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Evaluating The Effectiveness Of Surgical Interventions For Anal Fistula: A Systematic Review

Dr. Varun Gupta
Consultant, Pristyn Care, Chandigarh, India

Dr. Piyush Nikam
Consultant, Pristyn Care, Delhi, India

Dr. Amit Maurya
Consultant, Pristyn Care, Mumbai, Maharashtra, India

Dr. Tanmay Jain
Consultant, Pristyn Care, Jaipur, Rajasthan, India

Dr. Vaibhav Kapoor
Co-Founder, Pristyn Care, Gurgaon, India

Mitesh Mohan Hood
Pristyn Care (Agm- Medical Excellence), Gurgaon, India

Abstract
Objective: *The objective of this systematic review is to evaluate the effectiveness and safety of different surgical techniques for the treatment of anal fistula. The study aims to provide clinicians with evidence-based information pertaining to the surgical management of anal fistulas and eventually improve patient outcomes.*
Methods: *A systematic review was conducted that analyzed studies related to surgical treatments of anal fistula published on PubMed, Springer, ScienceDirect, and Cochrane between 2001 and 2022. The types of studies included were randomized controlled trials (RCTs), observational cohort studies, prospective studies, cohort studies, and comparative studies. The risk of bias for RCT studies was determined using Revman 5.4.1 software, and the risk of bias for comparative studies, prospective studies, observational cohort studies, and clinical trials was described using a Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist.*
Results: *The search strategy revealed 227 studies, and based on the inclusion criteria, 18 relevant studies were selected. From these studies, the data of a total of 1709 patients were analyzed. The following interventions were observed: Ligation of Intersphincteric Fistula (LIFT), fistulotomy, Seton, fistulectomy, Video-Assisted Anal Fistula Treatment (VAAFT), fistula plug, and Fibrin Sealant-Assisted Treatment (FSR). There is no single intervention which was found to be superior to other interventions for all types of anal fistula.*
Conclusion: *The various treatments for anal fistulas, including LIFT, Radiofrequency Fistulectomy, Seton, FSR, VAAFT, and Fistula plug, have all shown promising results in different studies. Minimally invasive procedures such as LIFT and VAAFT prove to be more reliable for complex fistulas, whereas fistulotomy and seton produce better outcomes in the case of uncomplicated fistulas. Further research is needed to explore more regarding the implications of some advanced non-surgical treatment options such as fibrin sealant assisted treatment.*
Keywords: *Anal fistula, Surgical treatment, Fistulotomy, LIFT, VAAFT*

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I. Introduction

An anal fistula is a common condition that affects the anal canal, leading to the formation of a tunnel or tract that connects the anal gland to the skin near the anus. The most common causes of anal fistula include infections of the anal glands, Crohn's disease, trauma, and radiation therapy. [1] The condition can cause significant morbidity, and surgical intervention is often required for treatment. Over the years, several surgical techniques have been proposed for treating anal fistula. However, the optimal technique remains a matter of

debate. An ideal surgical treatment for anal fistula should eradicate sepsis and promote healing of the tract while preserving the sphincters and the continence mechanism. [2] For simple and most distal fistulas, the traditional method of surgically treating a fistula, which involves lay-opening of the fistulous tract and completely severing the tissue between the fistula tract and the anoderm, was proven to be highly successful, with success rates reaching up to 100%. [3] In cases of high-grade fistulas, particularly those that are recurrent or complex with multiple extensions or separate tracts, or when the fistula tract traverses more than 30%-50% of the external sphincter, there exists a considerable risk of compromised functional outcomes and potential damage to the anal sphincters. [4, 5] In recent years, there has been a growing interest in the use of minimally invasive techniques like VAAFT (Video-assisted anal fistula treatment) and LIFT (Ligation of intersphincteric fistula tract) for the treatment of anal fistula. VAAFT involves the use of a small camera to visualize the fistula tract. [6] The LIFT technique involves ligating the fistula tract at the level of the intersphincteric plane, which is the space between the internal and external anal sphincters. [7] LIFT is effective in treating complex anal fistulas while preserving sphincter function. [8] In addition to these minimally invasive techniques, advancements in surgical technology led to the development of several other treatment options for anal fistula. These include using fibrin glue and stem cells, which have shown promising results in small studies. [9]

Despite the availability of various surgical options for the treatment of anal fistula, the optimal technique remains unclear. This study can help identify the most effective and safe surgical procedure for treating anal fistula while minimizing the risk of complications and preserving sphincter function.

