

# Radiofrequency Sinus Excision: Better Alternative to Marsupialization Technique in Sacrococcygeal Pilonidal Sinus Disease

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**Background:** A number of techniques have been described for treatment of patients with sacrococcygeal pilonidal sinus disease. The author reports his experience in the surgical management of pilonidal sinus using radiofrequency sinus excision technique. The results are compared with those obtained after excision and marsupialization procedure.

**Materials and Methods:** Seventeen patients were operated by radiofrequency sinus excision and 18 with excision and marsupialization. An Elman radiofrequency device was used. The two groups were matched for age, gender and presentation symptoms. The median follow-up was two years. The patient's satisfaction on the outcome of the procedure was also evaluated.

**Results:** In the radiofrequency sinus excision group, we found on average a shorter operation time (10 vs. 36 minutes,  $p < 0.001$ ), shorter hospitalization (nine vs. 30 hours,  $p < 0.001$ ), significantly less postoperative pain, fewer cumulative requests for analgesia by the patients (14 vs. 25 tablets,  $p < 0.001$ ), and earlier return to work (six vs. 16 days,  $p < 0.001$ ). The wounds with marsupialization did heal faster than those with sinus excision; however, the difference was not significant. At two year follow-up, one patient from each group had a recurrence.

**Conclusion:** This pilot study shows that this new technique can be performed as a day care surgery. With reduced postoperative pain and early resumption to work, patient satisfaction is better in comparison to excision and marsupialization technique.

**Key words:** pilonidal sinus ■ excision and marsupialization ■ radiofrequency surgery ■ recurrence

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## INTRODUCTION

Pilonidal sinus disease is a chronic intermittent disorder of the sacrococcygeal region. Despite surgical therapy dating back more than a century, the ideal management of this disease remains controversial.<sup>1</sup>

Excision and healing by open granulation is one of the several procedures practiced since long. However, it takes months to heal and needs regular dressing and meticulous wound care. While excision with primary closure obviates a large wound, the incidences of complications, such as infection, wound dehiscence and recurrence, are very high.<sup>2</sup>

Complex procedures, such as closure by Z-plasty, rhomboid or myocutaneous advancement flaps, require expertise, long operation time and extended hospital stay. These too are fraught with complications, like loss of the graft or flap.<sup>3,4</sup>

Another technique is excision and marsupialization, in which after a radical excision, the wound is partially closed by approximating the wound edges. The procedure has been found to be simple with reduced incidences of postoperative complications and recurrence. However, the time taken for wound healing is long.<sup>5</sup>

Karydakakis<sup>6</sup> proposed a minimally invasive technique of removal of midline sinuses and lateral tracts. The procedure is simple and quick to perform, and the complication and recurrence rates are comparable with other surgical approaches.

We followed the Karydakakis technique, with the only difference being that the complete procedure of removal of sinuses and lateral tracts was performed using a radiofrequency device. Our attempt achieved favorable results in managing the pilonidal sinus disease.

This study describes the technique of sinus excision with radiofrequency. A randomized study compares the outcome of this procedure and the marsupialization technique.

## Radiofrequency Surgery

Radiofrequency surgery is a method of achieving simultaneous cutting and coagulation of the tissues

in an atraumatic manner. It uses radio waves released through a thin electrode, which cut, coagulate or reshape the desired tissues.

A radiofrequency generator Ellman dual frequency 4 MHz [Ellman International, Oceanside, NY] was used. The unit is supplied with a handle to which different electrodes could be attached to suit the requirement of the procedure. We used a needle electrode to incise the tract, a loop electrode to reshape the wound edges, and a ball electrode to coagulate the bleeding points.<sup>9</sup>

### Radiofrequency Sinus Excision Procedure

The procedure was performed, keeping the patient in left lateral position. The sinus openings were identified and marked with an indelible pen after preparing the operating area.

Methylene blue mixed with hydrogen peroxide was introduced in one of the sinuses. While delineating the tract and its branches, hydrogen peroxide helped to open up of any blocked sinus tract.<sup>10</sup> A director probe was then inserted in the sinus opening and with the help of a fine needle electrode, the sinus tract was excised. Care was taken to leave an area of at least 1 cm around the sinus opening before its excision. Any brisk bleeding encountered was coagulated with the ball electrode. A funnel-shaped dissection continued until the inner end of the sinus tract was reached. Whenever the sinuses were found connected with each other, the fistula tract and the skin between the two sinuses were simultaneously excised. All the tracts were traced in the similar fashion, and the surrounding fibrous tissue was shaved off with loop electrode to leave behind a red, raw area. Care was taken that the wound acquired a shape of the inverted cone, i.e., wide externally and narrow internally.

