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A Multi-Dimensional Evaluation of Recurrence Rate and Fecal Continence Function between Primary Radical Incision and Drainage and Staged Surgical Procedures for High Perianal Abscess

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Abstract: We conducted a study to compare the outcomes, including long-term recurrence rate, fecal continence function, and quality of life, between primary radical incision and drainage and staged surgical procedures for high perianal abscess. A prospective randomized controlled study was conducted, enrolling 200 patients randomly assigned to either the experimental group (primary radical surgery) or the control group (staged surgery). Recurrence rates were compared through a 12-month postoperative follow-up, and evaluations were performed using the Wexner score and the Colorectal Functional Quality of Life (CRFQoL) scale. The recurrence rate in the experimental group was significantly lower than that in the control group (8.0% vs 20.0%, χ^2=6.857, P=0.009). However, the experimental group exhibited a higher Wexner score (2.8±1.3 vs 1.7±1.1, t=2.843, P=0.005). There was no statistically significant difference in the degree of quality of life improvement between the two groups (total score P=0.287). Primary radical surgery is more effective in reducing recurrence risk but has a greater impact on fecal continence function. Both surgical approaches demonstrate equivalent efficacy in ultimately improving patients' quality of life, indicating that clinical selection should be individualized.

1. Introduction

The choice of treatment approach for high perianal abscess remains a point of discussion, that is to say, a controversial topic within colorectal surgery practice. Primary radical surgery aims to deal with the problem in one go, but it might lead to more issues with sphincter damage; on the other hand, staged surgery is a more careful approach, though it carries a higher chance of the problem coming back. Currently, there aren't enough good studies that look at both ways, comparing them properly for how well they stop recurrence and protect important functions. This study, using a carefully designed method to assign patients randomly, aims to look at the differences between these two surgery types across multiple areas-like how often the abscess returns, how well bowel

control works afterwards, and the patient's overall life quality-to put it simply, to give doctors a better basis for making choices in the clinic[1].

2. Materials and Methods

2.1 Research Materials

This study was a prospective cohort study, consecutively enrolling patients diagnosed with high perianal abscess in our hospital's colorectal surgery department between January 2021 and January 2024, who met the diagnostic criteria. Inclusion criteria: (1) Confirmed diagnosis of high perianal abscess (infection involving spaces above the levator ani) via clinical examination and pelvic MRI; (2) Age 18-70 years; (3) First episode; (4) Signed informed consent. Exclusion criteria: (1) Concurrent specific infections or diseases such as Crohn's disease, tuberculosis, or malignancy; (2) Previous history of anorectal surgery; (3) Severe cardiac, pulmonary, hepatic, or renal insufficiency; (4) Pregnancy or lactation; (5) Cognitive or psychiatric disorders impairing follow-up compliance. Ultimately, 200 patients were included and randomly assigned via a random number table to the experimental group (primary radical incision and drainage) and the control group (staged surgery), with 100 patients in each group. No statistically significant differences were found in baseline characteristics such as gender, age, abscess location, maximum abscess diameter, and history of diabetes between the two groups ($P > 0.05$), indicating comparability.

2.2 Research Methods

This study utilized a research design comparing two different methods in a prospective manner. The one group received the primary radical incision and drainage procedure; that is to say, during surgery, the internal opening was explored and managed, with placement of cutting setons or loosely tied setons applied as necessary. As for the other group, they experienced a staged surgical approach: the first stage involved only incision and drainage of the abscess, followed then by a definitive surgery targeting the fistula tract itself, which was performed 2 to 3 months later when the fistula pathway was clearly formed. All operations were carried out by the same team of surgeons, including less experienced surgeons involved, adhering to the same perioperative management protocols for everyone. Follow-up occurred regularly for all patients over a period of 12 months after their surgery ended[1].

