Al-Rafidain J Med Sci. 2025;9(1):172-177.
DOI: https://doi.org/10.54133/ajms.v9i1.2170

Research Article

A J M S
Online ISSN (2789-3219)

Outcomes of Modified Fistulectomy Under Local Anesthesia for Anal Fistula: A Prospective Observational Study from Iraq

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Received: 5 June 2025; Revised: 25 July 2025; Accepted: 30 July 2025

Abstract

Background: Fistula in ano (FIA) is a chronic condition involving an epithelialized tract between the anal canal and perianal skin, typically requiring surgery. Conventional techniques often require general anesthesia and hospitalization, with risks of recurrence and incontinence. ***Objective***: To assess outcomes of a modified fistulectomy performed under local anesthesia in an outpatient setting. ***Methods***: A prospective observational study was conducted at a private surgical clinic in Wasit, Iraq, from January 2018 to December 2024. Of 500 enrolled patients, 373 met the inclusion criteria and underwent a standardized modified fistulectomy by a single surgeon. Exclusions included refusal to participate, incomplete follow-up, and fistulae related to injury, Crohn's disease, or malignancy. The protocol included preoperative imaging, local anesthesia, and marsupialization. Follow-up lasted at least 6 months, with most patients observed for 12 months or more. Data were analyzed using SPSS. ***Results***: The cohort was predominantly male (91.2%), with a median age of 36 years. Simple fistulae comprised 72% of cases. Complete healing without complications occurred in 86% of patients. Recurrence was observed in 1%, with no cases of fecal incontinence. Pain or discomfort occurred in 6%, and delayed healing or infection in 3.5%. No significant associations were found between outcomes and age, gender, or fistula type. ***Conclusions***: Modified fistulectomy under local anesthesia is a safe, effective, and practical approach for treating anal fistula, with low recurrence and complication rates. It eliminates the need for general anesthesia or hospitalization, supporting its use in outpatient settings.

Keywords: Anal fistula, Local anesthesia, Modified fistulectomy, Outpatient surgery, Surgical outcomes.

نتائج استئصال الناسور المعدل تحت التخدير الموضعي للناسور الشرجي: دراسة رصدية مستقبلية من العراق

الخلاصة

الخلفية: الناسور الشرجي (FIA) هو حالة مزمنة تنطوي على قناة ظهارية بين القناة الشرجية والجلد حول الشرج ، وعادة ما تتطلب جراحة. غالبا ما تتطلب التقنيات التقليدية تخديرا عاما ودخول المستشفى، مع مخاطر التكرار وسلس البول. **الهدف**: تقييم نتائج استئصال الناسور المعدل الذي يتم إجراؤه تحت التخدير الموضعي في العيادات الخارجية. **الطرائق**: أجريت دراسة رصدية مستقبلية في عيادة جراحية خاصة في واسط ، العراق، من يناير 2018 إلى ديسمبر 2024. من بين 500 مريض مسجلين، استوفى 373 منهم معايير التضمين وخضعوا لاستئصال الناسور المعدل المعدل من قبل جراح واحد. وشملت الاستثناءات رفض المشاركة، والمتابعة غير الكاملة، والناسور المرتبط بالإصابة أو مرض كرون أو الورم الخبيث. تضمن البروتوكول التصوير قبل الجراحة والتخدير الموضعي والتخريب. استمرت المتابعة 6 أشهر على الأقل، مع ملاحظة معظم المرضى لمدة 12 شهرا أو أكثر. تم تحليل البيانات باستخدام SPSS. **النتائج**: كانت المجموعة في الغالب من الذكور (91.2٪)، بمتوسط عمر 36 عاما. شكلت الناسور البسيط 72٪ من الحالات. حدث الشفاء التام دون مضاعفات في 86٪ من المرضى. لوحظ تكرار في 1٪، مع عدم وجود حالات سلس البراز. حدث الألم أو الانزعاج في 6٪، وتأخر الشفاء أو العدوى في 3.5٪. لم يتم العثور على ارتباطات يعتد بها بين النتائج والعمر أو الجنس أو نوع الناسور. **الاستنتاجات**: يعد استئصال الناسور المعدل تحت التخدير الموضعي نهجا آمنا وفعالا وعمليا لعلاج الناسور الشرجي، مع انخفاض معدلات التكرار والمضاعفات. يلغي الحاجة إلى التخدير العام أو الاستشفاء، مما يدعم استخدامه في العيادات الخارجية.

