



# Gastroparesis on Diabetes Mellitus Patients

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## Abstract

Diabetes mellitus is a metabolic disease of multiple etiologies. Global statistics of diabetes mellitus showed that 382 million people in the world had the disease; type II diabetes mellitus represented 90% of cases.

Diabetic gastroparesis is a serious complication due to diabetes mellitus. Further studies suggest that diabetes mellitus is associated with up to 75% of gastrointestinal symptoms, in diabetic gastroparesis; the antral body contractions are ineffective, although the smooth muscle layers appear to be normal.

Gastric emptying scintigraphy is considered the gold standard for diagnosis and quantification of delayed gastric emptying. The goal of treatment is to reduce symptoms, correct nutrition, and improve quality of life. Includes prokinetic medications like first line, nausea and vomiting can be controlled with some antiemetic medications, it should also include education and support diet, behavior changes.

**Keywords:** Diabetic gastroparesis; Type 1 diabetes mellitus; Type 2 diabetes mellitus; Symptom

## Introduction

To date, diabetes mellitus is a metabolic disease of multiple etiologies characterized by the presence of hyperglycemia resulting from a defect in the secretion of insulin that is associated with disorders of carbohydrates, fats and protein metabolism [1].

World statistics of Diabetes Mellitus (DM) in 2013 showed that 382 million people in the world had the disease, type II diabetes mellitus accounted for 90% of cases. It is predicted that by the year 2035, about 592 million people will die of diabetes complications, the economic cost could increase in the world. The prevalence of type 1 Diabetes Mellitus (DM1) has increased from 2% to 5% worldwide and its prevalence, at 18 years of age in the US [2]. It is approximately one in 300. Compared to data from the United Kingdom that says there are 4.7 million people living and 90% with type II Diabetes Mellitus (DM2) [3].

The average age of diabetes mellitus is 42 years and it is the main consequence of a diet high in sugar and calories, low physical activity, genetic susceptibility and lifestyle [2]. Diabetic gastroparesis is a syndrome characterized by a delay in emptying in food intake in the absence of obstructive mechanisms of the stomach and duodenum [4,5]. That is, a symptomatic stomach disorder characterized as a delay in gastric emptying [6].

## Epidemiology

Diabetic gastroparesis is a serious complication due to diabetes mellitus and its prevalence is 52.7%, with a difference in DM1 of 53.8% and in DM2 of 52.2% [7]. Complemented studies suggest that diabetes mellitus is associated with up to 75% on gastrointestinal symptoms, and alterations such as diabetic gastroparesis, these have been observed in DM1 and DM2 with and without complications, and so they consider that intestinal disorders increase with increasing age [8].

In a period of 10 years, 5.2% of DM1 patients will acquire diabetic gastroparesis, which is five times less than patients with DM2 during that same period [9]. Mortality is increased in patients presenting with diabetic gastroparesis, they present as a complication in patients with type 1 DM and type 2 DM [10]. They are usually related to cardiovascular events compared to diabetic patients who do not suffer from gastroparesis [11].

The prevalence is higher in women, 5.8% more than in men (3.5%) according to a study

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**Received Date:** 01 May 2020

**Accepted Date:** 21 May 2020

**Published Date:** 26 May 2020

### Citation:

Sanchez-Barajas M, Garcia Perez M,  
María de la Roca Chiapas J, Cordova-  
Fraga T. Gastroparesis on Diabetes  
Mellitus Patients. *J Gastroenterol  
Hepatol Endosc.* 2020; 5(2): 1080.

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conducted in the United States in 2017 [12].

Diabetic gastroparesis is associated in a variable way with lower unemployment, lower household income and absenteeism [13].

These factors increase the incidence of hospitalizations due to gastroparesis; these include an increase in the prevalence of diabetes due to gastroparesis, changes in the diagnostic criteria, treatment and severity of gastroparesis, recognition, and diagnoses of these disorders or changes in hospital practice [14].

## Pathophysiology

In diabetic gastroparesis, the contractions of the antral body are ineffective, although the smooth muscle layers appear to be normal [15,16].

Changes in cellular abnormalities in patients with diabetic gastroparesis include abnormalities in extrinsic innervation in the stomach, loss of neurotransmitters at the level of the enteric nervous system, mild muscle abnormalities, loss of interstitial cells of Cajal, and changes in the population of macrophages present in the muscular wall [17].

Chronic gastric motility abnormality is characterized by symptoms suggestive of obstruction mechanisms and delayed gastric emptying in the absence of obstruction mechanisms [6-18].

The associated symptoms that may occur in some patients are early satiety, prolonged postprandial fullness, swelling, nausea, and vomiting, abdominal pain [17], and weight loss [19].

Only 20% undergo these symptoms [20-22]. Physical examination is normal in most cases, in type II diabetics obesity is a risk factor for diabetic gastroparesis [23].

## Diagnosis

Usually, it has been done using the breath test [24]. Scintillography for gastric emptying is considered the gold standard for diagnosis and quantification of gastric emptying delay [25]. Another supportive study that is useful for diabetic gastroparesis is through ultrasonographic methods [3].

## Differential Diagnosis

The symptoms that occur in diabetic gastroparesis are like those presented with benign or malignant gastric obstruction and other organic causes such as cholecystitis [26,27]. DM has been related to pancreatic cancer [28], chronic intestinal obstruction resulting from alterations in the small intestine [29,30].

Vomiting from gastroparesis occurs later in the postprandial period and may occur for two reasons. First diabetic gastroparesis may predispose to regurgitation, however vomiting and regurgitation may coexist, second, initial regurgitation without effort is followed by subsequent vomiting [5].

## Treatment

The goal of treatment is to reduce symptoms, a correct nutrition and to improve the quality of life [5]. It includes prokinetic drugs such as first line, nausea and vomiting can be controlled with some antiemetic drug, it must also include education and support diet, behavioral changes [18,24,25,31].

Other authors differ saying that antiemetics should be first line, followed by a diet modification, such as fiber, but is infrequently

sustained [5,30-32]. In an accomplished study 30% of patients with diabetic gastroparesis implementing nutritional support have a calorie deficient diet [33]. The uncontrolled glycemia increases the symptoms of gastroparesis [34]. There are few evidences that rapid emptying is associated with hypoglycemia in DM [35]. The clinical consequences of diabetic gastroparesis include the induction of gastrointestinal symptoms, changes in medication absorption and loss of drug stabilization [36].

In endoscopic therapy for gastroparesis, intrapyloric botulinum toxin injection has been used [37]. Electronic stimulation and surgical intervention can be used in some patients and represents a therapeutic option [19], such as percutaneous endoscopic gastrostomy [38], and/or jejunostomy [39]. Idiopathic gastroparesis treatment based on botulinum toxin has been shown [37]. Two studies showed that there is no benefit with the administration of tricyclic antidepressants for the improvement of rapid emptying in idiopathic gastroparesis and functional dyspepsia [40]. In the treatment it is important to consider the emotional variables [41].

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