Analysis of Clinical Value and Necessity of Preoperative Colonoscopy in Patients with Anal Fistula

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Article

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Abstract

Background: To explore the clinical application value of preoperative colonoscopy in patients with anal fistula.

Methods: (1) This study analyzed 1796 patients with benign anorectal diseases who underwent preoperative intestinal endoscopy and met the surgical criteria in the past three years at the First Affiliated Hospital of Guizhou University of Traditional Chinese Medicine. Of these patients, 949 with anal fistula were classified as group A and 847 non-anal fistula patients were classified as group B. We compared and analyzed the general information, endoscopic findings, pathological characteristics of polyp, distribution of bowel-inflammation location, and inflammatory bowel disease examination results between the two groups of patients. (2) 2275 anal fistula patients without surgical contraindications in the past three years at the hospital were selected. Based on whether they underwent preoperative intestinal endoscopy, 949 anal fistula patients who underwent preoperative intestinal endoscopy were classified as group A and 1326 anal fistula patients who did not were classified as group C. This study compared the detection rate of endoscopic lesions and IBD results between the two groups of patients.

Results: (1) There was no statistically significant difference in general information between groups A and B, indicating comparability. However, the abnormal detection rate in group A was higher than that in group B \( P < 0.01 \). In terms of endoscopic findings, the detection rate of bowel inflammation, IBD, and polyps in the anal fistula group was higher than that in the non-anal fistula group \( P < 0.05 \). Regarding the location of inflammation, group A exhibited a higher detection rate in the terminal ileum, ileocecal region, and ascending colon than group B \( P < 0.05 \). The incidence of IBD in group A was higher than that in group B, but there was no statistically significant difference between the two groups \( P < 0.05 \). (2) The study found that there was a statistically significant difference in the intestinal endoscopic detection rate between the two anal fistula groups (groups A and C) \( P < 0.01 \). The detection rate of IBD in the two anal fistula groups (groups A and C) had statistical significance \( P < 0.05 \). The detection rate of Crohn's disease in the two anal fistula groups (groups A and C) also had statistical significance \( P < 0.05 \).

Conclusions: Preoperative colonoscopy is of great clinical value in the preoperative evaluation of patients with anal fistula, and it is necessary to perform preoperative colonoscopy to exclude localized perianal lesions caused by inflammatory bowel disease, thereby reducing the rate of missed diagnoses and improving treatment outcomes.

Introduction

Anal fistula is a common disease in anorectology, and the clinical symptoms are mostly discomfort such as repeated ulceration of the mass, overflow of fluid and pus or anal itching. According to statistics, the incidence of anal fistula accounts for about 1.67%~3.6% of anorectal diseases in China, which can occur in any age group, but is mostly seen in young adults and is higher in men than in women. Surgery is the main treatment for anal fistula, but some patients with anal fistula suffer from long postoperative healing time and high recurrence rate. Recent studies have reported that the risk of recurrence after anal fistula surgery can be as high as 57%, and one of the main reasons for this is related to combined intestinal pathologies, such as inflammatory bowel disease (IBD) and intestinal tuberculosis. These anal fistulas are often complex, difficult to operate and prone to recurrence after surgery, and are one of the current challenges in the field of anorectal medicine. However, the
lack of typical bowel lesion presentation leads to a high rate of underdiagnosis of bowel lesions\(^8\)\(^{-9}\). Preoperative colonoscopy in patients with anal fistula can be used to observe whether patients have Ulcerative Colitis (UC), Crohn’s disease (CD), isolated enterocolitis, intestinal tuberculosis, and intestinal tumors, which can support the development of treatment plans and determine the prognosis\(^10\)\(^{-12}\). Therefore, preoperative colonoscopy in patients with anal fistula has positive significance for both surgical diagnosis and treatment and for ensuring medical safety\(^13\). In this study, we selected 1796 patients with benign anorectal diseases who underwent preoperative intestinal endoscopy as the research subjects and divided them into an anal fistula group and a non-anal fistula group. By comparing the results of intestinal endoscopy between the two groups, including the detection rate of lesions, the location of inflammatory lesions, the nature of polyps, and the incidence of inflammatory bowel disease, the clinical diagnostic value of preoperative intestinal endoscopy in anal fistula patients was explored. In order to further investigate the necessity of preoperative intestinal endoscopy in anal fistula patients, another 2275 anal fistula patients were selected as research subjects and were divided into two groups based on whether they underwent preoperative intestinal endoscopy. A retrospective comparison was made between two groups of anal fistula patients: those who did not undergo preoperative intestinal endoscopy and later developed intestinal lesions due to poor prognosis, and those who underwent preoperative intestinal endoscopy and were found to have intestinal lesions. This comparison aims to provide guidance for clinical physicians in the diagnosis and treatment of anal fistula patients in the later stages. The following is reported.