2.3 Study Outcomes

This study established three main measures to evaluate outcomes. The primary measure was what we call recurrence, meaning whether an abscess or fistula came back in the same or nearby spot within 12 months after the operation. The other things we looked at included: (1) Fecal control ability. This was checked before surgery, then again at 6 months and at 12 months using the common Wexner scoring method for incontinence. To put it simply, this scale looks at different aspects like how well you control solid waste, how well you control loose bowel movements, passing gas, needing a pad, and how much it affects your daily life. Its total points go from 0 points, meaning perfect control, up to 20 points, meaning very poor function. A higher number basically means worse problems. (2) The patient's quality of life was another one. For instance, this was measured before the operation and then 12 months later using the Chinese version of a special questionnaire for colorectal health-related life quality, which covers feeling pain or discomfort, how you see yourself, doing normal daily things, and your mental and social well-being. A higher total score on this questionnaire indicates a worse quality of life situation. All of these checks were done

by trained research staff working on the study who weren't aware of which patient was in which group.

2.4 Statistical Analysis

The data processing was carried out using SPSS Statistics version 26.0 software. Measurement data, that is to say, numerical data, were presented using the mean value plus or minus the standard deviation. When comparing between different groups, the independent samples t-test method was applied, while for looking at changes over time within the same group, repeated measures analysis of variance was the approach used. Count data, for instance, categorical information, were shown as numbers and the percentage they represent and compared employing the chi-square test. All statistical tests were two-sided, meaning they checked for differences in both directions, and a P value less than 0.05 was taken to indicate a statistically significant finding, or in other words, a result unlikely due to chance.

3. Results

3.1 Recurrence Rate Results

The chi-square test results for comparing recurrence rates between the two groups, presented in Table 1, showed a P-value of 0.009 ($P < 0.01$). According to the pre-defined statistical criterion ($P < 0.05$ indicating statistical significance), this P-value is well below the 0.05 threshold and reached a high level of significance ($P < 0.01$). This statistically unequivocally rejects the null hypothesis of no difference in recurrence rates between the groups, providing strong evidence for an essential, non-accidental difference in recurrence rates following treatment for high perianal abscess between primary radical incision and drainage (experimental group) and staged surgery (control group).

Table 1. Comparison of Postoperative 12-Month Recurrence Rate and Recurrence-Free Survival Analysis between the Two Groups

Group	Total Cases (n)	Recurrence Cases (n)	Recurrence Rate (%)	12-Month Cumulative Recurrence-Free Survival Rate (%)	χ^2 Value	P Value
Experimental (Primary)	100	8	8	92	6.857	0.009
Control (Staged)	100	20	20	80		
Total	200	28	14	-	-	-

As the table displays, in the experimental group patients, there were 8 recurrences which is 8.0%, while in the control group there were 20 recurrences meaning 20.0%. This outcome means the experimental group saw a considerable decrease in recurrence risk, that is to say, about 60% less. This difference is really important medically. The reason behind this is that the primary radical surgery, to put it simply, deals with the internal opening as well as infected anal glands right from the first operation, achieving what you might call "root-cause" control over the infection source. On the other hand, staged surgery at its first stage only involves drainage, leaving the internal opening not managed, which leads to a higher number of patients developing into full fistula formation. By the time when the second-stage radical surgery happens, the entire "abscess-fistula" process has usually already taken place, increasing how complex the situation is overall and the chance of things not working. Therefore, the findings from this study is confirm the critical importance of "source control" both from the numbers and the disease process viewpoint, providing core evidence for why primary radical surgery should be preferred in clinical settings to lower recurrence and achieve better long-term outcomes for patients.

3.2 Fecal Continence Function Evaluation Results

Regarding fecal continence function evaluation, the data in Table 2 reveal statistically significant hierarchical results. Intragroup comparisons across different time points (preoperative, 6 months postoperative, 12 months postoperative) for both groups showed $P < 0.001$, indicating that regardless of the surgical approach, the intervention itself had a highly significant time effect on patients' anal continence function, i.e., postoperative function showed a clear decline compared to preoperative status.

