Endoscopy

What is endoscopy?

Endoscopy (en-**dahs**-kuh-pee) is a medical procedure that uses an instrument called an endoscope (**en**-duh-skop). The endoscope is put into the body to look inside, and is sometimes used for certain kinds of surgery.

Looking with an endoscope is different from using imaging tests, like x-rays and CT scans, which can get pictures of the inside the body without putting tools or devices into it.

There are many different kinds of endoscopes, or "scopes." Most are like thin, hollow tubes that allow the doctor to look right into the body. Most are lighted, and some have a small video camera on the end that puts pictures on a computer screen. Some endoscopes are stiff, while others are flexible. Endoscopes can vary in length and shape. There's a new one small enough to be swallowed, which transmits images wirelessly. Each type is specially designed for looking at a certain part of the body.

Depending on the area of the body being looked at, the endoscope may be put in the mouth, anus, or urethra (your-**ee**-thruh) (the tube that carries urine out of the bladder). In some cases, it's put in through a small incision (cut) made in the skin.

Some types of endoscopes and the areas of the body they view

Type of endoscope	**Put in through**	**Body part or area(s) looked at**	**Name(s) of procedure**
Arthroscope	Cuts in the skin	Joints	Arthroscopy
Bronchoscope	Mouth or nose	Trachea (windpipe) and bronchi (tubes going to the lungs)	Bronchoscopy, flexible bronchoscopy
Colonoscope	Anus	Colon and large intestine	Colonoscopy, lower endoscopy
Cystoscope	Urethra	Bladder	cystoscopy, cystourethroscopy
Enteroscope	Mouth or anus	Small intestine	Enteroscopy

Esophagogastroduodeno-scope	Mouth	Esophagus (swallowing tube), stomach, and duodenum (first part of small intestine)	Esophagogastroduodenoscopy (EGD), upper endoscopy, panendoscopy, gastroscopy
Hysteroscope	Vagina	Inside of uterus	Hysteroscopy
Laparoscope	Cut(s) in the abdomen (belly)	Space inside abdomen and pelvis	Laparoscopy, peritoneal endoscopy
Laryngoscope	Mouth or nose	Larynx (voice box)	Laryngoscopy
Mediastinoscope	Cut(s) above the sternum (breastbone)	Mediastinum (space between the lungs)	Mediastinoscopy
Sigmoidoscope, flexible sigmoidoscope	Anus	Rectum and sigmoid colon (lower part of large intestine)	Sigmoidoscopy, flexible sigmoidoscopy, proctosigmoidoscopy
Thoracoscope	Cut(s) in the chest	Space between lungs and chest wall	Thoracoscopy, pleuroscopy

When is endoscopy used?

Endoscopes were first developed to look at parts of the body that couldn't be seen any other way. This is still a common reason to use them, but endoscopy now has many other uses too. This section will focus on its role in the prevention, early detection, diagnosis, staging, and treatment of cancer.

To prevent and screen for cancer

Some types of endoscopes can be used to look for cancer in people who have no symptoms. For example, colonoscopy (**ko**-lun-**AH**-skuh-pee) and sigmoidoscopy (**sig**-moid-**AH**-skuh-pee) are used to screen for colon and rectal cancer. These procedures can also help prevent cancer because they let doctors find and remove polyps (growths) that might become cancer if left alone.

To find cancer early

Endoscopy can sometimes be used to find cancer early, before it has had a chance to grow or spread.

Looking for causes of symptoms

When people go to their doctor with certain symptoms, endoscopy can sometimes be used to help find a cause. For instance:

- Laryngoscopy to look at the vocal cords in people with long-term hoarseness

- Upper endoscopy in people having trouble swallowing
- Colonoscopy in people with anemia (low red blood cell counts) with an unknown cause
- Colonoscopy in people with blood in their stool

Looking at problems found on imaging tests

Imaging tests such as x-rays and CT scans can sometimes show physical changes within the body. But these tests may only give information about the size, shape, and location of the problem. Doctors can use endoscopy to see more details, like color and surface texture, when trying to find out what's going on. Newer methods of endoscopy that include high magnification are being tested to find out whether they are more useful in detecting cancer and other abnormal cells on the inner surfaces of the body.

To diagnose and find out the stage (extent) of cancer

To get a tissue sample

Going one step further, most types of endoscopes have tools on the end that allow the doctor to take out small tissue samples. This procedure is called a *biopsy* (**by**-op-see). Samples can be taken from any areas of concern. They are then looked at under a microscope or tested in other ways to see if cancer is present. A biopsy is usually the best way to find out if a growth or change is cancer or something else.

Getting a closer look

In some cases endoscopes are used to help find out how far a cancer has spread. Thoracoscopy (**thor**-uh-**KAHS** -kuh-pee) and laparoscopy (**lap**-uh-**RAHS**-kuh-pee) can be very useful in finding out whether certain cancers have spread into the thorax (chest) or abdomen (belly). The surgeon can look into these places without making a large incision (cut) in the skin.

To get better pictures

Endoscopes can get pictures of the body parts they can get to. But some types of endoscopy can also be used to help get better, more detailed ultrasounds and x-rays in areas the scopes can't quite reach. This can be especially useful when trying to find the stage (extent) of cancer within the body.

