Gastric Pacing: Pacing results in patients with Gastroparesis

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Gastric pacing is a treatment for gastroparesis; it is not a new treatment, but is being redesigned due to previously controversial results. Gastroparesis is a chronic disorder affecting gastric motility; the gastric emptying, or emptying of digested materials in the stomach is unusually slow. This poorly understood, and often mistreated disorder affects mostly young and middle-aged women, as well as both type I and type II diabetics. The stomach and digestive process depends on motor muscular contractions and myoelectrical activity; these functions are partly regulated by the vagus nerve. Damage or malfunction of any of these components can lead to hypomotility, tachygastria, and/or uncoordinated and dysrythmic electrical activity in the stomach.

The causes of this condition can be related to diabetes (high blood sugar can damage vagus nerve), post viral stomach illness, surgery (mechanical damage), diseases of the nervous system, anorexia nervosa (damages nerves and mechanics), as well as medications that may slow or impair gastric functioning.

The symptoms include nausea, abdominal pain, early satiety, vomiting, bloating, heartburn, weight loss, decreased appetite and gastric reflux. These symptoms are usually strong and persistent; patients suffer daily with these problems. Complications include bacterial infections of the stomach due to lingering food in the digestive tract and bezoars- solid masses of food that obstruct digestive tract.
Gastroparesis can be diagnosed by several, or a combination of several methods; the method chosen is a result of other pertinent medical history on the patient. Methods include: Barium x-ray, barium beefsteak meal, radioisotope gastric-emptying scan, gastric manometry, and standard blood work.

Currently, the common treatment methods include diet modification, prokinetic drugs, jejunostomy feeding tubes and other surgically implanted tubes to deliver nutrients. None of these treatment methods treat the disorder; each deals with the symptomatic aspect of gastroparesis.

Gastric pacing is a newly redesigned treatment option that should relieve symptoms and regulate the gastric dysfunction. The concept is the same as a cardiac pacemaker and is a battery operated, surgically implanted device. Cardiac pacing wires are placed on the serosal surface of the stomach, near the greater curvature, and electrodes (normally 4 pairs) are stitched to the stomach lining. One pair of electrodes receives electrical stimulus for pacing, and the other three record gastric activities. Intrinsic Gastric slow wave Frequency (IGF), commonly known as gastric slow waves, are the frequencies that occur in healthy adults (normally 3 cycles per minute (cpm)), and allow contractions to propagate through the digestive tract. Gastric pacing alters frequency, pulse width and amplitude of the signal sent through the cardiac wires to achieve the optimal IGF. The optimal result is a normal IGF that allows normal gastric emptying time, and asymptomatic patients.

Various medical groups have performed clinical studies to investigate gastric pacing. In all studies the results were promising; patients maintained a normal IGF during, and for a short while after, gastric pacing sessions where current was sent through the wires to the electrodes. The implications are that permanent, constant stimulation would be required for a real therapeutic approach. Gastric pacing seems to be the best solution to gastroparesis, and has results far better than existing treatment options.

Source: Lin, Z.Y., McCallum, R.W., Schirmer, B.D., and Chen, J.D.Z. "Effects of pacing parameters on entrainment of gastric slow waves in patients with gastroparesis," *American Journal on Physiology- Gastrointestinal and Liver Physiology*, vol. 274, Issue 1, G186-191, January 1998.