

# Video-Assisted Anal Fistula Treatment (VAAFT) for Complex Perianal Fistulae with Long-Term Follow-Up

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## ABSTRACT

**Objective:** To evaluate the clinical outcomes of video-assisted anal fistula treatment (VAAFT) in patients with complex perianal fistulae, with particular focus on complications and recovery.

**Study Design:** A non-randomised observational study.

**Place and Duration of the Study:** Department of Surgery, Shifa International Hospital, Islamabad, Pakistan, from January 2013 to September 2023.

**Methodology:** All cases of complex perianal fistula undergoing VAAFT were included in the study. Patients were followed up postoperatively in the surgical clinic for persistent discharge, wound healing, and recurrence at six weeks, six months, and annually. Frequency and percentages were calculated for categorical data, and the Chi-square test was applied to determine significance.

**Results:** Total number of cases enrolled was 171. The mean age was  $41.73 \pm 12.05$  years; the male-to-female ratio was 12:1. Ninety-one (53.2%) cases were operated for recurrent disease. Twenty cases (11.7%) were complex trans-sphincteric grade 4, thirty (17.5%) were extra-sphincteric grade 4, seventeen (9.9%) were inter-sphincteric grade 2, sixty-two (36.3%) were trans-sphincteric grade 2, and twenty-three (13.5%) were trans-sphincteric grade 3. Twenty (11.6%) had persistent discharge at six months, and thirty-one (17.9%) had recurrence at two years.

**Conclusion:** VAAFT has very good results regarding recurrence.

**Key Words:** Perianal fistula, Recurrence, Video-assisted anal fistula treatment, Abscess, Trans-sphincteric fistula.

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## INTRODUCTION

Perianal fistula is a relatively common condition, ranging from simple low-lying to complex and super-complex fistulae, which can significantly impair the life of affected individuals.<sup>1</sup> Treatment modalities vary accordingly, from very simple laying-open of the tract to complex, and often multiple and staged procedures.<sup>2,3</sup> The primary challenge in managing perianal fistula is to achieve effective cure of the disease, while preserving sphincter function. No consensus does, and probably may never, exist to manage complex fistulae.<sup>4</sup> The treatment experience, therefore, varies both among treating units and between individual surgeons.<sup>5</sup>

MRI can delineate anatomic descriptions on the relation between the fistula tract and the anal sphincter complex, helping surgeons to categorise the type of fistula, hence choosing the best possible surgical treatment.<sup>4</sup>

In an attempt to improve upon the centuries-old traditional seton insertion for high-lying and more complex fistulae, several novel procedures and techniques have been developed in the past few decades. These procedures include advancement flaps, use of fibrin glue, anal fistula plugs, the ligation of inter-sphincteric fistula tract (LIFT) procedure, laser ablation, and video-assisted anal fistula treatment (VAAFT).<sup>5-7</sup> Among these, VAAFT has held its position for the last decade. Over this period, numerous reports have emerged describing its efficacy. The main advantage of VAAFT is the direct visualisation of the fistulous tract and its targeted management, as compared to all other techniques that are mostly blind in terms of tract navigation.<sup>8</sup>

The current study was designed to prospectively observe and record data of patients undergoing VAAFT, with long-term follow-up to evaluate outcomes in terms of cure, disease control, complications, and recurrence.

## METHODOLOGY

This was a non-randomised, observational study with prospectively collected data of patients undergoing VAAFT at the Department of Surgery, Shifa International Hospital, Islamabad, Pakistan, from January 2013 to September 2023. Follow-up was conducted concurrently and completed in December 2024, with a minimum duration of 24 months after the final

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operation. The study was approved by the Institutional Ethics Committee of Shifa International Hospital, Islamabad, Pakistan (IRB No. 874-149-2017; Dated: 1 March 2025). All patients consented for both the procedure and involvement in the study, and Helsinki Declaration principles were implemented. Patients with suspected fistula in ano (FIA) initially underwent office-based examination, including digital rectal examination. All patients were referred for magnetic resonance imaging (MRI) with a pelvic protocol for radiological assessment. Patients diagnosed with complex fistula were scheduled for VAAFT. All cases of complex and high-lying perianal fistula undergoing VAAFT were included, while patients with low or simple (subcutaneous) fistula were excluded.