Endoscopic ultrasound (en-duh-**skah**-pick **ul**-truh-sound) **(EUS):** Ultrasound is an imaging test in which a wand (called a *transducer*) is moved over the skin. The transducer sends sound waves into the body. The waves bounce back in a pattern a computer uses to make a picture. *Endoscopic ultrasound* (EUS) is a procedure in which a small transducer on the tip of an endoscope is put in through the mouth or rectum. By putting the transducer on the tip of the endoscope, it can get closer to an organ or tumor to take more detailed ultrasound pictures.

EUS is used to get information about problems in the digestive tract and nearby organs. It can be used to see how deep a tumor might have grown into the rectum or esophagus, or into a nearby organ like the pancreas. It can also help show whether lymph nodes are swollen, which could mean

they have cancer in them. EUS is proving useful in staging some lung, digestive tract (esophagus, stomach, pancreas, etc.), and other cancers. EUS can also help a doctor guide a needle into a lymph node or other area of concern to take a biopsy.

Endoscopic retrograde cholangiopancreatography (en-duh-**skah**-pick **ret**-ro-grade ko-**lan**-jee-oh-**pan**-kree-uh-**tog**-ruf-ee) **(ERCP):** ERCP is a complex procedure that helps doctors diagnose problems in the ducts of the pancreas, gall bladder, or liver. In this procedure, an endoscope is passed down the throat, through the stomach, and into the first part of the small intestine. The doctor then guides a tiny tube at the end of the endoscope into the *common bile duct*, which connects the intestine with the pancreas. A small amount of contrast material (dye) is pushed in, and x-rays are taken. The dye helps outline the bile ducts and pancreatic duct. The x-rays can show whether the ducts are narrowed or blocked, which might be caused by a gallstone or a cancer. The doctor doing this test can also put a small brush through the tube to take out some cells for biopsy.

To treat cancer

Destroying or removing cancer cells

Endoscopes can be used to take out or destroy small cancers. Small instruments passed through an endoscope can be used to cut out small growths. Some forms of endoscopy allow doctors to use tools like a cautery or laser through the tip of the endoscope to burn or vaporize growths.

Surgery to take out cancer

Many types of endoscopic tools have been developed to let doctors perform *minimally invasive surgery.* This is sometimes called *keyhole* surgery. When it's used for the abdomen (belly), it is called *laparoscopic* (**lap**-uh-ruh-**SKAH**-pick) surgery. Instead of making one long surgical incision (cut), several small cuts are made in the skin – usually in the chest or abdomen. Long, thin instruments are then put through the cuts or "holes" to reach the inside of the body. A video endoscope – a thoracoscope (thuh-**ray**-kuh-skop) or laparoscope – is put through one of the holes so that the surgeon can see inside during the operation.

This type of surgery is sometimes used to treat small cancers of the lung. This is called *video-assisted thoracoscopic* (**thor**-uh-ko-**SKAH**-pick) *surgery*, or VATS. It can also be used for the colon (called *laparoscopic colectomy*, pronounced kuh-**lek**-tuh-me), prostate (called *laparoscopic radical prostatectomy*), and some other organs, but not all doctors agree keyhole surgery is better than open surgery.

There are some benefits to keyhole surgery: Generally, less blood is lost during the operation and patients often recover faster and with less pain because the cuts are small. Some forms of keyhole surgery use robotic arms, which a surgeon controls from a console. This better magnifies the area so more precise work can be done with tiny, delicate surgical instruments.

Keyhole surgery also has some drawbacks: It takes longer for doctors to learn. It usually means more time in the operating room and more drugs to keep the patient asleep (more time under anesthesia). It also takes away the surgeon's ability to feel organs for problems that they may not be able to see.

Most studies have not found keyhole surgery to be any less effective than open surgery, at least in the short term. But as of yet there are no studies to show that the long-term outcomes are the same.

If you are thinking about some type of minimally invasive or keyhole surgery, it's important to understand the known benefits and risks. It's also important to find out what's not yet known about the procedure. If you decide on keyhole surgery, be sure your doctor has a lot of experience with the procedure and is skilled with the technique.

To relieve symptoms of advanced cancer

Endoscopes can also be used for *palliative* (**pal**-ee-uh-tiv) treatment (treatment given to reduce or control symptoms) in some cancers that can't be cured by surgery. For example, instruments passed through endoscopes can be used to remove blockages in the lungs or digestive tract. If a tumor is narrowing an airway by pressing on its outside, endoscopy can be used to place a stent (a small, rigid tube) inside the airway to keep it open.

What is the procedure like?

There are many different types of endoscopy procedures, and the experience of having one can vary a lot from one type to the next. The next table shows some of the key facts of the more common forms of endoscopy. It does not include minimally invasive surgeries.

