Review Article
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Gastroparesis: guidelines for effective management

Abstract

This article presents a narrative literature review on gastroparesis, exposing epidemiological data, risk factors, pathophysiology, clinical signs, symptoms, diagnosis, prognosis, as well as providing guidelines for the effective management of this disorder. It was seen that the diagnosis of gastroparesis depends on the recognition of late gastric emptying in the absence of mechanical obstruction and that the current treatment options for gastroparesis are limited and consist of a combination of lifestyle, dietary supplements, medications, alternative and complementary therapy, endoscopic therapy and surgical therapy. Despite the limitations involved in the treatment of gastroparesis, it is believed that these difficulties should be addressed as the understanding of the pathophysiology of this disorder expands. In addition, a combination of approaches (ie, basic research, clinical investigation and controlled clinical trials) is necessary to provide patient care in these conditions.

Keywords: Gastroparesis, Gastric emptying, Dyspepsias, Gastric motility disturbances, Gastrointestinal motility, Prokinetic drugs.

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Introduction

The main function of the stomach is to produce acid and facilitate peptic digestion of food. In addition, the main motor functions of the organ are accommodation, which allows the delivery and storage of food, followed by crushing and gastric emptying.

The main function of the stomach is to produce acid and facilitate peptic digestion of food. Furthermore, the main motor functions of the organ are accommodation, which allows the delivery and storage of food, followed by crushing food into fragments and emptying solid food. Gastroparesis is a chronic disorder characterized by delayed emptying of the stomach after eating (gastric emptying), in the absence of mechanical obstruction, mainly pyloric stenosis. The cardinal symptoms include early satiety after eating, postprandial fullness, nausea, vomiting, and eructation. The syndrome is caused by neuromuscular dysfunction that leads to delayed of gastric emptying. The basic mechanisms that lead to gastroparesis involve derangements in extrinsic neural control (mainly vagal function), dysfunction of intrinsic nerves and interstitial cells involved in local control of gastrointestinal muscle function and loss of smooth muscle function.[1]

Gastroparesis can be idiopathic, associated with diabetes mellitus, can occurs after a medical intervention (iatrogenic or post-surgical), it may be associated with neurological disorders or following a viral or bacterial infection, such as Salmonella gastroenteritis.[2] Interestingly, Helicobacter pylori infection does not appear to influence the emptying or gastric accommodation, but may be associated with sensitivity increased in patients with functional dyspepsia, a disorder associated with accelerated or delayed gastric emptying, impaired gastric accommodation and increased sensitivity in the upper gastrointestinal tract.[1] Rarely, specific viral infections caused by the herpes virus or Epstein-Barr virus may be associated with acute dysautonomia that results in a generalized motility disorder, including gastroparesis. Furthermore, many other conditions such as Parkinson's disease, collagen vascular diseases (such as systemic sclerosis), chronic intestinal pseudo-obstruction, and other conditions can lead to gastroparesis or delayed gastric emptying. All these causes ultimately induce gastroparesis through neuromuscular dysfunction.[3]

In recent years, suggestions have been made to change the definition of gastroparesis to "gastroparesis and related disorders", recognizing the disorder as part of a broader spectrum of gastric neuromuscular dysfunction.[4] There is overlap in symptoms between gastroparesis and postprandial distress syndrome, which is one of the recognized types of dyspepsia functional.[5] Functional dyspepsia may be associated with accelerated or delayed gastric emptying, impaired gastric accommodation and increased sensitivity in the upper intestine.[6] Having made these initial clarifications, this article reviewed data epidemiological, risk factors, pathophysiology, clinical signs, symptoms, diagnosis, prognosis of gastroparesis as well as provided guidelines for the effective management of this disorder.

Methodology

A narrative bibliographic review was carried out on epidemiology, factors risk, pathophysiology, clinical signs, symptoms, diagnosis,

prognosis and guidelines for the effective management of gastroparesis. All content was researched on the database Medline data. The following descriptors were applied in the searches: "gastroparesis (gastroparesis)" and "gastric emptying with the aim of find publications on the topic. Although a strict temporal parameter for the selection of articles, preference was given to articles published in the last ten years.

