

## —Report on Experiments and Clinical Cases—

## Anal Fistulotomy by Radiofrequency

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**Key words:** anal fistula, lay-open, radiofrequency, recurrence, incontinence**Introduction**

The fear of recurrence or impairment of continence<sup>1</sup> following an operation of fistula in ano had compelled the surgeons to explore use of a variety of diagnostic aids to identify the offending tracts and an equal number of surgical procedures<sup>2</sup> to reduce these risk factors. But despite all these attempts and trying a number of operative options, majority of surgeons still prefer the classical lay open technique [fistulotomy]<sup>3</sup> as the gold standard of treatment in anal fistula.

We present this study of using a radiofrequency device that helps perform fistulotomy in low transphincteric and intersphincteric anal fistula in a better way.

**Principles of Radio Surgery**

Radio frequency unit generate a very high frequency radio wave of 4 MHz. The unit includes a plastic covered ground plate or antenna, and a 'patient electrode' attached to a handle to be held by the operating surgeon. No electrical contact needs to be made between the patient and the ground plate, unlike operating theatre diathermy equipment. Radiofrequency thermal ablation works by converting radiofrequency waves into heat. The alternating current passing down from an uninsulated electrode tip into the surrounding tissues generates changes in the direction of ions

and creates ionic agitation and frictional heating<sup>4</sup>. The tissue heating then drives extracellular and intracellular water out of the tissue, which results in the final destruction of the tissue as a result of coagulative necrosis which can execute both cutting and coagulation effects. Unlike the electrocautry or diathermy, the electrode tip remains cold.

The unit is provided with a handle to which different electrodes could be attached to meet exact requirements of the procedure<sup>5</sup>. A ball electrode, a round loop and a fine needle electrode are needed in our procedure.

**Material and Methods**

The diagnosis of anal fistula is made on preoperative clinical judgment. In cases, where clinical diagnosis is doubtful, endoanal ultrasound is done. In none of the patients, probing or fistulogram is used as a method of establishing pre operative diagnosis<sup>6</sup>.

An informed consent is obtained from the patients before subjecting them to this new technique. The trial is approved by local ethics committee and is performed in line with the Declaration of Helsinki.

We are using the patented Ellman Dual Frequency 4 MHz unit for this procedure. [Ellman International—Hewlett, New York, USA]

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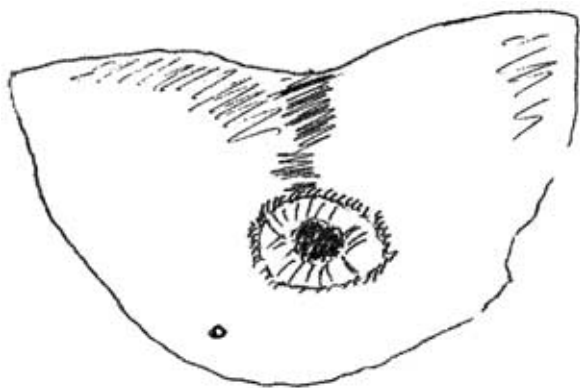


Fig. 1 Fistulous opening at 7 o'clock position with patient in the lithotomy position.

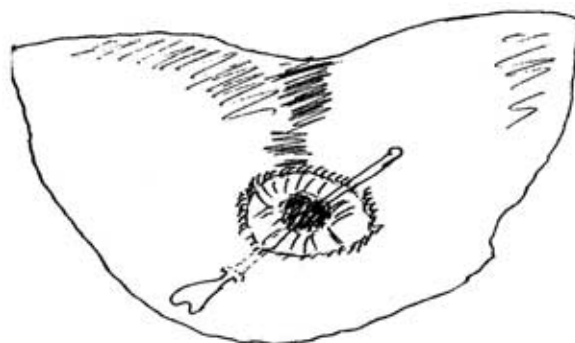


Fig. 3 Exit of the probe through the anus.

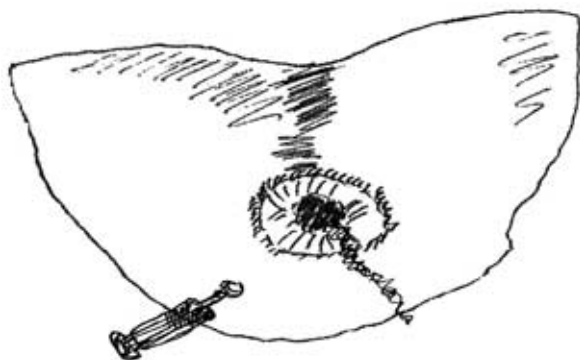


Fig. 2 Injection of methylene blue with hydrogen peroxide from the external opening seen emerging from the internal opening.