II. Methods

To collect the relevant studies for the systematic review of surgical treatments for anal fistula from PubMed, Springer, ScienceDirect, and Cochrane, we used a combination of keywords and MeSH (Medical Subject Headings) related terms. The keywords we used included ‘Anal fistula,’ ‘Fistulotomy,’ ‘Seton,’ ‘LIFT,’ ‘VAAFT,’ and ‘Fistulectomy.’ Two reviewers separately scanned the titles and abstracts of the relevant studies in search results. They employed the established inclusion and exclusion criteria to determine whether studies met the eligibility requirements. To ensure the chosen studies satisfied the quality standards and the research question, they checked the full-text versions of the studies. Discussions and agreements were used to settle any differences among reviewers. The studies reporting surgical treatment for anal fistula, outcomes such as fistula healing, recurrence, complication rates, or patient-reported outcomes, and published in English were included in this review. The studies reporting on non-surgical treatment methods for anal fistula and surgical treatment for conditions other than anal fistula and studies with inadequate sample size or incomplete data were excluded from this review.

The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) diagram (Fig. 1) visually shows how studies were selected and included in a systematic review. It displays the number of studies identified, screened, assessed for eligibility, and finally included in the review. The diagram provides a clear and concise overview of the study selection process.

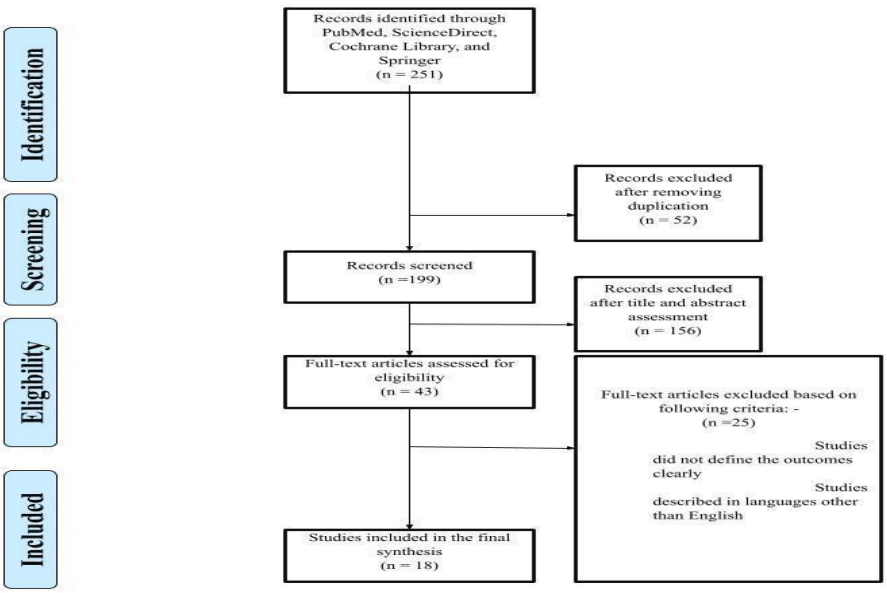

Fig. 1 Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)

The risk of bias assessment (Fig. 2, Fig. 3) for RCTs (Randomized control trials) was conducted using RevMan (Review Manager v5.4.1) software. Data from all the relevant articles were imported and analyzed using RevMan to obtain the risk of bias plots.

