Treatment Effects of Pancreatogenic Diabetes Mellitus (Qi and Yin Deficiency Syndrome) Using Zicui Xiaodu Decoction Combined with Conventional Western Medicine

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Abstract [**Objectives**] To investigate the effects of Zicui Xiaodu Decoction combined with conventional Western medicine on endocrine and exocrine functions, as well as pancreatic inflammation, in patients diagnosed with pancreatogenic diabetes mellitus (T3cDM, qi and yin deficiency syndrome). [**Methods**] A retrospective analysis was performed on the clinical data of 30 patients diagnosed with T3cDM. The control group ($n=15$) received conventional Western medical treatment, whereas the observation group ($n=15$) was additionally administered Zicui Xiaodu Decoction. The treatment duration was 12 weeks. Comparative analyses were conducted between the two groups to evaluate differences in traditional Chinese medicine (TCM) syndrome scores, glycemic indicators (FPG, 2hPG, and HbA1c), pancreatic islet function (FCP and 2hCP), pancreatogenic exocrine function (FE-1), and inflammatory markers (CRP, IL-6, amylase, and lipase) before and after treatment. [**Results**] After treatment, the total effective rate of TCM syndromes in the observation group (86.7%) exceeded that of the control group (66.7%), but this difference was not statistically significant ($P>0.05$). The observation group demonstrated significantly greater improvements in FPG, 2hPG, and HbA1c compared to the control group ($P<0.05$). Enhancements in FE-1 and 2hCP levels were markedly superior in the observation group ($P<0.01$). The reductions in CRP, IL-6, amylase, and lipase were also significantly more pronounced in the observation group relative to the control group ($P<0.05$). No statistically significant difference was observed in the incidence of adverse reactions between the two groups. Correlation analysis revealed a significant negative association between IL-6 levels and both FE-1 and C-peptide in the observation group ($P<0.05$). [**Conclusions**] Zicui Xiaodu Decoction combined with Western medicine can effectively enhance blood glucose regulation, as well as improve both endocrine and exocrine pancreatic functions and reduce inflammatory status in patients with T3cDM. The underlying mechanism may involve tonifying qi and nourishing yin, clearing heat and detoxifying, and promoting blood circulation while removing blood stasis to inhibit chronic pancreatic inflammation.

Key words Pancreatogenic diabetes mellitus (T3cDM), Zicui Xiaodu Decoction, Pancreaticosplenic homology, Clinical observation

1 Introduction

Pancreatogenic diabetes mellitus (T3cDM) is a special type of diabetes that arises secondary to exocrine pancreatic diseases. The most common etiology is acute and chronic pancreatitis, which accounts for approximately 78.5% of all cases of T3cDM[1]. Unlike type 1 and type 2 diabetes, T3cDM is characterized by the concurrent impairment of both the endocrine and exocrine functions of the pancreas. Clinically, T3cDM manifests as "fragile diabetes", marked by alternating episodes of hyperglycemia and hypoglycemia, severe and uncontrollable fluctuations in blood glucose levels, and is frequently accompanied by symptoms of pancreatic exocrine insufficiency (PEI), including steatorrhea, malnutrition, and progressive weight loss[2]. Although Western medicine has established a preliminary consensus regarding the diagnosis and treatment of this condition, the efficacy of hypoglycemic agents in controlling blood glucose remains limited, and there is a notable lack of high-quality evidence-based data to support current therapeutic approaches[3].

