

Rumination Syndrome: A Review of Current Concepts and Treatments

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Abstract: Rumination is a normal and common phenomenon among ruminant animals; but in humans, it is always regarded as symptom indicative of abnormal function of the upper gastrointestinal tract, and understanding of the mechanisms explaining this event are still evolving. Learning-based theories, organic factors such as gastroesophageal reflux disease and psychological disturbances (eg, depression, anxiety) and the role of life stresses have been postulated as potential mechanisms of rumination. In this review, we take the approach that rumination syndrome is a distinct and discrete functional gastroduodenal disorder. We review current concepts of the pathophysiology of this entity and diagnostic approaches, then detail the treatment paradigms that have been pursued in rumination syndrome in adults. Patients with rumination syndrome have a very distinct set of symptoms. It was focused on the immediate postprandial period, but recently, there is an awareness of an expanding spectrum of the clinical presentation. This includes the concept of “conditioned vomiting” occurring in the setting of delayed gastric emptying (gastroparesis). Physicians’ awareness of rumination syndrome is essential in the diagnosis and management of this disorder. Stress and psychological aspects in rumination syndrome are invariably in the background and have to be addressed. The crucial steps in the treatment strategy for rumination syndrome rely on reassurance, education and a physiologic explanation to the patient and family that this is not a “disease,” followed by behavioral and relaxation programs and addressing stress factors.

Key Indexing Terms: Rumination; Pathophysiology; Diagnosis; Treatment; Prognosis. [*Am J Med Sci* 2014;348(4):324–329.]

A TYPICAL SCENARIO

A 24-year-old woman presented with a 3-year history of symptoms of recurrent regurgitation of food occurring shortly after eating. Regurgitation can start within a few minutes of beginning food ingestion, or as long as 15 to 20 minutes after completing a meal. She states that the regurgitated food tastes the same as when she ate it. She describes reswallowing the food when the social context does not permit her to spit it out or vomit, terms she interchanges depending on the volume of contents involved. Her symptoms are not worse with any particular food. Her close relatives have repeatedly complained to her about her noticeably bad smelling breath. She noticed occasional heartburn, early satiety and mild epigastric abdominal pain. Nausea was absent or minimal until right before regurgitation. There was no history of bulimic behavior, and she does not desire to lose weight. Her medical history is significant for a history of gastroesophageal (GE) reflux easily controlled by gastric acid blocking medication. Physical examination was unremarkable other than for multiple dental fillings. She had

an extensive investigation including a normal upper endoscopy, upper gastrointestinal and small bowel follow-up through barium study, computed tomography scan of the head and abdomen and normal gastric emptying test. Repeated trials of proton pump inhibitor medication and metoclopramide have failed to relieve her symptoms of regurgitation of undigested foods. After an outpatient consult with the authors, the diagnosis of rumination syndrome based on Rome III criteria was made. A trial of relaxation therapy and diaphragmatic breathing showed a marked improvement of symptoms that was sustained during 6 months of follow-up.

Rumination syndrome is one of the least understood functional upper gastrointestinal (GI) disorders. The symptom is primarily characterized by recurrent regurgitation of recently ingested food into the mouth. This event is often preceded by belching before fluid and food are regurgitated. It is not the same as projectile vomiting, rather more effortless fountain-like regurgitation that can result in either reswallowing or with a vomiting/spitting maneuver. Early clinical reports of rumination were in children and adults with developmental delays or mental retardation, but this entity is becoming increasingly recognized in otherwise healthy children, adolescents and adults.

Rumination syndrome is a clinical diagnosis based on symptoms and the absence of structural disease. Individuals with rumination syndrome are often misdiagnosed or undergo extensive, costly, invasive testing and, on some occasion, aggressive medical therapies including enteral or parenteral nutrition and fundoplication surgery before the diagnosis reached. Insufficient awareness of the clinical features of rumination syndrome contributes to the underdiagnosis of this important medical condition. Many gastroenterologists are unaware of, or are reluctant to make the diagnosis of, rumination syndrome. One reason is because categorizing vomiting based on timing of the event after a meal is not familiar to them. In addition, most gastroenterologists are not aware that a simple behavioral therapy—relaxation approaches—is available to treat this disorder and can be taught to patients in the office.^{1–8}

DEFINITION

The word “rumination” is derived from the Latin word “*ruminare*,” which means to chew the cud. Rumination is a normal digestive procedure carried out by ruminant animals, such as cattle, sheep and goats, which helps in improving digestibility of digested food. The rumination syndrome is considered to be a functional GI disorder that has been recognized as a unique category according to the recently established Rome III criteria (Table 1).^{1,9}

However, it is now apparent that the usual clinical presentation of adult rumination syndrome can be broader and more complicated and difficult to diagnose. Specifically, some patients can have weight loss (mainly by choosing to stop eating because of social embarrassment), nausea and marked abdominal pain complaints, and the presence of heartburn.^{8–11} The syndrome was previously described in almost equal

