

Week 5 GI & Neuro

Alterations in the Gastrointestinal System

- GERD
- Obstructive GI Disorders
- Peptic Ulcer Disease (PUD)
- Inflammatory Bowel Disease
- Liver Cirrhosis
- Clinical Application:

Cirrhosis Alterations in

Neurobiological Function

- Depression
- Mood Disorders
- Anxiety Disorders
- Schizophrenia

Weekly objectives

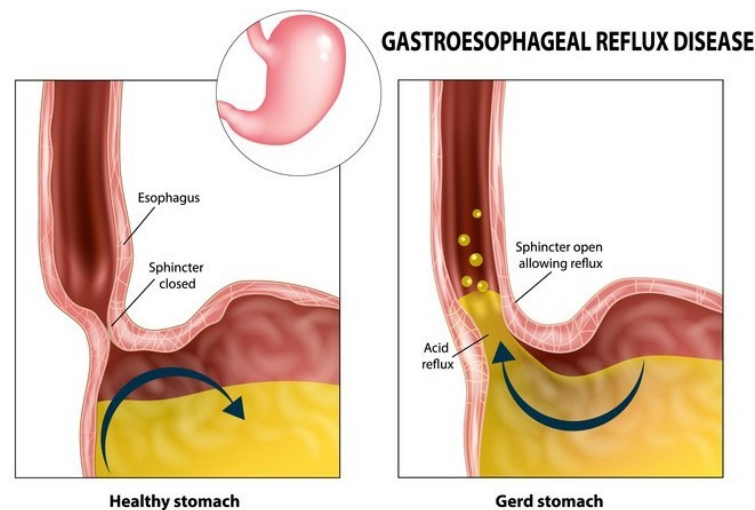
1. WO5.1-Analyze pathophysiological mechanisms associated with alterations in gastrointestinal and neurobiological processes. (CO1)
2. WO5.3- Differentiate between normal and abnormal gastrointestinal and neurobiological function. (CO1)
3. WO5.2- Describe outcomes of disruptive or alteration in gastrointestinal and neurobiological processes. (CO2)
4. WO5.5-Analyze risk factors for diseases associated with gastrointestinal and neurobiological function (CO3)
5. WO5.6-Recognize appropriate treatment modalities for alterations in gastrointestinal and neurobiological function. (CO4)
6. WO5.4- Apply a clinical practice guideline in the management of a patient with altered gastrointestinal and neurobiological function. (CO5).

Gastroesophageal Reflux Disease (GERD)

GERD is caused by gastric contents that enters the esophagus primarily due to the relaxation of the lower esophageal sphincter (LES). The influx of chyme from the stomach into the esophagus results in inflammation leading to reflux esophagitis. It is typically caused by an incompetent LES, hiatal hernia, gastroparesis, and obesity. The LES plays a critical role in the development of GERD symptoms. In an LES defect, the decreased tone of the LES allows acid to flow from the stomach into the esophagus, which results in the burning sensation that patients report. The worse the LES tone, the more reflux the patient will have. In examining the diagram below, the LES is not a true anatomical sphincter because there is no connection. Instead it is composed of smooth muscles in the distal esophageal area that causes it to close and open during swallowing. When the LES opens repeatedly over a long period of

time, stomach contents can enter the esophageal area leading to the symptomatic burning. From the diagram to the right, you can see that LES sphincter is never fully closed with GERD.

When evaluating a patient with GERD, the NP must consider the types of presenting symptoms. It is easy to evaluate typical GERD symptoms. But, with atypical and associated symptoms, the patient may not realize that these also reflect GERD. The typical, atypical and associated symptoms are listed below. Whether the symptoms are atypical or associated, all have heartburn and reflux in common.