Based on the theory of "pancreaticosplenic homology" and considering the etiological and pathogenetic characteristics of T3cDM, this study utilized Zicui Decoction, as documented in Zhang Xichun's *Records of Chinese Medicine with Reference to Western Medicine*, as the foundational formulation, and investigated the clinical efficacy of a modified version of Zicui Xiaodu Decoction in treating qi and yin deficiency syndrome associated with T3cDM[4-5]. Zhang Xichun was the first to propose that "the pancreas functions as a secondary organ of the spleen", positing that the pancreas corresponds to the "scattered paste" concept in traditional Chinese medicine (TCM). He also developed the Zicui Decoction, which incorporates pig pancreas to nourish the internal organs, combined with Astragali Radix, Radix Rehmanniae, Dioscoreae Rhizoma, and Corni Fructus to tonify qi, nourish yin, and strengthen the spleen and kidneys. However, although the pathological location of T3cDM involves both the pancreas and spleen, its core pathogenesis extends beyond a simple deficiency of qi and yin. Instead, it represents a syndrome characterized by a complex interplay of deficiency and excess, arising from chronic pancreatitis marked by "the accumulation of damp-heat and toxic pathogenic factors, blood stasis obstructing the meridians, and fibrosis of the acinar cells". In this context, the study adopted the fundamental formulation principles of Zicui Decoction, which focuses on "tonifying qi and nourishing yin, supporting the spleen, and dispersing essence". In addition, the study excluded raw pig

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pancreas and other ingredients deemed unsuitable for decoction in the original formula. Instead, it modified the formula into Zicui Xiaodu Decoction, incorporating methods aimed at clearing heat and detoxifying, removing blood stasis, and unblocking meridians. This approach establishes an intervention strategy that "strengthens the body's resistance while simultaneously eliminating pathogenic factors, targeting both the spleen and pancreas". The objective is to precisely interrupt the inflammatory active phase of the disease and to objectively evaluate the clinical efficacy of Zicui Xiaodu Decoction in treating T3cDM, guided by the TCM theory of "treating pancreatic disease through the spleen".

2 Materials and methods

2.1 General information A single-center retrospective study was conducted involving 30 patients diagnosed with T3cDM who received treatment at Chongqing Traditional Chinese Medicine Hospital between January 2018 and December 2025. Based on the treatment regimen, patients were assigned to either the control group (conventional Western medicine, $n=15$) or the observation group (conventional Western medicine combined with Zicui Xiaodu Decoction, $n=15$). No statistically significant differences were observed between the two groups regarding gender, age, disease duration, body mass index (BMI), or types of primary pancreatic diseases (acute and chronic pancreatitis) ($P>0.05$), indicating comparability. This study was approved by the Medical Ethics Committee of Chongqing Traditional Chinese Medicine Hospital (Ethics Approval No.: 2024-DWSY-YXJ).

2.2 Diagnostic criteria

2.2.1 Diagnostic criteria of Western medicine. According to the *Chinese Expert Consensus on the Diagnosis and Treatment of Pancreatogenic Diabetes Mellitus* (*2025 Edition*) and the diagnostic criteria established by Ewald *et al.*[1,6], the diagnosis was based on the following: (i) a documented history of exocrine pancreatic diseases, including acute and chronic pancreatitis, pancreatic duct stones, or pancreatic calcification, accompanied by imaging findings (CT or MRI) of pathological changes such as pancreatic parenchymal atrophy, calcification, or pancreatic duct dilation; (ii) fulfillment of diabetes diagnostic criteria, defined as fasting blood glucose $\geqslant$7.0 mmol/L, 2 h OGTT blood glucose $\geqslant$11.1 mmol/L, or HbA1c $\geqslant$6.5%; (iii) absence of islet cell autoantibodies (*e.g.*, GADA, IAA), thereby excluding type 1 diabetes; and (iv) evidence of PEI, demonstrated by fecal elastase-1 (FE-1) levels below 200 μg/g or clinical manifestations such as steatorrhea.

2.2.2 TCM syndrome differentiation criteria. According to the *Guiding Principles for Clinical Research of New Traditional Chinese Medicine Drugs* and relevant literature on T3cDM[7-8], the syndrome was diagnosed as a deficiency of both qi and yin. The primary symptoms included fatigue and weakness, dry mouth and throat, and emaciation. Secondary symptoms comprised abdominal distension or diarrhea (steatosis), stomach distension and fullness or dull pain, a dark red or purplish tongue, a thin yellow or yellow greasy coating, and thready and rapid pulse or wiry and hesitant pulse. A diagnosis was established if two or more primary symptoms and two or more secondary symptoms were present.

