Expert Consensus on Multidisciplinary Diagnosis and Treatment of Gastroparesis in China (2025, Beijing)

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Abstract: Gastroparesis (GP) is a gastric motility disorder characterized by delayed gastric emptying in the absence of mechanical obstruction. This expert consensus covers aspects of GP etiology (diabetes, surgery, drug-induced, idiopathic, scleroderma, etc.), symptomatology, diagnosis (scintigraphic imaging, ultrasound contrast meal assessment, and radiopaque marker gastric motility testing), and treatment (pharmacological therapy, nutritional support, traditional Chinese medicine, and interventions targeting the pylorus, such as endoscopic surgery and surgical procedures). GP significantly impacts patients' psychological well-being and quality of life, potentially leading to psychological disorders such as anxiety and depression, and also imposes a heavy economic burden on patients and society. Therefore, this expert consensus advocates for the establishment of a multidisciplinary team diagnosis and treatment model, which will further standardize and optimize the diagnosis and treatment process of GP in our country and is crucial for improving patients' therapeutic outcomes and quality of life.

Key words: Gastroparesis; Gastric emptying; Consensus; Multidisciplinary team treatment; Super minimally invasive surgery

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Gastroparesis (GP) is a gastrointestinal motility disorder characterized by delayed gastric emptying (GE) in the absence of mechanical obstruction [1]. The primary clinical manifestations of GP include upper abdominal pain, postprandial fullness, early satiety, nausea, and vomiting. The pathogenesis is mainly attributed to impaired gastric motility, resulting in delayed gastric emptying and dysfunction of the

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pyloric sphincter [2]. Although the global epidemiology of GP remains unclear, data from a large national database in the United States indicate a standardized prevalence of 267.7 cases per 100,000 individuals, with type 2 diabetes being the most common comorbidity among affected patients [3]. The most common cause of GP is diabetes (57.4%; with 5.7% for type 1 and 51.7% for type 2), followed by surgery (15.0%), drug-induced (11.8%), and idiopathic (11.3%); other causes (4.5%) include scleroderma, lupus, hypothyroidism, Parkinson's syndrome, cerebral palsy, and multiple sclerosis [3]. GP is a complex condition that involves multiple body systems and presents diagnostic challenges, a lack of curative treatments, and a need for multidisciplinary collaboration in both diagnosis and management. Additionally, controlling underlying conditions, such as diabetes, autoimmune diseases, and hypothyroidism, is essential for effective management [4]. Currently, the diagnosis and treatment of GP in China often depend on the professional level of the first attending physician, and patients frequently need to be referred to multiple departments, making the process cumbersome and costly, without access to more reasonable and comprehensive diagnoses. Additionally, there is a lack of consensus and guidelines for GP both domestically and internationally. Therefore, there is a need to establish a multidisciplinary team (MDT) treatment model for GP, with relevant consensus to guide clinical practice.

The Methods and Processes for Formulating Consensus

The methods of formulating consensus

This consensus was led by the Gastrointestinal Endoscopy Branch of the Chinese Medical Association, the Clinical Nutrition and Health Branch of the China Health Management Association, the Ultrasound Branch of the Chinese Medical Imaging Technology Research Association, and the Nuclear Medicine Branch of the Beijing Medical Association. A writing team was formed to create the "Multidisciplinary Expert Consensus on Gastroparesis (2025 Edition, Beijing)." The consensus adheres to a research-driven approach, focusing on research subjects, interventions, control measures, outcomes, and study types, while balancing evidence levels with recommendations and serving clinical practice. The process follows the international guideline writing standards and the core methods and basic procedures outlined in the "Guidelines for the Formulation/Revision of Clinical Practice Guidelines by the Chinese Medical Association" (2022 Edition) [5], and has been registered (registration website: http://www.guidelines-registry.org/). A literature support group was established, and a search strategy was defined, including: (1) Inclusion time frame: literature published from January 2000 to December 2024 (with exceptions for some classic literature). (2) Databases: Secondary database is the Cochrane Library; primary databases include PubMed, EMBASE, China National Knowledge Infrastructure (CNKI), and Wanfang Medical. (3) Keywords: English keywords include gastroparesis, gastric emptying, gastroparesis cardinal symptom index, gastric emptying scintigraphy, functional dyspepsia, gastrointestinal motility disorder, nutritional risk, malnutrition

The processes of formulating consensus

After collective discussion, the evidence and recommendations of this consensus were graded using the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) system (Table 1). The framework used for the presentation was "Problem, Recommendation (evidence level, recommendation level), Evidence Summary." Evidence was retrieved and synthesized based on clinical issues, systematically reviewed according to research questions, and ultimately led to the formation of recommendations. Key clinical issues were summarized, and conclusions were drawn after fully considering health economics effects. The consensus draft underwent multiple rounds of dis-

Table 1 GRADE evidence quality levels and recommendations [6].

Evidence level	Definition
Evidence quality	
High (A)	Highly confident that the observation value is close to the true value
Medium (B)	Moderately confident in the observation value: the observation could be close to the true value, but could also differ significantly
Low (C)	Limited confidence in the observation value: the observation may differ greatly from the true value
Very Low (D)	Almost no confidence in the observation value: the observation may differ drastically from the true value
Recommendation Strength	
Strong recommendation	A strong recommendation to support or oppose an intervention, with benefits outweighing harms
Weak recommendation	A recommendation to support or oppose an intervention, with uncertain benefits and harms

cussion and revision by the expert committee and voting until a consensus was reached. The evidence quality and recommendation levels of the voting opinions followed the GRADE system (Table 1) [6]. When evidence was insufficient or of low quality, expert opinions could be given, considering both the benefits and risks, as well as the economic burden. For recommendations with disagreements, the "Delphi Method" was used, and after discussions with experts from various fields, "evidence-based consensus" was achieved to resolve the disagreements.

The expert group consisted of specialists from gastroenterology, endocrinology, imaging, ultrasound, nutrition, and psychology. The group discussed four main areas: diagnosis, treatment, impact, and the establishment of multidisciplinary treatment for gastroparesis (GP). A total of 32 recommendations were formulated after two rounds of meetings and peer review, leading to a consensus. After the final version of the consensus was drafted, over 100 relevant experts from domestic fields were invited to vote online on each recommendation using a platform with six options: "Strongly agree," "Agree but with slight reservations," "Agree but with more reservations," "Disagree but with more reservations," "Disagree but with slight reservations," and "Strongly disagree." If the number of "Strongly agree" and "Agree but with slight reservations" votes reached 80%, the consensus was considered achieved and ready for publication. All participants declared that they had not received sponsorship from any related companies or held stocks, nor did they own any patents related to the field of this consensus.

The purpose and target population of this consensus

This consensus aims to provide evidence-based guidance for the diagnosis and treatment of gastroparesis (GP) in order to improve patient outcomes and quality of life. Through multidisciplinary collaboration, the goal is to develop comprehensive treatment plans to achieve the best possible therapeutic results. The target population for this consensus includes all healthcare professionals involved in the diagnosis and treatment of GP. The consensus seeks to collaboratively define treatment goals and plans, ensuring that every member understands and agrees with the treatment processes and principles.

Issues Raised by Consensus and Recommendations

Question 1: What are the causes of gastroparesis?

Recommendation 1: Gastroparesis refers to a condition or set of symptoms associated with delayed gastric emptying in the absence of mechanical obstruction. Gastroparesis is highly suspected when symptoms such as nausea and vomiting occur in the context of diseases such as diabetes, surgical procedures, opioid-induced effects, lupus, scleroderma, cerebral palsy, Parkinson's disease, hypothyroidism, and multiple sclerosis (Evidence A, Strong Recommendation, Consensus 98.3%).