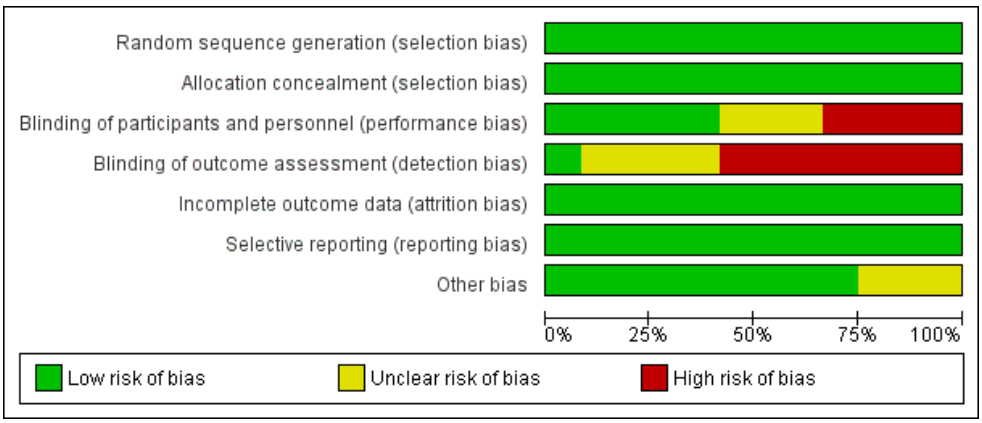

Fig. 2 Risk of bias assessment for RCT studies included in the systematic review

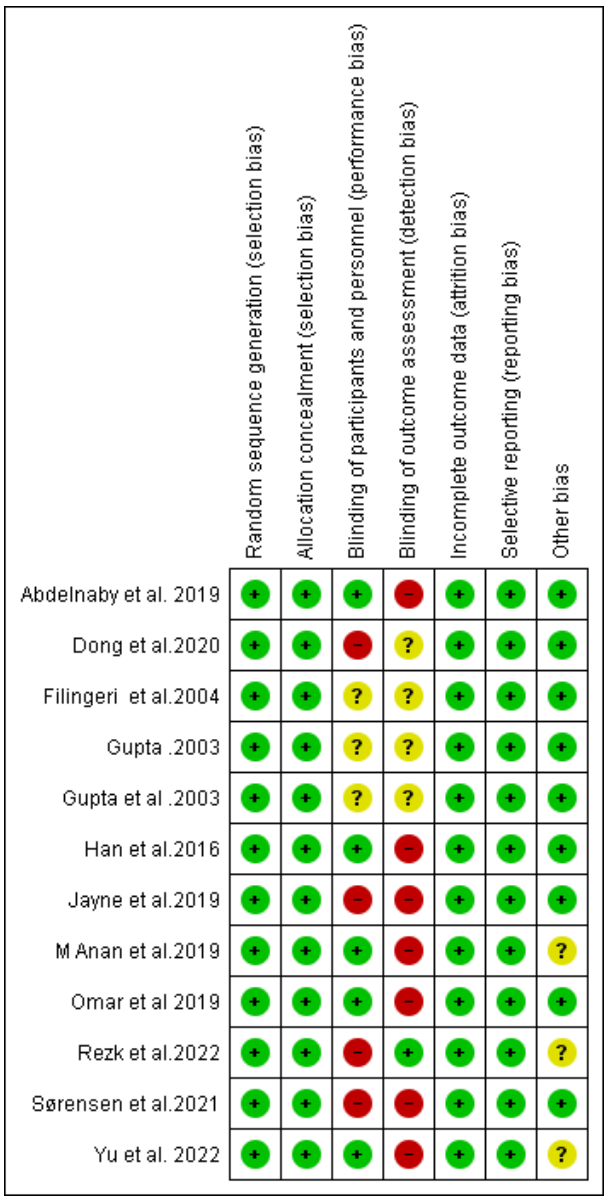

Fig. 3 Summary of the risk of bias for RCT studies included in the systematic review

The included studies' quality assessment (Table 1) was carried out independently using the STROBE checklist for comparative, prospective, observational cohort studies and clinical trials.