Literature review

Epidemiology

The epidemiology of gastroparesis is uncertain and difficult to estimate due to the relatively weak correlation of symptoms with gastric emptying, resulting in a high rate of underdiagnosis.[7] Some symptoms of gastroparesis, such as pain or discomfort in the abdômen superiority, eructation and early satiety, overlap with those of functional dyspepsia.[8]

An important etiology of gastroparesis is diabetes mellitus; in a series tertiary reference, diabetes mellitus was responsible for almost 1/3 of all cases of gastroparesis. Notably, symptoms attributable to gastroparesis are reported by 5 to 12% of patients with diabetes mellitus.[9] In clinical practice, there are approximately equal numbers of patients with type 1 and type 2 diabetes being evaluated for gastrointestinal symptoms higher, as documented in the NIH Gastroparesis database Consortium.[10]

Therefore, documentation of delayed gastric emptying by gastric scintigraphy or breathing test to distinguish between gastroparesis and functional dyspepsia. As a result, most studies of the natural history of gastroparesis has been performed in reference populations, with few studies community-based. Furthermore, most epidemiological data that describe the burden of gastroparesis come from the United States.[9]

Prevalence

A population-based study in Minnesota estimated that the incidence age-adjusted gastroparesis over a ten-year period was 2.4 cases per 100,000 person-years for men and 9.8 cases per 100,000 person-years for women; the prevalence was estimated at 9.6 cases per 100,000 individuals for men and 37.8 cases per 100,000 individuals in the case of women.[11] Some individuals with typical gastroparesis symptoms may never be subjected to confirmatory tests; one study estimated that 1.8% of the population in General can have gastroparesis, but only 0.2% are diagnosed. Presumably this is related to a lack of knowledge of the disorder and existing diagnostic confusion caused by an overlap between symptoms of gastroparesis and functional dyspepsia. The same study reported that consultation rates were similar between those with typical symptoms of gastroparesis and those with functional dyspepsia.[12]

Given that current prevalence estimates are based on clinical data obtained from patients who sought medical care, these estimates can be very low, as they can be impacted by the habit of taking care of the health of patients who have symptoms suggestive of gastroparesis.[13]

Etiology and risk factors

Several conditions have correlations with gastroparesis. Most cases are idiopathic, diabetic, medication-induced or post-surgical.[10] A wide variety of neurological disorders, as mentioned below, may affect gastrointestinal motility by altering nerve supply parasympathetic or sympathetic to the gastrointestinal tract. The etiology of gastroparesis is categorized as follows:

a) idiopathic - most common cause present in about half of patients;

b) diabetes mellitus (DM) - more common and severe in type 1 diabetics;

c) rheumatological diseases - amyloidosis, scleroderma;

d) autoimmune - autoimmune gastrointestinal dysmotility causing delay when emptying;

e) neurological conditions – stress, Parkinson's disease, sclerosis multiple, brain stem stroke and tumors, autonomic neuropathy;

f) post-surgical - injury to the vagus nerve during fundoplication and resection partial gastric;

g) trauma - spinal cord injury;

h) viral infections, including Norwalk virus and rotavirus;

i) medications - narcotics, cyclosporine, phenothiazines, dopamine, octreotide, alpha-2-adrenergic agonists (e.g. clonidine), tricyclic antidepressants, calcium channel blockers, exenatide or agonist GLP-1, liraglutide analogues, lithium and progesterone.[2]

Diabetic patients at risk of developing gastroparesis include type 1 diabetes, with long duration of the disease, poorly controlled blood glucose levels with fluctuations higher rates and other associated autonomic neuropathic complications. As observed in other diabetes-related complications, the oxidative damage of these tissues is the prominent mechanism in gastroparesis. In patients with diabetic gastroparesis, various abnormal physiological functions have been observed, resulting mainly from autonomic dysfunction and/or intrinsic dysfunction of the nervous system. This neuropathic malfunction and coordination results in reduced frequency of antral muscle contractions, impairing the gait reflex postprandial accommodation affecting gastric emptying.[14]