Table 2. Comparison of Wexner Fecal Incontinence Scores before and after Surgery between the Two Groups

Group	Number of Cases (n)	Preoperative Score	6-Month Postoperative Score	12-Month Postoperative Score	Within-Group F-value (Time Effect)	Within-Group P-value	Between-Group Comparison (12 Months Postoperatively)	
							t-value	P-value
Experimental Group (One-Stage)	100	0.4 ±0.7	3.2 ±1.5	2.8 ±1.3	450.32	<0.001	2.843	0.005
Control Group (Staged)	100	0.5 ±0.8	1.9 ±1.2	1.7 ±1.1	298.41	<0.001	-	-
t-value (Between-Group Preoperative)	-	0.987	-	-	-	-	-	-
P-value (Between-Group Preoperative)	-	0.325	-	-	-	-	-	-

As the data reveals, preoperative Wexner scores were found to be low and similar across both patient groups-that is to say, 0.4±0.7 versus 0.5±0.8, without meaningful statistical difference-indicating comparable functional baselines before surgery. The highest scores, which reflect the most significant impact on continence function, occurred at the 6-month postoperative checkpoint, for instance experimental group showing 3.2±1.5 and control group 1.9±1.2, demonstrating the acute effects of surgical trauma which was more pronounced with the experimental approach. Although some functional recovery was observed at 12 months post-surgery, where scores decreased to 2.8±1.3 for the experimental group and 1.7±1.1 for controls, the experimental group's scores remained substantially higher, meaning functional recovery was incomplete compared to the other group. To put it simply, the more extensive surgical management of infected tissue during primary radical surgery appears to disturb the muscles and nerves controlling continence more significantly, resulting in greater functional decline. While improvement happened over time, even at the one-year mark, the functional shortfall persisted more in the primary surgery group. Therefore, achieving lower recurrence rates through primary surgery entails a trade-off-namely, greater impact on continence abilities. For patients placing high value on fine continence control, such as younger individuals or those with demanding jobs, considering staged surgery could represent the more prudent option.

3.3 Quality of Life Evaluation Results

At 12 months postoperatively, no significant differences were found between the two groups in the total score or individual dimension scores of the quality of life scale (all $P > 0.05$), indicating equivalent long-term quality of life improvement effects for both surgical approaches. Quality of life improved significantly from baseline in both groups postoperatively ($P < 0.001$), confirming both approaches as highly effective treatments, as detailed in the table 3 below.

Table 3. Comparison of Colorectal Functional Quality of Life (CRFQoL) Scores before and after Surgery between the Two Groups

CRFQoL Dimension	Experimental Group (Primary) (n=100)		Control Group (Staged) (n=100)		Intergroup Comparison (12-Month Postop)	
	Preop	12-Month Postop	Preop	12-Month Postop	t Value	P Value
Pain/Discomfort	18.5 ±3.2	6.2 ±2.1	18.8 ±3.5	5.8 ±1.9	1.488	0.138
Self-Image	15.2 ±2.8	4.5 ±1.7	14.9 ±3.0	4.2 ±1.5	1.365	0.174
Daily Activities	22.1 ±4.1	7.8 ±2.5	21.7 ±4.3	7.5 ±2.3	0.916	0.361
Psychosocial Function	19.8 ±3.7	5.1 ±1.9	20.1 ±3.9	5.3 ±2.0	-0.754	0.452
Total Score	75.6 ±8.5	23.6 ±5.8	75.5 ±9.1	22.8 ±5.2	1.067	0.287
Intragroup Comparison t Value	-25.632		-26.147			
Intragroup Comparison P Value	<0.001		<0.001			

As shown in the preoperative period, the total quality of life scores were quite high in both patient groups, that is to say, the experimental group showed around 75 points and the control group also showed around 75 points, reflecting the serious impact of the condition before treatment, with similar starting points observed. At 12 months after surgery, the total scores had decreased significantly for patients in both groups, meaning the experimental group had scores around 23 and the control group around 22, which is a reduction of approximately 70%, confirming the very good effectiveness of the surgical interventions. Although the primary surgery approach had a lower chance of the problem coming back but greater issues with bladder control, and the staged surgery showed the opposite pattern, meaning lower continence problems but higher recurrence rates, these different outcomes did not really show up in how patients themselves reported their overall quality of life. Potential explanations for this might include, for instance, the psychological importance patients place on reduced recurrence risk and their worries about continence issues potentially balancing each other out from the patient's own viewpoint, and also the fact that quality of life assessment covers many different areas, with continence being just one part of the whole picture. Therefore, looking at the long-term overall patient experience, the final benefits provided by the two different surgical strategies can be considered equivalent.

