

DUMPING SYNDROME AND GASTROPARESIS-LIKE SYNDROME

Gastroparesis is a chronic disease accompanied by bloating, early fullness after a meal, nausea, vomiting, and abdominal pain. A diagnosis of Gastroparesis requires objective data demonstrating delayed gastric emptying in the absence of intestinal obstruction. There are, however, disorders known as Gastroparesis-Like Syndrome (GLS). Patients with GLS have the same or similar symptoms to those who have Gastroparesis, but on gastric emptying studies it shows normal or rapid emptying. Interestingly, both patient types, those with Gastroparesis (slowed or delayed emptying) and those with normal or rapid emptying, have been shown to benefit from Gastro-Electrical Stimulation (GES) placement. GLS may actually be a spectrum of Gastroparesis. Patients who present with unexplained nausea and vomiting for at least 12 weeks without evidence of obstruction should be evaluated for both Gastroparesis and GLS. Chronic unexplained nausea patients may have similar abnormal scores on the Gastroparesis Cardinal Symptom Index (GCSI); therefore, an objective test of gastric emptying needs to be done, such as a Scintigraphic Gastric Emptying study. For patients who have chronic unexplained nausea and vomiting on biopsy have loss of neuronal Nitric Oxide Synthase (NOS) and loss of Interstitial Cells of Cajal. These two findings are also seen in chronic Gastroparesis.

As a quick summary, when comparing patients with Gastroparesis with delayed gastric emptying and GLS with normal or rapid emptying, they both have similar GCSI scores. The difference is in the gastric emptying study. Gastroparesis patients appear to have slow emptying and a loss of the Interstitial Cells of Cajal. However, the Cells of Cajal also decrease in GLS patients.

Inflammation has been found in patients with these disorders, usually with elevated C-Reactive Protein (CRP) levels. CRP is produced in the liver and responds sensitively to inflammation, making it a very good marker of inflammation. Inflammation, as indicated by elevated CRP, is typically very prevalent in Diabetic Gastroparesis. One study showed that patients treated with immunomodulating agents, such as IVIG or Mycophenolate Mofetil or a combination of steroids and Mycophenolate Mofetil improved in 8-12 weeks supporting an anti-inflammatory and possibility and autoimmune mechanism. Studies confirm the hypothesis that patients with Gastroparesis and GLS are part of a spectrum and inflammation is an underlying factor.

Prospective studies are needed to further assess changes in the Autonomic Nervous System (ANS), Central Nervous System and Enteric pathways that play a role in Pyloric, Antrum and Gastric emptying. Rapid emptying may present in the form of a dumping type syndrome. While this is a common complication of esophageal, gastric or bariatric surgery and may include both early and late dumping components, it also can be seen in idiopathic states and post viral. Liquid meals may be better to detect acceleration of early gastric emptying than in solid meals. Solid meals generally have a low sensitivity and specificity for detecting accelerated gastric emptying. Therefore, if someone is suspected of having dumping syndrome and has a normal gastric emptying study with a solid meal, a liquid meal should be considered.

Most people with dumping syndrome develop signs and symptoms, such as abdominal cramps and diarrhea 10-30 minutes after eating while other people can just have symptoms three hours later, which includes symptoms of hypoglycemia. Generally, the early symptoms result when a patient feels bloated or too full after eating. That is early satiety. Also, nausea, vomiting, abdominal cramps, diarrhea, flushing, dizziness, lightheadedness, and rapid heart rate can be experienced. Late dumping syndrome starts one to three hours after a meal, especially one that is high in sugar. The dumping is usually a hypoglycemic or low sugar abnormality. It is usually due to the release of a large amount of insulin to absorb the sugars entering the small intestine. These can produce vasomotor (vascular) symptoms, including sweating and flushing, lightheadedness, weakness and rapid heart rate (palpitation), plus an intense desire to lie down. Physical exam of these patients show significant orthostatic changes, not just increase in heart rate but also a drop in blood pressure can occur upon standing or sitting-up. An abnormal change in blood pressure (including a decrease of any sort) upon assuming an upright posture (sitting up or standing) is known as Orthostatic Intolerance, and in the more extreme cases Orthostatic Hypotension. Vasomotor symptoms predominate. The late dumping symptom of orthostatic dysfunction is a consequence of active hypoglycemia from exaggerated release of insulin.