Regarding post-surgical etiology, any surgery involving the esophagus, stomach, duodenum and pancreas may pose a risk of injury to the vagus nerve. It even has the function of controlling the contraction of the smooth muscles of the stomach and the sensory pathways that coordinate the direct propulsion of gastric contents. Therefore, the Vagus nerve damage delays gastric emptying. Post-surgical gastroparesis It can develop immediately after surgery, months or years after surgery. Common surgical procedures associated with this complication include Nissen fundoplication, gastrectomy, cryoablation of pancreatic cancer, pancreaticoduodenectomy. Gastroparesis has rarely been reported in surgeries gynecological problems involving the lower abdomen.[15] The reason for the higher incidence and prevalence of gastroparesis in women is not clear. However, stomach motility depends on neuronal synthesis of oxide nitric acid and this pathway can be regulated by estrogen (RAVELLA et al., 2013). Few studies exist on the effect of body mass on gastroparesis. In a study of patients with type 2 diabetes, obesity was associated with an increase of almost 10 times the chances of reporting symptoms of gastroparesis (BOAZ et al., 2011).

Another study demonstrated an association between higher mass index body and delayed gastric emptying on scintigraphy in a cohort of 140 Indian patients with type 2 diabetes. Interestingly, it has been reported that almost 50% of patients with idiopathic gastroparesis are overweight or obese, and that symptom patterns differ according to body mass.[10] The role of other modifiable risk factors, such as smoking or alcohol, in gastroparesis is not proven, although considerable proportions of patients with diabetes mellitus and control subjects used tobacco or alcohol in the same epidemiological study.[10] In a

longitudinal study of follow-up carried out among 262 patients with gastroparesis, treated with According to the current standard of care in the US, smoking history was significantly associated with no improvement in symptoms through 48 weeks monitoring.[4]

Pathophysiology

Although there have been advances in understanding the mechanisms and pathophysiology of gastroparesis, there are still significant gaps in knowledge, inconsistencies between studies, potential differences between different groups etiological (e.g. diabetic versus idiopathic) and therefore individualization of therapy is currently best achieved by careful identification of the functional impairment rather than cellular mechanisms. One example is the recognition of concomitant reduction in gastric accommodation among patients who present symptoms suggestive of gastroparesis.[16] Gastroparesis and impaired gastric accommodation result from dysfunction neuromuscular system of the stomach. When food grinds in the stomach into fragments, they are liquefied by a combination of digestion with gastric acid and antral contractions and these contractions establish high forces of liquid shear and drive food particles against the pylorus closed before particles of size 1–2 mm are emptied into the duodenum.[17]

Innervation of the stomach by afferent fibers of the vagus nerve is essential for gastric accommodation of consumed food. Antral contractions, essential for crushing solid food and gastric emptying, are mediated by extrinsic vagal innervation and intrinsic cholinergic neurons. Furthermore, intrinsic inhibitory mechanisms, such as nitrergic neurons, facilitate pyloric relaxation and intragastric peristalsis. Nitrergic neurons are essential for relaxing the gastrointestinal tract muscle before a contraction and are responsible for descending inhibition before contraction upstream, which is induced by excitatory neurons, such as cholinergic neurons. These inhibitory and excitatory neural effects are transmitted through interstitial cells of Cajal and possibly other cells that have a pacemaker and smooth muscle cells in the muscles of the gastrointestinal tract, cause the muscular layer of the stomach to behave like a syncytium multicellular electrical system, so that coordinated contractions, which begin in the proximal stomach and involve the entire circumference of the stomach, they can propagate to the antropyloric region. This electrical syncytium consists of cells smooth muscle cells, interstitial cells of Cajal and other cells, which are positive for platelet-derived growth factor receptor alpha (PDGFRg).[18]