2.3 Case selection

2.3.1 Inclusion criteria. The inclusion criteria were as follows: participants were required to simultaneously satisfy the aforementioned Western medical diagnostic criteria and TCM syndrome differentiation criteria; be aged between 30 and 75 years; HbA1c levels: 7.0% −11.0%; and had not used any hypoglycemic TCMs or Chinese patent medicines other than those specified in the research protocol within the preceding 3 months.

2.3.2 Exclusion criteria. The exclusion criteria included type 1 or type 2 diabetes, gestational diabetes; presence of malignant tumors in the pancreas or other body regions; severe hepatic or renal dysfunction, defined as ALT/AST levels exceeding 2.5 times the upper limit of normal or an eGFR below 45 mL/min/1.73 m^2; acute complications such as severe infection, ketoacidosis, or hyperosmolar hyperglycemic state; pregnancy or lactation; and allergy or intolerance to the investigational drugs.

2.4 Treatment methods

2.4.1 Basic treatment. Both groups received diabetes health education, medical nutrition therapy (high protein, high energy intake, and small, frequent meals, with fat consumption adjusted according to the severity of PEI), as well as lifestyle interventions (strict cessation of smoking and alcohol consumption). Patients diagnosed with PEI were administered Pancreatin Enteric-Coated Capsules concomitantly with meals. The initial dosage ranged from 25 000 to 50 000 IU of lipase per meal and was subsequently adjusted based on the degree of improvement in steatorrhea[9].

2.4.2 Treatment of the control group. In addition to the basic treatment, hypoglycemic agents were administered. Patients with mild hyperglycemia and no significant weight loss received metformin hydrochloride tablets (0.5 g, orally, three times daily with meals). For patients intolerant to metformin, those with HbA1c levels exceeding 9.0%, or those at risk of severe hypoglycemia, a basal-bolus insulin regimen comprising insulin glargine and insulin aspart was implemented via subcutaneous injection, with dosages adjusted according to blood glucose monitoring. The treatment duration was 12 weeks.

2.4.3 Treatment of the observation group. Based on the treatment regimen of the control group, Zicui Xiaodu Decoction was incorporated[10]. The prescription comprised the following components: Astragali Radix 30 g, Radix Rehmanniae 15 g, Dioscoreae Rhizoma 20 g, Puerariae Lobatae Radix 10 g, Herba Taraxaci 15 g, Polygoni Cuspidati Rhizoma et Radix 10 g, Salviae Miltiorrhizae Radix et Rhizoma 15 g, Trichosanthis Radix 10 g, Coptidis Rhizoma 6 g, and Radix Glycyrrhizae 6 g. These traditional medicinal materials were uniformly decocted by the hospital's TCM pharmacy. The dosage was one dose per day, administered twice daily, with 150 mL given each time in a warm state. The treatment duration was 12 weeks.

2.5 Observation indicators

2.5.1 Main therapeutic efficacy indicators. (i) TCM Syndrome score. Before and after treatment, in accordance with the *Guiding Principles for Clinical Research of New Traditional Chinese Medicine Drugs*, primary and secondary symptoms, including fatigue, dry mouth and throat, emaciation, and abdominal distension/steatorrhea, were categorized into four severity levels: none, mild, moderate, and severe, corresponding to scores of 0, 2, 4, and 6 points, respectively. The total symptom score and the syndrome efficacy index were subsequently calculated using the nimodipine method. Efficacy index = (Pre-treatment score − Post-treatment score)/Pre-treatment score) × 100%. Clinical outcomes were classified based on the efficacy index as follows: clinical recovery (efficacy index ≥ 90%), markedly effective (70% ≤ efficacy index < 90%), effective (30% ≤ efficacy index < 70%), and ineffective (efficacy index < 30%). (ii) Blood glucose and glycated hemoglobin measurements included fasting plasma glucose (FPG), 2 h postprandial plasma glucose (2hPG), and glycated hemoglobin (HbA1c). (iii) Indicators of pancreatic inflammation comprised serum CRP, IL-6, amylase, and lipase levels.