Typical, atypical, and associated GERD symptoms

Symptom	Typical	Atypical	Associated
Heart burn	x		
Dyspepsia			x
Asthma		x	
Regurgitation (reflux)	x		
Bloating			x
Globus (lump in throat)		x	
Epigastric pain			x
Hoarseness		x	
Cough		x	
Nausea			x

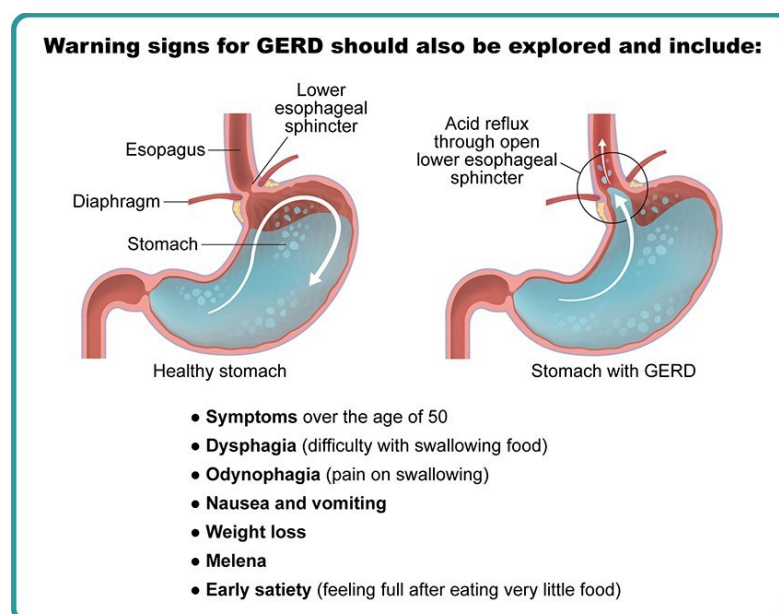
GERD Risk Factors and Warning Signs

Some individuals have risk factors for the development of GERD. Obesity is a risk factor that worsens not only the symptoms of GERD, but also its complications (i.e. Barrett's Esophagus; esophageal cancer). A hiatal hernia can trap gastric contents above the diaphragm which can also worsen GERD symptoms. Additionally, some medications can worsen GERD symptoms, such as calcium channel blockers, antibiotics and bisphosphonates. Finally, pregnancy is also a condition that can worsen GERD symptoms due to pressure that pushes the stomach above the diaphragm.

Helicobacter pylori (*H. pylori*) is a gram-negative bacterium that is associated with GERD. Most individuals world-wide have been exposed to *H. pylori* at some time. Although most individuals never develop symptoms, some do. Complications of *H. pylori* include dyspepsia and adenocarcinoma.

With an understanding of the typical, atypical and associated symptoms of reflux and its risk factors, it is extremely important to consider the patient's history when he or she presents to the office. The patient will often report burning or reflux that occurs 30-90 minutes following a meal; the symptoms are worse in a reclining position, but symptoms improve with sitting or standing or when an antacid is taken. Sour taste, lump in the throat, cough, hoarseness, worsening asthma episodes, epigastric pain and chest pain may also be reported.

As providers, we are always concerned about any patient that presents with chest pain. In these patients, a cardiac cause should be ruled out first, especially in older individuals who have cardiac risk factors and co-morbidities such as diabetes. Warning signs for GERD should also be explored and include:



During collection of the social, diet and medication history, the NP should explore if the patient smokes or drinks alcohol, ingests foods that triggers reflux (i.e. peppermint and chocolate) or takes medications which may be predispose the patient to GERD by relaxing the LES allowing for the reflux of acid. A diagnosis of GERD can often be made on patient history alone, especially when the patient presents with the typical symptoms of heart burn and regurgitation and have no warning signs. Additional diagnostic tests may be performed when it is unclear if the patient's symptoms are due to acid reflux. These tests require a referral to a gastroenterologist and may be used to establish the diagnosis:

- Upper GI series
- Endoscopy
- Esophageal manometry
- Esophageal pH

GERD Treatment and Management

Treatment

Treatment goals include:

- Eliminating symptoms
- Healing esophagitis
- Preventing the relapse or development of complications
- Decreasing the amount of acid that refluxes from the stomach back to the

esophagus Management

In many patients, GERD is a chronic, relapsing disease and long-term treatment may be needed to control symptoms and prevent complications. Maintenance therapy will vary in individuals and may include simple lifestyle modifications, over the counter antacids or prescription medication. Proton-pump inhibitors (PPI) are the gold standard for treating GERD when it's required. All PPIs are considered effective for treating reflux. The NP must be mindful of the dosage and length of therapy recommendations when prescribing a PPI as well as each patient's severity of symptoms. For example, in mild, intermittent GERD (<2 episodes/week) with no evidence of erosive esophagitis, the patient may be started on 10 mg once daily. The dose can be increased to 20 mg daily after 4-8 weeks. Once the patient is asymptomatic for 8 weeks, the medication should be discontinued to avoid any associated side effects.

Non-pharmacologic management of GERD includes:

- Weight loss, especially if body mass index (BMI) is 25 or >
- Elevating the head of bed
- Avoiding food 2-3 hours prior to bedtime
- Eliminating trigger foods.
- Although trigger foods can vary for individuals, some of the universal trigger foods include chocolate, caffeine, alcohol or spicy and acidic food.

Hiatal Hernia

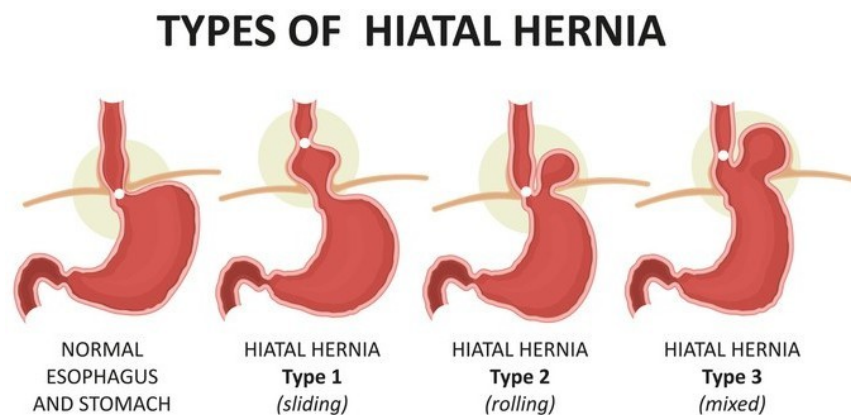
A hiatal hernia is a diaphragmatic hernia that protrudes (herniates) through the upper part of the stomach through the diaphragm and into the thorax due to dilation of the gastroesophageal junction (GJ).

There are four types of hiatal hernias:

1. Sliding hiatal hernia. This is where the junction of the esophagus slides up past the GE junction.
2. Paraesophageal hernia. In a paraesophageal hernia, the contents of the abdomen slide up around the esophagus and into the chest. The GE junction in the type 2 hernia does not go up into the chest.
3. Mixed hiatal hernia. This is a combination of both Type 1 and Type 2 hernias. The GE junction slides up into the chest and the fundus of the stomach slides up and around.

4. The type 4 hernia is an aggravated Type 3 where other organs other than the stomach slide up into the chest including the colon and small bowel and spleen.

The four types of hernias are depicted in the diagram below:



Patients who present with a hernia are often asymptomatic. When symptoms do develop, it is usually later in life and associated with other gastrointestinal disorders including GERD symptoms such as heartburn, regurgitation, dysphagia and epigastric pain. Hernia strangulation is a complication of the hernia and results in ischemia. Symptoms include acute, severe chest or epigastric pain, nausea, vomiting and GI bleeding.

Bowel Obstruction

In a bowel obstruction, the patient presents with nausea, vomiting, cramping abdominal pain, constipation, diarrhea, distended abdomen, fever, tachycardia. It can be of the small intestine or the large intestine. In an obstruction, the food “piles up”. Normally in the intestine, we find bacteria but when the bacteria are exposed to food stuck in the stomach, it will begin to grow.

