**Gastric Emptying Studies Do Not Always Diagnose Gastroparesis**

*By Dr. Josh Ferguson*

The majority of us suffering from Gastroparesis have endured Gastric (stomach) Emptying Studies that give doctors the amount of time that it takes for your stomach to empty. The emptying process is used to measure the general clearance of food/liquid from your stomach from a 1 hour, 2-hour, and 4-hour period of time to see what percent of stomach content has actually left your stomach over this period of time.

This is one of the most used “diagnostic” procedures for Gastroparesis however, it can not only be inaccurate for diagnosing Gastroparesis but has also been shown to be flawed when it comes to diagnosing the severity of Gastroparesis. The amount of delayed stomach emptying and the amount of Gastroparesis symptoms vary in intensity from day to day. There are even days when delayed stomach emptying is virtually minimal or non-existent therefore, if a test were performed on that day then you would receive an inaccurate diagnosis or even be told that you have nothing wrong with your stomach emptying and may even be told “it’s all in your head” which is something I have heard so many people with Gastroparesis tell me they have been told by more than one doctor.

Now back to some in-depth information into the Gastric Emptying test. The average gastric retention (in healthy subjects) at 1 hour, 2-hours, and 4-hours was 90%, 60% and 10% respectively. These values are for adults only. The 4-hour Gastric Emptying Test is now becoming the standard test, using a low-fat egg-substitute meal to minimize the effect of fat on gastric emptying. This means that the average person diagnosed with gastroparesis has an average gastric retention rate at 1 hour, 2-hours, and 4 hours of 10%, 40%, and 90% respectively. The majority of healthy individuals will have all stomach contents released within 20 to 30 minutes. In those with Gastroparesis the stomachs gastric retention time can vary from a few hours in minimal to moderate cases to a few days in severe cases.
The American Neurogastroenterology and Motility Society advocates quantifying four-hour retention of a radio-labeled egg substitute, a standardized protocol to eliminate repeated testing upon referral to different institutions and to provide foundations for consistent management approaches. This has been inconsistently adopted as many doctors do their own form of a gastric emptying study. Currently no standard gastric emptying test exists; for example, other methods commonly employed include measuring emptying of oatmeal or stew at 60 to 120 minutes or extrapolating half-emptying times. One study comparing two- versus four-hour emptying within individuals reported discordant (dissimilar) results in one quarter of patients. Using liquid phase scintigraphy (a diagnostic technique in which a two-dimensional picture of internal body tissue is produced through the detection of radiation emitted by a radioactive substance administered into the body) and wireless motility capsules to quantify liquid and indigestible solid emptying define delays in different populations in about one-third of cases. Which test do we believe, or should we perform all three? Furthermore, intra-individual variabilities are as high as 30 percent on sequential (tests performed for a second, third, fourth time or more) testing. From a practical standpoint, these observations show gastroparesis diagnoses are influenced not just by clinical factors, but by how, where and when testing is performed. This shows that the while the use of a gastric emptying study can indicate the presence and severity of Gastroparesis however, it can also be highly inaccurate and should not be solely relied upon for diagnosing Gastroparesis or determining the severity of a patients Gastroparesis.

Although some presentations certainly result from prolonged gastric retention (bezoars, prolonged postprandial hyperglycemia in diabetic gastroparesis), most gastroparesis symptoms are not clearly consequences of delayed emptying. Symptom severities were identical with delayed versus normal emptying in one large gastroparesis study (425 patients). In a large functional dyspepsia study, emptying weakly associated with fullness, but relations to pain, nausea and bloating were absent. Rapid gastric emptying is found in subsets of functional dyspepsia (Indigestion) (41 percent of patients), diabetics (22 percent), cyclic vomiting and functional diarrhea, but symptoms are indistinguishable from those with delayed emptying. Thus, the ability to predict emptying from symptom severity is perhaps only slightly better than a coin toss.
If emptying defects do not cause symptoms, what does? Looking at stomach emptying findings, different symptom profiles relate to distinct sensory-motor dysfunctions in dyspepsia (Indigestion); delayed emptying correlates with fullness, nausea and vomiting, impaired fundic accommodation with early satiety, weight loss and pain, and gastric hypersensitivity with weight loss and belching. Nevertheless, more than 70 percent of dyspeptics with normal emptying report fullness, and 50 percent note nausea. Thus, statistically significant findings in large cohorts have limited relevance when evaluating individual patients. One modeling study concluded that only 10 percent of the variance in postprandial dyspepsia relates to emptying. Gastroparesis symptoms also correlate strongly with depression and anxiety, indicating that extra gastric contributors are at play in regards to the symptoms associated with Gastroparesis making the cause and severity of Gastroparesis symptoms tied to other organs and health conditions that are not taken into account when diagnosis is attempted solely by using a gastric emptying study. Although this does not prove causation, the importance of psychological dysfunction is evident to clinicians conducting prolonged, emotionally charged office visits with refractory gastroparetics. Gastroparesis is more than a disorder of flow.