Table 1. STROBE Checklist for quality assessment of comparative studies, prospective studies, observational cohort studies, and clinical trials included in this systematic review

Title and Abstract / Studies	**Araújo et al. (2017) [10]**	**Ho et al. (2001) [11]**	**Izadpanah et al. (2016) [12]**	**Dalbem et al. (2014) [13]**	**Mushaya et al. (2012) [14]**	**Theerapol et al. (2002) [15]**
Indicate the study's design with a commonly used term in the title or the abstract	✓	✓	✓	✓	✓	X
Provide in the abstract an informative and balanced summary of what was done and what was found	✓	✓	✓	✓	✓	✓
Introduction						
Explain the scientific background and rationale for the investigation being reported	✓	✓	✓	✓	✓	X
State-specific objectives, including any prespecified hypotheses	✓	✓	✓	✓	✓	X
Methods						
Present key elements of study design early in the paper	✓	✓	✓	✓	✓	X
Describe the setting, locations, and relevant dates, including recruitment periods, exposure, follow-up, and data collection.	✓	X	✓	✓	✓	X
Give the eligibility criteria and the sources and methods of selection of participants	✓	✓	✓	✓	✓	X
Clearly define all outcomes, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable.	✓	✓	✓	✓	✓	✓
For each variable of interest, give data sources and assessment methods (measurement) details. Describe the comparability of assessment methods if there is more than one group.	X	X	X	X	X	X
Describe any efforts to address potential sources of bias	X	X	X	X	X	X
Explain how the study size was arrived at	✓	✓	✓	✓	✓	X
Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	X	X	X	X	X	X
Describe all statistical methods, including those used to control for confounding	X	X	X	X	X	X
Describe any methods used to examine subgroups and interactions	X	X	X	X	X	X
Explain how missing data were addressed	NA	NA	NA	NA	NA	NA
If applicable, describe analytical methods taking account of the sampling strategy	NA	NA	NA	NA	NA	NA
Describe any sensitivity analyses	NA	NA	NA	NA	NA	NA
Results						

Report numbers of individuals at each stage of study—e.g., numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analyzed	✓	✓	✓	X	✓	✓
Give reasons for non-participation at each stage	X	✓	X	X	X	X
Consider the use of a flow diagram	NA	NA	NA	NA	✓	X
Give characteristics of study participants (e.g., demographic, clinical, social) and information on exposures and potential confounders	✓	✓	✓	✓	✓	X
Indicate the number of participants with missing data for each variable of interest	NA	NA	NA	NA	NA	NA
Report numbers of outcome events or summary measures	✓	✓	✓	✓	✓	✓
Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence interval). Make clear which confounders were adjusted for and why they were included	NA	NA	NA	NA	NA	NA
Report category boundaries when continuous variables were categorized	X	X	X	X	X	X
If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time	X	X	X	X	X	X
Report other analyses are done—e.g., analyses of subgroups and interactions, and sensitivity analyses	NA	NA	NA	NA	NA	NA
Discussion						
Summarise key results regarding study objectives	✓	✓	✓	✓	✓	X
Discuss the limitations of the study, considering sources of potential bias or imprecision. Discuss both the direction and magnitude of any potential bias.	X	X	X	X	X	X
Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	✓	✓	✓	✓	✓	X
Discuss the generalisability (external validity) of the study results	✓	✓	✓	X	✓	X
Other information						
Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based.	NA	NA	NA	NA	NA	NA

To ensure accuracy and reduce bias, two independent reviewers extracted relevant information from each included study using a standard form. The form contains information about the study's authors, the year it was published, its title, the study's design, the characteristics of the patients, and the surgical procedure. Extracted patient variables were sample size, age, and anal fistula diagnosis. The methods used during surgery were recorded, along with the kind of procedure and any complications. Fistula healing rate, time to healing, recurrence rate, quality of life measures, wound healing time, and time to return to work were all retrieved as primary and secondary outcomes from each study. Surgical difficulties, such as postoperative complications, including bleeding, infection, abscess development, urine retention, and long-term outcomes like incontinence, fecal impaction, and recurrent fistulas, were described.

III. Results

A summary of the characteristics of included studies in the systematic review, highlighting their characteristics, interventions, outcomes, and conclusions, is given in Table 2.