### PATIENTS AND METHODS

A prospective and randomized study was carried out to assess if the technique of radiofrequency sinus excision offers any advantage over the excision and marsupialization procedure. The study was performed at Gupta Nursing Home, Nagpur, India

between January 2001 and June 2002, with a follow-up that was continued until December 2004. Thirty-five patients with limited, chronic pilonidal disease were randomized into two groups. Patients having acute disease, those who had a previous operation for this pathology or having more than four sinuses were excluded from the study.

Randomization was carried out using a sealed envelope at the time of admission in the hospital. Patients and researchers were blinded to the treatment strategy. The same surgeon performed both types of operations. The study was approved by the local ethical committee and was performed according to the Declaration of Helsinki. Informed consent was obtained from all the patients.

Patients were divided into two groups—namely, Group A and Group B. Group A patients were operated by the excision and marsupialization technique in the same manner as is described by other authors.<sup>7,8</sup>

Patients from Group B underwent a sinus excision with radiofrequency as described earlier in this paper.

### Postoperative Care

Patients were asked to take two tablets of 50 mg of diclofenac sodium for five days and thereafter as and when they felt pain. No antibiotic was prescribed. Patients from both the groups were called every week. The healing process, complications like infection, delayed wound healing, pain, etc. were monitored by an independent observer. The follow-up was continued until the wound healed completely. Thereafter, patients were asked to report after two years.

Both groups were evaluated in terms of demographics, symptoms before the procedure, operation time, hospital stay, postoperative complications, period off work, wound healing time and recurrence rate. At two-year follow-up in the office, patients were asked to rank overall satisfaction with the surgical procedure on a visual analogue scale (0 being dissatisfied, 10 being satisfied).

### Statistical Analysis

The results are presented as percentages, or means and standard deviation. Data was entered into

**Table 1. Patient Demographics**

	Excision and Marsupialization Group (n=18)	Radiofrequency Sinus Excision Group (n=17)
Male:Female	10:8	9:8
Mean age (range)	26 years (17–36)	24 years (16–33)
Intermittent discharge (%)	16 (89)	15 (88)
Pain (%)	18 (100)	16 (94)
Parasacral irritation (%)	8 (44)	6 (35)
Pruritus (%)	5 (28)	3 (18)

a database and analyzed using statistical software (Graph pad Software, San Diego, CA). The Chi-squared test and the unpaired Student's t test were used for evaluation, and a p value of <0.05 was considered significant.

**RESULTS**

Thirty-five patients with limited, chronic pilonidal disease were randomly assigned to undergo either excision and marsupialization (Group A) or sinus excision by radiofrequency (Group B). The patient demographics and symptoms before the procedure were similar in both the groups (Table 1).

The operating time was significantly shorter in the radiofrequency group in comparison to the marsupialization group (10 vs. 36 minutes, p<0.001). Patients from the control group required a longer hospitalization period when compared with the sinus excision group (30 versus nine hours, p<0.001).

The duration of postoperative pain was longer in marsupialization group. Consequently, the patients from the control group needed almost double the dose of analgesics than the patients operated by radiofrequency technique.

Patients from the sinus excision group were able to resume daily activities much earlier in comparison to the patients operated by marsupialization (six days vs. 16 days, p<0.001).

One patient from the marsupialization group developed suppuration in the suture line after one week. The wound was thoroughly cleaned and antibiotics prescribed. An uneventful wound healing was accomplished thereafter. No such wound-related problem was observed in the patients operated by radiofrequency (Table 2).

The follow-up periods were identical in both groups. The wounds of marsupialization healed earlier than the wounds of sinus excision; however, the dif-

ference was not significant. At two-year follow-up, one patient from each group developed recurrence.

The patients from the radiofrequency sinus excision group expressed better satisfaction with the procedure with a mean satisfaction grading of 9.2 on a visual analogue scale in comparison to a mean score of 7.8 recorded by the marsupialization group (Table 3).

