of surgery was 45–90 minutes (mean: 60 minutes). Average blood loss in this procedure

Table 1.
Sex distribution

Sex	Number	Percentage
Males	98	85.22
Females	17	14.78

Table 2.
Age distribution

Age	Number	Percentage
11 – 20	15	13.04
21 – 30	62	53.91
31 – 40	36	31.31
41 – 50	02	01.74

Table 3.
Comparison of the healing time (HT) and recurrence rate (RR)^{5,6,9}

Method	HT (days)	RR (%)
Saucerization	28–52	1–19
Marsupialization	28	6
Bascom	21	7–22
Primary closure	15	16–37
Karydakis	16	1–4
Rhomboid	–	5
Single Z-plasty	–	0–1.6
Multiple Z-plasty	10	1.98

was 50 cc (range: 30–70 cc), which was much less compared to 250–400 cc in single Z-plasty, rhomboid flap and V–Y advancement.⁶ Less cutting and undermining of tissues combined with the vasoconstrictor effect of adrenaline kept the blood loss to minimum.

Recurrence was seen in only 2 out of 101 patients (recurrence rate 1.98%). Both of these patients could be salvaged nonsurgically with phenol cauterization and repeated scraping. (The minimum follow-up without recurrence for a period of 18 months was considered as cure.) There was wound infection in 5 patients in whom a few sutures were removed for drainage. In such cases, care should be taken to remove sutures away from the midline. All the wounds healed satisfactorily thereafter in 14–25 days. There was no major skin necrosis as there is limited undermining. None of the patients complained of numbness in the natal cleft, which is a bothersome to the patient. This was attributed to limited undermining of the flap.

DISCUSSION

Pilonidal sinus remains a common, recurring problem with a high cost to the population in terms of days of

hospitalization, discomfort for patients treated on an outpatient basis, and the loss of both earning and production capacity.⁶ Pilonidal disease is a benign condition and patients apparently outgrow its infective complications. It is therefore imperative that the treatment not be worse than the disease itself. There are a number of operations described in the literature for this condition, none of them ideal. The ideal procedure for this condition would be an operation that:^{5,9}

- is simple to perform
- can be performed under local anesthesia
- is not associated with morbidity
- requires short or no hospitalization
- allows a rapid return to normal activity.
- is cost effective
- is not cosmetically disfiguring
- has low failure and recurrence rates
- avoids a midline wound or a scar, both of which predispose to skin breakdown and relapse
- is associated with rapid healing

The principle of the treatment of pilonidal sinus by excision and Z-plasty reconstruction acknowledges contemporary concepts of the etiology of this condition and seeks to eliminate these causal factors, thus making recurrence less likely. Most techniques aim at total excision or destruction of the sinus without any regard for the etiological factors. It is not surprising therefore that the recurrence rate following such procedures as marsupialization, fistulotomy, or excision and primary suture is high. Z-plasty excises the inflamed area as well as converts the deep natal cleft into a plateau. It is known that pilonidal sinus does not occur on a flat or a convex surface. Also the directions of the hair are altered away from the midline. It leaves no midline scar, largely prevents maceration, reduces suction effects in the soft tissues of the buttocks, and minimizes friction between two adjacent surfaces.⁷ In short, the procedure of Z-plasty

- prevents accumulation of debris and maceration
- leaves no residual pits, which might be the starting point for penetration of hairs
- elevates the contours of the natal cleft to a level nearer that of buttocks
- eliminates the fibrous raphae
- reduces the effects of both differential friction between the buttocks externally and differential movement and suction subcutaneously^{6,8,10}

The author's experience with multiple Z-plasty as a surgery for chronic pilonidal disease has been very encouraging. The operation is simple to perform, under

local anesthesia in most of the cases, with very little morbidity. It demands little nursing attention and is associated with rapid healing of the wound thereby reducing the cost. It keeps the scar away from the midline hence less chance of a relapse. Such relapse and treatment failures aggravate the psychological and social consequences to an unendurable degree for an individual patient. There is a rapid return to activity compared to methods like saucerisation and marsupialization. The cosmetic effect of multiple Z-plasty is much more pleasing compared to procedures like the rhomboid flap, gluteus myocutaneous flap, and V-Y advancement, as can be seen from the photographs (Figs. 2–6).

Advantages of Multiple Z-plasty over Single Z-plasty

Multiple Z-plasty requires less lateral undermining thus can be easily accomplished under local anesthesia. It also has all the other advantages of less undermining: less blood loss, no necrosis of the apices of the flaps, and absence of numbness, which is common with single Z-plasty. The cosmetic effect is more pleasing as the scars do not extend over the buttocks. It causes less distortion of the natal cleft. The side tracts can be easily excised as one of the limbs of the multiple Z-plasty. In single Z-plasty it would require a wider ellipse to encompass the side tracts, which would later put the wound closure under tension.

The author feels that there are no disadvantages with this technique over single Z-plasty. Technically it is as simple as single Z-plasty. Cosmetically it is less disfiguring compared to rhomboid flap, Limberg flap, V-Y advancement, gluteus maximus flap, and single Z-plasty. The healing is faster than marsupialization and saucerization and as good as primary closure but with a lower recurrence rate. In addition, it is technically simpler than Karydakis, Bascom, and D excision, and it removes the disease, unlike the Lord & Miller procedure. In short, it can be called a perfect balance between conservatism and radicalism.

CONCLUSIONS

Multiple Z-plasty for chronic pilonidal sinus can be recommended as it has many advantages: it avoids a midline scar; it makes the natal cleft shallow, thereby eliminating the suction effect and reducing sweat accumulation; it is easy to learn, safe, and effective; and it can be performed under local infiltration anesthesia.

REFERENCES

1. Maurice BA, Greenwood RK. A conservative treatment of pilonidal sinus. *Br J Surg* 1964;51:510–512.
2. Azab ASG, Kamal MS, Saad A, *et al.* Radical cure of pilonidal sinus by a transposition rhomboid flap. *Br J Surg* 1984;71:154–155.
3. Stansby G, Grestorex R. Phenol treatment of pilonidal sinus of the natal cleft. *Br J Surg* 1989;76:729–730.
4. Brearley R. Pilonidal sinus. A new theory of origin. *Br J Surg* 1955;43:62–68.
5. Senapati A, Cripps NPJ. (2000) Pilonidal sinus. In Johnson CD, Taylor I, editors, *Recent Advances of Surgery*, Vol. 23, New York, Churchill Livingstone.
6. Middleton MD. Treatment of pilonidal sinus by Z-plasty. *Br J Surg* 1968;55:516–518.
7. Bose B, Candy J. Radical cure of pilonidal sinus by Z-plasty. *Am J Surg* 1970;120:783–786.
8. Hodgson WJB, Greenstein RJ. A comparative study between Z-plasty and incision and drainage or excision with marsupialization for pilonidal sinuses. *Surg Gynecol Obstet* 1981;153:842–844.
9. Hull TL, Wu James. Pilonidal disease. *Surg Clin North Am* 2002;82:1169–1185.
10. Bascom JU. Procedures for pilonidal sinus. In Fielding LP, Goldberg S.M, editors, *Rob and Smith Operative Surgery, Surgery of the Colon, Rectum and Anus*, 5th Edition, London, Butterworth Heinemann, 1993:896.