

Clinical Effects of Microecological Agents on Intestinal Dysbacteriosis in Patients with Pancreatic Cancer

Zheng Liu, Meng Liang, Nan Zhang*

Hebei University Affiliated Hospital, Baoding 071000, Hebei, China.

How to cite this paper: Zheng Liu, Meng Liang, Nan Zhang. (2025) Clinical Effects of Microecological Agents on Intestinal Dysbacteriosis in Patients with Pancreatic Cancer. *International Journal of Clinical and Experimental Medicine Research*, 9(1), 143-147.

DOI: 10.26855/ijcemr.2025.01.023

Received: December 30, 2024

Accepted: January 28, 2025

Published: February 27, 2025

***Corresponding author:** Nan Zhang, Hebei University Affiliated Hospital, Baoding 071000, Hebei, China.

Abstract

Objective: To evaluate the clinical efficacy of microecological agents in the treatment of intestinal dysbacteriosis in patients with pancreatic cancer. **Methods:** A total of 60 patients with pancreatic cancer and intestinal dysbacteriosis admitted to our hospital from June 1, 2023, to May 31, 2024, were enrolled in this study. They were randomly divided into two groups: the conventional treatment group (n = 30) and the microecological agent group (n = 30). The conventional treatment group received standard treatment, while the microecological agent group received additional treatment with microecological agents. The therapeutic effects and safety were compared between the two groups. **Results:** Before treatment, there were no significant differences in laboratory indicators between the two groups ($P > 0.05$). After treatment, the laboratory indicators decreased in both groups, with a more pronounced decrease observed in the microecological agent group ($P < 0.05$). The clinical indicators of the microecological agent group were significantly lower than those of the conventional treatment group after treatment ($P < 0.05$). Additionally, the incidence of adverse reactions in the microecological agent group was significantly lower than that in the conventional treatment group ($P < 0.05$). **Conclusion:** Compared with conventional treatment alone, the administration of microecological agents in patients with pancreatic cancer and intestinal dysbacteriosis results in more pronounced therapeutic effects. It can significantly reduce laboratory indicators, shorten defecation and hospitalization time, and accelerate the relief of symptoms and signs, with high safety. Therefore, this treatment approach is worthy of clinical promotion.

Keywords

Microecological agents; Pancreatic cancer; Intestinal dysbacteriosis

Pancreatic cancer is a malignant tumor with a high fatality rate. Early diagnosis is challenging, and the disease progresses rapidly, often accompanied by severe nutritional and metabolic disturbances as well as immune dysfunction [1]. In recent years, numerous studies have revealed that the intestinal microbiota plays a crucial role in the occurrence, progression, and treatment of pancreatic cancer. Patients with pancreatic cancer are prone to intestinal dysbacteriosis due to the disease itself and therapeutic interventions such as surgery and chemotherapy. This imbalance can lead to damage to the gastrointestinal barrier, enhanced inflammatory responses, abnormal immune function, and ultimately, adverse effects on treatment outcomes and quality of life. Therefore, how to regulate the intestinal microecological environment and improve clinical outcomes in these patients has become a hotly debated research topic in clinical

practice in recent years. Based on this, the present study primarily explores the mechanism of action of microecological agents in improving the nutritional status of patients with pancreatic cancer, providing a more scientific basis for precise microecological intervention. The results are reported as follows.

1. Materials and Methods

1.1 Clinical Data

Sixty patients with pancreatic cancer and intestinal dysbacteriosis admitted to our hospital between June 1, 2023, and May 31, 2024, were enrolled in this study. They were randomly divided into two groups: the conventional treatment group (n = 30) and the microecological agent group (n = 30). In the conventional treatment group, the male-to-female ratio was 18:12, with ages ranging from 42 to 73 years and a median age of 62.35 ± 6.12 years. In the microecological agent group, the male-to-female ratio was 19:11, with ages ranging from 45 to 70 years and a median age of 62.44 ± 11.35 years. There was no statistically significant difference in clinical data between the two groups ($P > 0.05$), indicating comparability.