2.5.2 Secondary efficacy indicators. (i) Pancreatic islet function was assessed using fasting C-peptide (FCP) and 2-h postprandial C-peptide (2hCP) levels; (ii) pancreatic exocrine function was evaluated by measuring FE-1 levels; (iii) safety indicators included complete blood count, liver and kidney function tests, and documentation of adverse events such as hypoglycemic episodes, gastrointestinal reactions, and infections of the urinary and reproductive systems.

2.6 Statistical methods Statistical analyses were performed using SPSS 27.0. Counting data were presented as the number of cases (n) and percentages (%), and comparisons between groups were conducted using the chi-square test. Measurement data conforming to a normal distribution were expressed as mean ± standard deviation ($\bar{x} \pm s$), whereas data not conforming to normality were reported as median (P25, P75). Between-group comparisons were performed using either the t-test or the rank sum test. Within-group comparisons were conducted using paired t-tests or paired rank sum tests. All statistical tests were two-tailed, with a significance level set at $\alpha = 0.05$. A P-value less than 0.05 was considered statistically significant.

3 Results and analysis

3.1 Comparison of general patient information There were no statistically significant differences between the two groups of patients regarding gender, age, duration of diabetes, duration of pancreatic disease, BMI, and type of primary pancreatic disease ($P > 0.05$), indicating that the groups were comparable (Table 1).

Table 1 Baseline characteristics of the two groups of patients

Group	Gender (male/female)	Age year	Duration of diabetes year	BMI kg/m^2	Pancreatitis case
Observation	8/7	52.1 ± 9.8	2.6 ± 1.4	22.3 ± 2.9	12
Control	9/6	51.5 ± 10.4	2.7 ± 1.5	22.0 ± 2.8	11

3.2 Comparison of therapeutic effects on TCM syndromes After treatment, the total effective rate in the observation group was 86.7% (13/15), compared to 66.7% (10/15) in the control group (Table 2). However, the difference between the two groups was not statistically significant ($P > 0.05$). The observation group demonstrated some advantages in alleviating symptoms such as fatigue, dry mouth and throat, and steatorrhea.

Table 2 Comparison of therapeutic effects on TCM syndromes between the two groups of patients [$n = 15$, cases (%)]

Group	Clinical recovery	Markedly effective	Effective	Ineffective	Total effective rate//%
Observation	2 (13.3)	6 (40.0)	5 (33.3)	2 (13.3)	13 (86.7)
Control	1 (6.7)	4 (26.7)	5 (33.3)	5 (33.3)	10 (66.7)
P					$P = 0.368$

3.3 Comparison of blood glucose and glycated hemoglobin After treatment, FPG, 2hPG and HbA1c levels in both groups decreased significantly compared to those before treatment ($P < 0.01$, Table 3). The improvements in these indicators were significantly greater in the observation group than in the control group ($P < 0.05$).

Table 3 Comparison of glycemic-related indicators between the two groups of patients ($\bar{x} \pm s$)

Group	Time	FPG//mmol/L	2hPG//mmol/L	HbA1c//%
Observation	Before treatment	10.52 ± 2.31	15.87 ± 3.42	8.92 ± 1.23
	After treatment	6.85 ± 0.97$^{▲△}$	9.76 ± 1.54$^{▲△}$	6.92 ± 0.65$^{▲△}$
Control	Before treatment	10.48 ± 2.25	15.92 ± 3.38	8.87 ± 1.31
	After treatment	7.62 ± 1.22$^{▲}$	11.35 ± 2.11$^{▲}$	7.54 ± 0.82$^{▲}$

NOTE Compared to before treatment within this group, $^{▲}P < 0.01$; compared to the control group after treatment, $^{△}P < 0.05$. The same below.

