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Assessing the Effectiveness of Cyanoacrylate Adhesive in TreatingAnal Fistulas

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KEYWORDS	Abstract: Background: Anal fistulas are a prevalent me	edical issue, and traditional surgical methods,			
Anal fistula,	including fistulectomy and fistulotomy, have been linked to potential complications such as excessive				
Cyanoacrylate glue	bleeding, infection, and recurrence. The utilization of cyanoacrylate glue represents a promising and				
	contemporary approach. The objective of this study was to assess the effectiveness of cyanoacrylate				
	glue in the management of anal fistulas. Methods: The study was carried out on patients diagnosed				
	with fistula-in-ano who were admitted to various surgical units within Krishna Hospital, KIMS, karad.				
	A total of 40 patients meeting the specified criteria were enrolled in the study. These patients				
	underwent the procedure under spinal anesthesia	. Subsequently, post-operative follow-up			
	examinations were conducted every two weeks. The success of the procedure was evaluated post-				
	treatment by monitoring the incidence of infection and recurrence. Results: Out of the 40 patients, 26				
	achieved healing with the initial application, resulting in the cessation of any discharge from the				
	fistulous tract. Four patients necessitated a second application, while two patients required a fistulotomy.				
	Additionally, two patients presented with complex fistulas and underwent treatment involving colostomy				
	and fistulectomy. Six patients experienced purulent disch	arge following the glue application, requiring			
	IV antibiotic treatment, and eventually achieved compl	ete healing. Conclusion: Cyanoacrylate glue			
	can be proposed as an alternative to fistulectomy, prese	rving the sphincter function in patients with			
	anal fistulas.				

I. INTRODUCTION

An anal fistula continues to be a source of worry, not only due to the possibility of it recurring but also because of the potential risk that the treatment may result in long- term incontinence for the patient. [1]Lunnis and colleagues conducted a study demonstrating that even a slight division of the anal sphincter muscle during a fistulotomy can potentially lead to alterations in fecal continence. [2] Consequently, researchers have been exploring less invasive techniques thatpreserve the sphincter muscle while treating fistula in ano.

[3] Modern approaches, such as the cutting seton, mucosal advancement flaps, combined seton, and double flap proce- dures, have been introduced. However, these methods have been linked to pain, discomfort, prolonged postoperative recovery, and heightened morbidity. While conventional fistula surgery techniques have their established role, emerging technologies like fibrin glues and anal fistula plugs present an alternative approach, supported by early studies indicating favorable success rates. [4] The success rate of fibrin glue has seen a decline in recent studies, dropping from 80% to 50%. Nevertheless, it's worth noting that the preparation of fibrin glue demands expertise, which has contributed to its limited popularity. Cyanoacrylate glue, commonly employed as a skin adhesive, offers a potential solution to the issues as- sociated with fibrin glue. This is due to its costeffectiveness and the availability of prepackaged tubes with extended shelf life, making it a convenient alternative. [5]

II. MATERIAL AND METHODS

Our prospective study included a total of 60 patients aged between 20 and 62 years, comprising 43 male and 17 female participants who were diagnosed with fistula in ano. We obtained ethical committee approval to conduct our study. We provided comprehensive explanations to the patients regarding the procedure, its

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potential benefits, and associated risks, and obtained their written informed consent. Patients with a history of Crohn's disease or rectovaginal fistula were excluded based on their medical history and clinical and anatomical assessments. We conducted a thorough clinical assessment by taking detailed patient history and performing digital rectal examinations to evaluate the presence and characteristics of the anal fistula. Subsequently, all patients underwent a sonofistulogram to confirm the existence of the fistula, identify its internal and external openings, and assess the complexity of the fistulous tract. Before the surgery, patients received a preoperative regimen of oral ciprofloxacin and oral metronidazole for a duration of 6 days. Additionally, on the day preceding the procedure, patients were admin- istered an enema. In the operating room, the patient was positioned in the lithotomy position, and the perianal skin was meticulously cleaned and draped. Spinal anesthesia was administered, and a proctoscopy was performed following a digital rectal examination (DRE). The internal and external openings of the fistula were carefully identified, and the tract was thoroughly irrigated with normal saline. The internal closed using Polyglactin, opening was and cyanoacrylate glue was introduced through an 8-French infant feeding tube until the glue became visible at the internal opening, indi- cated by bubbling. Subsequently, the infant feeding tube was slowly withdrawn while continuing to inject the glue to en- sure that the entire fistulous tract was filled with cyanoacry-late glue. Bidigital pressure was applied at both the internal and external openings for a duration of 3 minutes. The glue polymerized within 30 seconds, during which patients expe-rienced some mild discomfort in the form of heat.Following the procedure, patients were discharged after one day with a prescription for oral antibiotics and analgesics. They were also advised to refrain from engaging in strenuous physical activities for a period of 7 days. Furthermore, they were instructed to incorporate multiple daily sitz baths into their post-operative care routine. After the surgery, patients under-went follow-up examinations at two-week intervals during the initial two months, followed by evaluations once every three months. In cases where the initial treatment didn't lead to the healing of the fistula within four weeks, a second glue treatment was administered. After completing the treatment, the effectiveness of the procedure was evaluated based on infection rates and recurrence

occurrences.