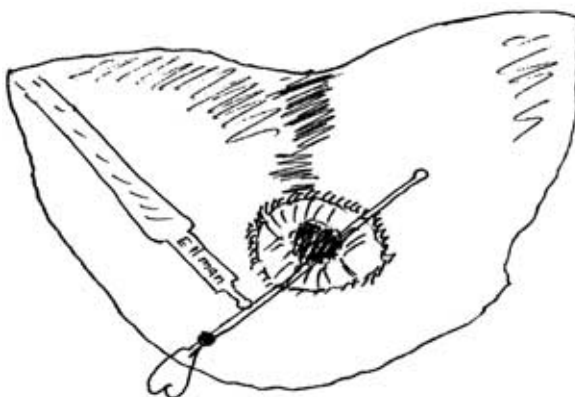


Fig. 4 The ball electrode of the radiofrequency coagulating the skin overlying the fistula tract.

### Procedure of Fistulotomy Using Radio Frequency Device

As a routine, the patient is operated under a short general anesthesia. The procedure is performed keeping the patient in a lithotomy position. While viewing through an anoscope, methylene blue dye mixed with hydrogen peroxide is injected through the external opening. The dye emerges out from the internal opening. Addition of hydrogen peroxide helps opening up the tract<sup>7</sup>. A probe is gently passed through the external opening and is brought out of the anal canal through the internal opening. The blue spot of the dye emerging from the internal opening is a good guide in this maneuver. The blue dye, though, impregnates its color to the tissue; helps in demarcating the secondary and deep tract and

helps in effectively eradicating them.

Keeping the probe in the fistula tract, the skin overlying the probe is coagulated by moving the ball electrode over its complete length. This reduces the amount of bleeding during incising the tract.

With a fine Needle electrode fixed on CUT/COAG mode; the tract is then slit opened over the probe. Two tissue forceps are applied at the edge of the wound and with a round loop electrode, the complete tract is shaved off. The bleeding points are held in the hemostat and are coagulated. If detected, the secondary or deep tracts are opened up in the same manner. The slit edges of the internal opening of the fistula are coagulated with the ball electrode. The wound is then washed with antiseptic solution and lightly tucked with gauze.

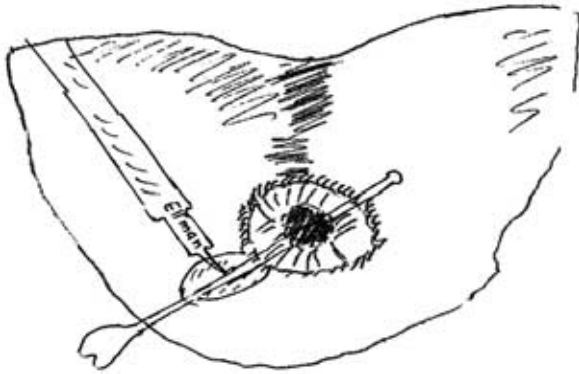


Fig. 5 Incision over the probe with the radiofrequency needle electrode, slitting open the tract.

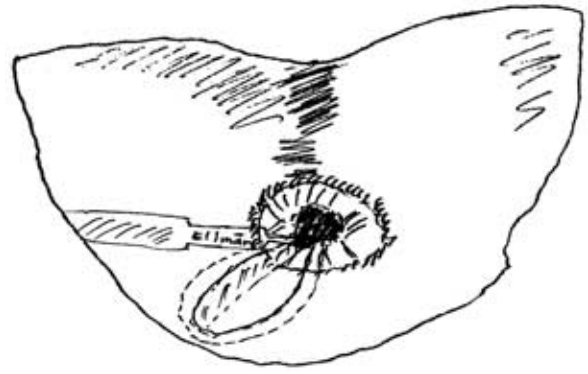


Fig. 7 Coagulation of the internal opening of the fistula tract.

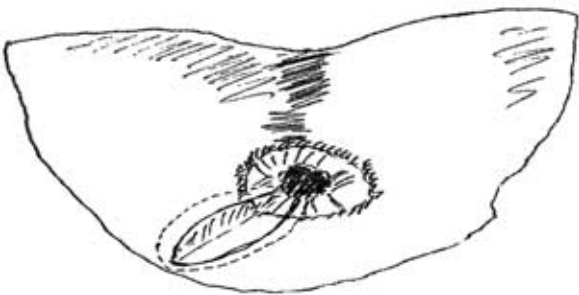


Fig. 6 Completely laid open tract.

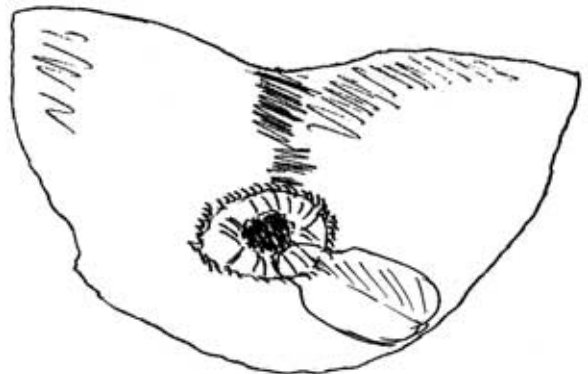


Fig. 8 The final pear shaped wound tapering towards anus.

### After Care

The patient is discharged on the evening of the procedure. He is called every 2 weeks for a review. Frequent office visits during the postoperative period helped in prompting the patient with hints of wound care. This also helped in maintaining the patient on the proper course to recovery. A warm sitz bath twice a day with application of antiseptic ointment over the wound is sufficient in maintaining the healing process.