Gastroparesis is classified into idiopathic gastroparesis (IGP) and secondary gastroparesis (GP) based on its etiology. Secondary GP refers to a group of conditions in which delayed gastric emptying is caused by gastrointestinal or systemic neuromuscular disorders due to other diseases. Secondary GP primarily includes iatrogenic GP and GP caused by other systemic diseases. Iatrogenic GP includes drug-induced GP (such as opioids, antibiotics, antiarrhythmic drugs, antispasmodics, etc.) and surgery-induced GP (such as fundoplication, vagotomy, thoracoabdominal surgeries, and proximal gastrectomy). Among other secondary GPs, diabetic gastroparesis (DGP) is the most common, and diabetes-related medications can also exacerbate delayed gastric emptying. Other causes include neurological diseases (such as Parkinson’s disease, amyloidosis, cerebral palsy, multiple sclerosis, etc.), rheumatic autoimmune diseases (such as systemic lupus erythematosus, scleroderma, etc.), viral infections (such as norovirus, herpesvirus, cytomegalovirus infections, etc.), hypothyroidism, and renal insufficiency[1-4,7-9]

Question 2: What are the symptoms of gastroparesis?

Recommendation 2: For patients with suspected gastroparesis, the Gastroparesis Cardinal Symptom Index (GCSI) should be used for initial assessment (Table 2). However, symptoms of gastroparesis significantly overlap with those of functional dyspepsia, necessitating high-quality gastric emptying tests (Evidence A, Strong Recommendation, Consensus 97.5%).

The GCSI scale includes symptoms that may occur in gastroparesis (GP), such as vomiting, nausea, early satiety, postprandial fullness, bloating, abdominal pain/discomfort, and anorexia, which are significantly associated with delayed gastric emptying (GE) [10,11]. However, these symptoms overlap considerably with those of functional dyspepsia (FD) as defined by the Rome IV criteria [10,12] Vomiting and nausea are associated with severe GE delay but are not the primary symptoms of FD, which can help in the initial differentiation of the two conditions [10,13]. Therefore, to diagnose GP, in addition to excluding mechanical obstructive diseases, high-quality gastric emptying tests are required. The GCSI scale can only serve as one of the preliminary assessment tools [14].

Table 2 Gastroparesis Cardinal Symptom Index (GCSI)

	None	Very mild	Mild	Moderate	Severe	Very severe
1. Nausea (feeling discomfort in the stomach, as if about to vomit or vomiting)	0	1	2	3	4	5
2. Dry Heaving (feeling like vomiting, but nothing is expelled)	0	1	2	3	4	5
3. Vomiting	0	1	2	3	4	5
4. Bloating	0	1	2	3	4	5
5. Inability to consume a normal amount of food	0	1	2	3	4	5
6. Feeling overly full after meals	0	1	2	3	4	5
7. Loss of appetite	0	1	2	3	4	5
8. Bloating (feeling the need to loosen clothing)	0	1	2	3	4	5
9. Significant enlargement of the stomach or abdomen	0	1	2	3	4	5

Note: (1) Scoring Method: Participants are required to select the most appropriate score for the severity of each symptom over the past two weeks. If the symptom is absent, it is scored as 0; if the symptom is very mild, it is scored as 1; if the symptom is mild, it is scored as 2; if the symptom is moderate, it is scored as 3; if the symptom is severe, it is scored as 4; and if the symptom is very severe, it is scored as 5. (2) Evaluation Criteria: The GCSI consists of three subscales to assess key symptoms associated with gastroparesis, specifically nausea/vomiting, postprandial fullness/early satiety, and bloating. The nausea/vomiting subscale includes three items: nausea, dry heaving, and vomiting. The postprandial fullness/early satiety subscale includes four items: stomach bloating, inability to complete a normal-sized meal, feeling overly full after meals, and loss of appetite. The bloating subscale includes two items: bloating and noticeable enlargement of the stomach or abdomen. Patients are asked to rate the severity of symptoms on a scale from none to very severe, corresponding to scores of 0, 1, 2, 3, 4, and 5. The score for each subscale is the average score of its related items, and the GCSI score is the average of the three subscale scores. A higher score indicates more severe gastroparesis symptoms. If one of the subscale scores is missing, the GCSI score cannot be calculated.

Question 3: What are the diagnostic criteria for gastroparesis?

Recommendation 3: Patients with a proposed diagnosis of gastroparesis need to fulfill 3 conditions, namely delayed gastric emptying, removal of mechanical obstruction, and duration of disease > 3 months; confirmation of the diagnosis of gastroparesis requires nuclear scintigraphy, ultrasonographic gastrodynamics, and opaque X-ray markers for gastric emptying. (Evidence B, strong recommendation, Consensus 97.5%).

The characteristics of gastroparesis are symptoms of delayed gastric emptying without mechanical obstruction, lasting for more than three months [2,15]. A definitive diagnosis requires supportive tests and other objective evidence. Currently, the commonly used methods for assessing delayed gastric emptying include radionuclide scintigraphy, wireless motility capsule (WMC) technology, carbon breath tests, ultrasonographic gastric motility assessment, and radiopaque markers (ROMs) gastric emptying tests [2,16]. In China, breath tests and WMC assessments are lacking, while radionuclide scintigraphy remains the gold standard for diagnosing gastroparesis [16]. Due to the large population base in China, the complexity of performing radionuclide scintigraphy makes it unsuitable as a primary screening tool. Ultrasonographic gastric motility assessment, being simpler to perform, holds promise as a potential method for initial screening [17].

Recommendation 4: To obtain high-quality gastric emptying test results, opioids, cannabinoids, prokinetics, antiemetics, and other neuromodulators that may potentially affect the test results should be discontinued 48 hours prior to the examination. (Evidence B, Strong Recommendation, Consensus 99.2%).

A systematic review and meta-analysis assessing the relationship between vomiting, nausea, early satiety/postprandial fullness, abdominal pain, and bloating symptoms with gastric emptying (GE) included 92 relevant studies, comprising 26 carbon breath tests, 62 radionuclide scintigraphy scans, 1 ultrasound examination, and 3 WMCs. The study ensured the discontinuation of medications that could affect GE prior to the examination, which contributed to obtaining valid GE results [10].

Question 4: What are the diagnostic methods and gold standards for delayed gastric emptying included?

Recommendation 5: Currently, radionuclide scintigraphy is the "gold standard" for clinically diagnosing delayed gastric emptying; it is particularly effective in assessing the gastric emptying of solid food. (Evidence A, Strong Recommendation, Consensus 99.2%).

Radionuclide scintigraphy is currently the "gold standard" for assessing gastric emptying function and is widely used in the diagnosis of motility disorders, particularly demonstrating higher diagnostic efficacy in the evaluation of solid food emptying [18]. Gastric emptying scintigraphy (GES) evaluates the degree of gastric emptying by measuring the retention of a standard meal labeled with 99mTc [19,20]. After excluding functional gallbladder diseases, GES is further used to assess gastric emptying in patients presenting with upper gastrointestinal symptoms (such as dyspepsia or bloating) who are suspected of having a motility disorder. Furthermore,

GES shows considerable reproducibility, with a consistency correlation coefficient of 0.54 for 4-hour GE evaluation and a consistency correlation coefficient of 0.79 for GE half-life [21]. GES is the standard method for detecting delayed gastric emptying (gastroparesis) and less common clinical conditions, such as the dumping syndrome [22].