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Article citation: Muzhir K, Muzhir HK, Al-Badri SG, Radhi SMZ. Outcomes of Modified Fistulectomy Under Local Anesthesia for Anal Fistula: A Prospective Observational Study from Iraq. *Al-Rafidain J Med Sci*. 2025;9(1):172-177. doi: https://doi.org/10.54133/ajms.v9i1.2170

INTRODUCTION

Fistula in ano (FIA) is a pathological condition characterized by a hollow tract lined with granulation tissue, establishing a connection between a primary internal opening within the anal canal and a secondary external opening in the perianal skin. In some cases, multiple secondary tracts may develop, extending from the same internal opening to form a branched fistula. The majority of FIA cases, approximately 26–38%, are attributed to obstruction of the anal glands located at the dentate line, which leads to infection and the formation

of a perianal abscess. Less common causes include prior surgical procedures, trauma, malignancies, and systemic diseases such as Crohn's disease, tuberculosis, and HIV infection [1]. Globally, the incidence of FIA is estimated to be around 8.6 cases per 100,000 individuals annually. The condition is approximately twice as common in males as in females and is most prevalent during the third and fourth decades of life. Higher rates have been reported in populations from the Mediterranean region, the Middle East, and the Indian subcontinent [2,3]. FIA can be classified based on various parameters such as anatomical path, complexity, underlying cause, and imaging characteristics. Among these, the American Gastroenterological Association (AGA) classification, which categorizes fistulae by their complexity, is especially relevant for clinical and surgical practice. A simple fistula typically involves a low intersphincteric or low transsphincteric path, features a single external opening, and is associated with minimal complications, such as abscesses, strictures, or inflammatory bowel disease. In contrast, a complex fistula may involve high transsphincteric, suprasphincteric, or extrasphincteric tracts and multiple external openings and is often associated with conditions such as Crohn's disease, abscesses, or malignancies [4-6]. A wide range of surgical techniques is available for managing FIA, selected based on the type and complexity of the fistula. The primary goals of treatment include the effective control of sepsis, successful closure of the fistulous tract, preservation of anal continence, and a reduction in recurrence rates. Commonly employed techniques include fistulotomy, core fistulectomy, anorectal advancement flap, ligation of the intersphincteric fistulous tract (LIFT), seton placement, fibrin glue injection, use of an anal fistula plug, video-assisted anal fistula treatment (VAAFT), and fistula laser closure (FiLaC^{TM}) [7]. Each surgical method carries its risks, particularly concerning the likelihood of recurrence and the potential for fecal incontinence. Moreover, most procedures require general or spinal anesthesia and may involve hospitalization. Given these challenges, this study aims to evaluate the outcomes of a modified fistulectomy technique performed under local anesthesia, focusing specifically on postoperative complications such as anal incontinence, pain, recurrence, infection, bleeding, and healing time.

METHODS

Study design and setting

This prospective observational study was conducted at a private surgical clinic in Wasit province, Iraq, over a period spanning from January 2018 to December 2024. The study included all patients diagnosed with anal fistula—whether newly diagnosed or recurrent—who underwent a modified fistulectomy performed by a single experienced surgeon.

Inclusion criteria

The inclusion of both new and previously treated cases was intended to minimize selection bias. Written informed consent was obtained from all participants for both the surgical procedure and follow-up assessments.