All patients were admitted and given klean enema the night before surgery, along with antibiotic prophylaxis consisting of intravenous Cefazolin (1gm) and metronidazole (500 mg) administered at induction of anaesthesia. The procedure was then performed in lithotomy position under general anaesthesia using the Karl Storz® (Karl Storz GmbH, Tuttlingen, Germany) fistuloscope and the associated kit (Figure 1). All patients underwent a dye test using diluted hydrogen peroxide before the procedure to delineate the tract and internal opening. The typical VAAFT technique, as described by Meinerio, was followed.<sup>8</sup> The procedure was performed in two phases: diagnostic and operative. The diagnostic phase involved surveillance of the entire fistula tract, including identification of the internal opening secondary tracts, and abscess cavities, using the fistuloscope. A particular attempt was made to find out any side branches or multiple tracts. The findings were compared with the MRI findings and documented. The operative phase involved marking of the internal opening, if found, using 00 Vicryl (Ethicon) sutures, followed by cleansing and de-sloughing of the debris in the tract using a special forceps and later removed by endobrush. Thereafter, the operative phase included curettage and fulguration of the tract with monopolar electrodes, brushing, and irrigation of the fistula tract, followed by closure of the internal opening using a mattress suture. The internal opening was then closed using local mucosal flaps or under-running by the same Vicryl sutures. Fibrin glue (Glubran-2) was then instilled into the tract to strengthen the closed internal opening. Lastly, a piece of the tract at the external opening was excised for histological examination. The tract was usually closed with a small gauze wick. All enrolled patients underwent both phases of the procedure. In this experience, some tracts were longer than the actual length of the fistuloscope, and modified techniques were adopted for such fistulae. Postoperatively, the patients were advised a sitz bath and dressing changes on the next postoperative day. All cases were discharged the following day with routine instructions on cleansing and dressing care at home. Cases were followed regularly until complete closure and healing of the tract.

Patient demographic data were recorded, along with patient satisfaction using Likert scale, Park's fistula type, history of previous surgeries, and the number of tracts and openings. All

patients were assessed preoperatively for any comorbidities, and an attempt was made to identify the underlying cause of the fistula, if any, before labelling them as cryptoglandular. Only those patients who underwent VAAFT as the sole complete procedure were included. Outcome measures included wound healing, persistent discharge, and recurrence were recorded. Primary healing was defined as complete closure of the external opening with absence of discharge, without the need for further intervention. Recurrence was defined as the presence of sign of healing (closure of external opening with absence of discharge), followed by relapse of symptoms such as abscess formation or discharge during the follow-up period. Complex perianal fistula was defined as anal fistula characterised by its challenging anatomical features, including multiple tracts and involvement of sphincter muscles. Persistence of disease was defined as failure of the fistula to heal, necessitating further procedures. Where recurrence or persistence occurred, reoperation with VAAFT was offered alongside other suitable treatment options. Follow-up was conducted at intervals of 1, 3, 6, and 12 months, and then followed at yearly intervals, either telephone or visits, as feasible. Complications were measured and documented according to the Clavien-Dindo classification of wound infection.<sup>9</sup> Incontinence was measured preoperatively and postoperatively using the Wexner Incontinence Score (WIS).<sup>10</sup>



**Figure 1: Karl Storz apparatus.**

Data were obtained through retrospective review of a prospectively maintained database. Microsoft Excel® (Microsoft, Seattle, WA) spreadsheet was used for data collection, and SPSS version 23 was used for statistical analysis. The Chi-square test was used to determine significance, with a p-value <0.05 considered statistically significant.

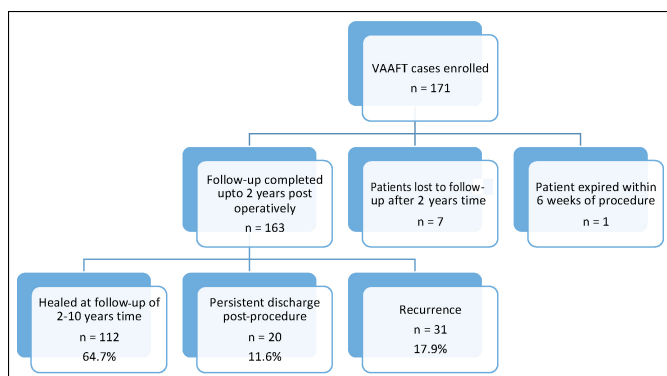
## RESULTS

Out of 171 patients enrolled in the study, 158 (92.4%) were male, and 13 (7.6%) were female. The mean age was 41.731 years (SD ± 12.05; 17-78 years). Eighty patients (46.8%) presented with abscess. Figure 2 shows the flow chart of total cases of VAAFT, the outcome of the procedure, whether completely healed, persistent discharge, or recurrence at follow-up after a minimum of two years.