Interstitial cells of Cajal and PDGFRg - positive are considered pacemaker cells in the GI tract and have the ability to transmit signals electrical. In gastroparesis, delayed gastric emptying is associated with antral hypomotility and, in some patients, pyloric sphincter dysfunction caused due to neuromuscular dysfunction.[13] Gastric neuromuscular disorders may result from denervation extrinsic, intrinsic neuropathy, pacemaker cell or muscle disorders straight. Smooth muscle disorders (myopathic disorders) may be infiltrative (e.g. e.g., scleroderma) or degenerative (e.g., hollow visceral myopathy, amyloidosis and rarely mitochondrial cytopathy). Myopathic disorders are invariably associated with a component of the motility disorder that is more generalized that affects other regions of the intestine, e.g. small intestine, lower esophageal sphincter (LES) and esophagus. Furthermore, scleroderma is associated with systemic features such as CREST syndrome (calcinosis, Raynaud's phenomenon, esophageal dysmotility, sclerodactyly and telangiectasia), and there may be external ophthalmoplegia or involvement of skeletal muscle in mitochondrial cytopathy. Cell degeneration smooth muscle tissue and/or surrounding fibrosis is considered the mechanism underlying impairment of gastric emptying in these disorders.[19]

Histopathology

Histopathologically, gastroparesis is associated with a reduced number of autonomic ganglia and ganglion cells, in addition to inflammatory changes that result in abnormal gastric myoelectric motor functions.[14] In a study carried out in patients with refractory gastroparesis evaluating gastric neuromuscular histopathology, researchers observed the following findings: lymphocytic infiltration of the intermesenteric plexus, fibrosis in the circular layer internal and external longitudinal layer and decrease in interstitial cells of Cajal in the myenteric plexus. Additionally, fewer ganglia and ganglion cells were present in diabetic gastroparesis.[20]

Clinical signs and symptoms

Clinical symptoms of gastroparesis include nausea, vomiting, satiety premature onset, postprandial fullness, bloating, belching, and discomfort in the abdômen superiority that may overlap with the symptoms observed in functional dyspepsia and accelerated gastric emptying.[21] There are several symptom severity scales, which are used as assessments of patient-reported symptoms in gastroparesis, including the Indexof Cardinal Symptoms of Gastroparesis (GCSI), which is based on the questionnaire Assessment of Patients with Upper Gastrointestinal Disorders (PAGI-SYMP) and in the Revised GCSI Daily Journal (GCSI-DD). These scales were used in clinical trials to evaluate the effects of treatment in clinical studies of gastroparesis. However, the scales were not used to assess symptoms in clinical practices, such as deciding whether patients should undergo studies diagnoses of various gastric functions.[22]

In general, the severity of gastroparesis is assessed by the degree of nutritional impairment, weight loss or the degree of delay in emptying gastric, which will be affected by the method and meal used to assess general function of the stomach. There are also several symptom severity scales to assess clinical signs and symptoms.[8]

Diagnosis

Gastroparesis is assessed in clinical practice through the recognition of clinical signs and documentation of delayed gastric emptying. The objective of examination is to rule out mechanical obstruction and make the diagnosis of gastroparesis due to through the assessment of gastric motility. Patients with postprandial upper abdominal symptoms such as nausea, vomiting, postprandial bloating and upper abdominal pain are candidates for the gastric motility. Patients must first undergo an endoscopy upper digestive; If this test does not reveal a cause for the symptoms, patients can start mobility and functionality tests. Some tests are available to help diagnose gastroparesis. Among them we have:

Scintigraphy: The most relevant functional test is the measurement of emptying gastric. It is the gold standard method for diagnosing gastroparesis.[23] It is a non-invasive quantitative test that addresses physiology. To carry it out, the patient must take a solution with a radiopharmaceutical and the amount of Radiation to the stomach is measured at different points over time. One parameter for evaluating gastric emptying time was established by Society for Nuclear Medicine, Neurogastroenterology and Motility in accordance with the following reference values, namely: when using solid substances such as technetium-labeled protein 99, delay is observed when retention > 90 in 1 hour, > 60 in 2 hours, > 10 in 4 hours after ingestion of the radiopharmaceutical; On the other hand, it is characterized that gastric emptying is accelerated when > 30 of the radiopharmaceutical is excreted in the first hour of the study. The patient must stop taking medications that may affect mobility up to 2 days before carrying out the test. On the day of the test, the patient

must be fasting for at least 6 hours and images are taken at times zero, 1, 2 and 4 hours after administration of the radiopharmaceutical. It is worth highlighting that the use of scintigraphy for Diagnosis of gastroparesis is practically valid only for solid substances, as the evacuation of liquids is hardly affected. It is important to note that the scintigraphy does not distinguish the stomach from the loops sandwiched with the radiopharmaceutical and, therefore, it may overestimate retention;[24]

Breath test: It is a non-invasive technique that uses $13CO_2$ isotopes to measure the evacuation of solids and liquids;[25]

Fluoroscopy: The negative factors of this exam are the low sensitivity and high exposure to radiation. It is performed using x-rays with markers radiopaque and has been used to measure solid urination and the effect of drugs prokinetics;[26]

Ultrasonography: It is an operator-dependent examination that is used to estimate the size of the stomach, the volume of the anthropic region, the antral area, the liquid transpyloric during fasting and food intake. This exam allows the evaluation simultaneous gastric emptying and accommodation. However, it is only used with safety in measuring gastric emptying of liquids and is intended only for assess fluid emptying. Its use in obese people is difficult. A 3D ultrasound can measure gastric volume and emptying;[27]

Nuclear magnetic resonance: It has excellent correlation with scintigraphy with any type of food, it is very sensitive and can detect differences between different consistencies and caloric densities. It is the ideal test to evaluate the effect of medicines without exposure to radiation. Furthermore, it has the property of evaluating simultaneously the contractility, emptying and accommodation of the stomach. Per On the other hand, it presents the disadvantages of high cost and low application in practice clinical;[28]

Barostat: This test aims to measure gastric volume and evaluate the relaxation of the fundus in response to food. It's a device, a bomb computer-controlled air flow, which measures visceral tone, compliance and feeling of a hollow organ. It has the ability to measure the tone of the fundus through monitoring air volume with an intragastric balloon maintained at a pressure predefined constant;[29]

Single Proton Emission Tomography (SPECT): It is performed through intravenous injection of technetium 99, which selectively accumulates in the mucosa gastric. It is useful for measuring gastric volume;

Antroduodenal manometry: This test evaluates the intraluminal pressure in the distal to the stomach and duodenum. It is performed by inserting a cateter transnasal motility or, if the patient has undergone a gastrostomy, by insertion through the surgical site. The frequency and amplitude of contractions interdigestive and postprandial events can be recorded and the response to prokinetics assessed by providing information about the coordination of motor function between the stomach, pylorus and duodenum;[30]

Wireless motility capsule (SmartPill GI Monitoring System): consists of a capsule that is swallowed during a standard meal and sends measurements of pH and intraluminal pressure via telemetry to a device during the postprandial period. In healthy volunteers, the capsule penetrates the duodenum after 5 hours. It's good correlation with scintigraphy and has the advantage of not being radioactive, and can be carried out on an outpatient basis (ESCUDERO, OG; 2011).

