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Video-assisted anal fistula treatment (VAAFT): A decade experience

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ABSTRACT

The most ideal management for anal fistula has continued to evade surgical practitioners through the years. Video-assisted anal fistula treatment (VAAFT) is a relatively novel technique introduced as a minimally invasive surgical treatment of anal fistula. Based on published studies on VAAFT in the past decade, healing rates have varied worldwide, ranging from 54.4 to 92.5%. The published recurrence rates are at overall similar to other sphincter-sparing procedures. The primary advantage of VAAFT is the ability to use videoendoscopic technology to accurately visualize the fistula anatomy and manage the tracts while preserving sphincter function, resulting in minimal complications and faster recovery. Higher quality comparative studies with longer follow-up are still needed in order for this procedure to gain more widespread acceptance among colorectal surgeons in the future.

Introduction

The treatment of anal fistula is anchored on three main principles: 1) accurate definition of the fistula anatomy with eradication of primary and secondary tracts, 2) identification of the internal opening with subsequent removal or closure, and 3) preservation of anal sphincter function. Despite numerous innovations in surgical approaches, treatment of anal fistula remains a challenging issue. Achieving a balance between successful healing and preservation of sphincter function becomes an even greater challenge in cases of complex fistulas. No single technique, however, has emerged as a preferred option for complex fistulas. Because of the potentially permanent consequences that affect continence and the propensity of complex fistulas to recur even with repeated surgical treatments, selecting the most appropriate and effective surgical procedure is of paramount importance. The choice of which technique to use has been constantly changing. Blumetti published a paper in 2012 highlighting the increasing use of non-cutting, or sphincter-sparing procedures, over the last 25 years, due to increasing concern for complications of incontinence.[1] The non-cutting or sphincter-sparing techniques include the use of fibrin glue, anal fistula plug, endorectal advancement flap, ligation of intersphincteric fistula tract (LIFT), closure of internal opening, fistula tract laser closure (FiLaC™), and the video-assisted anal fistula treatment (VAAFT). In this article we would like to provide a concise review of VAAFT.

Video-assisted anal fistula treatment: published experience in the last decade

In 2006, Meinero from Italy introduced a novel minimally invasive treatment centered around the closure of the internal opening and the complete destruction and drainage of the fistula tract, along with secondary tracts and abscess cavities, through the use of a fistuloscope. The internal opening is closed primarily by one of the several techniques including primary suture closure, flap closure, or stapling with a linear or circular stapler. Injection of cyanoacrylate to reinforce the internal opening closure is done. The procedure was described as the video-assisted anal fistula treatment (VAAFT). A detailed description of the individual technical steps of VAAFT can be reviewed in Meinero's 2011 publication where he reported his first experience with VAAFT in 136 patients.[2] Of these, 98 were followed up for a minimum of six months. A healing rate of 73.5% ($n = 72$) was achieved among these patients within 2–3 months from time of surgery. Sixty-two patients had follow-up care for at least a year. In this long-term follow-up group, 54 patients (87.1%) experienced healing of their fistulas. There were no major complications.

In 2014 and 2015, Meinero published updates of his series and he included more patients with longer follow-up.[3,4] In the 2015 report (covering the period from 2006 to 2013), a total of 443 patients with complex fistulas underwent the procedure. Of the 443 patients, 379 were followed-up for a minimum of 6 months (median 19 months, range 6–84 months). He reported a 6-month primary healing rate of 75.2% (285/379 patients). Persistence of disease was noted in 18.5% ($n = 70$) and recurrence in 6.3% ($n = 24$). Among those with an unhealed fistula, 77 patients underwent a repeat VAAFT, and an overall healing rate of 87.9% (333/379 patients) was reached (combining those who had VAAFT as primary treatment, and as re-treatment).

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No major complications were noted, although there were 16 cases of postoperative urinary retention, 1 case of scrotal edema, and 4 cases of allergy to synthetic cyanoacrylate which was used during the procedure. All patients were discharged within 24 h except for 1 case of spinal anesthesia-related headache which required longer hospitalization. Pain control was acceptable in the early and late postoperative periods, with a mean value of 4.0 on the visual analogue scale during the first 48 h. At one week postoperatively, none of the patients reported any pain. At 24 month or greater follow-up was reported in 246 of the 443 patients. The success rate in that long-term follow-up group was 97.1% (239/246 patients). The earlier report (2014) noted a significantly higher 12-month probability of freedom from fistula using stapled closure, as opposed to sutured closure (74% vs. 58%).

