

INSTRUCTIONS FOR CAPSULE ENDOSCOPY

You have received a prescription for TriLyte/NuLyte. Have your prescription filled at a pharmacy. Purchase Gas-X (simethicone) over the counter at the pharmacy.

DAY BEFORE:

1. Mix TriLyte/NuLyte as instructed and store in refrigerator. Do not add flavoring to the TriLyte/NuLyte other than the flavoring packet that comes with the prescription.
2. Stay on a clear liquid diet for breakfast, lunch and dinner the day before the Capsule Endoscopy (jello [no red jello], clear apple juice, ginger ale, 7-Up, broth, bouillon, tea and coffee). **DO NOT** eat solid foods. Avoid all milk products and alcoholic beverages. **NO** iron medications should be taken the day before the procedure.
3. At 4:00 PM the night before the procedure, drink 2 liters (approximately half of the TriLyte/NuLyte solution). Drink 8 ounces every 10-20 minutes until finished. Between 7:00 PM and bedtime, drink at least 2 quarts of water.
4. **Nothing to eat or drink after 12 midnight.**
5. On the morning of the procedure, take one 80 mg tablet of Gas-X with 8 ounces of water ½ hour before arriving for the capsule endoscopy. **DO NOT** take any medication beginning 2 hours before undergoing Capsule Endoscopy.
6. Abstain from smoking 24 hours prior to undergoing Capsule Endoscopy.

DAY OF CAPSULE ENDOSCOPY:

1. Arrive at the office at the time noted above for your Capsule Endoscopy dressed in comfortable clothing.
2. A pre-procedure interview will be conducted upon arrival. During this interview, you will be informed that Capsule Endoscopy is associated with a small chance of intestinal obstruction. You will be checked in and asked to give your informed consent.
3. You will be fitted with a belt that will hold the Data Recorder and will be asked to ingest a capsule about the size of a vitamin pill.

AFTER INGESTING THE CAPSULE:

1. After ingesting the capsule, do not eat or drink for at least 2 hours.
2. After 4 hours, you may have a light snack. Follow liquid diet as stated above. You may include applesauce as a snack food.
3. Once the examination is completed, you may return to your normal diet.
4. **CONTACT THE OFFICE IMMEDIATELY IF YOU SUFFER FROM ANY ABDOMINAL PAIN, NAUSEA OR VOMITING DURING CAPSULE ENDOSCOPY.**
5. After ingesting the capsule and until it is excreted, you should not be near any source of powerful electromagnetic fields such as one created near an MRI device or amateur (ham) radio.
6. Occasionally, some images may be lost due to radio interference (MRI, amateur radio transmitter, etc.). On rare occasions, this may result in the need to repeat the capsule endoscopy examination. In this case, your doctor will advise you to stay within the premises of the office during the capsule endoscopy to prevent this problem from recurring.
7. Capsule endoscopy lasts approximately 8 hours. Do not disconnect the equipment or remove the belt at any time during this period. Since the Data Recorder is actually a small computer, it should be treated with utmost care and protection. Avoid sudden movement and banging of the Data Recorder.
8. During capsule endoscopy, you will need to verify every 15 minutes that the small light on top of the Data Recorder is blinking twice per second. If, for some reason it stops blinking at this rate, record the time and contact your doctor. You should also record the time and nature of any event such as eating, drinking, your activity and unusual sensations. Return the Event Form attached with these notes to your physician at the time you return the equipment.
9. Avoid any strenuous physical activity especially if it involves sweating and do not bend over or stoop during capsule endoscopy.

AFTER COMPLETING CAPSULE ENDOSCOPY:

1. You will be instructed by office staff on how to return the equipment at the end of the capsule endoscopy.
2. If you did not positively verify the excretion of the capsule from your body and you develop unexplained post-procedure nausea, abdominal pain or vomiting, contact the physician for evaluation and possible abdominal x-ray examination.
3. Undergoing an MRI while the capsule is inside your body may result in serious damage to your intestinal tract or abdominal cavity. If you did not positively verify the excretion of the capsule from your body, you should contact the doctor for evaluation and possible abdominal x-ray before undergoing an MRI examination.

CAPSULE ENDOSCOPY EVENT FORM

Patient Name		ID #	
Office		Date	
Time	AM PM	Event (eating, drinking, activity and unusual sensations)	
:	AM	Capsule ingestion	
:	AM	Clear liquids (7-up, ginger ale, apple juice)	
:	AM	Light snack (clear soup or chicken noodle soup, jello [no red], applesauce, coffee, tea [no milk products])	
:	PM	Return to office	
RECORD ANY UNUSUAL EVENTS/SENSATIONS BELOW			
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Who to call in case of need:	Time to return to office	
856-996-4001 Ext. 116 Ask for a nurse	Special Instructions:	
	Time:	
	<ul style="list-style-type: none"> • Do not eat or drink for 2 hours after ingesting capsule. 	
	Time:	
	<ul style="list-style-type: none"> • You can have a light snack 4 hours after ingestion. See above list. 	