### Results

The retrospective data of 180 patients of low transphincteric and intersphincteric anal fistula operated in our hospital over a period of 18 months from July 2000 onwards and followed up for at least 18 months is as follows.

1. Return to work-5 days [range 3~9 days]
2. Time for complete wound healing-34 days [range 28~40 days]

3. Recurrence-2 patients [1.1%]
4. None of the patient had any interference with continence.

### Discussion

In earlier days surgeons were reluctant to incise the skin and subcutaneous tissues with electro-surgical instrument under a belief that these devices increase devitalized tissue with the wound which in turn leads to increased wound infection, increased scarring and delayed wound healing<sup>8</sup>.

With the development of very high frequency electro-surgical units, which are capable of delivering a pure sinusoidal current, most of these lacunae have been overcome. This has generated a renewed interest in the field of electro-surgery.

Our study has demonstrated significant advantages of incising the skin by use of radiofrequency namely shorter operating time,

Table 1 Comparative results of radiofrequency fistulotomy and traditional fistulotomy procedures.

Observations	Radiofrequency fistulotomy technique	Conventional fistulotomy techniques
Time for wound healing [No. Of days]	28 ~ 40 days	65 ~ 75 days <sup>19</sup> .
Impairment of continence. [In percentage of patients]	None	12% <sup>17</sup> ~ 20% <sup>20</sup>
Delayed wound healing [In percentage of patients]	None	15% <sup>14</sup>
Recurrence rate [Percentage of cases]	1.1%	4% <sup>21</sup> ~ 10% <sup>20</sup>

reduced postoperative pain and edema due to sealing of lymphatics<sup>9</sup>.

Few other noteworthy features of radio frequency procedure are as follows.

Time taken for the procedure-RF fistulotomy can be performed in much less time than the conventional procedure.

Intra operative bleeding-As the radio surgical tool performs coagulation of the small bleeding vessels while the tissue is being cut<sup>10</sup>; the oozing from raw and friable tissues is much less when compared with the conventional scalpel dissection.

The radiofrequency procedure uses high frequency [4 MHz] radio waves instead of heat to cut and coagulate tissues and thereby excludes the burning effect that is common with traditional electro surgical devices, cryosurgery, and cautery equipment<sup>11</sup>.

Postoperative pain-Radio surgery has been found successful in sealing the sensory nerve endings and the leaking lymphatic<sup>12</sup>. Because of the low level of tissue destruction and controlled direction of the radio wave current, there is an appreciable fall in the amount of postoperative pain<sup>13</sup>. With the reduced intensity and duration of pain, the patients need fewer doses of analgesics. This also encourages early return to work.

Functional Impairment-Radiofrequency fistulotomy causes lesser amount of destruction of the surrounding sphincter tissues and the incidence of functional impairment like incontinence is negligible<sup>14</sup>.

Due to the precise functioning of the RF equipment, a very little normal tissue is removed or

damaged while removing the offending tissues<sup>15</sup>. It could possibly be termed as a minimally invasive procedure than conventional procedure in the process of removal of the affected tissues<sup>16</sup>.

It has been proved that the anal fistulae begin from cryptoglandular infection, which can spread to the intersphincteric space and then pass through the anal sphincter<sup>17</sup>. Our practice of dividing and coagulating the edges of the internal opening of the fistula served two purposes; namely, the cryptoglandular tissue was obviated and the fringe of anoderm between the anus and wound was ablated which apt to become edematous and painful during the postoperative course.

The radiofrequency device allows cutting and coagulation of tissues in an atraumatic manner, contrary to the traditional electrosurgical devices. With radiofrequency, the targeted tissue temperatures stay localized within a 60~90°C range thus limiting heat dissipation and damage to adjacent tissue. In contrast, electrocautery, diathermy or laser temperatures are significantly higher (750~900°C) which result in significant heat propagation in excess of the desired therapeutic need<sup>18</sup>. While techniques, using conventional scalpel apparently works in an atraumatic way, the prominence of bleeding from the wound forces the surgeon to coagulate the bleeders more frequently using traditional electrocautery or diathermy.

In comparison with the lay open technique used for anal fistula by employing traditional electrosurgical devices,<sup>19-21</sup> our technique of fistulotomy with radiofrequency was found to be superior in terms of wound healing time, impairment

of continence and wound complications like delayed wound healing and recurrence rate (**Table 1**).

### Conclusion

It can be concluded that radio frequency method is effective in achieving an effortless tissue excision with negligible bleeding and thereby providing a clean operative field for the surgeon to be more precise in his maneuvers. It allows usage in deep and difficult areas like the adjoining tracts. The wound healing is quicker. The recurrence or failure rate of the procedure is as low as 1%. The treatment is cost effective as compared to the conventional one due to reduction in hospital stay and reduced period off the work. We agree that more controlled and randomized studies comparing the radiofrequency technique with other techniques of fistulotomy are needed to establish the utility and advantages of the radiofrequency fistulotomy.

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