The symptoms of gastroparesis are nonspecific and may result from other sensory or motor disorders of the upper gastrointestinal tract, including impairment of gastric accommodation. A study with 1287 patients with upper gastrointestinal symptoms enrolled in a care center tertiary care for more than 10 years measured gastric emptying by scintigraphy and gastric accommodation by SPECT, and found that there was a number approximately equal number of patients with delayed gastric emptying, with impaired gastric accommodation, a combination of both, or with the absence of both.[6]

Therefore, getting the correct diagnosis for gastrointestinal symptoms superiors of the patient is an essential first step. Based on the current definition, gastroparesis is indistinguishable from functional dyspepsia with delayed emptying gastric. It is estimated that approximately 25% to 35% of patients with symptoms dyspeptics have delayed gastric emptying.[8] Severe gastroparesis must be clinically differentiated from pseudoobstruction chronic intestinal disease (POIC). Both pathological disorders are characterized by similar clinical manifestations, gastrointestinal motor changes and some form of underlying neuromuscular disorder. The main difference between patients with gastroparesis and patients with CIOP is that patients with CIOP presente episodes similar to mechanical intestinal obstruction. The correct diagnosis is essential, as patients with CIOP are more frequently exposed to useless and potentially dangerous surgical procedures.[31] Other conditions to differentiate from gastroparesis are the rumination, cannabinoid hyperemesis syndrome (CHS), and vomiting syndrome cyclical (SVC).[32]

Unexplained chronic nausea and vomiting (NVCI) or nausea and vomiting syndrome chronic disease (SNVC) are identified as subgroups of symptoms of functional upper gastrointestinal disorders with unknown prevalence and overlap of symptoms with gastroparesis and functional dyspepsia (STANGHELLINI et al., 2016). Patients with rumination syndrome may experience regurgitationrepetitive and effortless chewing, sucking, and re-swallowing or spitting out food previously ingested. The disorder is not associated with nausea, but may occur weight loss and rumination can be confused with vomiting. The diagnosis is based primarily on careful history and clinical observation, and the manifestations are similar in adults and adolescents.[32]

A recent review made a series of recommendations regarding clinical management of rumination syndrome: clinicians should consider rumination syndrome in patients reporting postprandial fullness and consistent regurgitation; and the presence of nocturnal regurgitation, dysphagia and nausea or symptoms that occur in Absence of meals does not exclude rumination syndrome, but it makes it less likely. Diaphragmatic breathing with or without biofeedback (administered by speech therapists, psychologists, gastroenterologists and other health professionals) is the first-line therapy in all cases of rumination syndrome. The test goal of rumination syndrome with high-quality esophageal impedance manometry postprandial resolution can be used to support the diagnosis, but experience and the lack of standardized protocols are the current limitations.[33] SHC and SVC are characterized by recurrent episodes of nausea and severe vomiting, often associated with abdominal pain, in the absence of any recognizable underlying cause other than cannabis use in the SHC. The main clinical feature that distinguishes SHC and SVC from gastroparesis is that both disorders are characterized by a substantial absence of symptoms among episodes. Delayed gastric emptying is strongly associated with vomiting and has been reported in patients with CHS.[34] On the other hand, normal or even accelerated gastric emptying is considered a supporting criteria for the diagnosis of CVS.[35]

Notably, compulsive showering behavior is a clinical characteristic traditionally considered of diagnostic value for CHS, but this behavior may also be present in patients with CVS and helps distinguish the two conditions of gastroparesis.[36] O SHC can be differentiated from SVC if episodes of nausea and vomiting after stopping marijuana use (STANGHELLINI et al., 2016).

Treatment and prevention

There are few known preventive strategies specific to gastroparesis. Improved, long-term control of hyperglycemia in patients with diabetes mellitus can prevent the occurrence of diabetic neuropathy. Furthermore, the risk of postsurgical gastroparesis may be increased by pyloroplasty, which is an incision in the pyloric region that increases the diameter of the gastroduodenal junction and removes any obstruction to flow, to improve gastric emptying in patients undergoing gastric surgery. Finally, the choice of medication can help prevent iatrogenic gastroparesis (e.g. gastroparesis associated to opioids) through the use of alternative drugs that achieve the same effect.[17]