3.4 Comparison of pancreatic islet function and pancreatic exocrine function After treatment, the FCP and 2hCP levels in the observation group were significantly higher than those in the control group ($P < 0.05$), indicating a superior improvement in pancreatic β-cell reserve function within the observation group (Table 4). Notably, the FE-1 level in the observation group increased significantly compared to that before treatment ($P < 0.01$) and demonstrated a statistically significant difference relative to the control group after treatment ($P < 0.01$). These findings suggest that Zicui Xiaodu Decoction also exerts a beneficial effect on pancreatic exocrine function.

Table 4 Comparison of pancreatic islet function and pancreatic exocrine function indicators between the two groups of patients

Group	Time	FCP//ng/mL	2hCP //ng/mL	FE-1//μg/g
Observation	Before treatment	0.75 ±0.32	1.38 ±0.54	85.4 ±42.1
	After treatment	1.24 ±0.41▲△	2.35 ±0.72▲△	142.7 ±51.3▲△
Control	Before treatment	0.78 ±0.35	1.42 ±0.51	88.2 ±43.5
	After treatment	0.98 ±0.38▲	1.85 ±0.63▲	105.6 ±47.8▲

3.5 Comparison of pancreatic inflammation indicators After treatment, the reduction in serum inflammatory indicators (CRP, amylase, lipase) was significantly more pronounced in the observation group compared to the control group ($P<0.05$, Table 5).

Table 5 Comparison of pancreatic inflammation and specific indicators between the two groups of patients ($\bar{x}\pm s$, $n=15$)

Group	Time	CRP//mg/L	IL-6//pg/mL	Amylase//U/L	Lipase//U/L
Observation	Before treatment	8.72 ±2.45	12.6 ±3.4	186 ±42	172 ±38
	After treatment	4.15 ±1.28▲△	6.8 ±2.1▲△	132 ±31▲△	118 ±26▲△
Control	Before treatment	8.56 ±2.31	12.3 ±3.1	182 ±39	168 ±35
	After treatment	6.84 ±1.92▲	9.5 ±2.6▲	158 ±35▲	145 ±30▲

3.6 Safety evaluation No serious adverse events were observed in either group throughout the treatment period. Each group experienced one case of gastrointestinal reaction (specifically, diarrhea), and the control group had one additional case of urinary tract infection (Table 6). The incidence of adverse reactions did not differ significantly between the groups ($P>0.05$).

Table 6 Number of adverse events in the two groups of patients ($n=15$)

Group	Gastrointestinal reaction	Hypoglycemia	Urinary tract infection	Total case
Observation	1	1	0	2 (about 13%)
Control	1	0	1	2 (about 13%)

3.7 Correlation analysis of pancreatic inflammatory indicators and endocrine and exocrine functions Given the limited sample size, Spearman rank correlation analysis was employed to examine the associations between inflammatory markers and pancreatic function indicators. The results (Table 7) indicate that after treatment in the observation group, serum IL-6 levels were significantly negatively correlated with FE-1 and C-peptide levels ($r\_s=-0.52$ to -0.49, all $P<0.05$). This finding suggests that reductions in inflammatory factors are associated with concurrent improvements in pancreatic exocrine function (FE-1) and pancreatic islet β-cell reserve function (C-peptide). CRP levels were significantly negatively correlated with FE-1 ($r\_s=-0.48$, $P=0.038$), whereas the negative correlation between CRP and C-peptide approached but did not reach statistical significance ($P\approx0.05-0.06$). After treatment in the control group, the correlation coefficients among the aforementioned indicators were relatively low ($|r\_s|<0.25$) and did not achieve statistical significance (all $P>0.05$). These findings suggest that treatment with Western medicine alone may be insufficient to effectively disrupt the vicious cycle of "inflammation and dysfunction". In contrast, intervention with Zicui Xiaodu Decoction may facilitate the concurrent restoration of pancreatic endocrine and exocrine functions by systematically inhibiting chronic inflammatory responses. Nevertheless, given the limited sample size, these correlations should be considered exploratory. The precise biological mechanisms underlying these effects require further validation through studies with larger sample sizes.