**Materials And Methods**

**Study design and Participants.** A total of 1796 patients with benign anorectal diseases admitted to the Department of Anorectal Medicine, The First Affiliated Hospital of Guizhou University of Traditional Chinese Medicine, from January 2017 to September 2020 who underwent preoperative colonoscopy and had no contraindications to surgery were included and divided into the anal fistula group (Group A, 949 cases), and the non-anal fistula group (Group B, 847 cases); another 2275 patients with anal fistula were included and divided into the observation group (Group A, 949 cases), and the control group (Group C, 1326 cases) according to whether they underwent preoperative colonoscopy or not.

Anal fistula according to Diagnostic criteria for inclusion\(^14\), but the diagnosis needs to be combined with clinical symptoms, signs, and ancillary examinations for comprehensive analysis and differential diagnosis with purulent sweat gland infection and perianal subcutaneous cyst infection.

**Preoperative procedure.** Patients in both groups were required to start a low-fiber diet 1 day before the examination according to the Chinese bowel preparation guidelines \(^15\).

1. Fasting from food and water after 22:00 hours 1 day before the examination; if the gastrointestinal motility disorder is present, the fasting time should be extended.
2. Oral laxative (polyethylene glycol electrolyte dispersion 68.56g/bag) as prescribed by the doctor, followed by defecation with yellow watery stool without fecal residue.
3. Fasting and water fasting was required for 2h after the examination, and a liquid soft food was given on the same day.

**Outcome measures.**
1. Using the results of colonoscopy as observation indicators.
2. Statistical analysis of abnormal findings detected by colonoscopy and the location of enterocolitis lesions.
3. Removing or taking lesion tissues such as polyps, inflammatory bowel disease and tumors for pathological biopsy, and conducting comparative analysis of the detection rate, nature and pathological findings of lesion tissues.

**Statistical analysis.** In this study, Microsoft Excel was used to create the database, and SPSS 25.0 was used to statistically analyze the clinical data. The measurement data were expressed as Mean±SD (± s), and independent sample t-test was performed for comparison between the two groups of measurement data. The count data were expressed as case (rate) [n (%)]. The comparison of percentages between two or more groups was analyzed by chi-square test, $P < 0.05$ was considered a statistically significant difference.

**Ethical statement.**

All methods of this study were carried out in accordance with the Declaration of Helsinki and the regulations of our hospital.

The study was approved by the ethics review committee of the first affiliated hospital of Guizhou University of Traditional Chinese Medicine (No. KS2022-21), and the requirement for informed consent was waived by the aforementioned research ethics board due to the retrospective nature of the study.

**Results**

2.1 **Intestinal endoscopy results for benign anorectal diseases**

2.1.1 **General information and endoscopic findings of patients**

The results showed that there was no statistically significant difference in gender and age between the two patient groups, and they were comparable (Table 1). The detection rate of lesions was higher in group A than in group B, and the difference in intestinal endoscopy results between the two groups was statistically significant (Table 1).

Tab.1 Comparison of general information and endoscopic findings between two groups A B.
9) Group B (n=847)

<table>
<thead>
<tr>
<th>Item</th>
<th>(\chi^2/t)</th>
<th>(P)-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enteritis</td>
<td>79/768</td>
<td>0.002</td>
</tr>
<tr>
<td>IBD</td>
<td>40.08±12.89</td>
<td>0.145</td>
</tr>
<tr>
<td>Polyps</td>
<td>269 31.76</td>
<td>21.909</td>
</tr>
<tr>
<td>Malignant</td>
<td>578 68.24</td>
<td></td>
</tr>
</tbody>
</table>

Note: * indicates that the difference between group A and group B is statistically significant.