Currently, China lacks breath test assessments and wireless motility capsule (WMC) examinations, making radionuclide scintigraphy extremely important. Although breath tests and wireless motility capsule examinations show some comparability to radionuclide scintigraphy as alternative diagnostic tools for gastric emptying in certain cases, radionuclide scintigraphy remains the primary method for clinical gastric emptying assessment in many countries, including China, due to cost and availability issues. Research by Bluck [23] and Sanaka [24] explored the use of stable isotope-labeled breath tests and their comparability with radionuclide scintigraphy. While these tests showed some consistency in measuring the emptying of solid and liquid food, radionuclide scintigraphy still holds advantages in accuracy and broader application. Researchers such as Maqbool et al [25]. further pointed out that, although the wireless motility capsule system has the potential to become an effective alternative, its widespread clinical adoption is limited.

Recommendation 6: A retention of > 10% of the isotope within 4 hours in gastric emptying scintigraphy is diagnosed as delayed gastric emptying. This method has good reproducibility, but there is still a 30% probability of different results between two assessments. (Evidence B, Strong Recommendation, Consensus 97.5%).

Gastric emptying scintigraphy uses a standardized low-fat egg powder meal labeled with 99mTc, and imaging is performed at 0,1, 2 and 4 hours post-meal. The 1-hour scan is utilized to detect rapid gastric emptying (retention rate < 30%), while the 2-hour and 4-hour scans are employed to assess delayed gastric emptying (retention rates > 60% and > 10%, respectively). The definition of delayed gastric emptying is based on normal data established from standardized gastric emptying tests, with a 4-hour isotope retention rate exceeding 10%. Normal, fasting, and delayed values come from a multicenter study that provided gastric emptying (GE) values for healthy subjects using the same meal and methodology [19,20].

In clinical diagnoses of abnormal gastric emptying, radionuclide scintigraphy provides good reproducibility; however, in some cases, there may be inconsistencies between two assessments. Desai et al. [21] reported a cohort study involving 60 patients, which showed that radionuclide scintigraphy diagnosis had good reproducibility, but in 30% of cases, the results of two assessments could differ. Additionally, in evaluating postoperative residual gastric function, researchers such as Michiura et al. [26] pointed out that radionuclide scintigraphy can effectively assess the residual gastric function after pylorus-preserving gastrectomy. Multiple studies have also shown that residual stomachs after gastric surgeries are more likely to exhibit delayed gastric emptying compared to normal stomachs [27,28].

Recommendation 7: Gastric ultrasonography with contrast enhancement is an effective method for gastric motility assessment, with stronger feasibility for detecting emptying capability in the gastric antrum. (Evidence B, Strong Recommendation, Consensus 96.6%).

The presence of gas is a major obstacle in gastric ultrasound examination. By orally administering a gastrointestinal ultrasound contrast agent, the stomach cavity can be filled, thereby eliminating the interference of gas. Under ultrasound, the gastric cavity appears as a strong echo similar to solid tissue, clearly displaying the location of the stomach body, the layering of the gastric wall, and gastric motility, which can be used to assess the gastric emptying of the liquid ultrasound contrast agent.The ultrasound methods used in China for assessing gastric emptying ability primarily include: two-dimensional ultrasound and three-dimensional reconstruction ultrasound. Motility index (MI), gastric emptying rate (GER), antral contraction frequency (ACF), antral contraction amplitude (ACA), changes in gastric antrum area (ΔS), and gastric emptying time (GET) are the primary parameters that are examined. Many researchers in China have studied gastric motility under various underlying conditions, including functional dyspepsia, anxiety, high-pressure college student populations, Parkinson's disease, chronic nephritis, uremia, gastroparesis, and functional dyspepsia combined with anxiety. Several studies have shown that ultrasound gastric motility assessment is a reliable evaluation method, with commonly used parameters being ACA and GER measured under two-dimensional ultrasound [29]. However, some researchers have pointed out that there are many factors affecting gastric emptying, and simply observing the gastric antrum cannot fully describe the motility changes of the entire stomach, so it is also necessary to focus on the motility changes of the stomach body and fundus [30]. Additionally, factors such as obesity, severe abdominal bloating, and insufficient operator experience can affect the reliability of gastric ultrasound contrast-enhanced examination results.

Recommendation 8: Gastric ultrasonography with contrast enhancement can serve as an initial screening tool for patients with a high suspicion of gastroparesis. It is particularly effective for assessing the gastric empty-

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ing of liquid food. (Evidence C, Strong Recommendation, Consensus 92.4%).

Oral gastrointestinal contrast agents are in a paste-like form, similar to the regular diet of postoperative and diabetic patients, making them a simple method for observing gastric emptying function in postoperative gastroparesis and diabetic gastroparesis patients. Research has shown that patients with postoperative gastroparesis and diabetic gastroparesis have lower gastric emptying rates and longer gastric emptying times compared to healthy individuals. The gastric residual volume measured by three-dimensional ultrasound in the gastroparesis group was significantly higher than that of the healthy control group [31]. One study showed that the fasting gastric antrum area (α) in gastroparesis patients was more than twice that of the healthy control group ($P = 0.009$), and fasting ultrasound gastric antrum area had a positive correlation with the gastric emptying extent measured by radionuclide scintigraphy at 4 hours ($r = 0.329$, $P = 0.013$) and 2 hours ($r = 0.354$, $P = 0.008$) [32]. Gastric ultrasonography with contrast enhancement is convenient, easy to perform, non-invasive, and radiation-free. It allows real-time dynamic observation of gastric motility changes without affecting normal gastric motility, providing a reliable and non-invasive diagnostic tool for gastroparesis. It can help in the early detection of gastrointestinal dysfunction in postoperative or diabetic patients. Additionally, for elderly individuals, gastric ultrasonography with contrast enhancement is a simple method for assessing gastric motility.

Recommendation 9: ROMs gastric emptying tests can serve as a supplementary examination when there is inconsistency between radionuclide scintigraphy and gastric ultrasonography with contrast enhancement, but this method is not recommended for initial screening of gastroparesis. (Evidence D, Strong Recommendation, Consensus 95.0%).

Several studies have shown that when evaluating the gastric emptying of digestible solid food, radionuclide scintigraphy is more accurate than ROMs gastric emptying tests. The specificity and sensitivity of the ROMs test are 34% and 97%, respectively [33,34]. Compared to ultrasound-based gastric motility testing, ROMs involve the risk of radiation exposure and are not recommended as an initial screening tool. The ROMs method for solid food gastric emptying testing is as follows: the participant should fast for 10 hours and, on the day of the test, consume an egg pancake (one fried egg and one sesame flatbread) along with 150 ml of mineral water at 7:00 AM, providing approximately 263 kcal. During the meal, the participant should also swallow a capsule containing 20 barium strips (i.e., radiopaque markers), each approximately 1 mm × 1 mm × 2 mm in size. X-ray images are taken at 1, 2, 3, and 4 hours after the meal (abdominal AP and lateral views), and the images are evaluated by two radiologists. The gastric emptying rate is calculated as { (20 - number of barium strips remaining in the stomach)/20 } × 100%. A gastric emptying rate of < 48.23% at 4 hours is considered delayed gastric emptying [35].

Question 5: What are the pharmacological treatment options for gastroparesis?