Exclusion criteria

Patients were excluded if they declined participation, did not complete scheduled follow-up visits, or had fistulae associated with perineal injury, malignancy, or Crohn's disease. Data were collected and analyzed using SPSS software, although specific statistical tests should be detailed based on the type of data and comparisons performed.

Preoperative assessment and imaging

Preoperative preparation included a comprehensive medical history and physical examination, which included a digital rectal examination (DRE) and proctoscopy assessment. Routine laboratory investigations were conducted for all patients. Magnetic resonance imaging (MRI) of the pelvis with contrast was performed selectively for patients with complex fistulae, fistulae with hidden external orifices, suspected high-type fistulae, or recurrent cases previously operated on by other surgeons. These assessments also aimed to rule out underlying conditions such as Crohn's disease or malignancy.

Anesthesia and patient positioning

All procedures were scheduled as outpatient day-case surgeries. Conscious sedation was achieved using an oral diazepam tablet, 5-10 mg adjusted according to body weight, administered 30 minutes before the operation. Patients were placed in the lithotomy position, and the surgical site was prepped and draped appropriately. Local anesthesia was administered using lidocaine with adrenaline 1:10000, infiltrated slowly around the external orifice with a small 27-gauge needle (Figure 1) to minimize patient discomfort.

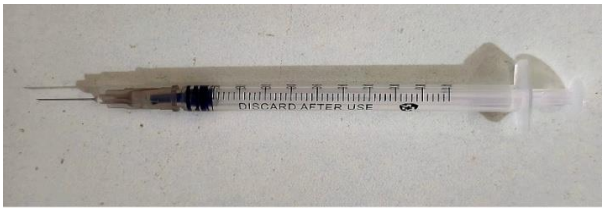

Figure 1: 27-gauge needle used for anesthesia infiltration.

Surgical technique

An elliptical incision was made around the external opening of the fistula using an electrocautery device with a beveled end, as prepared by the surgeon (Figure 2), to ensure precise dissection of the tract and preservation of surrounding healthy tissue as much as possible (Figure 3).

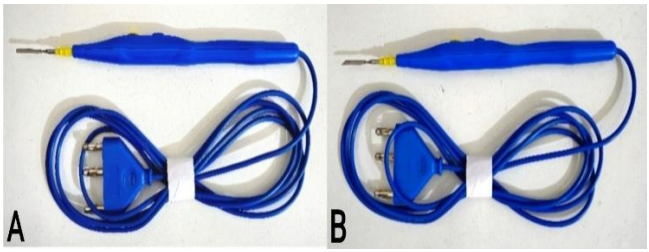

Figure 2: Electrocautery instruments : (A) Non-beveled electrode, (B) Beveled electrode.

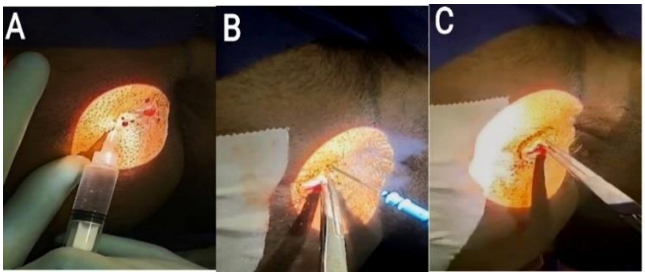

Figure 3: Surgical technique : (**A**) Infiltration of the external orifice, (**B**) performing an elliptical incision using electrocautery, (**C**) Elliptical incision surrounding the external orifice.

The surgeon identified the fistula by its firm, cord-like consistency due to chronic inflammation and followed the tract from the external opening to its internal extension near the anal gland. Retraction of the wound edges in multiple directions facilitated complete exposure and dissection of the wound. To maintain anesthesia in deeper layers, local anesthetic was injected parallel to the tract itself, avoiding tract disruption. This technique not only reduced anesthetic volume but also facilitated the separation of the fistula from adjacent tissues, thereby acting as a form of hydrodissection. A low-intensity electrocautery probe, operating in both cutting and spray modes, was used to dissect and extract the entire tract. Hemostasis was achieved using gauze wicks soaked in xylocaine with adrenaline, which were placed in the wound cavity. Marsupialization of the wound edges was performed using 3-0 Vicryl sutures, which were placed at the four corners of the elliptical incision and tied over the dressing.