**Table I: Demographics of VAAFT cases and their significance with recurrence or persistent discharge (n = 171).**

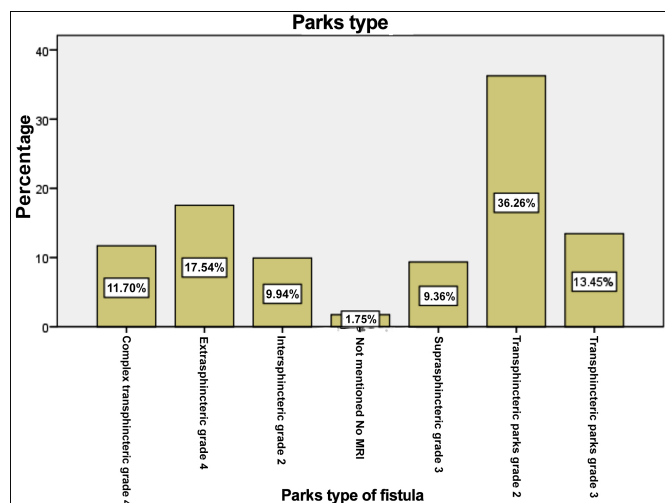
Variables		Frequencies	Percentages	p-values*
Gender	Female	13	7.6	0.679
	Male	158	92.4	
Recurrent tract / previous surgery	Yes	91	53.2	0.996
	No	80	46.2	
Internal opening identified	Found	130	76	0.177
	Not found	41	23.9	
Park's fistula type	Complex trans-sphincteric grade 4	20	11.7	0.912
	Extra-sphincteric grade 4	30	17.5	
	Inter-sphincteric grade 2	17	9.9	
	Supr-sphincteric grade 3	16	9.4	
	Trans-sphincteric grade 2	62	36.3	
	Trans-sphincteric grade 3	23	13.5	
	MRI not available	3	1.8	
Associated abscess	Present	80	46.8	0.361
	Absent	91	53.2	
Associated comorbidities	Diabetes mellitus	5	2.9	0.816
	Fournier's gangrene	2	1.1	
	Haemorrhoids	35	20.4	
	Crohn's disease	1	0.6	
	Ischiorectal abscess	7	4	
	Chronic myeloid leukaemia	1	0.6	
	Ischaemic heart disease	1	0.6	
	None	119	69.6	
Number of tracts	1	108	63.2	0.001
	2	48	28.1	
	3	8	4.7	
	≥4	7	4.1	
Duration of symptoms/fistula	≤6 months	37	21.6	0.542
	>6 months - 1 year	43	25.1	
	1-2 years	49	28.7	
	>2 years	42	24.6	
Types of procedure	VAAFT, incision, and drainage	6	3.5	<0.001
	VAAFT and seton placement	15	8.8	
	VAAFT and fistulotomy + fistulectomy	29	17	
	VAAFT only	117	68.4	
Healing time	≤2 months	27	15.7	0.054
	2-3 months	35	20.46	
	3-6 months	46	26.9	
	>6 months	63	36.8	
Patient satisfaction with VAAFT procedure	Highly unsatisfied	4	2.3	<0.001
	Not responding	7	4	
	Satisfied	78	45.6	
	Very satisfied	46	26.9	
	Unsatisfied	36	21	

\*p-value was calculated using the Chi-square test.

**Figure 2: Flowchart of VAAFT cases.**

The internal opening was identified in 130 (76%) patients. Figure 3 shows the observed distribution of different fistula types encountered in VAAFT cases, based on MRI findings and later confirmed peroperatively. A summary of the results is shown in Table I, along with subgroup analysis and its significance with recurrence and persistent discharge. It also highlights patient satisfaction with the VAAFT procedure in the studied group. Patients who did not respond to telephonic

follow-up for satisfaction assessment were placed in the neutral group. None of the cases developed post-procedure incontinence (0%).

**Figure 3: Distribution of different fistula types based upon Park's classification (n = 171).**

## DISCUSSION

In complex perianal fistulae, the gold standard centuries-old seton placement treatment is still widely practised. However, various novel techniques are used as alternatives with scalable results.<sup>11</sup> Some of these include LIFT, advancement flaps, laser ablation of the tract, and VAAFT.<sup>12</sup> VAAFT is a minimally invasive technique that allows direct visualisation of the perianal fistula tract for effective management. Its role is not established in low-lying fistulae, which can be easily managed by fistulotomy or fistulectomy with good sphincter control.<sup>13</sup>