Recommendation 10: For patients with gastroparesis, first-line treatment includes lifestyle and dietary changes, the use of antiemetics, and prokinetic drugs. Second-line treatment includes endoscopic therapy, gastric stimulation, laparoscopic surgery, and traditional Chinese medicine, with careful consideration of the benefits and risks of the treatments. (Evidence B, Strong Recommendation, Consensus 96.6%).

The first-line treatment for gastroparesis (GP) includes lifestyle and dietary changes, antiemetics, and prokinetic agents (Table 3). However, some of these medications have serious side effects such as arrhythmias, tardive dyskinesia, and rapid tolerance, making their use potentially dangerous [36,37]. The two most commonly used drugs in GP-related clinical trials are metoclopramide and domperidone [4]. Second-line treatments include peroral endoscopic pyloromyotomy (G-POEM), gastric stimulators (approved for nausea-dominant diabetic gastroparesis), laparoscopic pyloroplasty, stent placement, pyloric dilation, and traditional Chinese medicine [38,39].

Recommendation 11: Metoclopramide is an approved first-line drug for the treatment of gastroparesis but carries the risk of tardive dyskinesia. Regulatory agencies limit its dosage to 10 mg, taken 3-4 times daily. (Evidence B, Strong Recommendation, Consensus 97.5%).

Metoclopramide, also known as Reglan, is primarily a dopamine receptor antagonist with serotonin (5-HT3) receptor antagonism and serotonin (5-HT4) receptor agonism. It has been used for nearly 50 years as both an antiemetic and a prokinetic. It effectively shortens the average gastric emptying time, but long-term use can lead to tolerance to this gastric emptying effect. Despite this, due to its antiemetic properties, long-term treatment can still alleviate symptoms [40]. Comprehensive evaluations show that metoclopramide carries a 0.1% risk of tardive dyskinesia (TD) per 1000 patients annually, lower than the previously estimated 1%-10% risk suggested by regulatory guidelines; the high-risk groups are elderly women, diabetic patients, those with liver and kidney failure, and patients concurrently receiving antipsychotic medications [41]. Due to the risk of TD, the use of metoclopramide is limited to 10 mg three to

Table 3 GP therapeutic drugs summary table.

Medication	Dose	Side effects and precautions
1. Prokinetic drugs		
Metoclopramide	5-10 mg tid or qid; 10-20 mg per injection, not exceeding 0.5 mg/kg per day	Can cross the blood-brain barrier, risk of tardive dyskinesia, hyperprolactinemia, and extrapyramidal side effects
Domperidone	10-20 mg tid	Increases the risk of hyperprolactinemia and cardiovascular events
Itopride	50 mg tid	Allergies, headache, sleep disturbances, abdominal pain, diarrhea, constipation, leukopenia
Mosapride	5 mg tid	Headache, abdominal pain, diarrhea, possible ECG abnormalities
Prucalopride	2 mg qd	Headache, nausea, diarrhea, occasional palpitations
Erythromycin	40-250 mg tid; 125 mg twice daily for nausea and vomiting	Liver dysfunction, intestinal flora imbalance or secondary infections, increased risk of sudden cardiac death, ototoxicity at high doses
2. Antiemetic drugs		
Ondansetron	4-8 mg bid or tid	Maximum 8 mg daily for liver dysfunction, avoid after abdominal surgery to prevent masking symptoms of ileus or gastric distension
Chlorpromazine	12.5-25 mg tid or qid	Extrapyramidal reactions, hyperprolactinemia, palpitations, dry mouth, constipation, blurred vision
Diphenhydramine	12.5-25 mg tid	Drowsiness, dizziness, dry mouth, fatigue
Aprepitant	80 mg qd	Elevated ALT, fatigue
3. Pain management drugs		
3.1 Tricyclic antidepressants		
Nortriptyline	25-100 mg/day	Drowsiness, QT interval prolongation, arrhythmia
3.2 Serotonin-norepinephrine reuptake Inhibitors		
Duloxetine	60-120 mg/day	Dizziness, nausea, dry mouth, insomnia
3.3 Anticonvulsants		
Gabapentin	> 1200 mg/day, divided doses	Eosinophilia, angioedema, drowsiness, dizziness, withdrawal rebound
Pregabalin	100-300 mg/day, divided doses	Dizziness, drowsiness, dry mouth, edema, blurred vision, severe cases can lead to angioedema, increased risk of adverse reactions with sudden discontinuation
3.4 Other antidepressants		
Mirtazapine	7.5-30 mg/day	Drowsiness, orthostatic hypotension, tremor, muscle cramps (rare)

four times daily, with age restrictions between 12 and 65 years and a treatment duration not exceeding 3 months [4,42]. In June 2020, the FDA approved the intranasal formulation of metoclopramide for the same indications, to control acute episodes; the most common side effects are taste disturbances (unpleasant, metallic, or bitter taste), headaches, and fatigue [43].

Recommendation 12: Domperidone can be used for symptom management in gastroparesis patients as an alternative when metoclopramide is ineffective or poorly tolerated; however, its use is restricted in some countries or regions. (Evidence C, Strong Recommendation, Consensus 94.1%).

Domperidone is a dopamine D2 receptor antagonist that has been demonstrated to stimulate gastric motility and act as an antiemetic, improving symptoms in diabetic gastroparesis (DGP) patients. Due to its good tolerance, domperidone has become an effective alternative to metoclopramide for treating GP [44]. The European Medicines Agency (EMA) has reported that domperidone is associated with serious cardiovascular risks and recommends restricting its indications across the European Union, using it only for relieving nausea and vomiting symptoms and no longer for treating other indications such as bloating or heartburn. A meta-analysis of 22 studies found that among GP patients treated with domperidone, most GP-related symptoms improved, but 5% experienced clinically significant adverse events, including QTc interval prolongation (95% CI: 3.32-8.62) [45].

Recommendation 13: Itopride, mosapride, and prucalopride can improve gastric emptying delay and can be used for the treatment of gastroparesis. (Evidence C, Strong Recommendation, Consensus 96.6%).

Itopride is a prokinetic drug that, in addition to antagonizing dopamine D2 receptors, inhibits acetylcholinesterase activity. A real-world data study from Pakistan showed that after 4 weeks of treatment with itopride (150 mg once daily), the severity of DGP-related upper gastrointestinal symptoms significantly improved ($P < 0.001$), with notable improvements across all levels of gastroparesis severity (very mild, mild, moderate, and severe) [46]. Ogasawara N et al. reported two successful cases of mosapride citrate treating gastroparesis

induced by radiofrequency ablation [47]. Prucalopride, a 5-HT4 agonist, is approved in most countries for the treatment of chronic constipation [48,49]. In a recent major study targeting idiopathic gastroparesis patients, prucalopride effectively improved gastric emptying and symptoms [48], although another study targeting diabetic gastroparesis patients failed to demonstrate its effectiveness [49].

Recommendation 14: Erythromycin and azithromycin can accelerate gastric emptying and improve bloating symptoms and can be considered as alternatives when metoclopramide treatment is ineffective. (Evidence C, Strong Recommendation, Consensus 92.4%).

Erythromycin is a motilin agonist that can improve bloating symptoms caused by gastric emptying delay. A randomized controlled study comparing erythromycin with metoclopramide showed that both improved gastric emptying and overall gastrointestinal symptoms, with erythromycin showing better results [50]. A retrospective case-control study comparing erythromycin and azithromycin showed that both accelerated gastric emptying, with no significant difference between the two treatments: the gastric half-emptying time in the erythromycin group was 166 ± 68 minutes, improving by 11.9 ± 8.4 minutes, while in the azithromycin group, it was 178 ± 77 minutes, improving by 10.4 ± 7.2 minutes [51].