Postoperative management and follow-up

Patients were discharged on the same day and instructed to return for a follow-up visit within 24 hours to change the dressings. Patients were encouraged to resume daily activities with minimal restrictions. Broad-spectrum antibiotics were prescribed postoperatively. Pain was managed with diclofenac sodium tablets (bid) and semazine capsules (t.i.d). A proton pump inhibitor was also given to reduce analgesic gastrointestinal side effects. At the first postoperative visit, the wound was examined, and the gauze wick was gradually removed to check for bleeding. Patients received education on perianal hygiene, including the importance of cleansing with water after defecation and the use of sitz baths and diluted iodine solution twice daily. Follow-up visits were scheduled weekly for the first month, then monthly for six to twelve months. Patients were also encouraged to maintain communication via mobile phone until complete healing was achieved. Healing typically occurs within four to six weeks. The external orifice was intentionally kept open to ensure adequate drainage and avoid premature closure, which could lead to residual infection. Continuous monitoring and wound care were crucial for achieving complete recovery and preventing recurrence.

Ethical considerations

This study was reviewed and approved by the Institutional Review Board of Al-Zahra Educational Hospital, affiliated with the College of Medicine, University of Wasit. The protocol was assigned the approval ID: UW.MED.2025.0610. Ethical clearance was granted based on the submitted protocol titled "Outcomes of Modified Fistulectomy Under Local Anesthesia for Anal Fistula: A Prospective Observational Study from Iraq." All patients provided written informed consent after receiving a clear explanation of the study objectives, procedures, potential risks, and benefits. In accordance with institutional policies, any future modifications to the protocol will be submitted to the Ethical Approval Committee prior to implementation.

Data analysis

Data analysis was conducted using SPSS version 26. For qualitative data, descriptive statistics were presented as absolute frequencies and percentages. Quantitative variables were summarized using mean values along with their standard deviations. When relevant, the median and range were also reported. To assess statistical associations, chi-square tests or Fisher's Exact tests were utilized alternatively, depending on the expected frequencies in the contingency tables.

RESULTS

Out of the initial 500 patients enrolled in the study, 127 were excluded: 100 patients did not complete follow-up, 15 had anal fistula associated with malignancy, and 12 were diagnosed with Crohn's disease. Consequently, the final analysis included data from 373 patients. The cohort consisted predominantly of male patients (91.2%), with females comprising only 8.8% of the study population. The median age was 36 years (SD = 11.6), with a wide age range from 13 to 85 years. The majority of patients were categorized as young adults, followed by middle-aged adults, teenagers, and the elderly, as detailed in Table 1. Regarding the types of anal fistula, 72% of cases were classified as simple. The remaining patients presented with various forms of complex fistula, including those associated with abscesses, branched tracts, hidden external orifices, high-level tracts, or recurrent disease. Despite the variation in fistula type, all patients underwent the same

modified fistulectomy technique. The minimum follow-up duration was six months, with 92% of patients followed for at least 12 months or more, and a smaller percentage reaching an 18-month follow-up, as outlined in Table 1.

