Dumping Syndrome — Causes and Treatment

Dumping syndrome, or “too rapid drainage of the stomach,” is a condition most often found in patients post-gastrectomy. Symptoms of this condition can be separated into vasomotor symptoms (such as palpitations, flushing or diaphoresis) and abdominal symptoms (such as diarrhea, nausea or cramps). The symptoms often resolve within several months. Medication is often helpful and surgical intervention is rarely necessary.

Background and Definitions

The stomach is hollow and muscular, and it is the most dilated part of our gastrointestinal system, situated between the esophagus and duodenum (the first part of small intestine). It is divided into three main sections, each of which has a role in the digestion of food. They are the cardia, the fundus and body, and the pylorus. The food enters from the esophagus into the cardia, which is the most proximal part of the stomach.

The fundus and body (of the stomach) are commonly known as a storage tank for all our consumed meals. The body churns the food and mixes it with all the digestive enzymes. Finally, the pylorus discharges the food in a systematic manner into the duodenum. The pylorus is surrounded by a muscular valve, the pyloric sphincter, which controls the flow of food into the duodenum. Gastric movements are controlled by myogenic, hormonal and neural activity.
In adults, the *stomach* can store around two (2) liters of food content due to its greater distensibility. Any change in the gastric structure (e.g., *gastrectomy*), hormonal status, myogenic or neural activity may have deep effects on the gastric storage tank and the pyloric sphincter function. This results in a constellation of symptoms occurring after a meal termed as “dumping syndrome,” or “rapid drainage of the stomach,” which was first described by Hertz, in 1913.

**Dumping syndrome:** It is the collection of gastrointestinal and vasomotor symptoms that occur after a meal; most common in patients with gastrectomy.

### Pathophysiology of Dumping Syndrome

The important functions of the stomach are to act as a food *reservoir*, to start the *digestion* process by secreting gastric acid and enzymes, and to grind the food into smaller parts (around 1-2 mm) by organized muscular contractions. This partially digested food then passes through the pylorus into the duodenum.

The pyloric sphincter makes sure that only small food particles are passed into the duodenum and that, too, is accomplished gradually, as not to overload the small intestine’s proper food digestion and absorption.

Gastric surgeries quite often reduce the storage capacity of the stomach, remove the gastric glands and damage the pylorus so that it becomes unable to control the rate of passage of food into the duodenum, causing the stomach to empty rapidly. This *increased gastric emptying* is one of the main symptoms when diagnosing dumping syndrome.

### Epidemiology of Dumping Syndrome

In the United States, around 10-40% of the patients who have undertaken gastric surgery are diagnosed with dumping syndrome, with 5% of the cases exhibiting severe symptoms. The frequency of dumping syndrome has been reported to be 10-14% in those patients who have undertaken *vagotomy surgery* and 14-20% after *partial gastrectomy*.

Reductions in the need for elective gastric surgery have led to a decline in the frequency of postgastrectomy syndromes. In the last 20 years, gastric surgery has been reduced
about 10-15 times, with the main reason being the newer drugs (proton pump inhibitors and anti-histamine 2) along with efficacious eradication therapy for Helicobacter pylori. These have reduced the cases of peptic ulcers and hence, the need for gastric surgeries, leading to a drastic decrease in the occurrence of this syndrome.

Clinical Features of Dumping Syndrome

Early symptoms of dumping syndrome

The early dumping syndrome occurs due to rapid gastric emptying. The hyperosmolar food rapidly enters the small intestine, thus overwhelming its digestive and absorptive capabilities. The “hyperosmolar” food contents further cause the water to shift from the cells into the intestinal lumen. These patients often present with the following symptoms 30 - 60 minutes after a meal:

- Diarrhea
- Nausea
- Epigastric fullness
- Abdominal cramps
- Borborygmi
- Fatigue
- Faintness
- Syncope
- Flushing
- Headache
- Palpitations.

Late symptoms of dumping syndrome

The late dumping syndrome occurs due to reactive hypoglycemia that occurs 1 - 3 hours after a meal. As food containing carbohydrates quickly passes into the small intestine and is absorbed; rapid hyperglycemia occurs that leads to a rapid secretion of insulin. This leads to a hyperinsulinemic state, which remains for a longer period of time than hyperglycemia and is responsible for the subsequent hypoglycemia and the following symptoms:

- Perspiration
- Shivering
- Hunger
- Decreased consciousness
- Tiredness and fatigue.

Management of Dumping Syndrome

Dumping syndrome can be managed by multiple steps. The first and foremost includes lifestyle and dietary modifications. The patient is advised to take frequent, but small, meals. The sugar content (carbohydrate) should be reduced. The fluid and water intake should be reduced during the meal.

The medical options that have shown good results in the management of dumping syndrome include:
**Acarbose**: It is an alpha-glycoside hydrolase inhibitor that decreases the dumping syndrome by delaying the carbohydrate absorption and reducing the time between the hyperglycemia and release of insulin.

**Octreotide**: It is a somatostatin analogue that decreases the dumping syndrome mainly by inhibiting the release of insulin and other gastrointestinal hormones that delay gastric emptying and small intestinal transit time. It further induces a fasting intestinal pattern and causes splanchnic vasoconstriction.

![Structural diagram of octreotide](image)

The surgical intervention options that help in the management of dumping syndrome include:

- Stomal revision
- Conversion of Billroth II to Billroth I anastomoses
- Pyloric reconstruction
- Jejunal interposition
- Roux-en-Y conversion
- Laparoscopic conversion.

**Review Questions**

The correct answers can be found below the references.

1. A 63-year-old gentleman presents to your office one month after partial gastrectomy, which was done due to a gastric tumor. In his visit, he complains to you of nausea, vomiting, diarrhea and postprandial abdominal pain. He also complains of shortness of breath and flushing. He does not smoke or drink alcohol. His drug history includes only two drugs: atorvastatin and omeprazole. Abdominal distention and increased bowel sounds were revealed by physical examination. What is the most appropriate treatment for this gentleman?
   A. Add simple accessible carbohydrates to his diet.
   B. Prescribe loperamide.
C. Increase fibers in his diet.
D. Decrease the intake of carbohydrates.
E. Increase the omeprazole dose.

2. All of the following are correct regarding dumping syndrome, except:
A. Tachycardia is a common symptom of Dumping syndrome.
B. Flushing is a common clinical feature of the syndrome.
C. A somatostatin analogue can control the symptoms.
D. Early post-vagotomy dumping syndrome usually resolves spontaneously.
E. Some of the symptoms may be alleviated by separating solids and liquids in the patient’s oral intake.

References

Correct answers: 1D, 2E

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