Recommendation 15: Antiemetic drugs such as ondansetron, chlorpromazine, diphenhydramine, and aprepitant can improve nausea, vomiting, and bloating symptoms in gastroparesis, but they do not improve gastric emptying delay. (Evidence C, Strong Recommendation, Consensus 95.0%).

A clinical study involving 41 diabetic gastroparesis patients showed that ondansetron significantly reduced the sensation of fullness during enteral lipid infusion [52]. Cannabis, ondansetron, promethazine, and diphenhydramine are considered among the most effective treatments for gastrointestinal nausea (including GP) [53,54]. Aprepitant, a neurokinin 1 (NK1) receptor antagonist, works by blocking NK1 receptors in the brainstem's vomiting center and is approved for treating chemotherapy-induced or postoperative vomiting. In a randomized, double-blind, placebo-controlled, parallel-group study, aprepitant did not significantly affect the gastric half-emptying time for solids, but it did help control gastric volume and post-meal bloating symptoms [55].

Recommendation 16: The central nervous system modulator nortriptyline can improve abdominal pain symptoms in gastroparesis, but it is not recommended as a standalone treatment for gastroparesis. (Evidence B, Strong Recommendation, Consensus 95.8%).

The most well-supported central nervous system modulator for treating GP is the tricyclic antidepressant nortriptyline. A multicenter, parallel, placebo-controlled, double-blind, randomized clinical trial involving 130 idiopathic gastroparesis patients over 15 weeks showed that, compared to a placebo, nortriptyline did not alleviate overall GP symptoms but did improve abdominal pain [56].

Recommendation 17: For gastroparesis patients with concurrent psychological disorders, drugs such as escitalopram and duloxetine can be used to alleviate nausea, vomiting, and other symptoms, based on the advice of a neurologist or psychiatrist. (Evidence D, Strong Recommendation, Consensus 96.6%).

In gastroparesis patients with psychological disorders, symptoms such as nausea and abdominal pain may be physical manifestations of psychiatric conditions [57]. A retrospective study of 22,150 GP patients, 4196 of whom were diagnosed with generalized anxiety disorder (GAD), showed that escitalopram and duloxetine could alleviate GAD-related nausea and vomiting symptoms [58].

Recommendation 18: For gastroparesis patients with abdominal pain as the primary symptom, combined use of tricyclic antidepressants, gabapentin, and pregabalin can effectively alleviate this symptom. (Evidence D, Weak Recommendation, Consensus 89.9%).

Abdominal pain in gastroparesis patients severely affects quality of life and may even lead to disability, especially in patients with diabetic neuropathy, characterized by pain, sensory abnormalities, and sensory loss. Tricyclic antidepressants, gabapentin, and pregabalin can be used as adjunctive medications to alleviate this symptom [59,60].

Recommendation 19: Mirtazapine can improve symptoms such as vomiting, nausea, and loss of appetite in gastroparesis and can be used to relieve gastroparesis symptoms. (Evidence C, Strong Recommendation, Consensus 90.8%).

A prospective study on gastroparesis patients taking mirtazapine (15 mg/day) showed improvements in symptoms of vomiting, nausea and loss of appetite [61]. Another study demonstrated that mirtazapine (30 mg/day) improved symptoms such as dysphagia, nausea, and abdominal bloating in gastroparesis patients caused by systemic sclerosis [62].

Question 6: How should treatment be approached for the underlying conditions related to gastroparesis?

Recommendation 20: Fluctuations in blood glucose can worsen the severity of gastroparesis, and maintain-

ing good blood glucose control is fundamental to the treatment of diabetic gastroparesis. (Evidence A, Strong Recommendation, Consensus 97.5%).

Studies from the Diabetes Control and Complications Trial and epidemiological research on diabetes intervention and complications have shown that acute hyperglycemia is closely associated with delayed gastric emptying in diabetic gastroparesis (DGP). Chronic hyperglycemia can continuously affect gastric emptying function and lead to motility disorders [63,64]. In an open-label, prospective study involving 45 patients diagnosed with poorly controlled type 1 or type 2 diabetes and 20 GP patients, continuous subcutaneous insulin infusion was utilized to control blood glucose levels over 24 weeks. The results showed improvement in symptoms associated with the GCSI score and quality of life, demonstrating that actively and strictly controlling blood glucose and maintaining stability is the most important measure for preventing, treating, and alleviating DGP [65].

Question 7: How should nutritional support be provided to patients with gastroparesis?

Recommendation 21: Gastroparesis (GP) patients experience significant weight loss and a high incidence of malnutrition. It is recommended to perform nutritional screening and assessment before initiating nutritional therapy. For patients at nutritional risk or with malnutrition, early nutritional intervention is advised. (Evidence A, Strong Recommendation, Consensus 98.3%).

Due to the exacerbation of symptoms with food intake, GP patients often have insufficient food consumption, with 64% of patients ingesting less than 60% of their daily energy requirements, leading to deficiencies in calories and micronutrients [66]. Currently, there is a lack of specialized nutritional screening tools for gastroparesis patients, though some general screening tools can be adapted for this population, such as the Nutritional Risk Screening 2022 (NRS 2002), Malnutrition Universal Screening Tool (MUST), and Mini Nutritional Assessment Short Form (MNA-SF). For patients who test positive on screenings, comprehensive nutritional assessments should be conducted, including reviewing the patient's symptoms, medical history, surgical history, food intake, social habits, nutritional history, reported changes in body composition, laboratory tests, bioelectrical impedance analysis, and physical examination with an emphasis on nutritional status. Several clinical nutritional assessment tools are used, including the Subjective Global Assessment (SGA) and Global Leadership Initiative on Malnutrition (GLIM) criteria. Malnourished GP patients have a significantly higher mortality risk compared to those with good nutritional status (OR = 3.29). Furthermore, hospitalization duration and medical expenses are increased for malnourished patients [67]. Early identification and management of malnutrition can significantly improve the overall health status of GP patients and reduce morbidity and mortality.

Recommendation 22: Nutritional therapy for gastroparesis should follow a five-step treatment model. If the condition allows, oral diet and oral nutritional supplements are the first choice. When oral intake fails to meet 60% of the energy requirements for 3-5 days, artificial nutritional therapy should be selected, including enteral nutrition (EN), partial parenteral nutrition (PN) combined with enteral nutrition, or total parenteral nutrition (TPN). (Evidence A, Strong Recommendation, Consensus 100%).

GP patients need to improve their diet, with the following dietary recommendations: A low-residue diet significantly improves symptoms in gastroparesis patients; foods high in fiber should be minimized; liquid foods are preferred. Compared to solid foods, pureed foods significantly improve symptoms in GP patients [68-70]. The American Gastroenterological Association recommends small, frequent meals for GP patients, with a low-fat, low-fiber diet, ideally 4-5 meals per day. If this does not meet the nutritional needs, meal frequency can be increased [37].

When oral intake fails to meet 60% of energy requirements for 3-5 days, enteral nutrition is the preferred choice [37]. Evidence suggests that jejunal feeding is the most effective alternative to oral feeding in GP patients, helping maintain normal nutritional status, alleviate symptoms, and reduce hospitalization rates and hospital-acquired infections [71]. The American Gastroenterological Association recommends that patients with refractory GP should receive enteral nutrition via a jejunostomy tube [37]. Gastrostomy can improve nutritional status and promote weight recovery by relieving the symptoms described above, although this result has not been validated in clinical randomized controlled trials [72]. Enteral nutrition formulas should initially be low-osmolarity, followed by isotonic formulas, with infusion rates starting at 25 mL/h and gradually increasing to 60 mL/h, with continuous infusion for about 15 hours per day. The American Gastroenterological Association indicates that enteral nutrition should be the first-line strategy for nutritional therapy in GP patients. Partial parenteral nutrition (PN) or total parenteral nutrition (TPN) is mainly used for GP patients whose enteral nutrition does not meet 60% of the body's nutritional needs.