Inclusion Criteria:

- (1) Patients diagnosed with pancreatic cancer and intestinal dysbacteriosis. The diagnosis of pancreatic cancer referred to relevant content in the "Standardized and Normalized Diagnosis and Treatment of Malignant Tumors: Pancreatic Cancer Volume" [2]. The diagnosis of intestinal dysbacteriosis referred to relevant content in "Clinical Microbiological Diagnosis and Illustration (2nd Edition)" [3].
- (2) Patients able to maintain basic nutritional status through oral intake or enteral nutrition support.
- (3) Patients undergoing chemotherapy but not taking other interventions that affect intestinal flora.

Exclusion Criteria:

- (1) Patients with other severe diseases.
- (2) Patients who had recently used medications that affect intestinal flora.
- (3) Patients with severe gastrointestinal dysfunction.
- (4) Patients who had recently participated in other clinical trials.

1.2 Methods

The conventional treatment group received standard treatment, which included fasting, anti-infective therapy, gastrointestinal decompression, and inhibition of pancreatic enzyme secretion. Enteral nutrition intervention was administered to the patients, and X-rays were used to confirm the placement of nasojejunal feeding tubes. Based on the individual patient's constitution, varying amounts of calories and required protein substances were provided.

The microecological agent group received additional microecological agent treatment on top of the conventional treatment. Microecological agents in the form of Bifidobacterium and Lactobacillus Triple Viable Tablets (Manufacturer: Inner Mongolia Shuangqi Pharmaceutical Co., Ltd.; Approval Number: National Medical Products Administration Approval Number S19980004; Specification: 0.5g/tablet) were added to the patients' enteral nutrition solution at a dosage of 4g/day for a continuous treatment period of 7 days.

1.3 Observation Indicators

- (1) Before and after treatment, 4 ml of fasting blood was drawn from the patients, and plasma was obtained. Enzyme-linked immunosorbent assay (ELISA) was used to test and compare the plasma levels of interleukin-8 (IL-8), endotoxin, and intestinal fatty acid-binding protein (iFABP) between the two groups. PEG1500 was injected into the patients' intestines through nasogastric tubes before and after treatment, and venous blood was collected 2 hours after injection. The concentration of PEG1500 was determined using high-performance liquid chromatography (HPLC).
- (2) The clinical indicators of the two groups were compared and analyzed, including defecation time, length of hospital stay, and time to relieve symptoms and signs.
- (3) The incidence of adverse reactions after treatment was compared and analyzed between the two groups, including acute renal failure, massive gastrointestinal bleeding, acute respiratory distress syndrome, and peripancreatic abscess.

1.4 Statistical Methods

Data were analyzed using the statistical software SPSS 22.0. Continuous variables, such as laboratory indicators and clinical indicators, were described using means and standard deviations, while categorical variables, such as the incidence of adverse reactions, were described using frequencies and percentages. Independent-sample t-tests or chi-square tests were used for comparisons between groups. For all statistical tests, a P-value < 0.05 was considered statistically significant.

2. Results

2.1 Comparison of Laboratory Indicators Before and After Treatment

Before treatment, there were no significant differences in laboratory indicators between the two groups of participants ($P > 0.05$). After treatment, the laboratory indicators decreased in both groups, with a more pronounced decrease observed in the microecological agent group ($P < 0.05$) (see Table 1 for details).

Table 1. Comparison of Laboratory Indicators Before and After Treatment in Both Groups ($x \pm s$)

| Group | N u m | PEG1500(ug/ml) | | IL-8(pg/ml) | | Endotoxin (pg/ml) | | iFABP(pg/ml) | |
|------------------------------|-------------|------------------|-----------------|------------------|-----------------|---------------------|-----------------|------------------|-----------------|
| | | Before Treatment | After Treatment | Before Treatment | After Treatment | Before Treatment | After Treatment | Before Treatment | After Treatment |
| Microecological Agent Group | 30 | 58.16±6.37 | 22.34±8.12* | 92.41±11.36 | 43.24±9.68* | 85.53±10.81 | 25.74±13.86* | 312.96±21.87 | 182.49±37.41* |
| Conventional Treatment Group | 30 | 57.15±5.04 | 36.27±6.11* | 91.06±10.23 | 61.75±12.66* | 85.11±11.34 | 52.12±14.87* | 314.37±20.16 | 266.36±23.57* |
| <i>t</i> | | 0.763 | 13.728 | 0.337 | 4.924 | 0.700 | 6.665 | 0.562 | 5.561 |
| <i>P</i> | | 0.448 | 0.001 | 0.737 | 0.001 | 0.505 | 0.001 | 0.576 | 0.001 |

Note: Compared with before treatment in the same group, * $P < 0.05$.

