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Comparison of Outcome Between Ligation of Inter Sphincteric Fistula Tract with Distal Bipolar Electrocauterization (Lift With DBE) V/S Fistulectomy/ Fistulotomy for Fistula in Ano

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ABSTRACT

Background: Fistula-in-ano, an abnormal tract between the anal canal and perianal skin, often requires surgical management to prevent complications like abscesses, pain, and discharge. This study compares the outcomes of Ligation of the Intersphincteric Fistula Tract with Distal Bipolar Electrocauterization (LIFT with DBE) and traditional Fistulectomy/Fistulotomy. The study aims to evaluate the effectiveness of LIFT with DBE versus Fistulectomy/Fistulotomy in terms of fistula closure rates, recurrence, postoperative complications, healing, and recovery.

Material and methods: A prospective study of 100 patients with fistula-in-ano was conducted. Patients were divided into two groups: Group-A (Fistulectomy/Fistulotomy) and Group-B (LIFT with DBE). Outcomes included recurrence, postoperative pain (Visual Analogue Scale), bleeding, incontinence, healing time, hospital stay, and time to resume normal activities. Statistical analysis was performed using SPSS.

Results: Group-B (LIFT with DBE) had a significantly lower recurrence rate (10% vs. 20%) and a faster mean return to normal activities (11.6±1.750 days vs. 12.8±1.841 days) compared to Group-A. Postoperative pain, bleeding, and hospital stay were also more favorable in Group-B. There was no significant difference in fecal or flatus incontinence between the groups.

Conclusion: LIFT with DBE demonstrated superior outcomes, including lower recurrence rates and quicker recovery, compared to Fistulectomy/Fistulotomy. It is a less invasive and more effective surgical option for fistula-in-ano, warranting further research into minimally invasive techniques.

Keywords: Fistula-in-ano, Ligation of Intersphincteric Fistula Tract, Distal Bipolar Electrocauterization, Fistulectomy, Fistulotomy, Recurrence, Return to Activity, Surgical Outcomes

INTRODUCTION

Fistula-in-ano is a prevalent anorectal condition characterized by an abnormal tract connecting the anal canal or rectum to the perianal skin. The condition often necessitates surgical intervention due to its propensity to cause recurrent abscesses, persistent pain, and discharge, which can significantly impair the patient's quality of life. [1-3] Despite advancements in surgical techniques, the

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management of fistula-in-ano remains challenging, particularly in achieving complete healing while minimizing complications and preserving anal sphincter function. [4-6]

Fistula-in-ano presents a clinical challenge due to its tendency to recur and its associated complications, such as abscess formation, incontinence, and chronic discomfort. Effective surgical management aims to achieve complete healing while preserving the integrity of the anal sphincter to ensure continence. [2,7] The choice of surgical technique often depends on factors such as the complexity and location of the fistula, as well as the patient's anal sphincter function. [1,8] Comparing newer techniques, like Ligation of the Intersphincteric Fistula Tract with Distal Bipolar Electrocauterization (LIFT with DBE), with traditional approaches such as fistulectomy or fistulotomy is essential to determine the optimal approach for various clinical scenarios. [8,9]

There is a significant need to evaluate and compare the outcomes of LIFT with DBE and traditional fistulectomy/fistulotomy in the management of fistula-in-ano. Such a comparison is critical to determining which technique offers superior clinical outcomes.[8]

This study holds significant clinical relevance in guiding the selection of surgical techniques for fistula-in-ano management. By systematically comparing LIFT with DBE and fistulectomy/fistulotomy, the research aims to provide evidence-based insights into the efficacy and safety of these procedures. The findings will enable clinicians to make informed decisions tailored to patient-specific needs and fistula characteristics, ultimately improving treatment outcomes and patient satisfaction. [10,11]

The study aims to assess the techniques based on higher rates of fistula closure, lower rates of recurrence, fewer complications (including wound infections, postoperative pain, and anal incontinence), improved preservation of anal sphincter function, and enhanced overall quality of life for patients.