2.1.2 Lesion findings under intestinal endoscopic

Further analysis of the lesion findings under intestinal endoscopic of the two groups showed that the detection rates of bowel inflammation, IBD, and polyps were higher in group A than in group B, and the differences were statistically significant. There was no statistically significant difference in the incidence of melanosis coli (MC), diverticulum, and malignant tumors between the two groups, as shown in Table 2.

Tab.2 Lesion findings under intestinal endoscopic between two groups A B [n(%)]

<table>
<thead>
<tr>
<th>Items</th>
<th>Enteritis</th>
<th>IBD</th>
<th>Polyps</th>
<th>Colonic melanosis</th>
<th>Diverticulum</th>
<th>Tumor</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>153 (37.97)</td>
<td>14 (3.47)</td>
<td>205 (50.87)</td>
<td>12 (2.98)</td>
<td>6 (1.49)</td>
<td>10 (2.48)</td>
<td>3 (0.74)</td>
</tr>
<tr>
<td>Group B</td>
<td>132 (49.07)</td>
<td>6 (2.23)</td>
<td>111 (41.26)</td>
<td>7 (2.60)</td>
<td>2 (0.74)</td>
<td>5 (1.86)</td>
<td>6 (2.23)</td>
</tr>
<tr>
<td>(\chi^2)</td>
<td>8.146</td>
<td>7.713</td>
<td>5.974</td>
<td>0.083</td>
<td>0.260</td>
<td>0.287</td>
<td>1.689</td>
</tr>
<tr>
<td>(P)-value</td>
<td>&lt;0.05*</td>
<td>&lt;0.05*</td>
<td>&lt;0.05*</td>
<td>0.774</td>
<td>0.610</td>
<td>0.592</td>
<td>0.194</td>
</tr>
</tbody>
</table>

Note: * indicates that the difference between group A and group B is statistically significant.

2.1.3 Pathological diagnosis of polyps

Further analysis of the pathological diagnosis of polyps showed that the results of the two groups were not statistically significant \((P > 0.05)\), see Table 3

Tab.3 Pathological diagnosis of polyps between two groups A B [n(%)]
2.1.4 Enteritis location results

Further analysis of the distribution of enteritis sites in the two groups showed that the detection rate of enteritis in the terminal ileum, ileocecal and ascending colon sites was higher in group A than in group B, and the comparison between the two groups was statistically significant \((P<0.05)\). There was no statistical difference between the two groups in the distribution of transverse colon \((P>0.05)\), as shown in Table 4.

Tab.4  Enteritis location between two groups A B [n(%)].

<table>
<thead>
<tr>
<th>Items</th>
<th>Terminal ileum</th>
<th>Ileocecal</th>
<th>Cecum</th>
<th>Ascending colon</th>
<th>Transverse colon</th>
<th>Descending colon</th>
<th>Sigmoid colon</th>
<th>Rectum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>28 18.30</td>
<td>3 1.96</td>
<td>1 0.76</td>
<td>1 0.65</td>
<td>14 9.15</td>
<td>6 3.92</td>
<td>26 16.99</td>
<td>74 48.37</td>
</tr>
<tr>
<td>Group B</td>
<td>11 8.33</td>
<td>9 6.82</td>
<td>1 0.65</td>
<td>7 5.30</td>
<td>5 3.79</td>
<td>8 6.06</td>
<td>25 18.94</td>
<td>66 50.00</td>
</tr>
<tr>
<td>(\chi^2)</td>
<td>5.960</td>
<td>4.145</td>
<td>0.011</td>
<td>4.040</td>
<td>3.275</td>
<td>0.694</td>
<td>0.183</td>
<td>0.076</td>
</tr>
<tr>
<td>(P)-value</td>
<td>0.05*</td>
<td>0.05*</td>
<td>0.917</td>
<td>0.05*</td>
<td>0.070</td>
<td>0.405</td>
<td>0.669</td>
<td>0.783</td>
</tr>
</tbody>
</table>

Note: * indicates that the difference between group A and group B is statistically significant.

2.1.5 IBD morbidity

Further analysis of the inflammatory bowel disease results showed no statistical difference between the two groups \((P>0.05)\), as shown in Table 5.