Recommendation 23: Gastroparesis patients undergoing gastrointestinal endoscopic surgery should follow

the enhanced recovery after surgery (ERAS) perioperative nutritional therapy guidelines. (Evidence B, Strong Recommendation, Consensus 95.8%).

According to ERAS nutritional treatment guidelines [73,74], early nutritional screening and assessment should be conducted before gastrointestinal endoscopic surgery in GP patients, with active nutritional therapy. For malnourished patients undergoing gastrointestinal endoscopic surgery, oral nutritional supplementation should be provided for more than 7 days, with parenteral nutrition (PN) support for 7-14 days before surgery. For patients with severe malnutrition, the duration of PN can be extended as needed. Preoperative fasting should be avoided, but due to the gastric emptying disorder in GP patients, preoperative oral intake and 12.5% carbohydrate solutions are not recommended due to insufficient evidence. Early postoperative oral feeding should be initiated. For patients with malnutrition and inadequate oral intake (< 60%), enteral nutrition should be started within 24 hours. If enteral nutrition cannot meet the goals, early combined parenteral nutrition should be considered. Prophylactic placement of a jejunal feeding tube or nasoenteric tube should be performed to establish an early enteral nutrition route. Jejunostomy tube placement has been shown to be more effective than percutaneous endoscopic gastrostomy (PEG)-jejunal extension tube (PEG-JET) [75]. Many patients experience insufficient nutritional intake after discharge, so follow-up and nutritional monitoring after discharge should be prioritized.

Question 8: How can Traditional Chinese Medicine (TCM) be used to treat gastroparesis?

Recommendation 24: Traditional Chinese Medicine (TCM) or a combination of TCM and Western medicine can improve symptoms and enhance gastric emptying time to some extent. (Evidence C, Strong Recommendation, Consensus 97.5%).

The efficacy and safety of TCM decoctions for treating diabetic gastroparesis (DGP): A meta-analysis collected randomized controlled trials on the use of TCM decoctions for DGP, including 67 eligible studies with 4790 DGP patients and 7 different TCM decoctions. The results showed that the combination of Banxia Xiexin Decoction and Western medicine was most effective in improving clinical outcomes and early satiety scores; Simotu Decoction combined with Western medicine was most effective in improving nausea, vomiting, appetite loss, and bloating scores; Chai Shao Liujunzi Decoction was most effective in increasing motilin levels; Zhi Shi Xiao Pi Decoction was most effective in improving gastric emptying rates; Jian Pi Xiao Zhi Decoction was most effective in promoting gastrin levels. The combination of Chai Shao Liujunzi Decoction and Western medicine was found to be most effective in improving gastric emptying time. Ultimately, Simotu Decoction combined with Western medicine and Banxia Xiexin Decoction combined with Western medicine were considered potential optimal treatment options [76,77].

Recommendation 25: Acupuncture alone, acupuncture combined with medication, and acupuncture combined with endoscopic surgery can improve symptoms of gastroparesis to some extent. (Evidence C, Weak Recommendation, Consensus 92.4%).

Gastroparesis (GP) is associated with gastrointestinal motility disorders, and there is a lack of correspondence between these disorders and clinical symptoms. Acupuncture has a beneficial bidirectional regulatory effect on the gastrointestinal system, not only reducing hyperglycemia in diabetic patients but also improving gastrointestinal motility and promoting gastric emptying. Acupuncture can effectively alleviate symptoms such as postprandial bloating discomfort, early satiety, vomiting, nausea, and bloating [78,79]. A multicenter randomized controlled trial using acupuncture at different acupuncture points for treating GP showed that combining Zhongwan and Zusanli points was most promising in symptom relief [80]. A systematic review and meta-analysis of acupuncture for postoperative gastroparesis syndrome (PGS) found that acupuncture, as a complementary and alternative therapy, is widely used in China due to its significant efficacy and fewer side effects [81]. Another systematic review and meta-analysis on acupuncture for GP after thoracic or abdominal surgery, which included 15 studies with 759 patients, showed that acupuncture combined with medication had a significant advantage over medication alone in treating PGS related to abdominal surgery [82].

Question 9: What are the super minimally invasive surgical options for treating gastroparesis?

Recommendation 26: Super minimally invasive pyloromyotomy via a tunneled approach is a second-line treatment for gastroparesis when drug therapy is ineffective. It is suitable for the treatment of refractory gastroparesis. (Evidence A, Strong Recommendation, Consensus 95.0%).

In 2016, Professor Enqiang Ling proposed the concept of super minimally invasive surgery (SMIS), which aims to achieve "curing the disease and restoring the organ to its original state" by removing lesions while maintaining the integrity of the organ. Super minimally invasive surgery (SMIS) refers to surgical operations for diseases requiring resection or incision, performed through natural orifices, tunneled approaches, puncture channels, or multi-lumen approaches. The technique is

rapidly developing, and gastric peroral endoscopic myotomy (G-POEM) is one of the SMIS procedures used for treating refractory gastroparesis (GP) [83-85].

Since the first case report in 2013, over 200 papers on G-POEM have been published. This narrative review summarizes short- and long-term outcomes and reviews other important studies. G-POEM for treating GP not only alleviates symptoms but also improves gastric emptying, with a technical success rate of 100%. The short-term success rate (within 1 year) is approximately 50-80%. This procedure takes 50-70 minutes, with an average hospital stay of 2-3 days. The rate of adverse events is about 10%, with very few patients requiring further interventions. Three studies have shown that the response to G-POEM is sustained over a 4-year follow-up, with a recurrence rate of 13% or higher annually. Repeating G-POEM may still be beneficial for some patients [86]. Most studies show that long-term illness is associated with poor outcomes. Current literature suggests that G-POEM is superior to gastric electrical stimulation and surgical pyloroplasty. A multicenter retrospective study showed that the clinical success rate for refractory GP patients treated with G-POEM was 65.8% after 12 months, defined as a reduction of at least one point in the GCSI score [87]. A randomized controlled study confirmed that G-POEM outperforms sham surgery in improving symptoms and gastric emptying after 6 months in refractory GP patients [88].

Recommendation 27: Endolumenal functional lumen imaging probe (EndoFlip) technology can be used to predict the effectiveness of G-POEM in treating refractory gastroparesis. (Evidence B, Strong Recommendation, Consensus 90.8%).

Endolumenal functional lumen imaging probe (EndoFlip) technology is a new method for evaluating the degree of lumen expansion. The technology places a balloon at the pylorus of GP patients and measures the pressure and cross-sectional area ratio during the isovolumetric expansion phase using impedance channels within the balloon. This helps assess pyloric distensibility, which is useful for evaluating pyloric diameter, expansion index, or compliance [89,90]. Clinical trials considering such pyloric interventions and incorporating pyloric physiological assessments to evaluate the impact of pyloric dysfunction on outcomes are rational. EndoFlip used to select patients for pyloromyotomy or botulinum toxin injection shows that pyloric diameter and expansion index or compliance are closely related to gastric retention. Using EndoFlip to measure these indicators can predict the efficacy of pyloric interventions, particularly the degree of pyloric dilation after G-POEM [91].