The primary objective of this study is to assess the sphincter-sparing potential of LIFT with DBE compared to traditional fistulectomy or fistulotomy. Specific outcomes to be evaluated include postoperative pain, bleeding and wound discharge, incidence of fecal and flatus incontinence, recurrence rates, risk of anal stenosis, and time required for complete healing. This comparative analysis aims to establish which technique is most effective in achieving favorable clinical and functional outcomes for patients with fistula-in-ano.

MATERIALS AND METHODS

Study design and location: This study was conducted as a prospective comparative analysis at the Department of General Surgery, Maharani Laxmi Bai Medical College, Jhansi, Uttar Pradesh, over a duration of 18 months, from January 2023 to June 2024. Patients diagnosed with fistula-in-ano were enrolled based on inclusion and exclusion criteria, and they were divided into two groups: one underwent Fistulectomy/Fistulotomy (Group-A) and the other underwent Ligation of the Intersphincteric Fistula Tract with Distal Bipolar Electrocauterization (Group-B).

Patients and Methods: A total of 100 patients with fistula-in-ano were included. Eligibility required patients above 18 years of age, of either gender, who provided consent.

Ethical Issues: Voluntary informed written consent was obtained from all study participants prior to inclusion. The study protocol was reviewed and approved by the Institutional Ethics Committee (Human Studies), Maharani Laxmi Bai Medical College, Jhansi, Uttar Pradesh, India, under approval number 2105/IEC/I/2022-2023. All procedures were conducted in accordance with the Declaration of Helsinki and relevant national guidelines.

Those with inflammatory bowel disease, tuberculosis, malignancy, Crohn's disease, ulcerative colitis, chronic diarrhea, or incontinence were excluded. Patients with comorbidities were not excluded.

Participants were randomized in a 1:1 ratio into two equal groups of 50 each using block randomization with allocation concealed in sealed opaque envelopes. Group-A underwent conventional fistulectomy/fistulotomy, while Group-B was treated with LIFT combined with distal bipolar electrocauterization (DBE).

Randomization was performed using a computer-generated sequence with variable block sizes of 4–6, stratified by fistula type, and allocation concealment was ensured through sequentially numbered, opaque, sealed envelopes. The sample size calculation was based on recurrence as the primary outcome, assuming a 35% recurrence rate in the control group, as reported by Yassin NA et al. (2013)[12], and a 10% recurrence rate in the intervention group. With $\alpha = 0.05$ and 80% power, 43 patients per group were required; allowing for 15% attrition, 50 patients were enrolled in each group to maintain adequate statistical power.

Preoperative evaluation included detailed history, clinical examination, and MRI fistulogram for delineating fistula anatomy. The LIFT with DBE procedure involved dissecting the tract at the intersphincteric plane and cauterizing the distal segment. Fistulectomy/fistulotomy involved excision or laying open of the tract, with wounds managed by primary closure or secondary intention.

Postoperative outcomes assessed were pain (VAS), bleeding, incontinence, healing time, recurrence, hospital stay, and return to normal activity. Follow-up visits were scheduled at 1 week, 1 month, 3 months, and 6 months, documenting healing, pain, bleeding, discharge, continence, recurrence, and anal stenosis.

During the 18-month study period, three patients (two from Group-A and one from Group-B) were lost to follow-up and excluded from final analysis.

Inclusion Criteria: Patients aged more than 18 years of both genders who provided informed consent for the procedure were included in the study. In addition, patients with any comorbidities were also considered eligible to participate.

Exclusion Criteria: Patients with fistula in ano associated with Inflammatory Bowel Disease, tuberculosis, or malignancy were excluded from the study. Those with fistulas related to Crohn's disease, ulcerative colitis, malignancy, or preexisting chronic diarrhea were not included. Furthermore, patients with preexisting incontinence were excluded to maintain the study's integrity.