2.2 Comparison of Clinical Indicators Between the Two Groups

After treatment, the clinical indicators of the microecological agent group were significantly lower than those of the conventional treatment group ($P < 0.05$). See Table 2 for details.

Table 2. Comparison of Clinical Indicators Between the Two Groups ($x \pm s$)

| Group | Number of Cases | Defecation Time | Length of Hospital Stay | Time to Relief of Symptoms and Signs |
|------------------------------|-----------------|-----------------|-------------------------|--------------------------------------|
| Microecological Agent Group | 30 | 24.37±4.12 | 8.16±2.38 | 39.42±8.28 |
| Conventional Treatment Group | 30 | 38.01±5.74 | 15.21±1.67 | 50.74±7.65 |
| <i>t</i> | | 3.446 | 3.692 | 3.485 |
| <i>P</i> | | 0.001 | 0.001 | 0.001 |

2.3 Incidence of Adverse Reactions

The incidence of adverse reactions in the microecological agent group after treatment was significantly lower than that in the conventional treatment group ($P < 0.05$). See Table 3 for details.

Table 3. Comparison of Incidence of Adverse Reactions Between the Two Groups (n, %)

| Group Categorization | Number of Cases | Acute Renal Failure | Gastrointestinal Bleeding | Acute Respiratory Distress Syndrome | Peripancreatic Abscess | Overall Incidence |
|------------------------------|-----------------|---------------------|---------------------------|-------------------------------------|------------------------|-------------------|
| Microecological Agent Group | 30 | 0(0.00) | 1(3.33) | 1(3.33) | 0(0.00) | 2(6.70) |
| Conventional Treatment Group | 30 | 1(3.33) | 2(6.70) | 2(6.70) | 1(3.33) | 6(20.00) |
| χ^2 | | | | | | 4.533 |
| <i>P</i> | | | | | | 0.000 |

3. Discussion

Pancreatic cancer is a highly malignant digestive system tumor clinically, with its incidence and mortality rates showing an upward trend year by year. Clinical research results indicate that the 5-year survival rate for pancreatic cancer patients is less than 10%. In the early stages, pancreatic cancer patients often do not exhibit obvious symptoms. By the time the disease is detected, patients are usually in the middle to advanced stages. Treatments such as surgery, radiotherapy, and chemotherapy may lead to malnutrition, immune dysfunction, and intestinal flora imbalance in these patients [4]. Clinical research results have shown that pancreatic cancer patients generally exhibit characteristics such as decreased intestinal flora diversity, reduced engineered bacteria, and increased pathogenic bacteria. This intestinal flora imbalance not only affects patients' nutritional absorption but also exacerbates their inflammatory responses, thereby promoting the progression of pancreatic cancer and increasing related complications. Therefore, improving patients' intestinal flora, reducing systemic inflammation, and the risk of enterogenic infection are of great significance for the prognosis and quality of life of pancreatic cancer patients.