Some patients do not experience a drop in blood pressure when assuming an upright posture, rather they experience a rapid or irregular heart rate (tachycardia or palpitations). Occasionally Propranolol, or a low-dose Verapamil, is useful in treating these rapid or irregular heartbeats which can occur in dumping syndrome. These abnormal heart rate patterns are characteristic of the orthostatic dysfunction of Postural Orthostatic Tachycardia Syndrome (POTS). POTS tends to occur more in younger females. This is due to the fact that women are born with hearts that are physically smaller in size (especially thinner muscle walls) than men. This may cause women to experience cardiac deconditioning more than men, and in these cases, since the heart is smaller, it cannot leverage pressure; therefore, it leverages rate in its attempt to deliver more blood to the brain. This can occur in the early or late stage gastric dumping.

Most people that develop dumping syndrome have early dumping and only about a quarter have late dumping. The early dumping patients generally have both abdominal symptoms and vasomotor symptoms. The abdominal symptoms, as mentioned, include early satiety, abdominal pains, nausea, cramps, diarrhea and vomiting, whereas the vasomotor symptoms include the sweating, flushing, tachycardia, palpitations, low blood pressure, headaches and at times even passing out, or syncope. These symptoms are related to the bowel becoming distended and hormones being secreted by the GI tract and activation of the ANS, specifically the Parasympathetic Nervous System. Therefore, with early dumping, one has both vasomotor and gastrointestinal symptoms. One to three hours later, the second phase, one has reactive low blood sugar or reactive hypoglycemia symptoms. These are predominately what we call vasomotor in origin. If a patient develops dumping syndrome, they often avoid food and eating because symptoms are so uncomfortable.

Usually, an oral glucose challenge of 50 grams of glucose is given. An increased heart rate by 10 beats per minute in the first hour is considered a positive test. Also, if the hematocrit increases

3% in the first 30 minutes that suggests dumping syndrome. Late dumping syndrome is indicated if one develops low blood sugar 2 to 3 hours later. Radionuclide Scintigraphy, also known as Gastric Scintigraphy, demonstrates rapid gastric emptying with standardized tests. The main mechanism for dumping syndrome is the rapid introduction of partially digested food into the small intestine.

Dumping syndrome is often seen after gastroesophageal surgeries such as Fundoplication (a surgical procedure to treat gastric reflux), or bariatric surgeries. It had at one time been seen for surgical treatment of peptic ulcer disease. This is rarely the case since medical therapy is very effective. Gastric bypass is the most common cause of dumping syndrome that we see today in adults. Up to 75% of patients have dumping syndrome after gastric surgery, but many of them learn how to handle this with proper dietary intake. Dietary modifications are important. Complex carbohydrates, small meals of six per day, reducing the actual carbohydrate quantity, and fluid intake are important to modify. Fluids should be taken one hour after meals or after ingestion of solids, since liquids will quicken the transit time through the stomach. Dairy products should be avoided. Fats and proteins are preferred over carbohydrates. Increasing dietary fiber helps to treat the reactive hypoglycemia that is seen in a delayed response and it also slows the gastric emptying. If one feels lightheaded and they have low blood pressure they should lie down after eating.

If a patient does not respond to dietary moderation, low doses of Loperamide may be beneficial for the diarrhea. Candy is useful to relieve the hypoglycemia which may occur later. Oftentimes, abdominal distention and bloating can be controlled with probiotics. A medicine used in treating diabetes, Acarbose, has been useful for the late stage of dumping syndrome. It lowers the blood sugar elevation after eating and helps to control reactive hypoglycemia. Anticholinergic medicines also may be very useful in slowing rapid GI transit due to Parasympathetic Excess. Antispasm medicines, such as Dicyclomine (Benadryl) or Propantheline, may be helpful. There are other more advanced medicines which Gastroenterologists can use such as Diazoxide to control the reactive hypoglycemia in the late dumping stage. Another advanced medication is Somatostatin, but these advanced medications are used in patients with intractable symptoms. GES is a recently developed advanced treatment. Interestingly, GES normalizes gastric transit time by actually slowing it, and patients respond. This should be considered, just as in Gastroparesis, in patients that are unresponsive to dietary changes and drug therapy. GES helps improve rapid gastric emptying and causes increased gastric retention of food and reduces nausea and vomiting.