Tab.5  IBD between two groups A B [n(%)].

<table>
<thead>
<tr>
<th>Items</th>
<th>Group A</th>
<th>Group B</th>
<th>(\chi^2)</th>
<th>(P)-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>UC</td>
<td>3 21.43</td>
<td>1 16.67</td>
<td>0.057</td>
<td>0.812</td>
</tr>
<tr>
<td>CD</td>
<td>11 78.57</td>
<td>5 83.33</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2.2 Intestinal endoscopy results for anal fistula

2.2.1 Results of intestinal endoscopy for two groups of anal fistula patients

The results indicate that group A had a higher detection rate of lesions compared to group C, and the difference in the detection rate of lesions between the two groups of anal fistula patients was statistically significant ($P<0.05$). The results for IBD showed that group A had a higher detection rate than group C, and the difference between the two groups was statistically significant ($P<0.05$). There was no statistically significant difference in the detection rate of ulcerative colitis between the two groups ($P>0.05$). Results for Crohn's disease indicated that group A had a higher detection rate than group C, and the difference between the two groups was statistically significant ($P<0.05$).

Tab.6 Results of intestinal endoscopy between two groups A C.

<table>
<thead>
<tr>
<th>Items</th>
<th>Group A ($n=949$)</th>
<th>Group C ($n=1326$)</th>
<th>$\chi^2$ or $t$</th>
<th>$P$-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive(%)</td>
<td>403 42.47</td>
<td>14 1.06</td>
<td>633.605</td>
<td>$&lt; 0.001^*$</td>
</tr>
<tr>
<td>Negative(%)</td>
<td>546 57.53</td>
<td>1312 98.94</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IBD(%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>14 1.48</td>
<td>5 0.38</td>
<td>8.522</td>
<td>$&lt;0.05^*$</td>
</tr>
<tr>
<td>No</td>
<td>935 98.52</td>
<td>1312 98.94</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UC(%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>3 0.32</td>
<td>2 0.15</td>
<td>1.117</td>
<td>0.572</td>
</tr>
<tr>
<td>No</td>
<td>946 99.68</td>
<td>1321 99.85</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CD(%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>11 1.16</td>
<td>3 0.23</td>
<td>7.964</td>
<td>$&lt;0.05^*$</td>
</tr>
<tr>
<td>No</td>
<td>938 98.84</td>
<td>1323 99.77</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: * indicates that the difference between group A and group C is statistically significant.

Discussion

In recent years, colonoscopy has become an important tool for screening and surveillance of gastrointestinal tumors, and is also used in the adjuvant examination of benign anorectal diseases$^{16}$. Anal fistula is a common disease in anorectology, among which complex anal fistula is manifested by the formation of multiple fistulas, complex canal travel, or repeated failure to heal after multiple surgeries and high recurrence rate, and this condition requires consideration of whether the patient has combined inflammatory bowel disease, intestinal tuberculosis, etc$^{17}$. Therefore, the necessary preoperative colonoscopy is beneficial to clarify the intestinal condition of the patient. In this study, the overall abnormal rate of preoperative colonoscopy detection was high, including 42.47% in patients with anal fistula and 31.76% in patients without anal fistula, which, combined with
the statistical results of the two groups of patients with anal fistula in this study who did or did not receive preoperative colonoscopy, further indicates that colonoscopy has good application value for the assessment of the condition of patients with anal fistula and should be taken seriously.