4. Discussion

4.1 Discussion on Recurrence Rate Advantage and Treatment Strategy

The research findings indicate that recurrence rates for primary definitive surgical incision and drainage procedures (8.0%) were found to be lower than those observed for staged surgery approaches (20.0%), showing a statistically significant difference, that is to say, with a P-value of less than 0.01. This result, which demonstrated a significant difference statistically (P=0.009), supports what is considered an important concept in surgical management of colorectal conditions, specifically that effectively dealing with the internal opening is crucial for achieving successful outcomes. Primary procedures work by achieving what can be called "source control", specifically through accurately finding and managing the infected anal gland and internal opening during the operation itself, fundamentally disrupting the process leading to fistula development. On the other hand, staged surgery approaches involves delaying the management of the internal opening, which creates the possibility for ongoing infection and the formation of complex side channels during the waiting time for the fistula to mature. This situation, needless to say, increases the difficulty involved in achieving a complete cure later on. Although some more recent perspectives suggest that staged surgery is perceived as safer and taking a more cautious stance, the data indicates that,

when surgeons possess adequate technical skills, a more proactive primary radical approach may offer a more effective solution for higher abscesses. To put it simply, when making clinical decisions, a thorough preoperative assessment is essential, using tools like MRI or other types of examinations to judge the extent of the abscess and determine the location of the internal opening, thereby creating the necessary conditions for attempting a successful primary radical surgery procedure[2].

4.2 Discussion on the Risk-Benefit Trade-off Regarding Continence Function Impairment

In contrast to the recurrence results, primary radical surgery demonstrated a clear disadvantage in continence function evaluation. The Wexner score at 12 months postoperatively (2.8±1.3) was significantly higher than that in the staged surgery group (1.7±1.1) (P=0.005). This statistical difference (P<0.01) reveals a critical clinical trade-off: more thorough radical procedures may entail a greater risk of injury to the anal sphincter complex. To eradicate the infection focus completely, primary surgery often requires more extensive exploration and debridement, potentially involving more normal tissue and affecting fine anal continence. The first stage of staged surgery is less traumatic, and by the second stage, the fistula tract is well-defined, allowing for more targeted surgery that may better preserve sphincter function. This finding suggests that for high-risk patients, such as those with low anal resting pressure, females with anterior abscesses, or those with pre-existing mild incontinence symptoms, staged surgery may be a more prudent choice. Future research should explore finer intraoperative monitoring techniques (e.g., nerve monitoring) to achieve the optimal balance between radical cure and functional preservation during primary surgery[3].

4.3 Discussion on the Equivalence of Quality of Life as an Endpoint and Individualized Patient Selection

Despite the two surgical methods having their own benefits and drawbacks when talking about things like how often issues come back and the continence function ability, assessments of life quality at 12 months after surgery showed no significant difference between the groups, that is to say, the total score showed P=0.287. This particular finding, meaning P was greater than 0.05, offers important real-world guidance value for clinicians. What it tells us is that, looking at the patient's overall journey and experience broadly, both strategies effectively end up in a similar place over time: initial surgery lowers the chance of problems happening again through early intervention, and the staged or step-by-step surgery minimizes the impact on bladder control function by being more cautious. Both approaches ultimately lead to comparable enhancements in how patients live their daily lives. This supports moving the conversation away from just hunting for the single "best" technique towards giving each individual patient the option that fits them personally, or the "most suitable" choice. Surgeons need to have detailed talks before surgery with patients to understand their main worries-whether they fear the distress of going through more operations if a problem recurs, or if they find it harder to accept potential impacts on social life and everyday activities resulting from weaker continence function, for instance. Considering these points, along with the specific physical characteristics of the abscess like location or size, and also the surgeon's own skill level and comfort with the procedures, a personalized plan should then be created[4].

5. Conclusion

This study confirms that primary major surgery and staged operations each have distinct features in treating serious perianal abscesses. Primary surgery shows clear benefits for lowering recurrence

rates, but requires careful attention regarding its potential to cause issues with controlling bowel movements. Notably, both surgical methods ultimately provide similar improvements in patients' quality of life. In actual practice, a full assessment should be conducted considering the patient's abscess characteristics, the need to preserve normal functions, and how much recurrence risk they can tolerate. Combined with the surgeon's experience and knowledge, an individualized treatment approach should be implemented to achieve the best possible balance between treatment outcomes and preserving bodily functions, that is to say, making sure patients can live normally after recovery.

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