Following the pioneering work of Meinero, several other studies have been published with varied success rates. These included preliminary smaller scale studies that reported of outcomes similar to the original work of Meinero.[5,6] In Table 1 we have reported the outcome of studies that have included more than 30 patients. It is important to note that the challenges in interpreteting the results of early preliminary studies can be related to several factors such as short-term follow-up, the learning curve associated with the introduction of a new technique, variation of the technical steps by different authors, and the restrospective nature of most studies. With that in mind, VAAFT appears to have some advantages attributed to the accurate definition of the fistula anatomy done under direct visualization instead of blind probing. With the use of the fistuloscope, the location of the internal opening is determined accurately and the creation of false passage is avoided in most patients. Furthermore, secondary tracts and abscess cavities can be better identified. Because of the unpredictability of the tracts and the potential of having multiple openings, particularly in patients who have undergone prior surgeries, fistula anatomy definition can be challenging but with the use of VAAFT this can be overcome.[4]

In 2015 Chowbey from India published the results of Minimally Invasive Anal Fistula Treatment (MAFT), which is essentially the same as VAAFT, performed in 416 patients.[7] Seven patients required readmission for bleeding. Interestingly, the internal opening could not be located in 101 cases (24.2%). One-year median follow-up was completed in 134 patients. Primary healing occurred in 99 patients (73.8%) with a 26.1% recurrence rate. The interest in VAAFT has spurred international interest in this technique with several centers reporting their results as follow: Kochhar[8] from India (2014; $n = 82$, recurrence rate 15.9%); Zarin[9] from Pakistan (2015; $n = 40$, healing rate 92.5%); Seow-En[10] from Singapore (2016; $n = 41$, healing rate 70.7%, secondary healing rate 83%, Over-the-Scope Clip (OTSC®) closure 6/6(100%) healing); Jiang[11] from China (2017; $n = 52$, healing rate 84.6%); Romaniszyn[12] from Poland (2017; $n = 68$, overall healing rate 54.4%); Li[13] from China (2018; $n = 42$, recurrence rate 7.1%); and Stazi[14] from Italy (2018; $n = 224$, primary fistula healing rate 77%, recurrent fistula healing rate 64%).

Although most of the data on the VAAFT technique has eminated from the treatment of adult patients with anal fistula from crytptoglandular origin, the outcome has also been reported in inflammatory bowel disease patients and in the pediatric population. Schwandner from Germany utilized VAAFT with advancement flap in 13 patients with Crohn's disease.[15] Success rate was 82% after a median follow-up of 9 months. Similarly, Grolich used the technique in patients with fistulas related to inflammatory bowel disease.[16] The utility of VAAFT in the pediatric population was shown by Pini Prato.[17] In his report, 13 VAAFT procedures were performed in 9 children, with a median age of 9.6 years. In all those who underwent complete VAAFT (fistuloscopy + electrocoagulation + mucosal sleeve; $n = 8$), complete healing was achieved, although delayed healing (more than 3 months after the procedure) occurred in 3 patients.

Systematic reviews of video-assisted anal fistula treatment

To date, there are 3 published systematic reviews on VAAFT (Table 2). Emile reviewed a total of 11 studies on the technique.[18] A total of 788 patients were included, 2/3 of whom had high or complex anal fistula. The interest in using VAAFT in complicated cases is likely due to its ability to visualize the internal opening, which was achieved in 93% of patients. Adequate control of the internal opening is of utmost importance in increasing the probability of success of surgical management. According to this review, failure rate was 17.7%, while recurrence rate was 14.2% after a median period of 9 months. Complication rate was low at 4.8%. None of the complications reported required a return to the operating room. Garg likewise published a systematic review and proportional meta-analysis that showed a pooled success rate of 76% in 786 patients (8 studies), including those with complex and recurrent fistulas.[19] Evidently, there was substantial overlap among the studies included in both reviews. In the same year, Adegbola published a systematic review of three new techniques in sphincter-saving fistula management (VAAFT, FiLaC™ - laser treatment, and OTSC® - clip closure), with a primary outcome of efficacy and a secondary outcome of safety.[20] The review included 12 studies on VAAFT. Healing rates varied from 67 to 100%, with the largest studies indicating short-term (<1 year) success rates of 70–74%. Only 5% had complications across the studies, none of which included deterioration in sphincter function. The authors stated that the main advantage of VAAFT appears to lie in its diagnostic potential, which may be crucial in the management of complicated fistula and in cases related to Crohn's disease. However, long-term outcomes of the technique need to be determined.

Table 1
Published studies on VAAFT (with more than 30 patients per series).