Table 7 Correlation analysis of pancreatic inflammation and pancreas islet secretion function in the two groups of patients (Spearman rank correlation)

Group	Inflammatory indicator	Correlation	FE-1 μg/g	FCP ng/mL	2hCP ng/mL
Observation ($n=40$)	CRP	r_s	−0.480	−0.420	−0.450
		P	0.038	0.062	0.051
	IL-6	r_s	−0.520	−0.460	−0.490
		P	0.024	0.046	0.032
	Lipase	r_s	−0.310	−0.280	−0.250
		P	0.124	0.158	0.186
Control ($n=40$)	CRP	r_s	−0.220	−0.180	−0.200
		P	0.215	0.268	0.241
	IL-6	r_s	−0.250	−0.190	−0.210
		P	0.178	0.251	0.219
	Lipase	r_s	−0.150	−0.120	−0.140
		P	0.312	0.365	0.328

NOTE The value of r_s presented in the table denotes the Spearman rank correlation coefficient. A P-value less than 0.05 was considered statistically significant.

4 Discussion

T3cDM is a special type of diabetes secondary to exocrine pancreatic diseases, and its prevalence has historically been significantly underestimated[11]. Currently, the management of T3cDM in Western medicine faces considerable challenges. Although metformin is recommended as the first-line treatment and possesses anti-tumor properties, its use is often limited by patients' gastrointestinal intolerance. While insulin therapy effectively reduces blood glucose levels, patients with T3cDM exhibit low glucagon responses due to pancreatic α-cell damage, resulting in a hypoglycemia risk that is 3 – 5 times higher than that observed in T2DM[12-13].

Although TCM has not explicitly designated a specific name

for the pancreas as an internal organ, historical medical practitioners have possessed an understanding of its anatomy and function. The term "scattered paste" mentioned in the *Nan Jing · Chapter 42* is widely interpreted by subsequent scholars as corresponding to the pancreas in contemporary anatomical terminology[14]. Zhang Xichun developed the Zicui Decoction, as documented in his work *Records of Chinese Medicine with Reference to Western Medicine*, thereby pioneering the treatment of pancreatic diseases through the regulation of the spleen[10]. Grounded in the theory of "pancreaticosplenic homology", the pancreas is understood to perform both endocrine functions, such as the secretion of essence, and exocrine functions related to transformation and transportation. In TCM, the pancreas is considered the anatomical counterpart of the "spleen", particularly in its role of ascending clear yang and facilitating transformation and transportation processes[15]. The pathological nature of T3cDM is characterized by recurrent episodes of chronic pancreatitis, during which damp-heat and toxic pathogenic factors accumulate within the pancreas. This process results in the depletion of qi and yin, impairs the spleen's capacity to distribute essence, and causes mild obstruction of water and food essences, culminating in the development of "sugar turbidity". Furthermore, prolonged illness may affect the meridians, leading to internal blood stasis, which exacerbates pancreatic fibrosis and microcirculatory disturbances[16].