Microecological agents, by regulating the intestinal flora of patients, can improve the metabolic and immune status of the host, which has emerged as a new strategy for tumor-supportive treatment. The results of this study show that after treatment, the laboratory indicators decreased in both groups, with a more pronounced decrease observed in the microecological agent group ($P < 0.05$). The reason for this is that PEG1500 is an important marker for assessing intestinal barrier permeability in humans. Clinical studies have found that microecological agents can reduce PEG1500 levels and improve intestinal barrier function by increasing patients' mucosal repair capacity and enhancing the expression of tight junction proteins. IL-8, a pro-inflammatory cytokine, is significantly elevated in pancreatic cancer patients and is closely related to inflammatory responses and cancer cell proliferation. Microecological agents can reduce the release of IL-8, decrease local and systemic inflammation, and improve patients' immune status by inhibiting the NF- κ B and TLR4/MyD88 signaling pathways in the body. When intestinal flora imbalance occurs in patients, the number of Gram-negative bacteria in the body also increases accordingly, and their cell wall component, lipopolysaccharide, may enter the bloodstream through the damaged intestinal barrier, triggering a systemic inflammatory response and accelerating disease progression. Clinical studies have shown that microecological agents can reduce the absorption of lipopolysaccharide, thereby increasing the levels of anti-inflammatory factors and reducing inflammatory damage. iDABP, a biomarker of intestinal ischemic injury, is elevated in pancreatic cancer patients, suggesting impaired intestinal microcirculation. Microecological agents can improve intestinal microcirculation, enhance local blood perfusion, and thus reduce iDABP levels. The results of this study show that after treatment, the clinical indicators of the microecological agent group were significantly lower than those of the conventional treatment group ($P < 0.05$). The reason for this is that microecological agents can increase the production of short-chain fatty acids, stimulate intestinal motility, and regulate bile acid metabolism, thereby improving fat digestion. The results of this study also show that the incidence of adverse reactions in the microecological agent group after treatment was significantly lower than that in the conventional treatment group ($P < 0.05$). The reason for this is that microecological agents can reduce the level of uremic toxins and decrease renal injury in patients [5]. In addition, microecological agents can also promote the repair of intestinal epithelium and reduce the formation of ulcers.

In summary, compared with conventional treatment alone, the administration of microecological agents to pancreatic cancer patients with intestinal flora imbalance can achieve more pronounced therapeutic effects. It can significantly reduce laboratory indicators, shorten defecation time and hospital stay, accelerate the relief of symptoms and signs, and is relatively safe. Therefore, it is worthy of clinical promotion.

References

- [1] Shi P, Fu X, Pan L, Ye M. Study on the Effect of Early Enteral Nutrition Combined with Microecological Agents on Intestinal Flora in Children with Acute Pancreatitis Based on Metagenomics. *Chin J Birth Health Hered.* 2024;32(9):1943-51.
- [2] Zhao P, Wang C. Standardized and Normalized Diagnosis and Treatment Series of Malignant Tumors: Pancreatic Cancer Volume. Beijing: People's Medical Publishing House; 2011.
- [3] Zhou T. *Clinical Microbiology Diagnosis and Illustration*. 2nd ed. Shanghai: Shanghai Scientific and Technical Publishers; 2007.
- [4] He Q, Qian G, Zhang X, et al. Application Effect of Enteral Nutrition Support with Microecological Immunomodulators in the Treatment of Acute Infectious Necrotizing Pancreatitis. *Chin J Nosocomiol.* 2024;34(22):3402-7.
- [5] Wang L, Li Q, Yang P, et al. Study on the Effect of Intestinal Microecological Adjustment on Serum TMAO Level, Coagulation Function, and Prognosis in Patients with Acute Pancreatitis. *Mod Dig Interv Ther.* 2024;29(5):582-6.
- [6] Xie G, Zhang Y, Guo X, et al. Study on the Differences in Intestinal Flora Structure and Functional Variations in Patients with Damp-Heat Syndrome of Pancreatic Cancer Based on High-Throughput Sequencing Technology. *Shanghai J Tradit Chin Med.* 2019;53(12):9-16.
- [7] Chen Z, Qian X, Zhang A, et al. Study on the Correlation between Different Traditional Chinese Medicine Syndromes and Prognosis of Pancreatic Cancer Based on the Characteristics of Intestinal Flora Structure. *Zhejiang J Integr Tradit Chin West Med.* 2019;29(12):965-9, Frontispiece 1.
- [8] Gou F, Jia J, Zhang T, et al. Risk Factors for Secondary Intra-abdominal Infection After Pancreatic Cancer Surgery and the Relationship between Intestinal Flora Dysbiosis, Interferon-Stimulated Gene Protein, and Endotoxin Levels. *Chin J Nosocomiol.* 2023;33(1):76-80.
- [9] Yin Z, Peng X, Lin Y, et al. Causality between Intestinal Flora and Its Metabolic Pathways and Pancreatic Cancer: A Two-Sample Mendelian Randomization Analysis. *J Hainan Med Univ.* 2024;30(22):1727-34.