SMALL BOWEL BLEEDING AND CAPSULE ENDOSCOPY

1. What is the small bowel?

The small bowel (or small intestine) is the longest portion of the intestinal tract. It is called “small” because it is thin or narrow compared to the “large” bowel, but it is much longer than the large bowel. The small intestine is the organ of nutrient absorption and as such it is a vital organ. It is hard to reach with instruments passed by either the mouth or the anus because it is located between the stomach and the large bowel.

2. What is small bowel bleeding?

Intestinal bleeding, including from the small bowel, occurs when an abnormality on the inner lining begins to bleed. It may bleed slowly (causing anemia or low blood count) or may cause a hemorrhage. Fortunately, only 3-5% of all gastrointestinal bleeding comes from the small bowel, and most of these abnormalities lie within reach of the standard endoscope used to evaluate the stomach and upper small bowel. An endoscope is a tube instrument with a light and camera at one end passed through the mouth after receiving a sedative. A longer instrument called an enteroscope can reach further into the small bowel.

3. Why is it difficult to find the source of small bowel bleeding?

Determining the source of gastrointestinal (GI) bleeding that originates in the small bowel (the area of the intestine between the stomach and the colon) is one of the major diagnostic challenges facing gastroenterologists. Many small bowel causes of blood loss go undetected because the small bowel is long and hard to reach and therefore difficult to evaluate. The small bowel is constantly contracting and relaxing making visualization impossible for more than a few seconds. In addition the small intestine is much more mobile than either the stomach or colon, making endoscopy much more difficult. X-ray studies may be unable to pinpoint exact locations of abnormalities so that if masses or bleeding lesions are found, their location is difficult to accurately describe to the surgeon for removal. Finally, the small bowel is more than 17 feet long which is much longer than any of the instruments currently available.

4. What causes bleeding from the small bowel?

The causes of bleeding in the small bowel are different from those in the colon or stomach. The most frequent causes of large bowel (colon) bleeding are polyps, diverticulosis or cancer. Upper GI (esophagus, stomach or duodenum) bleeding sources are most frequently associated with ulcers. However, unlike the colon and the upper GI tract, 70-80% of small bowel blood loss that is significant enough to warrant investigation is caused by abnormal blood vessels that lie within the wall of the small bowel. These abnormal blood vessels called AVMs (arteriovenous malformations) are invisible to standard X-rays. Other, less common causes of small bowel bleeding include both benign (non-cancerous) and malignant (cancerous) tumors, Crohn's disease (an inflammatory bowel disease) and ulcers.

5. What tests are performed to detect bleeding from the small bowel?

X-ray studies continue to have a role in the evaluation of small bowel bleeding as 20-25% of bleeding episodes that originate in the small bowel are caused by abnormalities in the intestinal wall that can be seen by standard or specialized X-ray studies. Fortunately, most of the causes of bleeding in the small bowel are AVMs that, once treated, are of little consequence. However, both benign tumors as well as malignant cancers can be found in the small bowel, so X-ray testing remains a good initial test.

The two X-ray tests most commonly used in the evaluation of the small bowel are the small bowel follow-through and enteroclysis. The small bowel follow-through test is a series of abdominal X-rays that are taken at different times after a patient drinks a white chalky fluid called barium that shows up clearly on X-rays. The test allows the doctor to see the lining of the intestine for any irregularities as the barium flows along its course. The test is good for large abnormalities but can miss many smaller ones. However, it is safe, easy to tolerate and can demonstrate irregularities in the bowel that are unreachable by standard endoscopy.

A second X-ray test, the enteroclysis study, is similar to the small bowel follow-through in that it uses barium to visualize the inner wall of the small bowel. It is more invasive because it requires a small tube called a catheter to be slowly advanced from the nose down the esophagus, through the stomach and into the small bowel to allow for air and barium to be instilled. The advantage of this study is that pictures from enteroclysis have better resolution so abnormalities missed by the small bowel follow-through test may be detected. A disadvantage of the enteroclysis study is that it can be an uncomfortable examination due to the presence of the catheter and the use of air to distend the small bowel while taking pictures. The study is also not perfect at finding abnormalities. Two major limitations of these radiographic studies are: (a) neither can detect AVMs that are the most common cause of small bowel bleeding, and (b) if an abnormality is seen, there is no way to apply immediate treatment to stop the bleeding or to take biopsies to confirm a diagnosis.