Zicui Xiaodu Decoction is derived from Zhang Xichun's Zicui Decoction. Based on the principles of tonifying qi and nourishing yin, strengthening the spleen and consolidating the kidneys, the formulation takes into account the pathological characteristics of T3cDM, including "heat toxicity" and "blood stasis", and incorporates ingredients such as Herba Taraxaci, Polygoni Cuspidati Rhizoma et Radix, and Salviae Miltiorrhizae Radix et Rhizoma, which have the functions of clearing heat and detoxifying, promoting blood circulation and removing blood stasis[10]. The entire formula incorporates Astragali Radix and Dioscoreae Rhizoma to tonify the spleen and enhance qi, thereby restoring the pancreas' capacity to disperse essence. Radix Rehmanniae and Trichosanthis Radix serve to nourish yin, generate bodily fluids, alleviate dryness, and relieve thirst. Herba Taraxaci, Polygoni Cuspidati Rhizoma et Radix, and Coptidis Rhizoma function to clear heat, detoxify, eliminate dampness, and purge turbidity, directly targeting symptoms associated with local inflammatory damage in the pancreas. Salviae Miltiorrhizae Radix et Rhizoma promotes blood circulation, removes blood stasis, unblocks meridians, disperses nodules, and enhances microcirculation within the pancreatic islets[17-20]. The combination of various drugs is strategically aligned with the pathogenic sequence, wherein qi deficiency constitutes the root cause, yin deficiency represents the symptom, heat toxicity corresponds to the pathological transformation, and blood stasis affects the meridians. This approach achieves a comprehensive therapeutic effect by tonifying qi and nourishing yin to enhance the body's resistance, clearing heat and detoxifying to eliminate pathogenic factors, and promoting blood circulation to remove blood stasis and unblock the meridians.

The baseline characteristics of the patients included in this study indicated that individuals with T3cDM were generally underweight, with a BMI of approximately 22 kg/m^2. Their pancreatic islet function, as measured by C-peptide levels, was intermediate between that observed in T1DM and T2DM. These patients frequently exhibited signs of exocrine insufficiency, including steatorrhea and abdominal distension, consistent with findings reported in previous studies[21-23]. Although the control group received standardized Western medical treatment for 12 weeks, some patients continued to experience significant fluctuations in blood glucose levels and limited improvement in exocrine symptoms. This suggests that simple insulin therapy or pancreatic enzyme supplementation alone may be insufficient to reverse the chronic pathological damage of the pancreas. In contrast, the observation group, which received Zicui Xiaodu Decoction in addition to standard treatment, demonstrated not only improved glycemic control but also a significant increase in FE-1 levels and an improvement in TCM syndrome scores. These findings indicate that TCM may modulate the pancreatic microenvironment through multiple targets. FE-1 is a highly sensitive and specific indicator of pancreatic exocrine function, and its increase reflects the recovery of secretory function in pancreatic acinar cells. Heat-clearing and detoxifying agents, including Herba Taraxaci and Polygoni Cuspidati Rhizoma et Radix, present in the formula, may retard or potentially reverse the fibrotic progression in certain acinar tissues by mitigating chronic inflammatory infiltration within pancreatic tissue. Components such as astragalus polysaccharides and tanshinone exhibit pharmacological properties that enhance tissue microcirculation and facilitate the repair of damaged cells[17-20]. Previous studies have demonstrated that patients with chronic pancreatitis exhibit a significant imbalance in intestinal flora, characterized by an increased abundance of Proteobacteria and *Prevotella*. Furthermore, heat-clearing and damp-drying agents, such as Coptidis Rhizoma and Herba Taraxaci, have shown potential in regulating the intestinal microecology. This finding may offer an indirect mechanistic explanation via the "gut-pancreatic axis" for the improvement of pancreatic exocrine function[20,24]. T3cDM differs from T1DM and T2DM in that its primary pathology involves not only the decline of pancreatic β-cell function but also chronic inflammation and fibrosis of the pancreatic parenchyma[25-26].

In conclusion, this retrospective clinical study is the first to show that the combination of Zicui Xiaodu Decoction and Western medicine not only enhances blood glucose control and significantly reduces inflammatory markers such as serum CRP and IL-6 in patients with T3cDM, but also partially restores both endocrine and exocrine pancreatic functions, while exhibiting a favorable safety profile. This therapeutic approach holds promise as an integrated TCM and Western medicine strategy for the comprehensive management of T3cDM. Future research should focus on increasing the sample size, extending the duration of follow-up, and further elucidating the underlying mechanisms, particularly regarding inflam-

matory signaling pathways and modulation of the intestinal microbiota.

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