Table 2. Characteristics of studies included in the review

Sr. No.	Author name (Year) [Citation]; Study design; Participants	Interventions	Outcome	Conclusion
1	Han et al. (2016) [16]; RCT; 239	LIFT vs. LIFT-plug	Operative time (min): 26.7 vs. 28.5, p=0.03 Median healing time (days): 30 vs. 22, p 0.001 Primary healing rate (%): 83.9 (95% CI 77.2%-90.6%) vs. 94.0 (95% CI 89.7%-98.3%), p< 0.001	The procedures known as LIFT-plug and LIFT are straightforward, secure, and successful. LIFT-plug offers some benefits, including a higher likelihood of healing, a shorter recovery period, and less pain in the early stages of recovery.
2	Rezk et al. (2022) [17]; RCT; 70	LIFT + BM-MNC vs. LIFT	Healing time: 20.5 ± 5.2 vs. 28.04 ± 5.8 days; p < 0.0001 Success rate: 68.6% vs. 60%; p = 0.62 Mean operation time in 26.7 ± 8.03 vs. 26.02 ± 6.9 p = 0.7 Complications (%): 2 (5.7) vs. 0 (p = 0.49). Incontinence (%) 0 vs. 0 p = 0.99	The combination of LIFT and BM-MNC injection resulted in a faster time for complete healing than LIFT alone. Although the injection did not significantly affect the overall healing and success rate.
3	Mushaya et al. (2012) [14]; Comparative study; 39	Anorectal advancement flap management vs. LIFT	Surgical time (mins): 42.5 (28.8–46.3) vs. 10.0 (7.5–11.0), p = 0.0011 Complications: 3 (21%) vs. 6 (24%), p = 0.855 Healed in 1 month: 12 (86%) vs. 17 (68%), p = 0.224 Recurrence (n): 1 (7%) vs. 2 (8%), p = 0.711	The LIFT procedure was a safe and straightforward method that allowed patients to return to work sooner. The use of preliminary Seton drainage may have contributed to the low recurrence rates observed in all patients.
4	Araújo et al. (2017) [10]; Observational cohort study; 38	LIFT	Operative time (min): 30 (20-45) Success after LIFT (%): 30 (79) Median time interval to recurrence (weeks): 24.8 (18-42.5)	A technique known as LIFT, which involves not removing the fistula tract, is safe and successful for treating trans-sphincteric anal fistulas.
5	Dalbem et al. (2014) [13]; Prospective study; 22	LIFT	Healing time: 4-8 weeks Cured patients: 17 (77%) Relapsed patients: 5 (23%)	Treatment of trans-sphincteric perianal fistulas with the LIFT method was reported to be safe and efficient.
6	Dong et al. (2020) [18]; RCT; 90	LIFT vs. Anal fistulectomy	Wound healing time (days): 16.51 ± 2.01 vs. 22.50 ± 3.50, t-test 9.956, p<0.001 Operation time (min): 49.2 7.4 Vs. 43.4 ± 6.5 t-test 3.95, p = 0.002 Anal continence score: 2.34 ± 1.04 vs. 6.25 ± 1.07 t-test 17.58, p<0.001	Compared to patients who received simple anal fistulectomy, patients who underwent LIFT had better surgical results, faster wound healing rates, improved anal continence, shorter hospital stays, and less intense postoperative discomfort.
7	Filingeri et al. (2004) [19]; RCT; 20	Radiofrequency fistulectomy vs. Conventional fistulotomy	Mean Operative Time (min): 18.3 vs. 17.9 Mean Healing Time (weeks): 3.5 vs. 5.9	Radiofrequency fistulectomy has technical advantages over traditional fistulotomy and produces superior outcomes.
8	Gupta (2003) [20]; RCT; 50	Radiofrequency fistulotomy vs. Conventional fistulotomy	Average wound healing time (days): 49 Recurrence (n) = 2	Regarding operation duration, blood loss, return to regular activities, and wound healing, it was discovered that the Radiofrequency technique outperformed the standard fistulotomy