Table 1: Demographic and clinical characteristics of patients in the cohort

Factor			n(%)
Gender	Male		340(91.2)
	Female		33(8.8)
Age	Teenage		10(2.7)
	Young age (20-39)		203(54.4)
	Middle-aged adults (40-59)		140(37.5)
	Elderly ≥ 60 years		20(5.4)
Type of Fistula	**Simple**		267(71.6)
		Recurrent	2(0.5)
		Branched/ Multiple tracts	18(4.8)
	Complex	Associated with an abscess	77(20.7)
		Hidden external orifice	7(1.9)
		High	2(0.5)
Duration of follow-up	6.0 mo		25(6.7)
	12 mo		343(92)
	18 mo		5(1.3)

The outcomes of the modified fistulectomy procedure were favorable across the cohort. Complete healing without complications was observed in 86% (n = 321) of cases. Recurrence was rare, occurring in only four patients (1%), two of whom had complex fistulae. Notably, no cases of fecal incontinence were reported during the follow-up period. The most common postoperative complaint was pain and discomfort, primarily during defecation, affecting 6% of the cohort (n = 25). Delayed healing extending beyond six weeks and infections at the surgical site were reported in 13 patients (3.5%). These findings are illustrated in Figure 4.

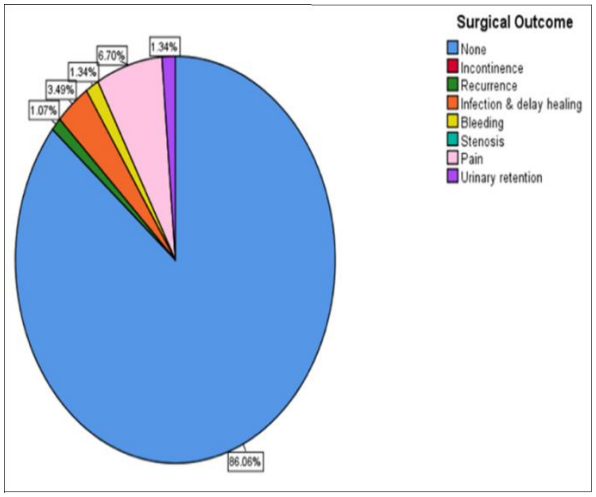

Figure 4: Pie chart showing the percentage distribution of surgical outcomes following modified fistulectomy under local anesthesia.

Statistical analysis revealed no significant association between surgical outcomes and patient age (p = 0.48), gender (p = 0.207), or the type of fistula (p = 0.16), suggesting that the success of the modified fistulectomy technique was consistent across various subgroups. A detailed breakdown of these associations is provided in Table 2. Overall, the results support the effectiveness and safety of the modified fistulectomy technique across a broad patient population, regardless of demographic variables or fistula complexity.

DISCUSSION

This prospective observational study evaluated the outcomes of a modified fistulectomy technique performed under conscious sedation local anesthesia in an outpatient setting for the management of anal fistula. In the current study, a striking 91% of participants were male. This notable predominance can be attributed to both social barriers and the well-documented higher incidence of anal fistulae in males. Furthermore, it is essential to consider that most cases of fistulae in females are often linked to postpartum conditions and perineal injuries, which fall outside the study's inclusion criteria. In a prospective study, Bhatia (2019) reported excellent pain tolerance, and no complications related to anesthesia when low anal fistulae were treated with excision under local anesthesia [8]. Similarly, Jain *et al*. (2021) observed high patient satisfaction and minimal complications when simple fistulae were managed with local anesthesia and conscious sedation [9]. These results support our study's findings on patient discomfort across various fistula types, highlighting the feasibility and effectiveness of performing fistula surgery under local anesthesia in an outpatient setting. The present study reported a favorable outcome, with high healing rates (86%) and no cases of fecal incontinence. The promising results regarding incontinence, in comparison to a study performed by Maqbool *et al*. in 2022, which reported 8% of cases under general anesthesia (GA) [10], can be attributed to the conscious state allowed by local anesthesia. In this awake state, the surgeon can assess sphincter tone, which helps to prevent sphincter injury. Recurrence after fistula surgery is an important outcome to consider.