Management of gastroparesis involves correcting deficiencies in fluids, electrolytes and nutrients; identify and treat the cause of delayed emptying gastric (e.g. diabetes mellitus); and suppress or eliminate symptoms. To the therapeutic strategies depend on dietary modifications, medications that stimulate gastric motor activity, antiemetic drug therapy and measures non-pharmacological, such as endoscopic or surgical intervention or stimulation gastric electrical.[1] Regarding diet modification, meal size can limit the time emptying and help alleviate symptoms. Patients may need to eat 4 or 5 times a day to compensate for the small meal size. Drinks carbonated drinks like soda and beer can release carbon dioxide, which may worsen gastric distension. Smoking or high doses of alcohol can decrease antral contractility and impair gastric emptying. The nutritional status of the patient must be evaluated immediately, using a service consultation assistant. If oral intake is not adequate, enteral nutrition via a tube jejunostomy should be considered. Parenteral nutrition is rarely necessary.[37] If a gastroparesis-appropriate diet fails to control symptoms, Patients can be treated clinically with pharmacological agents, including prokinetic and antiemetic medications. The clinical efficacy of the agentes pharmacological treatment for symptoms of nausea and vomiting is questionable.[38]

Gastric prokinetic medications increase the rate or amplitude of stomach contractions and therefore increase the rate of gastric emptying. You Currently approved medicines (although not in all countries) include metoclopramide, domperidone and erythromycin.[39] Several promising new prokinetic agents are in the pipeline for treatment of gastroparesis. Relamorelin is a ghrelin receptor agonist that stimulates the gastric body and antral contractions, accelerates gastric emptying and has been shown in phase IIA and IIB clinical trials to increase emptying of solids and reduce the symptoms of gatroparesia, particularly nausea, fullness, swelling and pain.[23] Relamorelin is currently being tested in phase III trials, which should also provide information on the ideal subcutaneous dose of this treatment.

Furthermore, prucalopride, a 5-HT4 receptor agonist, has no cardiac adverse events, is approved in most countries, except the United States, for the treatment of chronic constipation. The drug accelerates gastric emptying and was shown in a preliminary report to alleviate symptoms in 28 patients with idiopathic gastroparesis.[40] Acotiamide has relaxing and prokinetic properties of the fundus due to its ability medication to antagonize type 1 and type 1 inhibitor muscarinic autoreceptors 2 in cholinergic nerve endings and inhibit acetylcholinesterase. The medicine improves gastric accommodation and emptying and relieves dyspeptic symptoms and is approved in Japan for the treatment of functional dyspepsia.[41,42] However, there are currently no registered trials with acotiamide in gastroparesis. Regarding pyloric intervention, delayed gastric emptying in Gastroparesis is associated with antral hypomotility and, in some patients, dysfunction of the pyloric sphincter in the form of pylorospasm; It is important to note that This intervention is not performed for pyloric stenosis. Botulinum toxin blocks the exocytosis of acetylcholine in cholinergic nerve endings, thus blocking increased tone or spasm of the pyloric sphincter leading to decreased symptoms of gastroparesis.[37]

Gastric electrical stimulation (EEG) has been shown to alleviate symptoms, mainly vomiting and the need for nutritional supplementation. In patients with refractory symptoms, even after medication trials mentioned above, EEG is considered an approved form of treatment for patients with diabetic gastroparesis. Diabetic patients respond more effectively than other groups of patients with gastroparesis. The implementation of the EEG stimulator requires a surgical procedure, either by laparotomy or by laparoscopic approach. The device consists of a pair of leads, implanted in the muscularis propria approximately 10 cm proximal to the pylorus and then connected to a pulse generator. The risks of EEG include infection of the device, lead migration and perforation, requiring repeated procedures surgical. You may also need to replace the battery every ten years, approximately.[1]

Regarding future perspectives, several prospective treatments have been considered or are being investigated for the management of gastroparesis. O granisetron, a 5-HT3 antagonist, administered as a transdermal patch, improved symptoms of nausea and vomiting, as evident in a prospective study.[43]