The Ligation of Intersphincteric Fistula Tract (LIFT) with distal bipolar electrocauterization procedure was performed under saddle anesthesia with the patient in the lithotomy position. The fistula tract was identified using methylene blue dye or hydrogen peroxide. An incision was made in the intersphincteric groove, and dissection was carried out between the sphincter muscles to expose the tract. A probe was left in place during dissection for accurate identification, after which the tract was divided, ligated at the intersphincteric groove, and the internal opening was closed with vicryl 2-0 absorbable sutures. The distal tract was then cauterized using bipolar electrocautery to remove infected tissue, promoting healing and minimizing recurrence.[8]

Fistulectomy involves the surgical removal of a fistula, beginning with preoperative evaluation and confirmation of its location through clinical examination and imaging, followed by administration of prophylactic antibiotics. Under saddle anesthesia, with the patient in lithotomy position, the area is sterilized, and the fistula's extent is assessed. An incision is made over the fistula tract, which is carefully dissected and excised, including associated abscesses or secondary tracts. Methlyene blue dye or probing is used to ensure complete removal. The wound is either closed primarily or left open for secondary healing. Hemostasis is achieved with cautery, and a sterile dressing is applied. Postoperatively, pain is managed, and antibiotics were administered.[13]

Plan for Data Analysis: Statistical analysis was carried out using SPSS version 21 and Microsoft Excel. Continuous variables that followed a normal distribution were expressed as mean ± standard deviation, while categorical variables were presented as numbers and percentages. Group comparisons were performed using the unpaired t-test or its non-parametric equivalent for continuous data, and the chi-square test (χ^2) for proportions. A p-value <0.05 was considered statistically significant.

RESULTS

The demographic distribution of patients in both groups is summarized in **Table 1**. Group-B (LIFT with DBE) had a comparatively higher proportion of younger patients, with 40% in the 18–30 year age category compared to 22% in Group-A (Fistulectomy/Fistulotomy). In contrast, older patients (>50 years) were more prevalent in Group-A (22% vs. 10%). The gender distribution also differed significantly, with females constituting 34% of Group-B compared to only 12% in Group-A, suggesting a more balanced representation in the minimally invasive group. Such demographic differences may partly influence recovery outcomes, as younger age and female predominance are often associated with improved healing dynamics.

Clinical outcomes are detailed in **Table 2**. The mean duration of surgery was significantly shorter in Group-B (14.22 ± 8.555 minutes) compared to Group-A (20.32 ± 3.930 minutes, $p < 0.0001$). Postoperative pain scores were consistently lower in Group-B across all time points: on postoperative day 1 (1.34 ± 0.479 vs. 1.76 ± 0.476, $p < 0.0001$), day 2 (2.22 ± 0.465 vs. 2.74 ± 0.443, $p < 0.0001$), and day 7 (0.48 ± 0.505 vs. 0.96 ± 0.498, $p < 0.0001$). Group-B also had significantly reduced intraoperative blood loss (5.94 ± 1.754 ml vs. 8.30 ± 3.265 ml, $p < 0.0001$).

Table 1: Comparison of Demographic Parameters in our study

Parameter	Group-A (Fistulectomy/ Fistulotomy) (%)	Group-B (Ligation of fistula with DBE) (%)
Age Distribution (in years)		
18-30	11 (22.00)	20 (40.00)
31-40	15 (30.00)	13 (26.00)
41-50	13 (26.00)	12 (24.00)
51-60	07 (14.00)	04 (08.00)
>60	04 (08.00)	01 (02.00)
Sex Distribution		
Male	44 (88.00)	33 (66.00)
Female	06 (12.00)	17 (34.00)

Table 2: Comparison of Outcomes Between Fistulectomy/Fistulotomy (Group-A) and Ligation of Fistula with DBE (Group-B)