				procedure.
9	Anan et al. (2019) [21]; RCT; 60	Fistulotomy vs. Fistulotomy with marsupialisation	Mean operation time (min): 16.8 ± 3.1 vs. 18.4 ± 3.2, p = 0.054 Mean time to complete healing (weeks): 6.7 ± 1.7 vs. 5.1 ± 1, p=< 0.0001 Recurrence (%): 1 (3.3) vs. 0 p = 1	In comparison to lay-open fistulotomy alone, faster wound healing was achieved by marsupialization of the edges of the laid-open fistula track following the procedure.
10	Gupta (2003) [22]; RCT; 100	Radiosurgical fistulotomy vs. Conventional fistulotomy	Operative Time (min): 22 vs. 37 p <0.001 Average Healing Time (days): 47 vs. 64, p=0.0009 Recurrence (%): 2 vs. 6, p=0.0198	In terms of operation time, blood loss, return to regular activity, and wound healing time, a fistulotomy A procedure using a radio frequency technology has a number of advantages over the conventional method.
11	Ho et al. (2001) [11]; Prospective study; 108	Chemical seton vs. Fistulotomy	Time to healing (median): 54 days (19-229) vs. 45 days (12-175), p = 0.1682.	Chemical seton treatment for low-grade anal fistulas does not offer any significant advantage over fistulotomy.
12	Theerapol et al. (2002) [15]; Clinical Trial; 47	Setons	Patients with completely healed fistula (n): 37 (78%) Median healing time: 9 weeks Recurrence (n): 1	The routine seton method is safe, cheap, and effective in the treatment of anal fistulas, regardless of type.
13	Izadpanah et al. (2016) [12]; Prospective study; 201	Pulling seton	Treatment duration: 11 weeks (range: 4 weeks-13 months) Fistula recurrence (n): 9 (5%) Treatment success rate: 95%	The treatment of high grade anal fistulas with seton pulling appears to be effective.
14	Omar et al. (2019) [23]; RCT; 59	Conventional drainage seton vs. External anal sphincter-sparing seton	Operation time, mean ± SD, (min): 29.8±4.3 vs. 43.8±4.4, p<0.0001	After rerouting the fistula tract, patients who received external anal sphincter-sparing seton experienced faster healing and less postoperative discomfort than those who received conventional drainage seton. Both groups' postoperative complication and recurrence rates were comparable.
15	Abdelnaby et al. (2019) [24]; RCT; 97	Drained mucosal flap vs. Rerouting seton around the IAS	Mean operation time in minutes: 56.1 ± 7 vs. 38.9 ± 6.5, p< 0.00001 Faecal incontinence (n): 1 (2%) vs. 7 (14.5%), pp = 0.03 Persistence/Recurrence (n): 2 (4.1%) vs. 4 (8.3%), p = 0.43 Complications (n): 4 (8.2%) vs. 3 (6.25), p = 1	In comparison to rerouting seton around the IAS, the drained mucosal flap approach was associated with a much-reduced incidence of FI, but a longer operating time and a longer time for healing to be fully complete. Both methods' success rates were comparable.
16	Yu et al. (2022) [25]; RCT; 120	Decompression and drainage seton vs. Cutting seton	Rate of healing: 92.9% vs. 90.9%, p = 0.707 Mild incontinence (score 1–6): 6 (10.0%) vs. 18 (30.0%) Moderate incontinence (score 7–12): 0 5 (8.3%) Severe incontinence (score 13–24): 0 2 (3.3%) Total complications (n): 1 (1.7%) vs. 5 (8.3%), p = 0.094	A potential method for treating high-complexity anal fistulas is DADS. It is just as successful as cutting seton but requires less time to recover before returning to work, causes less discomfort, and preserves better sphincter function.
17	Sørensen et al. (2021) [26]; RCT; 45	FSR vs. VAAFT	Recurrence: 27% vs. 65%, p = 0.016	In this single-center investigation, FSR was linked to a reduced recurrence rate than VAAFT in the treatment of complicated anal fistulas.
18	Jayne et al. (2019) [27]; RCT; 304	Fistula plug vs. Surgeon's	Clinical Fistula Healing at 12 months: 54% vs. 55%	The anal fistula plug had effectiveness comparable to the surgeon's

		preference	MRI Fistula Healing at 12 Months: 49% vs. 56%	preference after a 12-month follow-up, but the study indicated that it was unlikely to be a cost-effective use of resources in the UK NHS due to its greater costs and only minor increases in QALYs.