A scopolamine patch underwent a no-effect evaluation significant. Additionally, research is underway studying the effects of transcutaneous acupuncture (TEA) in gastroparesis. Cannabinoids (dronabinol) were considered in the treatment of gastroparesis symptoms, but have not been published clinical studies were found. It is likely that cannabinoids are ineffective, as they delay gastric emptying. Attention must be paid to development of new effective therapies for symptomatic control. O prucalopride, relamorelin, velusetrag, and metoclopramide nasal spray are therapies research into evaluation of patients with gastroparesis.[44] Gastric peroral endoscopic myotomy (G-POEM) is considered a therapeutic current and minimally invasive treatment for refractory gastroparesis. G-POEM is carried out with single-channel gastroscopy or double-channel endoscopy, followed by anestesia general with tracheal intubation. The technique performed a submucosal injection (a mixed solution of 100 ml of saline, 1 ml of indigo carmine and 1 ml of epinephrine), followed by an incision in the mucosa was made 5 cm from the pylorus in the greater curvature of the stomach. A submucosal tunnel was created from the mucosal entrance to approximately 1 cm above the pylorus. Full-thickness myotomy was performed 2 to 3 cm proximal to the pylorus to 1 cm beyond the duodenal bulb. After hemostasis, the mucosal entrance was closed with metal staples or a suturing device.[45] This is a single-center retrospective study of 16 patients who underwent GPOEM for refractory gastroparesis from August 2016 to October 2017. This study included 11 men and 5 women; in addition, 13 patients had postsurgical gastroparesis and 3 patients had diabetes. The included patients had severe and refractory gastroparesis as indicated by the Gastroparesis score Cardinal Symptom Index (GCSI) ≥20, and evidence of delayed scintigraphy gastric emptying (GES).[45]

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Technical success was achieved in all patients, and this finding is According to the results of many studies that reported the safety of procedure. Doubts remain about the effectiveness of the procedure. We report a clinical success rate of 81.25% with an average follow-up period of 14.5 months. Gonzalez et al. presented success rates of 79% and 70% for periods 3 and 6 months, respectively. Furthermore, a recent study showed a rate success rate of 81% with a 6-month follow-up, which could represent a promising result for these patients.[45]

Prognosis

Gastroparesis is a very uncommon condition in the community, but it can be associated with poor results.[11] The natural history of Gastroparesis is uncertain and little described. In a small study of 20 patients with diabetes followed for 12 years, symptoms of gastric emptying were reasonably stable.[46] In another study, 86 patients with diabetes were assessed; After adjusting for comorbidities, symptoms of gastroparesis did not correlate with mortality.[47] On the other hand, the results of a study carried out in a tertiary center suggested that 7% of patients with gastroparesis had died and 22% of patients required long-term enteral or parenteral nutrition after six years monitoring, which indicates that gastroparesis may be associated with significant mortality and morbidity.[2] Are necessary controlled community studies for the prognosis of gastroparesis, and data of tertiary hospitals may not represent the disease in the general population.

Conclusion

The relationship between delayed gastric emptying, the pattern of symptoms associated with it related and its separation from functional dyspepsia remains an area of controversy and uncertainty. The diagnosis of gastroparesis depends on the recognition delayed gastric emptying in the absence of mechanical obstruction. Studies do not transients that assess gastric motility play a complementary role and can help guide therapy.

Current treatment options for gastroparesis are limited and consist of in a combination of lifestyle and dietary supplements, medications (antiemetics, prokinetics, neuromodulators and accommodation enhancers), alternative and complementary therapy, endoscopic therapy (pylorus-directed therapy, temporary pacing, jejunostomy or ventilation gastrostomy) and therapy surgical (pyloroplasty, gastric electrical stimulation, gastrectomy).

Despite the limitations involved in the treatment of gastroparesis, this situation is expected to improve substantially as understanding of the pathophysiology of this disorder broadens. Furthermore, a combination of approaches (i.e., basic research, clinical investigation, and clinical trials controlled) to improve patient care in these conditions. New therapeutic measures reserved for cases refractory to treatment clinical practice have been developed, with electrical gastric stimulation and myotomyendoscopy. Gastroparesis still continues to represent a challenge to gastroenterologista.

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