

UDC: 616.37/-06:616-005.1

## GASTROPARESIS DIAGNOSTICS IN DIABETES

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**Key words:** diabetes mellitus, gastroparesis, diagnostics.

Gastrointestinal (GI) disorders are common among all people, including those affected by diabetes.

Both acute and chronic hyperglycemia can lead to specific GI complications. Diabetes is a systemic disease that may affect many organ systems, and the GI tract is no exception. As with other complications of diabetes, the duration of the disorder and poor glycemic control seem to be associated with more severe GI problems. Patients with a history of retinopathy, nephropathy, or neuropathy should be presumed to have GI abnormalities until proven otherwise, and this is best determined by asking a few simple questions.

Many GI complications of diabetes seem to be related to dysfunction of the neurons supplying the enteric nervous system. Just as the nerves in the feet may be affected in peripheral neuropathy, involvement of the intestinal nerves may lead to enteric neuropathy. This is a type of autonomic or "involuntary" neuropathy and may lead to abnormalities in intestinal motility, sensation, secretion, and absorption. Different nerve fibers can either stimulate or inhibit intestinal motility and function, and damage of these nerves can lead to a slowing or acceleration of intestinal function, giving rise to a variable symptom complex. This article will highlight the most common GI disorders seen in people with diabetes.

Diabetic gastroparesis is a condition in which emptying of food from the stomach is delayed, leading to retention of stomach contents. This may cause bloating, early satiety, distention, abdominal pain, nausea, or vomiting. Gastric stasis may lead to worsening gastroesophageal reflux along with symptoms of heartburn and mechanical regurgitation of gastric contents. In addition, fatty foods and very fibrous foods normally exit the stomach slowly and may be poorly tolerated.

The diagnosis of gastroparesis is often suspected on the basis of symptoms alone. Upper GI endoscopy is helpful to rule out anatomic obstruction of the stomach or duodenum but does not provide an accurate physiological assessment of gastric emptying. Upper GI barium studies may confirm delayed gastric emptying with a dilated atonic/aperistaltic stomach with retained gastric contents. However, the upper GI series is more commonly nondiagnostic because liquids may empty normally from the stomach in spite of severe abnormalities in the ability to empty solid materials from the stomach into the duodenum.

The nuclear medicine gastric emptying test is the best confirmatory test for evaluation of gastroparesis. A test solid-food meal containing a technetium isotopic tracer is ingested, and scintigraphy is used to quantitatively measure the rate of gastric emptying. This test is highly sensitive and specific, although false positives and negatives may occur in response to medications that accelerate or slow the rate of gastric emptying. When performing initial diagnostic testing, it is better to measure gastric emptying rates when patients are off of medications that may affect the rate of gastric emptying.