The best way to find most of the causes of small bowel bleeding is to directly look at the small bowel with an endoscope. Most abnormalities that cause small bowel bleeding lie within reach of either a standard endoscope or a much longer endoscope called an enteroscope that can reach further into the small bowel. If neither one of these is successful at finding the cause, surgical assistance may be needed, where in the operating room, a surgeon pushes the endoscope through the intestine, allowing full examination of the entire small bowel. The advantage of endoscopy is that it allows the doctor to treat the cause of the bleeding at the time of discovery (for blood vessels) or biopsy suspicious masses or polyps. Endoscopy is safe, reliable and effective and is often used as a first step in the evaluation of bleeding that arises in the small bowel, although the technique involving surgery is generally reserved as a last resort. Recently, a new technique called capsule endoscopy has emerged as an effective way to evaluate the small bowel for bleeding.

6. What is Capsule Endoscopy?

In 2000, a group of doctors from England reported the use of a new instrument for determining the causes of small bowel bleeding. The device, the endoscopic capsule, is 1 1/8" long and 3/8" in width, the size of a large pill, and held a battery with an 8 hour life span, a strong light source, a camera and a small transmitter. Once swallowed, the capsule begins transmitting images of the inside of the esophagus, stomach and small bowel to a receiver worn by the patient. After 8 hours, the patient returns the receiver to the doctor who loads the information into a computer and then can review in detail the 8 hours of pictures of the capsule passing through the intestine looking for abnormalities that are possible sources of bleeding. The patient passes the capsule through the colon and it is eliminated in the stool and discarded. The capsule is safe, easy to take and has had only rare reported side effects. However, the capsule can get stuck in the small intestine if there has been prior abdominal surgery causing scarring or due to any other condition that causes narrowing of the small intestine. If the capsule becomes stuck, surgical removal is necessary.

7. How effective is Capsule Endoscopy at detecting the source of small bowel bleeding?

In an initial study, investigators showed that the capsule was better than routine endoscopy or enteroscopy at locating small beads that had been implanted into an animal's intestine. Other studies have shown the capsule is more effective than small bowel X-rays at finding the cause of bleeding. In 2001, the first human studies reported that capsule endoscopy not only found all of the bleeding sources seen using standard endoscopy, but also an additional bleeding cause in 56% of patients for whom traditional endoscopy had not been successful. In 2002 and 2003, numerous scientific presentations showed the use of capsule endoscopy in obscure GI bleeding, as a screening tool for patients with genetic predisposition for small bowel cancer, for small bowel Crohn's disease and for small bowel malabsorption. The capsule endoscope is now the new first line test for evaluation of small bowel GI bleeding in many medical centers.

However, capsule endoscopy technology is not perfect. Although it is better than other available techniques to detect sources of small bowel bleeding, capsule endoscopy does not detect all sources of small bowel bleeding. Like X-rays, the capsule is purely diagnostic and cannot be used to take biopsies, apply therapy or mark abnormalities for surgery. Moreover, the capsule cannot be controlled once it has been ingested so that once it has passed a suspicious abnormality, its progress cannot be slowed to better visualize the area.

Despite these limitations, it is increasingly clear that capsule endoscopy has a place in the evaluation of small bowel bleeding and that it will replace some standard diagnostic techniques currently in use. The technology is not yet at a point where it can adequately visualize enough of the colon wall. However, one day the use of the capsule endoscopy may be extended to routine colorectal cancer screening.

8. Treatment of small bowel bleeding:

Whether diagnosed by routine endoscopy, enteroscopy or capsule endoscopy, once the cause of small bowel bleeding is determined, the treatment is straightforward. In cases of AVMs, a small amount of electric current can be delivered through the endoscope to destroy the abnormality. If the AVM is discovered during endoscopy, the treatment can be applied immediately without requiring further endoscopy. If found with the capsule, the options include a repeat endoscopy or an enteroscopy if the AVMs are within reach, or surgical assistance as described above to help reach the site. Polyps can be removed with an endoscope. Cancers require surgical removal. Other causes of small bowel bleeding can be treated medically (Crohn's disease).

9. Conclusions:

Bleeding from the small bowel is a rare cause of GI blood loss. Cancers, inflammatory bowel disease and infection account for 20-25% of all small bowel bleeding, while AVMs account for the vast majority of causes. Endoscopic therapy is limited to the parts of the bowel within its reach and is the only minimally invasive way to apply direct treatment to bleeding sources or take biopsies. The development of the endoscopic capsule has changed the way in which gastroenterologists will approach GI bleeding from the small bowel. With further development and innovation, capsule endoscopy will improve the management of this condition.