Recommendation 28: Endoscopic pyloric botulinum toxin injection and endoscopic pyloric balloon dilation are alternative endoscopic treatments that can temporarily improve gastroparesis symptoms. (Evidence B, Strong Recommendation, Consensus 92.4%).

Pyloric injection of botulinum toxin type A is safe for children and provides temporary relief for patients with refractory upper gastrointestinal symptoms, whether they have gastroparesis or not. A Mayo Clinic experience, literature review, and meta-analysis indicate that pyloric botulinum toxin injection is safe for children and provides short-term relief for patients with refractory upper gastrointestinal symptoms, both in those with and without gastroparesis [92]. A large multicenter study in France recorded the effectiveness of botulinum toxin injection for treating GP, showing significant relief of vomiting symptoms [93]. A study on the efficacy and safety of endoscopic pyloric balloon dilation for treating refractory GP showed a 53% effectiveness at 2 months, and one-third of patients showed continued improvement at 2 years. This treatment should be considered an alternative to pyloromyotomy [94]. A 10-year study indicated that combining botulinum toxin injection with balloon dilation is a safe procedure, with 85% of patients who had undergone esophagectomy showing significant improvement in GP symptoms. The balloon dilation after botulinum toxin injection may help the toxin diffuse better into the pyloric sphincter complex, potentially enhancing its therapeutic effect [95]. A retrospective multicenter study showed that pyloric botulinum toxin injection combined with balloon dilation is safe for treating pediatric GP, with partial effectiveness in the initial months, but symptoms often recur, requiring repeated interventions [96].

Question 10: What surgical procedures can be used to treat gastroparesis?

Recommendation 29: For refractory gastroparesis patients, gastric electrical stimulation combined with pyloric surgery can significantly improve symptoms and accelerate gastric emptying. (Evidence C, Weak Recommendation, Consensus 92.4%).

Surgical treatments for refractory gastroparesis (GP) include gastric electrical stimulation (GES) and pyloric surgery (PS), such as pyloromyotomy or pyloroplasty. Both gastric electrical stimulation and the combination of gastric electrical stimulation with pyloric surgery can significantly improve symptoms of nausea and vomiting [97]. Additionally, studies have shown that laparoscopic pyloroplasty in 177 GP patients improved gastric emptying in 90% of cases and resulted in short-term improvements in vomiting, nausea, abdominal pain and bloating.

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However, the complication rate was 6.8%, with risks including perforation or the need for further surgical interventions such as jejunostomy or partial gastrectomy [98]. In multiple studies, gastric electrical stimulation has been demonstrated to significantly reduce the typical symptoms of refractory GP patients, though it has not been shown to reduce gastric emptying time in the long term. Therefore, the combination of gastric electrical stimulation with pyloric surgery provides a more significant improvement in GP symptoms and gastric emptying compared to gastric electrical stimulation alone [99].

Question 11: What are the personal and societal burdens of gastroparesis?

Recommendation 30: Gastroparesis can lead to psychological disorders and reduce the patient's quality of life. Understanding the quality of life of gastroparesis patients and providing appropriate psychological treatment can help alleviate their symptoms. (Evidence C, Strong Recommendation, Consensus 98.3%).

Research shows that gastroparesis can trigger psychological disorders, with approximately 12.4% of GP patients experiencing severe anxiety, 21.8% to 23.0% experiencing depression, 24.0% experiencing both anxiety and depression, and about 50.0% suffering from somatization disorders, all of which can contribute to a reduced quality of life for patients [100]. Other studies have found that GP patients who have undergone surgery often exhibit significant symptoms of depression and anxiety, and suggest that attention should be given to this phenomenon, with appropriate treatment provided [101]. A study assessing the quality of life of GP patients using a questionnaire included 715 GP patients (256 with diabetic GP, 459 with idiopathic GP). The study evaluated symptoms (PAGI-SYM and Rome III), quality of life (SF-36v2 and PAGI-QOL), anxiety (State-Trait Anxiety Inventory AQ7), and depression (Beck Depression Inventory [BDI]). The results showed that GP patients experience poor quality of life, with a negative correlation between the severity of symptoms and quality of life [102].

Recommendation 31: Gastroparesis imposes a heavy burden on both patients and society and should be given attention. (Evidence C, Weak Recommendation, Consensus 96.6%).

Gastroparesis (GP) imposes a significant burden on both patients and society, and the disease has broader impacts on healthcare, such as increased hospitalization rates and related direct and indirect economic consequences [103,104]. A French multicenter, open-label study showed that gastric electrical stimulation reduced average overall healthcare costs, with each patient saving an average of $3,348 per year. Patients with comorbid diabetes saved even more, with an average of $4,096 per patient per year [105].

Question 12: Establishment of a Multidisciplinary Team for the Diagnosis and Treatment of Gastroparesis

Recommendation 32: Gastroparesis involves multiple etiologies and requires a multidisciplinary team for standardized diagnosis and treatment. (Evidence C, Weak Recommendation, Consensus 98.3%).

Gastroparesis is one of the diseases with various causes, making it difficult to diagnose and cure. Its treatment requires a combination of lifestyle changes, medications, and surgical interventions in a multidisciplinary manner to improve the quality of life for these patients. Starting with lifestyle modifications, adjustments are made to the type and quantity of food, medical conditions are optimized, and the use of opioid painkillers and smoking is stopped. Many patients still require anti-nausea medications and prokinetics to control symptoms. Finally, when these measures fail, endoscopic surgery to reshape the pyloric muscle layer may be needed, and even surgical interventions may be required, which could include gastric surgery, placement of drainage tubes, implantation of a gastric stimulator, or even total gastrectomy or cholecystectomy [106]. Therefore, this requires collaboration among experts such as gastroenterologists, surgeons, endocrinologists, neurologists, radiologists, nutritionists, and psychologists.

The goal of a multidisciplinary approach is to bring hope to GP patients, helping them lead a more fulfilling and happier life. The key point of the GP multidisciplinary treatment model in diagnosis is to identify the root cause of GP, use imaging diagnostic tools to confirm the condition, and provide individualized treatment for the patients. Figure 1 outlines the entire diagnostic and treatment process. Once GP patients are classified based on the cause, the medical team discusses potential treatment options with the patient, which may include drug therapy, nutritional support, traditional Chinese medicine, endoscopic surgery, or surgical procedures.

Since gastroparesis (GP) is primarily characterized by delayed gastric emptying, most patients seek consultation in gastroenterology. Therefore, a multidisciplinary approach centered around gastroenterology should be employed, with collaboration from other specialties such as endocrinology, general surgery, neurology, rheumatology, general medicine, nutrition, radiology, nuclear medicine, psychology, and traditional Chinese medicine (Fig. 2).