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TABLE 1. Rome III diagnostic criteria for rumination syndrome

A. Adult Rome III criteria for rumination syndrome¹	
Must include both of the following:	
Persistent or recurrent regurgitation of recently ingested food into the mouth with subsequent spitting or remastication and swallowing	
Regurgitation is not preceded by retching	
Criteria fulfilled for the past 3 months with symptom onset at least 6 months before the diagnosis.	
Supportive criteria:	
Regurgitation events are usually not preceded by nausea	
Cessation of the process when the regurgitated material becomes acidic	
Regurgitation contains recognizable food with a pleasant taste	
B. Adolescent Rome III criteria for rumination syndrome⁸	
Must include all of the following:	
Repeated episodes of painless regurgitation and rechewing or expulsion of food that	
Begins soon after ingestion of a meal (within 5–15 minutes)	
Does not occur during sleep	
Does not respond to standard treatment for gastroesophageal reflux	
No retching	
No evidence of an inflammatory, anatomic, metabolic or neoplastic process that explains the subject's symptoms	
Criteria fulfilled for the past 3 months with symptom onset at least 6 months before the diagnosis	

prevalence among mentally retarded infants (6%–10%) and institutionalized mentally retarded adults (8%–10%). The syndrome is now being increasingly recognized in adults with normal mental capacity.^{9,12}

ETIOLOGY

A number of theories have been advanced to explain the disorder. These theories range from psychosocial factors to organic origins. Cultural, socioeconomic, organic and psychodynamic factors have also been implicated. The following major concepts capture the current understanding of this entity.

Learning-Based Theories

These theories state that rumination behaviors may increase following positive reinforcement, such as pleasurable sensations produced by the rumination (eg, self-stimulation) or increased attention from others after ruminating. Rumination also may be maintained by negative reinforcement when an undesirable event (eg, anxiety) is removed.

Organic Factors

The role of medical/physical factors in rumination is not yet very well known. Although an association between GE reflux disease and the onset of rumination may exist, other observations suggest that gastric disorders involving nausea and vomiting, such as gastroenteritis illness, cholecystectomy and gastroparesis, may precede or accompany rumination. Here, the concept of a “learned reflex” is advanced forward to explain the reflex of regurgitation of food immediately after intake. It is now recognized in some patients with known gastroparesis that chronic nausea contributes to this “learned reflex” of rejecting liquids and solids. Vomiting old food hours later, which is the

typical history in gastroparesis, will still be occurring but vomiting minutes after eating is an additional aspect. Usually, the late vomiting has been present for some time in the 1st place.

Psychiatric Disorders

Rumination in adults of average intelligence has been associated with psychological disturbances (eg, depression, anxiety) or during extremely stressful periods in their lives.

Heredity

Although occurrences in families have been reported, no genetic association has been established.^{6,8–13}

PATHOPHYSIOLOGY

Some pathophysiologic contributing mechanisms of rumination are as follows: increased intra-abdominal pressure accompanied by lower esophageal sphincter (LES) relaxation; learned reflex (conditioning) in the clinical setting of nausea and/or a history of vomiting (this entity can coexist with gastroparesis as explained above); adaptation of the belch reflex; and history of psychosocial issues, stress/depression, death in the family, new life challenges.^{6,8–13} Gastric emptying has been evaluated in some studies. In a recent study, 60% of the patients met the criteria for normal gastric emptying, while 40% met the criteria for delayed gastric emptying (gastroparesis).¹⁴ In that study, 2 main subsets or clinical states of rumination were identified:

1. Very stressful settings, such as death of a family member, new marriage, graduation from high school or college, divorce and family dissensions, new job challenges, relocation of the parents and children's illness, may be all in the background preceding the onset of rumination and in the setting of normal gastric emptying test.
2. In the setting of a history of GI illness with nausea/vomiting and postprandial distress, symptoms occur with the documentation of gastroparesis. Here, the most accurate term is “conditioned vomiting” or a learned reflex. Therefore, there are 2 separate timings for the vomiting that can be observed in gastroparesis patients:
 - A. immediately after meals (within 10–15 minutes) (freshly ingested food).
 - B. 2 to 4 hours or later accompanied by chronic nausea (gastroparesis) (old food identified). It is important to note that vomiting minutes after attempting to eat or drink does not mean that the gastroparesis state has now become refractory to all standard medical therapy and that the patient qualifies for the term “refractory” and should be considered for more aggressive therapy, such as a gastric electrical stimulation, enteral feeding, total parenteral nutrition or surgical resection of the stomach. However, this is the conclusion reached by many gastroenterologists and clinicians.

The ability to vomit within minutes of eating means that gastric emptying has not had a chance to take place and treating “gastroparesis” alone will not be the solution.

CLINICAL FEATURES

A person with rumination syndrome eats, swallows and then effortlessly regurgitates food back into the mouth where it is chewed and swallowed again or expelled. This process may be repeated several times or for several hours per episode. It may be voluntary or involuntary. Ruminators report that

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