**DISCUSSION**

There is a controversy whether open or closed operative treatment of pilonidal sinus is better, especially concerning postoperative recurrence rate and duration of work incapacity.<sup>11</sup>

It has been observed that simpler treatment methods of pilonidal disease not only carry less morbidity but also are associated with lower recurrence rate.<sup>12-14</sup>

When compared, sinus excision by radiofrequency offers several advantages over the more extensive excision and marsupialization procedure. The time to carry out sinus excision with radiofrequency was significantly shorter when compared with the marsupialization procedure. This was possible because during the procedure, the radiofrequency electrodes provided a coagulation effect<sup>15</sup> obviating the need to secure bleeding points and the time spent in this maneuver.

While suturing is required to be carried out in marsupialization, sinus excision with radiofrequency does not need any suturing. This reduces the operation time as well as the possibility of sepsis or wound-related complications that are encountered with suturing of the wound.<sup>16</sup>

Radiofrequency surgery has been found in sealing the sensory nerve endings and the leaking lymphatics,<sup>17-19</sup> the two factors that are supposed to cause pain in the postoperative period. As marsupialization requires approximation of a large wound, the wound and the sutured edges become a source of

**Table 2. Comparative Findings of the Postoperative Events between the Two Techniques**

	<b>Excision and Marsupialization (n=18) (Group A)</b>	<b>Radiofrequency Sinus Excision (n=17) (Group B)</b>	<b>P</b>
Operation time in minutes	36 (4.3)	10 (3.7)	0.001
Hospitalization in hours	30 (3)	9 (3)	0.001
Period off work in days	16(3)	6 (2)	0.001
Analgesic requirement (Number of analgesic tablets consumed)	25 (4)	14(4)	0.001
Wound infection (n)	1	0	NS
Follow up in months	24 (1)	25 (1)	NS
Healing period (days)	40 (4)	49(5)	NS
Recurrence (n)	1	1	NS

Values are mean (SD), NS: not significant

**Table 3. Patients Satisfaction Grading**

	<b>Excision and Marsupialization Group</b>	<b>Radiofrequency Incision and Lay Open Technique</b>
Mean score	7.8	9.2
[Range]	[7.1-8.3]	[8.8-9.4]
Visual analog scale: 0=dissatisfied, 10=satisfied		

pain and discomfort.<sup>20</sup>

While patients operated with radiofrequency were discharged within 12 hours of the procedure, the mean duration of hospital stay in the marsupialization group was significantly longer.<sup>21,22</sup> Similarly, the patients operated by radiofrequency were able to join their duties much earlier than the patients operated by marsupialization. This was possible because of the reduced pain and minimal discomfort in body movements.<sup>23</sup>

Shafik<sup>24</sup> used electrocautery for sinus excision and found it to be an easy and convenient method. The high-frequency radio wave has a property of sealing small blood vessels while dissecting the tissue without creating any char, whereas the electrocautery or diathermy create heat at the tip of the instrument, which is transferred to the surrounding tissues generating a temperature far exceeding the therapeutic need.<sup>25,26</sup> This invariably results in burning of the adjacent healthy tissues, which causes more pain and delay in wound healing.<sup>27</sup>

A two-year follow-up of the patients seems to be adequate to evaluate the efficacy and outcome of the procedure. "Recurrences" occurring after a year or more are usually due to formation of new sinuses and should be dealt with accordingly.<sup>28</sup>

The patients treated with sinus excision by radiofrequency expressed better satisfaction than the control group. This is explainable on the overall comfort ratio, which included short hospital stay, reduced postoperative pain and early resumption to work.

This series of 35 patients is too small to permit conclusions to be drawn concerning significant advantages of one form of treatment over the other. However, the technique proposed by us may be considered for the primary treatment or as an adjunct to surgery in recurrent pilonidal sinus disease.

## CONCLUSION

This study shows that radiofrequency sinus excision technique may have definite advantages over sinus excision and marsupialization in patients with limited, chronic pilonidal disease. The patient satisfaction in the radiofrequency technique seems to be perceptibly greater than that in the excision and marsupialization procedure.

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## PILONIDAL SINUS EXCISION WITH RADIOFREQUENCY

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