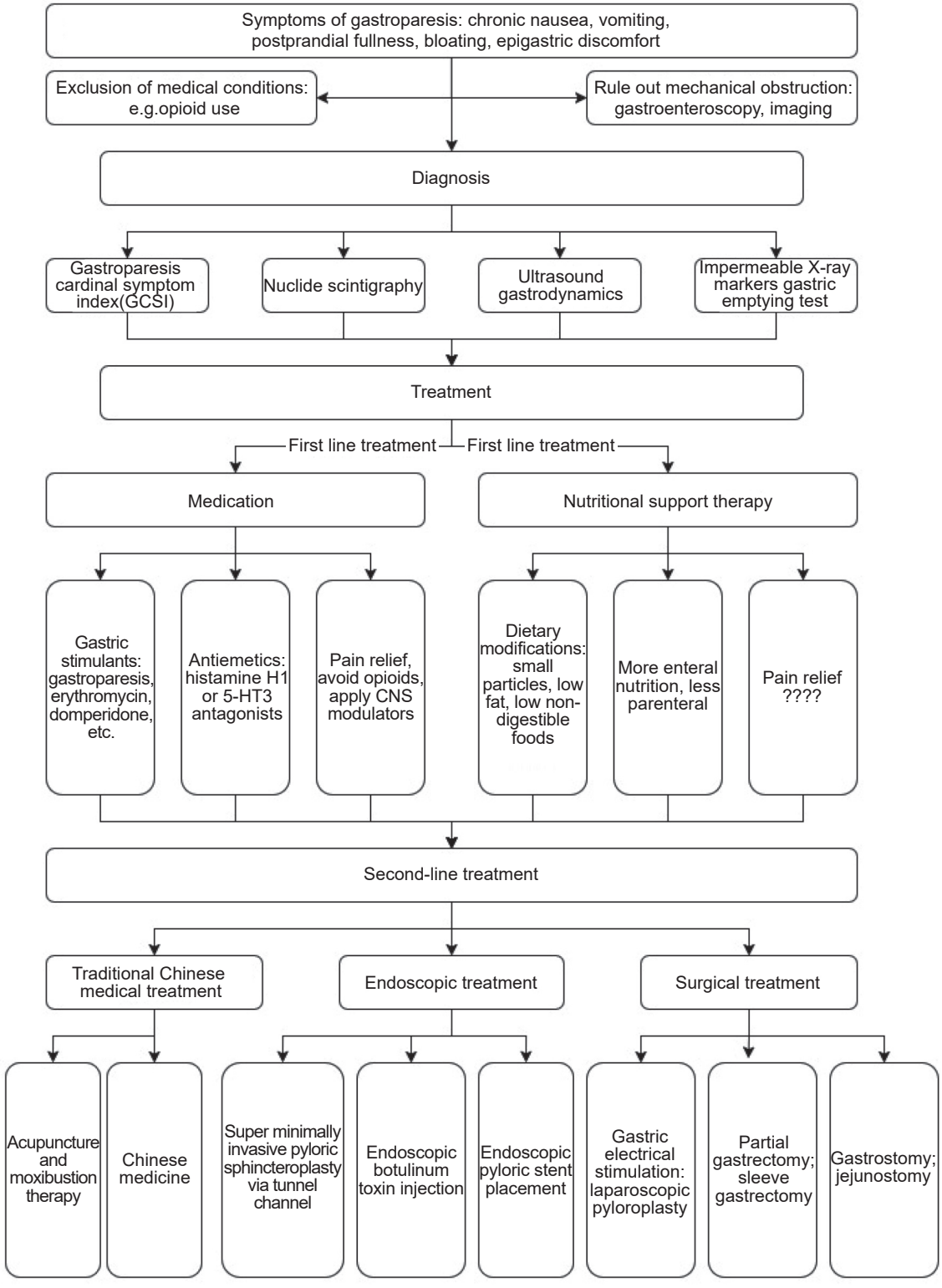

Figure 1 GP consultation process.

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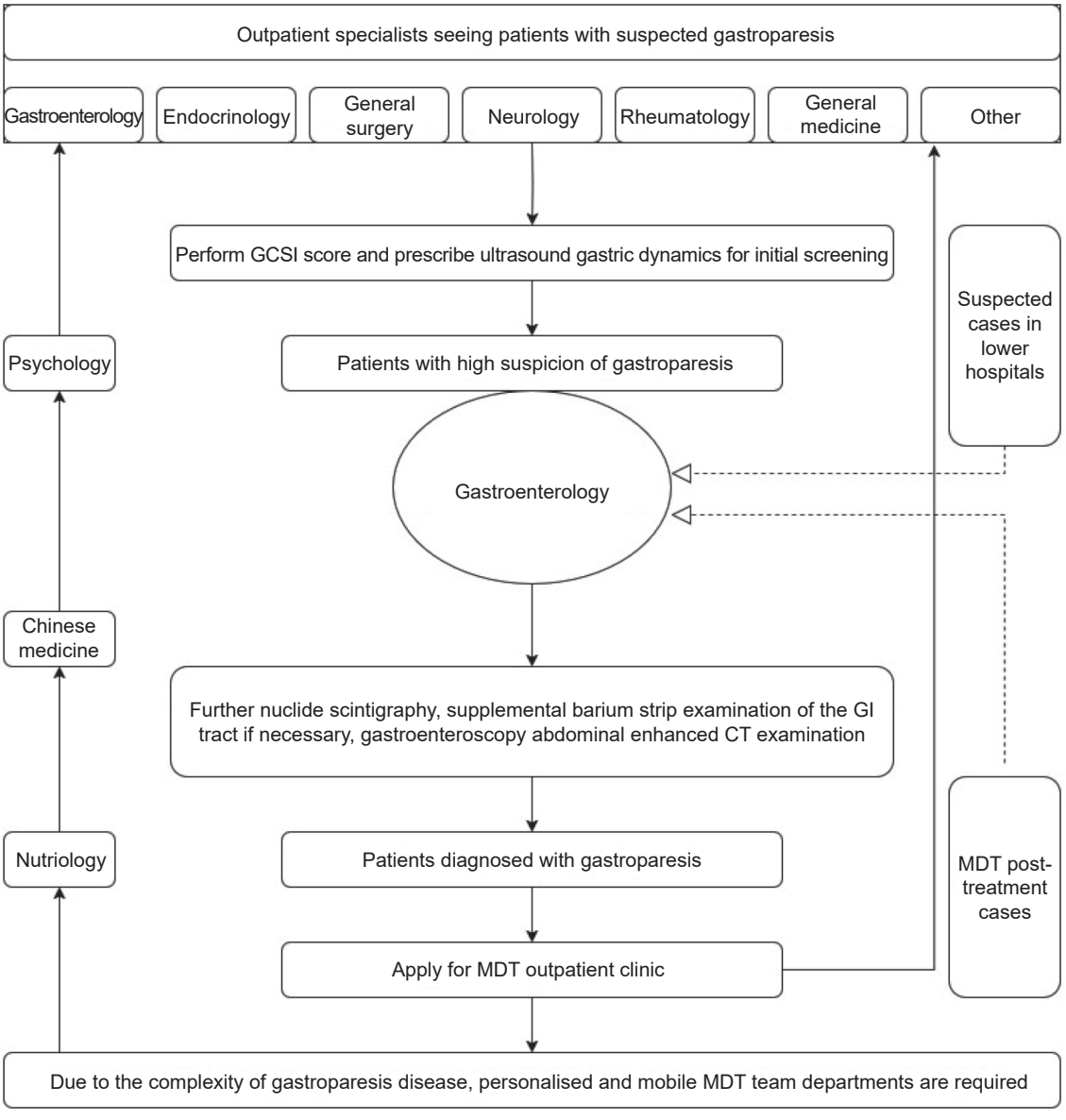

Figure 2 Illustrate the MDT (multidisciplinary team) treatment process.

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Data Availability

Data sharing is not applicable to this article as no datasets were generated or analyzed during the current study.

Declarations

Ethics approval and consent to participate

Practice Guideline Registration

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Conflicts of interest

The authors declare that they have no conflicts of interest to disclose.

Consent for publication

Not applicable.

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