Table 2: Analyses of surgical outcomes for the modified fistulectomy

Factor		Surgical outcome							*p*-value
		No complication	Recurrence	Infection/delayed healing	Bleeding	Pain	Urinary retention	Total	
Gender	Male	295	4	10	5	22	4	340	0.207
	Female	26	0	3	0	3	1	33	
Age groups	Teenage	9	0	0	0	1	0	10	0.48
	Young adults	177	2	5	1	18	0	203	
	Middle-aged adults	120	2	8	2	5	3	140	
	Elderly	15	0	0	2	1	2	20	
Type of fistula	Simple	234	2	5	4	18	4	267	0.16
	Complex	87	2	8	1	7	1	106	

A recent meta-analysis showed that recurrence rates following anal fistula surgery can range from 2.5% to 57.1% [11]. This analysis identified several significant risk factors for recurrence, including high transsphincteric fistula type, undetected internal openings, treating the fistula solely with a seton drain, the presence of horseshoe-shaped abscesses, multiple fistula tracts, and a history of prior anal surgery. In our study, 72% of cases were classified as simple types. We utilized precise dissection and tracking of the fistula tract based on its unique texture. To ease the separation of the fistula from adjacent tissues, we infiltrated lidocaine with adrenaline along the longitudinal axis of the fistula tract up to the anal gland (hydrodissection technique). Additionally, we removed the entire tract, emphasizing the healing of the cavity from the deep layers to the skin through marsupialization of the wound edges to prevent premature incomplete closure. These strategies may have contributed to achieving the extremely low recurrence rate (1%) in our study. Recent literature also highlights recurrence rates generally below 5% and 1% when treated with sphincter-preserving techniques [12-14]. However, the actual recurrence rate for the surgical technique may become more evident with more extended follow-up periods. Compared to traditional fistulectomy and fistulotomy approaches, the modified technique used in our study yields competitive, if not superior, results. In a comparative study, Gupta *et al*. and Rosa *et al*. demonstrated that marsupialization improves healing outcomes when combined with fistulotomy, resulting in faster wound closure and shorter discharge duration [15,16]. While our technique also incorporated marsupialization, we further optimized surgical exposure and minimized tissue damage through hydrodissection and precise dissection, which may have contributed to the low complication and recurrence rates observed.

Study limitations

This study, while insightful, is not without limitations. A notable constraint is the lack of a control group, which hinders our ability to make direct comparisons with other surgical techniques, such as LIFT or VAAFT. Furthermore, the fact that a single surgeon conducted this study presents both strengths and weaknesses. On one hand, this consistency helps minimize technical bias; on the other hand, it may lead to subjectivity, as the same surgeon also evaluated postoperative outcomes. To enhance the rigor of future research, incorporating a blind outcome assessment could significantly mitigate this potential bias.

Study strength

A key strength of our study lies in its broad patient cohort, which included a wide range of age groups and both simple and complex fistulae, with outcomes remaining consistent across subgroups. This is supported by findings from larger studies, such as the retrospective review by Rosa *et al*. (2006), which found that classical surgical techniques like fistulectomy and fistulotomy, when executed with proper preoperative assessment and follow-up, lead to high healing rates and acceptable continence outcomes [16]. Ultimately, it is essential to emphasize that the standout advantage of this surgical technique lies in its ability to enhance patient satisfaction through cost-effective day case surgery. This remarkable approach not only ensures affordability but also facilitates a swift recovery, enabling patients to return to their daily lives within 48 hours at most.

Conclusion

The modified fistulectomy under local anesthesia is a safe, effective, and practical option for treating anal fistulae in outpatient settings. It achieved high healing rates, low recurrence, and no cases of fecal incontinence across both simple and complex cases. This technique offers a cost-effective alternative to traditional surgeries, making it especially suitable for low-resource environments. Further studies are recommended to compare long-term outcomes with other surgical methods.

Conflict of interests

The authors declared no conflict of interest.

Funding source

The authors did not receive any source of funds.

Data sharing statement

Supplementary data can be shared with the corresponding author upon reasonable request.

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