Parameters	Group-A (Fistulectomy/ Fistulotomy)	Group-B (Ligation of Fistula with DBE)	P-value
Age (years) (mean±sd)	41.04 ±11.973	35.72±13.186	0.0372
Duration of Surgery (min) (mean±sd)	20.32±3.930	14.22±8.555	<0.0001
Post-operative day(mean±sd)	2.74±0.443	2.22±0.465	<0.0001
Post-operative day 1(mean±sd)	1.76±0.476	1.34±0.479	<0.0001
Post-operative day 7(mean±sd)	0.96±0.498	0.48±0.505	<0.0001
Bleeding (ml) (mean±sd)	8.30±3.265	5.94±1.754	<0.0001
Healing Time (days) (mean±sd)	26.92±10.751	22.76±9.415	0.0423
Hospital Stay (days) (mean±sd)	4.98±1.186	4.2±0.904	0.0004
Return to Activity (days) (mean±sd)	12.8±1.841	11.6±1.750	0.0012

Table 3: Comparision of outcome of Fistulectomy/Fistulotomy and Ligation of fistula with DBE

Outcome Variables	Group-A (Fistulectomy/ Fistulotomy) (%)	Group-B (Ligation of fistula with DBE) (%)	p-value	Odds Ratio (95% CI)
Fecal and flatus incontinence				
Yes	8 (16)	6 (12)	0.550	1.40 (0.45 – 4.37)
No	42 (84)	44 (88)		
Recurrence				
Yes	13 (26)	5 (10)	0.040	3.16 (1.03 – 9.69)
No	37 (74)	45 (90)		
Anal stenosis				
Yes	6 (12)	3 (6)	0.280	2.14 (0.50 – 9.07)
No	44 (88)	47 (94)		

The healing time was shorter in Group-B (22.76 ± 9.415 vs. 26.92 ± 10.751 days, p = 0.042), with parallel improvements in hospital stay (4.20 ± 0.904 vs. 4.98 ± 1.186 days, p = 0.0004) and earlier return to daily activities (11.6 ± 1.750 vs. 12.8 ± 1.841 days, p = 0.0012). These results indicate a consistent perioperative advantage of the LIFT with DBE technique.

Long-term clinical outcomes are presented in **Table 3**. Although rates of fecal or flatus incontinence were slightly lower in Group-B (12% vs. 16%), the difference was not statistically significant (p = 0.55, OR = 1.40, 95% CI: 0.45–4.37). Similarly, the incidence of anal stenosis was reduced in Group-B (6% vs. 12%) but did not reach statistical significance (p = 0.28, OR = 2.14, 95% CI: 0.50–9.07).

In contrast, the recurrence rate was markedly lower in Group-B (10% vs. 26%), and this difference was statistically significant (p = 0.04, OR = 3.16, 95% CI: 1.03–9.69). This finding highlights the superior long-term efficacy of the LIFT with DBE procedure compared to the conventional surgical approach.

DISCUSSION

The findings of our research showed, the mean age of patients in Group-A (Fistulectomy/ Fistulotomy) was 41.04±11.973 years while in Group-B (Ligation of fistula with DBE) mean age was found to be 35.72±13.183 years. Maximum patients were in 18-30 years of age in both the groups. The age distribution between the two groups did not show a significant difference (p >0.05). This suggests that the age factor was well-matched between the groups, allowing for a fair comparison of outcomes. Prior studies such as, Shafik AAet al (2014)[14] and Barase AK et al (2018)[15], had similar age distributions.

The mean duration of surgery in our study was significantly shorter in Group-B (14.22 ± 8.555 minutes) compared to Group-A (20.32 ± 3.930 minutes) (p < 0.05). This demonstrates that LIFT with DBE is a less time-consuming procedure than Fistulectomy/Fistulotomy which is supported by prior studies such as Shafik AA et al (2014)[14], Giamundo P et al (2014)[16], Killedar MM et al (2015)[17] and Barad SV et al (2020)[18].