The colonoscopy findings in this study showed that the top three diseases were enteritis, inflammatory bowel disease, and polyps. Perianal lesions in Crohn's disease (CD) have received increasing attention from clinicians since Bissell\textsuperscript{18} first reported localized colitis with perianal granulomatous inflammatory lesions in 1934. Anal fistula is the most common perianal disease in CD, and its prevalence has been reported in the literature to reach 43\%\textsuperscript{19}. The incidence of anal fistulas within 1, 10, and 20 years after diagnosis of intestinal CD is 12\%, 21\%, and 26\%, respectively\textsuperscript{20}. For patients, single surgical treatment has a high recurrence rate and a high reoperation rate, which seriously endangers the quality of life of patients\textsuperscript{21-22}. The results of this study showed that the detection rate of enterocolitis and inflammatory bowel disease was higher in the anal fistula group than in the non-anal fistula group. Regarding the location of enterocolitis lesions, the detection rate in the terminal ileum, ileocecal region and ascending colon was higher in the anal fistula group than in the non-anal fistula group. Therefore, we need to pay attention to anal fistulas caused by enteritis and inflammatory bowel disease, especially terminal ileal enteritis, which is likely to be the occult phase of CD. In a retrospective study\textsuperscript{23}, the detection rate of inflammatory bowel disease was found to be higher in patients with anal fistula than in patients with mixed hemorrhoids. The results of this study showed that the detection rate of inflammatory bowel disease in patients with anal fistula was even more than twice that of patients with non-anal fistula, and there was no statistical difference between the two groups. The analysis of the reasons may be related to the low incidence of inflammatory bowel disease, the small number of cases, and the lack of long-term follow-up of patients. Based on this study, we further analyzed the impact of preoperative colonoscopy in patients with anal fistula, and the data showed that the overall detection rate of inflammatory bowel disease in patients with anal fistula was high, and the treatment of intestinal lesions found by colonoscopy has been delayed due to poor prognosis, so preoperative colonoscopy in patients with anal fistula is a necessary adjunct.

In addition, postoperative trauma recovery time is long after anal fistula, and review 3-6 months after surgery makes some patients lose the best time for early treatment, thus affecting disease prognosis, increasing treatment risk and economic burden, and also easily causing serious medical dispute problems\textsuperscript{24}. In this study, we compared the detection rate of inflammatory bowel disease in three groups of patients and found that patients with anal fistula had a higher detection rate in inflammatory bowel disease, and the results were consistent with the above elaboration. Therefore, preoperative colonoscopy in patients with anal fistula is beneficial for the development of a reasonable treatment plan.

With the increasing incidence of colorectal polyps, it is important to grasp the clinical epidemiological features of colorectal polyps for the prevention of bowel cancer\textsuperscript{25-26}. For precancerous lesions, such as adenomatous polyps, detection and removal at an early stage can effectively prevent disease progression and deterioration\textsuperscript{27-29}. Previous studies have shown\textsuperscript{30} that patients who underwent early removal of intestinal polyps reduced the incidence of colorectal cancer by 30\%. It is also common to find cases of malignant tumors only after surgery for benign anal disease, and some of them are even in the middle and late stages. In the results of this study, the detection rate of polyps in the two groups of lesion data was as high as 50\%, and the percentage of adenomas after pathological examination of polyps was nearly 65\%, which further proves that preoperative colonoscopy for anorectal diseases can not only provide a comprehensive assessment of anal fistula and combined medical and
surgical treatment; it can be early detection and treatment of precancerous colorectal lesions, and substantially reduce the risk of cancer.

**Conclusion**

In summary, patients with anal fistula are more likely to develop inflammatory bowel diseases and symptoms such as enteritis, inflammatory bowel disease, and polyps, indicating that the development of anal fistula is closely related to the inflammatory environment of the intestine. Active preoperative colonoscopy can help reduce the rate of missed diagnosis in patients with anal fistula, improve the cure rate of anal fistula, reduce the recurrence rate, and alleviate patient pain using integrated medical and surgical treatment. Therefore, preoperative colonoscopy is not only a means of colorectal cancer screening, but also one of the mandatory investigations for patients with anorectal diseases. However, the following problems exist in this study. Due to the limitation of sample size collection and survey difficulty, this survey was limited to single-center data information in the past 3 years and the sample size was small, and the conclusions obtained need to be further confirmed by multi-center and large samples. In future studies, the survey scope can be further expanded, the survey items can be improved, and the association between colonoscopy findings and anal fistula disease can be further improved and guide clinical diagnosis and treatment.

**Declarations**

**Data availability**

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

**Author contributions**

S.X. contributed to statistical analysis and interpretation of the data and drafting of the manuscript. B.C., F.L., Z.L., K.W., contributed to acquisition, analysis and interpretation of data and revised the manuscript. L.Z. contributed to conception and design of the study, analysis and interpretation of data and drafting of the manuscript. All coauthors critically revised the article and gave final approval of this version to be published.

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**Competing interests**

The authors declare no competing interests.
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