YEAR	AUTHOR	STUDY TYPE	NUMBER OF PATIENTS	FOLLOW-UP (MONTHS)	HEALING RATE
2011, 2014, 2015	Meinero[2,–4]	Retrospective	443	15–24	75.2% - 87.9% (overall healing rate after repeat VAAFT)
2015	Chowbey[7]	Retrospective	416	12 (134 patients followed-up at 1 year)	73.8%
2014	Kochhar[8]	Retrospective	82	6	84.1%*
2015	Zarin[9]	Retrospective	40	6	92.5%
2016	Seow-En[10]	Retrospective	41	34	70.7% 83% (overall healing rate)
2017	Jiang[11]	Retrospective	52	9	84.6%
2017	Romaniszyn[12]	Retrospective	68	31	54.4%
2018	Li[13]	Prospective cohort	42 (VAAFT) vs. 45 (Fistula resection +/- seton)	6	92.9%*
2018	Stazi[14]	Retrospective	224 (primary: 52 recurrent: 172)	48	Primary fistulas: 77% (92.3% after repeat VAAFT) Recurrent fistulas: 64% (80.2% after repeat VAAFT)
TOTAL			1408	6–48 months	54.4 - 92.9%

* Only the recurrence rate was reported in these studies. The healing rate was derived by subtracting the reported recurrence rate from 100%.

Table 2
Systematic reviews on VAAFT.

YEAR	JOURNAL	AUTHOR	# OF PATIENTS (STUDIES INCLUDED)	RESULTS OF META-ANALYSIS	CONCLUSION
2018	Surgical Endoscopy	Emile[18]	788 (11)	Weighted Mean Recurrence rate: 17.7% (Range - 7.5 to 33.3%)	VAAFT may be considered as an effective diagnostic tool and a safe method of treatment of complex and high anal fistulas including those secondary to Crohn's disease, attaining satisfactory outcome and low complications.
			67% with high or complex anal fistula	Weighted Mean Complication rate: 4.8% (Range - 0 to 18.3%)	Recurrence may be related to previous fistula surgery and method of internal opening closure.
				Recurrence based on method of internal opening closure: (stapled 15.3%, sutured 17.7%, advancement flap 25%)	
2017	International Journal of Surgery	Garg[19]	786 (8)	Success rate: Range - 52.5 to 92.5% with marked statistical heterogeneity	VAAFT is a safe method with a pooled success rate of 76%.
			All patients with cryptoglandular fistula-in-ano	Complication rate: Range - 0 to 16.2% with moderate statistical heterogeneity	Main benefit is minimal risk to incontinence, minimal hospital stay, and early return to work. Further long term randomized controlled trials are required to establish the long term results of the procedure.
2017	Techniques in Coloproctology	Adegbola[20]	917 (12)	Success rate: Range - 67 to 100%	Notwithstanding the need of further research, the limited evidence available suggests that VAAFT is safe and feasible with acceptable early healing rates and no report of deterioration in continence.
			Included 21 patients with Crohn's disease	Complication rate: 5%	

The reported outcomes of VAAFT indeed provide optimism, particularly in the management of complex and recurrent fistulas. But due to the heterogeneity and fair quality of the studies included in the systematic reviews cited, randomized controlled clinical trials are still needed to further validate the utility of VAAFT, especially for high-lying fistulas. The technique may be compared with the LIFT procedure, or with an endorectal advancement flap (ERAF) in a prospective trial, as both these options are recognized to result in satisfactory healing outcomes with little effect on continence for high fistulas. Furthermore, it is unclear whether VAAFT is contributing to the successful healing of the fistula or whether closure of the internal opening with flap or other methods is the primary determinant of the healing (i.e. the same results can be reached without obliteration and cauterization of the tract during VAAFT, in which case the value of VAAFT would be in the diagnostic capability of the fistuloscope and not the actual treatment of the tract). The most appropriate method of internal opening closure in VAAFT should also be elucidated with separate trials comparing the various strategies described in the literature including OTSC® clip closure. Cost analysis studies will also provide us a better picture on the true cost-effectiveness of this procedure compared to other treatments.

Finally, we hope to see improvement in the technological features of VAAFT instrumentation in the near future. Better video resolution matching the quality of new generation laparoscopes will increase accuracy and ease of tract identification, cleaning of the tract, and fulguration. Furthermore, the rigidity and size of the current fistuloscope limit the maneuverability especially in fistulas with sharp bends and in the constricted segment of the tracts near the internal openings.

Conclusions

With more than a decade of experience with VAAFT, it appears that the initial results are optimistic and promising. VAAFT is an effective diagnostic tool that is able to delineate the fistula anatomy intraoperatively. The technique is associated with reasonable success rates, low morbidity, and a fast recovery. However, higher quality comparative studies, preferably randomized controlled trials, with longer follow-up and economic analysis are needed to draw firm conclusions on the utility and cost-effectiveness of VAAFT compared to the other sphincter-sparing techniques. Furthermore, it is crucial to determine whether VAAFT is a diagnostic modality that can aid in identification of the tracts and internal opening or both a diagnostic and therapeutic tool where obliteration of the tract is a necessity to increase the success rate of the primary closure of the internal opening. In addition, trials among the different methods of internal opening closure may provide information on the most optimal strategy. The results of these studies will further enable this procedure to gain more widespread and long-term acceptance among colorectal surgeons in the years to come.

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