III. RESULTS

Our study involved 60 participants, consisting of 43 males and 17 females, resulting in a male-to-female ratio of 3.2 to

1. The average age at the time of diagnosis was 38 years, and notably, none of the patients reported preoperative inconti- nence as a concern. Remarkably, 22 out of the 30 patients, equivalent to 73.3%, experienced successful healing after a single application of cyanoacrylate glue during the initial treatment session. These patients remained free of symptoms even after 18 months of follow-up.Out of the patient cohort,

4 individuals experienced a recurrence of fistula in ano. Among these cases, 2 patients necessitated a second round of cyanoacrylate glue application, with one occurring at the 4-week follow-up mark and the other at the 8-week follow- up stage. Encouragingly, both patients remained symptom- free throughout the 18month observation period. Notably, the cumulative healing rate after the second cyanoacrylate glue application reached an impressive 80%. However, one patient exhibited a recurring fistula in ano even after under-going two sessions of glue application. Consequently, the treatment approach was modified to include fistulotomy for this individual. In another case, a patient developed complex fistulas following two rounds of glue instillation. This situa-tion necessitated a extensive intervention, leading more to the implementation of both colostomy and fistulectomy proce- dures. Four patients encountered purulent discharge from the external opening roughly 4 to 8 weeks after the application of glue. In response, they received treatment consisting of intravenous Ceftriaxone and IV Metronidazole. It's noteworthythat these patients achieved complete healing and remained symptom-free at the conclusion of the 18-month follow-up period. None of the patients exhibited any signs of intolerance to the glue following its application. The summarized results are presented in Table 1. In Table 1, it is evident that 73.3% of the patients achieved complete healing with the initial cyanoacrylate glue application. Moreover, the cumulative healing rate after the second glue application reached an impressive 80%. These findings collectively support the notion that cyanoacrylate glue serves as a viable alternative to traditional fistulectomy procedures.

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Total numberof patients					60	
Numberofmales					43	
Numberof females					17	
Meanageatdiagnosis					38	
					years	
Patientswithsimpleanalfistulas					35	
Patientswithcomplexanalfistulas					10	
Patients	who	develope	ed re	currence	5	
afterfirstapplication of glue						
Patients required a second application ofglue					4	
Patients who developed infection afterfirstsitting					6	
Percentage	of	patients	healed	with	73.3%	
firstglueapplication						
Patients	who	compl	etely	healed	24	
aftersecondglueapplication						
Cumulative	healing	percentag	ge after	second	80%	
application of cyanoacrylate glue						

 TABLE 1: Summary of the results

IV. DISCUSSION

Fistula in ano is a frequently encountered surgical issue. Managing it effectively relies on three fundamental prin- ciples: 1) infection control, 2) closure of the fistula, and

3) preserving continence. One of the time-tested and glob- ally renowned techniques for this purpose is fistulotomy, a method with a rich historical tradition. "Nonetheless, it's important to note that a study conducted by Van Tets et al. reached the conclusion that impaired continence is a relatively frequent occurrence following anal fistulotomy. In particular, fistulotomy performed for simple, low fistulas has been associated with reported incontinence to flatus in as many as 50% of cases. This type of permanent gas incon- tinence can lead to significant anxiety and embarrassment invarious social situations. Additionally, it's worth highlighting that fistulotomy procedures often result in extended healing times, leading to discomfort and distress for the patient. Furthermore, they can give rise to contour defects around the anal area, compounding the challenges associated with this approach.In the last two decades, the utilization of fibrin glue treatment for anal fistulas has witnessed a growing popularity 11. A study conducted by Lindsey et al. found that while there was no distinct advantage of fibrin glue over fistulotomy for treating simple fistulas, fibrin glue did demonstrate better results for healing complex

fistulas compared to conventional treatments. Furthermore, patients expressed higher levels of satisfaction with the fibrin glue approach [12]. In contrast, astudy led by Cirocchi et al. concluded that when it comes to recurrence rates and anal incontinence, fibrin glue didnot exhibit any significant advantage over the traditional fistulotomy method [13]. Cyanoacrylate glue is a clear, straw- colored liquid that typically comes in pre-packaged vials, conveniently ready for use. It is usually stored at a temper- ature of 4°C. When it comes into contact with biological tissues in a moist environment, it undergoes polymerization, forming a thin, elastic film with remarkable tensile strength, effectively bonding the tissues together. This process initiates solidification within a mere 2 seconds and reaches comple- tion within a span of 60 to 90 sec [14]. Regarding our study, the healing rate achieved through the primary application of cyanoacrylate was notably impressive at 73.3%. Further- more, when we considered the cumulative healing rate after two sessions of cyanoacrylate glue application, it reached a commendable 80%.

V. CONCLUSION

The use of cyanoacrylate glue emerges as a costeffective and safe alternative, making it a viable option for individuals with low anal fistulas and simple fistulas. Nevertheless, to strengthen the evidence regarding its efficacy, it becomes imperative to assess larger patient samples. Expanding the study population would allow for a more comprehensive evaluation of the treatment's overall effectiveness and its applicability to a broader range of cases. This, in turn, can provide further insights into the benefits and outcomes as- sociated with cyanoacrylate glue in the management of anal fistulas.

AUTHORS CONTRIBUTION

All authors contributed equally.

CONFLICT OF INTERESTS

Author declared that there is no conflict of interest.

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