Bowel obstruction can be categorized into mechanical and pseudo-obstructions:

Mechanical Obstructions

There are 5 types of mechanical obstructions:

1. Adhesion: in an adhesion, two parts of the bowel are connected to one another by a fibrous band to create the obstruction; It is the most common type and can occur post-surgically if scar tissue forms. The fibrous adhesions between the bowel segments results in extrinsic compression of the bowel that can lead to an obstruction.
2. Tumor: A tumor is growth in the bowel as in the case of colorectal cancer; The risk factors for the development of a bowel tumor includes age, family, obesity, inflammatory bowel disease and diet. As the tumor enlarges, the it can lead to an obstruction.
3. Intussusception: this is a condition where part of the bowel invaginates itself. Intussusception occurs when part of the bowel goes into the other part of the bowel. The part of the bowel that is located on the outside is the intussusception. The most common site of obstruction is the ileocecal valve. Bowel obstruction due to intussusception is rare in adults.

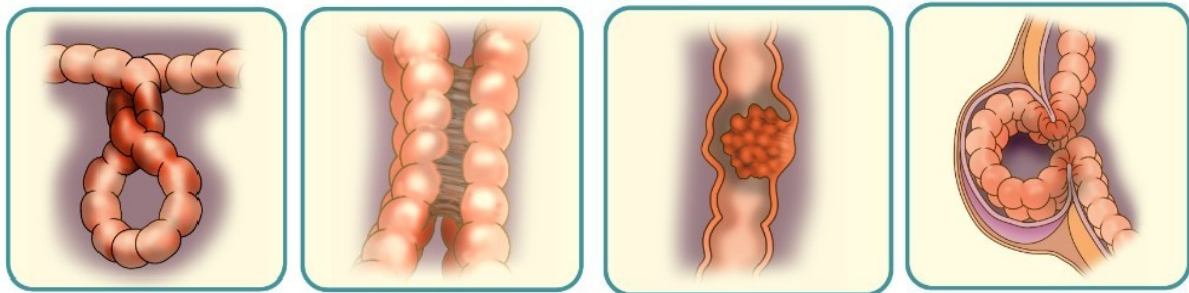
4. **Hernia:** A hernia occurs when an organ or tissue protrudes through a weak spot in the muscle or connective tissue. Common sites include the cecum and sigmoid area of the colon into the inguinal canal.
5. **Volvulus:** A volvulus is the twisting of the bowel. Common sites include the cecum and sigmoid area of the colon. A small bowel adhesion can lead to a Volvulus.

Pseudo Obstruction

Pseudo obstructions are false obstructions due to myopathy or neuropathy. These result in false obstructions because there is no actual structural factor involved or no contents within the bowel that leads to the obstruction.

1. **Myopathy:** In myopathy, the bowel muscle does not function. This can result in the patient having no bowel movement that leads to an obstruction.
2. **Neuropathy:** Neuropathy is an issue of nerve innervation within the bowel. Decreased innervation or no innervation of the bowel's smooth muscle results in abnormal movement of contents through the bowel. Hirschsprung's disease, for example, is a congenital condition where the nerves are missing at the distal end of the colon that results in no muscle innervation or peristaltic contractions. This can be corrected by surgery. The types of bowel obstructions are depicted below.

Types of Mechanical Obstruction

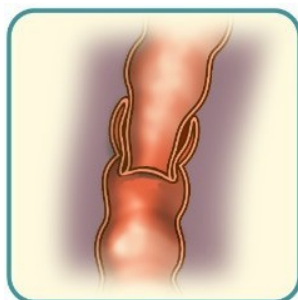


Volvulus

Adhesion

Tumor

Hernia



Intussusception

Regardless of the cause of the obstruction, the bowel contents accumulate in the area resulting in gas. This gas causes the bowel to extend causing venous compression which decreases oxygen supply to the area that can lead to intestinal cell death. This further aggravates bowel distention. Decreased oxygenation also promotes anaerobic bacteria in the bowel to enter the circulation resulting in sepsis. With venous compression, fluid is secreted in the bowel that results in water and electrolyte loss. This results in hypotension that can lead to shock. Nerves in the bowel are also triggered that sends signals to the brain to stimulation the vomiting response. Note that vomiting does not relieve the vomiting response.