Abbreviations: LIFT Ligation of Intersphincteric Fistula Tract, *BM-MNC* Bone Marrow Mononuclear Cells, *IAS* Internal Anal Sphincter, *DADS* Decompression and Drainage Seton, *MRI* Magnetic Resonance Imaging, *FI* Faecal Incontinence, *FSR* Fibrin Sealant-assisted Treatment, *VAAFT* Video-assisted Anal Fistula Treatment, *NHS* National Health Service, *QALYs* Quality-Adjusted Life Years

LIFT

Among 18 studies, six studies involved the LIFT technique. From the review, It can be said that the LIFT technique for treating trans-sphincteric anal fistula appeared to be effective and reliable. The LIFT method demonstrated quicker healing timelines, greater healing rates, and improved anal continence scores compared to alternative treatments such as anal fistulectomy and anorectal advancement flap management.

High-quality studies state that for Intersphincteric fistula, The LIFT technique gives promising results and better post-procedural outcomes. A study by Dong et al. (2020) compared the LIFT procedure with a fistulectomy for an Intersphincteric fistula and found LIFT to provide better results regarding healing time and hospital stay after the treatment. [18] Another high-quality study by Mushaya et al. (2012) concluded LIFT to be a better procedure than the advancement flap technique for complex anal fistula. [10] A study compared LIFT to LIFT-plug; LIFT-plug healed more quickly, took less time to heal, and had less postoperative pain. [16] Another study compared LIFT with LIFT combined with a BM-MNC (bone marrow mononuclear cells) injection and discovered that while the combination of LIFT and BM-MNC injection sped up the healing process, it had no significant impact on the rate of success or overall healing. [17] In conclusion, the LIFT procedure appeared to be a quick and reliable way to repair Intersphincteric anal fistulas. The literature showed that it outperformed other methods in parameters such as operative time, recovery time, healing rate, and anal continence.

Fistulotomy and Fistulectomy

Filingeri et al. (2004) conducted an RCT to compare the effects of Radiofrequency fistulectomy and conventional fistulotomy for submucosal fistulas. The mean operating time for radiofrequency fistulectomy was 18.3 minutes, compared to 17.9 minutes for conventional fistulotomy. The mean healing time for radiofrequency fistulectomy was 3.5 weeks, while for conventional fistulotomy, it was 5.9 weeks. The study concluded that radiofrequency fistulectomy was technically superior to standard fistulotomy and yielded better outcomes in the case of submucosal fistulas. [19] The studies by Gupta (2003) and Anan et al. (2019) suggested that using Radiofrequency in fistulotomy operations has several benefits over traditional fistulotomy methods in terms of operating time, blood loss, time to resume normal activity, and time for the wound to heal. Additionally, after a fistulotomy, marsupialization of the edges of the laid-open fistula track led to faster wound healing with comparable complication and recurrence rates. The studies also revealed that recurrence rates were often low regardless of the procedure employed. For example, Anan et al. (2019) revealed no significant difference in recurrence rates between fistulotomy alone and fistulotomy along with marsupialization, while Gupta (2003) discovered a considerably decreased recurrence rate using radiofrequency fistulotomy compared to traditional fistulotomy. [21, 22]

Seton Procedure

Setons, tiny threads or tubes inserted into the fistula tract to promote healing, are one of the treatments available for anal fistulas. According to recent studies, setons are a safe and efficient treatment option for anal fistulas of any kind. The regular seton procedure was found to be risk-free, affordable, and successful in treating anal fistulas, regardless of type. With a 95% success rate, pulling seton was found to be an effective treatment for high-grade anal fistula. After rerouting the fistula tract, patients who received external anal sphincter-sparing seton experienced quicker healing and less postoperative pain than those who received standard drainage seton. Compared to rerouting seton around the internal anal sphincter, the drained mucosal flap technique had a significantly lower incidence of fecal incontinence but required more time to heal. [12, 15, 23-25] A study by Ho et al. (2001) showed that chemical seton had no significant advantages over fistulotomy. [11]

Fibrin sealant-assisted treatment (FSR) vs. Video-assisted anal fistula treatment (VAAFT)