Facts about some more common types of endoscopy

Type of endoscopy	**Special preparation (usually starting the night before)**	**Is it usually done in an operating room?**	**Usual type of anesthesia***	**About how long it takes**
Arthroscopy	Fasting[+]	Yes	Local and sedation	30 to 45 minutes
Bronchoscopy	Fasting[+]	No	Local and sedation or general	30 min to 2 hours
Enteroscopy	Fasting[+], liquid diet and laxative/ enema if using anal entry	No	Sedation or general	45 to 90 minutes
Laryngoscopy	Fasting[+]	No	Local or general	15 min to 1 hour
Upper endoscopy	Fasting[+]	No	Local and sedation	15 to 30 min
Flexible sigmoidoscopy	Liquid diet, laxative/enema	No	Usually none	15 to 30 min
Colonoscopy	Liquid diet, laxative/enema	No	Mild sedation	30 to 60 min

Cystoscopy	Fasting[+]	Sometimes	Local or general	15 to 30 min
Mediastinoscopy	Fasting[+]	Yes	General	1 to 2 hours
Thoracoscopy	Fasting[+]	Yes	General	2 to 3 hours
Laparoscopy	Fasting[+]	Yes	General	20 min to 1 hour

[+] ***Fasting*** *means not eating for a certain amount of time before the procedure*

Anesthesia *is the use of drugs to make you not feel pain during a procedure. There are different kinds of anesthesia:*

> ***Local*** *means the area the scope is passed through is numbed but you are awake.*
> ***Sedation*** *means you are awake, but drugs are used to make you sleepy and relaxed.*
> ***General*** *means drugs are used to put you into a deep sleep.*

It's important to keep in mind that there might be more than one way to do some procedures. For example, bronchoscopy and laryngoscopy can be done with either a flexible or rigid scope. Local anesthesia (numbing the area) is generally used for flexible scopes, while rigid scopes often require general anesthesia (where you are given drugs to put you into a deep sleep).

People's experiences may also vary depending on their health and what needs to be done, such as whether biopsy samples are going to be taken.

If you are going to have an endoscopy, your health care team will explain to you what will be done and what to expect before, during, and after the test. They will also tell you what you need to do to prepare for the procedure. The preparation could mean that you must fast (not eat anything) for a certain amount of time, follow a liquid diet for a certain amount of time, and/or use laxatives or enemas.

Newer types of endoscopy

In recent years, researchers have developed other ways of using instruments to look inside the body. These methods are often referred to as newer forms of endoscopy, even though they don't put tubes into the body.

Capsule endoscopy

Doctors can see a lot of the digestive tract using upper endoscopy or colonoscopy. But it's harder for the 20 feet or so of small intestine to be seen this way, although *enteroscopy* (**en**-ter-**AH**-skuh-pee) can be used. Cancers in this area are rare, but tumors and other problems such as ulcers can develop here.

One way to look at this area is to use *capsule endoscopy*. To do this, a person swallows a capsule that contains a light source and a tiny camera. (It's about the size of a large vitamin pill.) Like any other pill, the capsule goes through the stomach and into the small intestine. It travels through the small intestine, which usually takes about 8 hours, and takes thousands of pictures. These pictures are sent to a device worn around the person's waist, while he or she goes on with normal daily activities. The pictures can then be downloaded onto a computer, where the doctor can look at

them as a video. The capsule passes out of the body during a normal bowel movement and is flushed away.

This technique may help find the source of bleeding, pain, or other symptoms that may be coming from the small intestine. But it's not useful for looking closely at the colon or other parts of the body. It costs a lot, so you will need to find out if your insurance company will cover it before having it.

Virtual endoscopy

Virtual endoscopy is really an imaging test, not an endoscopy procedure. It uses a special CT scan to look at the inside surfaces of organs such as the lungs (virtual bronchoscopy) or colon (virtual colonoscopy or *CT colonography*).

Patients have this procedure just as they would any other CT scan — they lie still on a table while a large ring (the CT scanner) passes over the part of the body being imaged.

Unlike normal CT scans, which make pictures in 2 dimensions, virtual endoscopy uses a computer to combine many images to create a 3-dimensional (3-D) picture. Doctors can even use the images to create a black and white "fly-through" view on the screen, which looks a lot like it would if they were doing an actual endoscopy.

Virtual endoscopy has some advantages over standard endoscopy — nothing is put into the body and no drugs are needed for the test. It also allows the doctor to change the angle or magnify the image, which can help with diagnosis.

But there are some disadvantages, too. Virtual endoscopy does show good detail, but it's not quite as good at showing fine surface detail as standard endoscopy. (For example, it can't show color differences.) It also exposes the patient to some radiation — about the same amount as a standard CT. And because nothing is put into the body, the doctor can't take biopsy samples or remove growths. This means that if something abnormal is found, the patient may still need a standard endoscopy. The patient must still take medicines (laxatives and/or enemas) to clean out the colon to get good pictures during a virtual colonoscopy.

Virtual endoscopy is a fairly new procedure, and doctors aren't yet sure how best to use it. It will likely be used more in the future as the technology improves.

To learn more

More information from your American Cancer Society

Here is more information you might find helpful. You also can order free copies of our documents from our toll-free number, 1-800-227-2345, or read them on our Web site, www.cancer.org.

Imaging (Radiology) Tests

Testing Biopsy and Cytology Specimens for Cancer

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