At two years, the recurrence rate was 17.9%, while 20 patients (11.6%) experienced persistent minimal discharge, and none developed sphincter incontinence. These results are consistent with international data.<sup>14,15</sup> The authors could not compare VAAFT with other techniques such as LIFT and advancement flaps in this setup. Moreover, the recurrence of fistulae was not compared with different fistula types in this study. The goal was to achieve a cure without compromising anal tone or sphincter function, while ensuring minimal pain and early return to work.<sup>16,17</sup> However, these goals were not achievable due to variations in complexity, such as multiple curved or zig-zag tracts with secondary offshoots, or very long tracts (>8 cm), which may result in recurrence or persistence discharge from one or more of these complex tracts. The majority of patients (72.5%) reported being satisfied or highly satisfied with the treatment (Table I). Notably, even those with persistent discharge were satisfied, as the technique provided symptomatic relief, without the irritation associated with the seton use. These results were comparable to other published data.<sup>18</sup> The postoperative course and the quality of life indicators were much better after the procedure.<sup>19</sup> Such results will help patients to make accurate decision about the choice of procedure.

A few patients (7; 4.09%) could not be contacted or were lost to follow-up at two years (telephonically or in clinic). However, the majority of cases (63%) achieved healing within 6-months. Persistent discharge was observed in 36.8% of patients at 6 months, and only 11.6% had persistent discharge at two years.

Moreover, this study showed a positive association of recurrence or persistent discharge with the number of tracts found peroperatively ( $p = 0.001$ ). Many studies in the literature review showed the same association.<sup>20,21</sup> The authors did not find any positive correlation of recurrence or persistent discharge with non-visualisation of internal opening in contrast to reports in the literature.<sup>22</sup>

The main advantage of this procedure is its minimally invasive and simple approach to a very complex problem, even at the cost of recurrence. Moreover, it offers the direct visualisation of the tract and necessary adjustments in the final dealing of the fistula. Hybrid techniques such as combining laying open, the seton placement, and even LIFT are possible in the end. The cutting seton, which was once considered the gold standard, has been widely criticised because of the increased incidence of sphincter damage and is no more recommended.<sup>23</sup> The loose seton is sphincter-safe but not a definitive treatment

and has to be followed by some definitive method.<sup>24</sup> LIFT, an open procedure, has gained wide popularity and is associated with minimal sphincter damage. However, it is effective mainly in low or medium high fistulae and may not be very effective in complex tortuous or high fistulae. Trans-anal advancement flap repair (TAFR) is a specialised repair technique, which has a recurrence rate of 7-49%.<sup>25</sup> VAAFT has its own limitations. The technique is difficult to learn, especially in terms of tract navigation in tortuous, long and branching tracts. There is a definite learning curve. The equipment is expensive, and some accessories need frequent replacements. Ligate of supralevator internal openings is technically challenging.<sup>23-25</sup>

This study is unique as the majority of patients went through long-term follow-up upto 10 years and surveillance without recurrence. There are certain limitations of the study. It is a non-randomised study. It appeared very difficult to implement such a trial in the unit, as most of the patients already knew about the procedure and demanded the same. Another limitation is that all the procedures were performed by a single surgical team. However, this may also be a strength, as it provides uniformity of technique and standardisation of care.

Future studies are recommended with the comparison of different techniques, as there is no gold standard procedure for complex fistulae.<sup>25</sup> With various modalities available, surgeons must be trained. Systematic randomised trials may effectively compare it with other minimally invasive procedures and suggest recommendations for customised solutions to different varieties of complex perianal fistulae. Although this study has a smaller sample size for long-term results, the findings show a prospect for VAAFT as becoming one of the key future procedures of anal fistula treatment.

## CONCLUSION

VAAFT is an effective and safe procedure for the management of complex perianal fistula, associated with significant patient satisfaction, absence of sphincter incontinence and acceptable long-term results, highlighting its minimal invasiveness and safety of the procedure. However, the procedure poses challenges, including a steep learning curve and costly equipment, despite directly visualising the fistula tract.

### ETHICAL APPROVAL:

Ethical approval for this study was obtained from the Institutional Ethics Committee of the Shifa International Hospital, Islamabad, Pakistan (IRB No. 874-149-2017; Dated: 1 March 2025).

### PATIENTS' CONSENT:

Written informed consent was obtained from all participants involved in the study.

### COMPETING INTEREST:

The authors declared no conflict of interest.

### AUTHORS' CONTRIBUTION:

MA, FF, SK: Drafting and critical revision of the manuscript.  
SL: Conception, design, and acquisition of the work.  
AA, SA: Analysis and interpretation of data.



All authors approved the final version of the manuscript to be published.

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