Our study evaluated that the Visual Analog Scale (VAS) pain scores were significantly lower in Group-B across all postoperative days measured, indicating that patients undergoing LIFT with DBE experienced less postoperative pain compared to those undergoing Fistulectomy/Fistulotomy (p <0.05). Hiremath SCS et al (2022)[19] also had similar pain scores in their studies.

In our study, Group-B had significantly lower mean bleeding (5.94 ± 1.754 ml) compared to Group-A (8.30 ± 3.265 ml) (p <0.05). Reduced bleeding in the LIFT with DBE group indicates a less invasive nature of the procedure. This is consistent with prior studies such as, Killedar MM et al (2015)[17], which also had less bleeding with LIFT + DBE group patients.

No statistically significant variation was observed in the incidence of fecal and flatus incontinence between the two groups (P >0.05), with Group-B showing slightly lower incontinence rates. This suggests that both procedures are comparable in terms of preserving continence. Prior studies such as, Shafik AA et al (2014)[14] and Dr Sejal V Barad et al (2020)[18] found similar postoperative status in patients of both the groups.

The mean healing time was significantly shorter in Group-B (22.76 ± 9.415 days) compared to Group-A (26.92 ± 10.751 days) (p <0.05). Faster healing in the LIFT with DBE group indicates an advantage in recovery time as is supported by prior studies such as, Shafik AA et al (2014)[14], Barase AK et al (2018)[15], Barad SVet al (2020)[14] and Al Sebai OI et al[20], all of which showed statistically significant difference between healing times with LIFT+DBE Group-Being superior.

The findings of our research showed Group-A (Fistulectomy/ Fistulotomy) 13 (26%) patients had recurrence while in Group-B (Ligation of fistula with DBE) only 5 (10%) patients had recurrence. The mean recurrence was found to be significantly different between the 2 group (p=<0.05). This highlights the effectiveness of LIFT with DBE in achieving long-term fistula closure. Prior studies such as, Yassin NA et al (2013)[12] and Shafik AA et al (2014)[14] also demonstrated lower recurrence rates with LIFT+DBE Group-As compared to Fistulotomy/Fistulectomy group.

Our analysis revealed no significant variation in anal stenosis between the groups (P > 0.05), with a slightly reduced incidence in Group-B. This suggests that both procedures have a similar risk for this complication.

The findings of our research showed the mean hospital stay was significantly shorter in Group-B (4.2 ± 0.904 days) compared to Group-A (4.98 ± 1.186 days) ($p < 0.05$). A shorter hospital stay for LIFT with DBE patients reflects the procedure's less invasive nature and faster recovery. Prior studies such as, Barad SV et al (2020)[18] and Hiremath SCS et al (2022)[19] also showed lower mean hospital stays in LIFT+DBE Group-As compared to the other group.

The findings of our research showed the mean of return to activity in Group-A (Fistulectomy/ Fistulotomy) was 12.8±1.841days and in Group-B (LIFT+DBE) it was 11.6±1.750 days, a statistically significant difference was noted between the two groups regarding return to activity ($P<0.05$). Prior studies such as, Shafik AA et al (2014)[14], Barase AK et al (2018)[15], and Al Sebai OI et al[20] also reported similar findings suggesting that patients who underwent LIFT+DBE procedure returned to their activities earlier thus having better satisfaction as compared to another group.

CONCLUSION

Our study shows that the LIFT with DBE procedure works better than the traditional fistulectomy or fistulotomy. It causes less pain and bleeding, helps patients recover faster, and lowers the chances of the fistula coming back, all while protecting the anal sphincter. This makes it a safer and less invasive option for treating fistula-in-ano. More research with larger sample and longer follow-up is needed to confirm these results and possibly make LIFT with DBE a standard treatment choice.

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Availability of Data: The datasets generated & analyzed during the study are available with the corresponding author & can be provided upon reasonable request.

Declaration of Non-use of generative AI Tools: The authors affirm that no generative artificial intelligence tools were used in the preparation, analysis, or writing of this manuscript.

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