In Sørensen et al. (2021) randomized controlled experiment, FSR and VAAFT were observed in 45 patients, each with complex anal fistulas. With a p-value of 0.016, the study showed that FSR was connected to a

considerably lower recurrence rate of 27% compared to VAAFT (63% recurrence rate). The study concluded that FSR might be a more effective option for treating complicated anal fistulas. [26]

Fistula plug

The Jayne et al. (2019) study observed the efficiency of using a fistula plug to treat anal fistulas. The study was a randomized controlled experiment with 304 people. According to the study's findings, at 12 months follow-up, The fistula plug treatment had a healing rate of 54%. Treatment options chosen by surgeons, such as cutting seton, fistulotomy, advancement flap, and LIFT procedure, had 64%, 75%, 53%, and 42% healing rates, respectively. The study concluded that, despite the fistula plugs' effectiveness being comparable to other techniques preferred by surgeons at a 12-month follow-up, it is unlikely to be a cost-effective technique. [27]

IV. Discussion

The purpose of this systematic review was to assess the safety and efficacy of various surgical procedures for the treatment of anal fistula. However, it was demonstrated that several methods are useful for treating anal fistula. The studies assessed many interventions, including radiofrequency fistulectomy, seton, LIFT, VAAFT, FSR, fistula plugs, and fistulotomy. The fistulotomy procedure (lay-opening of the fistula tract and a thorough transection of the tissue between the fistula tract and anoderm) is the standard surgical procedure for treating anal fistulas. This method was found to be effective against uncomplicated and distal fistulas. [3] However, due to potential damage to the anal sphincters, there is a risk of poor functional results for high-grade fistulas with a fistulotomy procedure. This risk is particularly high when many extensions or independent tracts are present in complex or recurring fistulas or when the tract spans more than 30%-50% of the external sphincter. There are several alternatives to conventional fistulotomy, such as radiofrequency fistulotomy or fistulotomy with marsupialization. The studies show that these alternatives can provide better results when compared to conventional ones. A systematic review by Malik et al. (2008) also showed similar results where they concluded that Radiofrequency fistulotomy and marsupialization after fistulotomy give better postoperative outcomes than conventional fistulotomy. [28] In recent years, there has been growing interest in using minimally invasive techniques for treating anal fistula. Two of these methods that have gained popularity are VAAFT and LIFT. LIFT entails ligating the fistula tract at the level of the intersphincteric plane. [17] VAAFT uses a small camera to visualize the fistula tract. Complex anal fistulas can be successfully treated with both methods while maintaining sphincter function. Similarly, with high success rates, fistulotomy, and seton effectively treat uncomplicated and most distal fistulas. Patients with severe or complex fistulas risk having substandard functional outcomes due to potential damage to the anal sphincters. According to Sørensen et al. (2021) study, FSR provides better post-procedural outcomes than VAAFT for complex fistulas. [26] The studies highlight that setons are a safe and efficient treatment option for anal fistulas. However, more studies are required to explore the comparable efficacy of seton than other procedures. The study by Ho et at. (2001) raises the possibility that chemical setons may cause increased postoperative discomfort. However, this conclusion was drawn based on insufficient evidence regarding healing and recurrence rates. [11]

The choice of treatment option or a combination of them depends a lot on the type of fistula. Similar findings were reported in a systematic review by Zahra et al. (2022), where they highlighted that no single technique was found effective for all types of fistulas and the decision of whether to combine the treatments or not depends on the type of fistula and individual characteristics. [29] One limitation of this review study is that only a few studies are available that compare surgical treatment methods for anal fistula. Hence, this makes it difficult to find one most effective procedure. We can conclude that the seton and fistulotomy procedures are more effective than other procedures for uncomplicated and most distal fistulas. Minimally invasive techniques such as 'Ligation of intersphincteric fistula tract' and 'Video-assisted anal fistula treatment' are reliable surgical options for complex fistulas. Some novel non-surgical methods, such as fibrin sealant-assisted treatment, may produce more successful outcomes for complex fistulas. However, further research may be required to explore more about these non-surgical procedures to arrive at a definitive conclusion.

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