Gastroparesis is a late complication in diabetics with existing neuropathy (damage to your peripheral nerves, often causes weakness, numbness and pain, usually in your hands and feet however, it can also affect other areas of your body. Your peripheral nervous system sends information from your brain and spinal cord (central nervous system or CNS) to the rest of your body including to your gastrointestinal region), retinopathy (a disease of the retina that involves damage to the tiny blood vessels in the back of the eye), nephropathy (Kidney disease from long-standing diabetes), or cardiovascular (heart) disease. Medical research studies have observed that diabetics with gastric symptoms and delayed emptying undergo more diagnostic testing, receive more gastrointestinal therapies, and have more inpatient and outpatient evaluations than symptomatic diabetics with normal emptying. These findings are misleading because diabetics were treated based on the presence or absence of symptoms rather than their severity. An alternate explanation is patients with delayed emptying in this study reported greater symptoms that drove health-care utilization rather than the prolonged gastric retention itself.
A therapy-oriented rationale for emptying measurement is to recommend prokinetic agents (a class of medications that increase the flow of substances through the digestive tract) for delayed emptying versus another treatment if testing is normal. In the only investigation specifically addressing this topic, emptying testing did not influence clinical management. This study is only peripherally relevant here, as it focused only on postsurgical gastroparesis which is one of the rarer indications or causes of Gastroparesis than diabetic or idiopathic gastroparesis which account for the majority of Gastroparesis cases.

Prokinetic drugs like Metoclopramide (Reglan) and Domperidone (Motilium) exhibit independent antiemetic actions on the brainstem. In older gastroparesis and dyspepsia studies, such agents produce long-term benefits even when the initial or acute (less than two weeks) prokinetic effects wane. Domperidone (Motilium) has been shown to be very effective in the long-term treatment of Gastroparesis symptoms and to be the safest of the Prokinetic medications available in the treatment of Gastroparesis. The same correlations between symptom reductions and accelerated emptying cannot be demonstrated in those taking Metoclopramide (Reglan) in long-term treatment due to the onset of side effects caused by Reglan which result in the drug having to be withdrawn as a treatment in most patients. In uncontrolled series, gastric electrical stimulation (a gastric “pace maker”) reduces vomiting but does not reproducibly affect gastric emptying. Rather, it may act on afferent pathways projecting from the stomach to the brain. In small trials, gastric stimulation is similarly effective in patients with normal emptying. Thus, clinicians considering these options need not order gastric emptying tests.

Pure prokinetic treatments without central antiemetic effects include macrolides (erythromycin), pyloric botulinum toxin and selected surgeries. Erythromycin is most potent at stimulating emptying, but one meta-analysis reported inferior symptom reductions with erythromycin versus metoclopramide. Another systematic review of five trials calculated benefits in only 43 percent of gastroparetics given erythromycin. Responses to experimental motilides (ABT-229, mitemcinal) range from symptom exacerbation to minimal benefits unrelated to delayed emptying. In the largest series, responses to pyloric botulinum toxin were greater in women and those with idiopathic disease, but did not relate specifically to gastric emptying and only seemed to mildly impact the
symptoms of Gastroparesis while having little to no effect on stomach emptying or overall gastric motility. Pyloric dilation, pyloromyotomy and gastric bypass to promote gastric drainage are unproven to work and are not recommended. Thus, pure prokinetics may be less effective than therapies with additional antiemetic (medications for the treatment of nausea and vomiting) effects; furthermore, emptying testing does not select patients responsive to pure prokinetics.

GENERAL OVERVIEW AND SUMMARY:

At the present time of this article (November 2018), there is little substantiation that testing to distinguish normal from abnormal gastric emptying is accurate for diagnosing Gastroparesis or delayed stomach emptying, and in most cases is not accurate in evaluating the severity of Gastroparesis symptoms which can vary from hour to hour, day to day. However, as a doctor and someone with Gastroparesis I would like to state that “absence of evidence is not evidence of absence” is very relevant. I say this because we have only just begun to try to form a standard test for evaluating gastric emptying. We are also limited in the ways to diagnose Gastroparesis as well as being limited in the treatment options that we can offer our patients. Therefore, without further study we will continue to stay at the current state of Gastroparesis diagnosis and treatment. More research is definitely needed into Gastroparesis to find more definitive ways of diagnosing the illness, the severity of the illness, the cause of the illness, and the best form of treating the illness. The only way that this can be achieved is by all of us patients, doctors, and scientists working together to report treatments that work in controlling the symptoms of Gastroparesis, working together to formulate a standard gastric test that is used to attempt diagnosis and rating of symptom severity in all patients.

So, I ask that everyone keep that in mind the next time that you see your doctor. Talk to them about your treatment. Ask them questions about the methods they plan to use in your gastric emptying study and why they are using those methods. I encourage everyone to be their own advocate and to educate yourself as much as possible about your condition which is what this support group is all about.