Many times the Dumping Syndrome is not diagnosed. It can be seen in Diabetes, but there is also an idiopathic form and surgery need not necessarily be present. Rumination Syndrome and Cyclical Vomiting Syndrome need to be excluded. Rumination Syndrome is an effortless regurgitation of gastric contents into the mouth, caused by contraction of the abdominal wall, and subsequent re-swallowing of food. A large number of patients who have not had gastric surgery have underlying Anxiety, Depression or Diabetes Mellitus, and a few have a diagnosis of Cyclical Vomiting Syndrome or reported Cannabis use. Cannabis may cause rapid gastric

emptying and a condition known as Cannabinoid Hyperemesis. Cannabis may also cause unexplained upper gastrointestinal symptoms, as seen in some hospitalized patients.

Patients without prior history of gastric surgery that have dumping syndrome are classified as idiopathic. In the past, we diagnosed these people as having non-ulcer dyspepsia. However, the patients who have dumping syndrome usually have more severe abdominal cramping as well as systemic symptoms of sweating, weakness, palpitations, flushing and dizziness which is more pronounced in people with just non-ulcer dyspepsia. About a third of these patients with Idiopathic Dumping Syndrome have had a prior gastroenteritis probably due to a viral mechanism. It is believed that injury to the duodenal receptors, mainly the osmotic and fat receptors, which control gastric emptying, may be damaged. Another is that the Vagus Nerve (a major part of the Parasympathetic nervous system) is only partially damaged. It is speculated that rapid gastric emptying is due to early Vagal damage where just the distal end of the Vagus Nerve is damaged. This is a part of a spectrum. When the entire Vagus Nerve is damaged, one could get slow gastric transit or Gastroparesis. Gastroparesis is a possible state that evolves into a more complete Vagal loss (as in Diabetes). The Vagus Nerve is the longest nerve in the body and is very susceptible to damage both at surgery and viral infections as well as inflammation or oxidative stress (stress at the cellular level).

Among the identifiable causative factors for dumping syndrome in nonsurgical patients, Diabetes is the most common. Therefore, Diabetes can cause both (1) a rapid emptying or a dumping-type presentation, as well as, (2) a delayed emptying or a Gastroparesis-type presentation. Therefore, with significant abdominal symptoms with nausea and vomiting, especially if they have vasomotor symptoms, dumping syndrome should be suspected, although the symptoms may be identical to Gastroparesis and a gastric emptying study will differentiate the two. This is important because treatment and pharmacology will differ. In all refractory patients, GES by different mechanisms may improve the gastric motility. Rarely are surgical revisions necessary in patients with dumping syndrome except if they have had prior bariatric surgery, in which case many times revisions might be indicated.

Rapid gastric emptying sometimes occurs in people who have not had stomach surgery. For example, those who have recent onset of Diabetes, especially type 2 Diabetes. This is in contrast to Gastroparesis which usually is a late finding in Diabetes and more often seen in Diabetes type 2 than type 1. Non-surgical, rapid emptying may also occur in patients with (1) Pancreatic exocrine insufficiency, which can cause problems with digestion, or (2) Duodenal ulcers, or (3) Zollinger-Ellison syndrome, which is a rare condition in which one or more tumors form in your pancreas or the upper part of your small intestine (duodenum). These tumors, called Gastrinomas, secrete large amounts of the hormone gastrin, which causes your stomach to produce too much acid. All in all, many cases rapid gastric emptying remains idiopathic (meaning of unknown origin). Much more research is required into the unknown of the Gastrointestinal and Enteric Nervous Systems.