

Colorectal Cancer and Continence

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Introduction

Cancer of the colon and rectum remains one of the most deadly forms of cancer. It is the third most common cancer in the United States, yet it is quite curable by surgery when found in its early stages. Since it involves the lower gastrointestinal tract, treatment of colon and rectal cancer frequently affects bowel function and, at times, continence. This article will attempt to show how colorectal cancer therapy, both surgical and medical, may affect fecal continence.

What is continence?

Fecal continence is the ability to delay defecation in a controlled manner to a socially acceptable time and place. Continence is a complex phenomenon, involving the way the body functions (physiology), anatomy, sensation, and awareness or thinking (cognition). In the normal healthy adult, the small intestine transfers approximately two to three liters (2000–3000 milliliters or 2–3 quarts) of liquid stool per day to the colon through the *ileocecal valve* [a valve that connects the bottom end of the small intestine (ileum) and the upper part of the large intestine (cecum)]. The colon then concentrates this stool by absorbing water and electrolytes until approximately 250 milliliters or 1 cup of stool reaches the rectum. The rectum is the last portion of the colon and is approximately 15 cm or 6 inches long. It functions as a stretchable (compliant) reservoir and is able to expand (dilate) to accommodate a fecal load. The rectum ends at the anus, which consists of the internal and external anal sphincters lined by both rectal mucosa and a highly sensitive skin. (Figure 1) Sensory nerves, lubricating anal glands, internal and external hemorrhoidal blood vessels, and a complex blood supply make the anus one of the most complex and sophisticated parts of the body.

Defecation occurs when the rectum becomes distended with stool. Rectal distention causes a reflex relaxation of the normally contracted internal anal sphincter. The contents of the rectum descend through the anal canal, which detects whether there is gas, liquid, or solid matter. The brain

receives this information and decides whether to pass the rectal contents or not. The external sphincter muscle along with other pelvic floor muscles may be voluntarily relaxed to allow passage of the stool. This relaxation helps to straighten the rectum and anus and is followed by a *Valsalva maneuver* as the diaphragm and abdominal muscles bear down, increasing the pressure on the rectum and encouraging the stool to pass through the anal canal. Alternatively, these muscles may be contracted, pushing the stool back up into the rectum and deferring defecation. The rectum will then relax for a time, but as additional stool enters, a more demanding urge will be felt as the rectum again contracts.

Continence thus depends on:

- Volume and consistency of stool
- Capacity and compliance of the colon and rectum
- Function of the internal and external sphincters
- Sensory *innervation* [supply of nerves or nerve stimuli] of the rectum and anal canal
- Motor innervation of the sphincter muscles and pelvic floor muscles
- Cognitive function

Some patients have problems with control prior to surgery due to anal sphincter muscle injuries, birthing trauma, or limited cognitive capacity. Additionally, many general medical problems such as diabetes and neurologic disorders may compromise motor and sensory function.

Colon and rectal cancer: basic concepts

Treatment of cancer may impact many of the factors affecting continence. Understanding how requires some knowledge of how colon and rectal cancer develops and spreads and how it is approached surgically and medically. Colon and rectal cancers arise from the inner lining of the bowel, known as the *mucosa*. Normal mucosal cells grow in a highly controlled fashion, which is controlled by their *genes*. Cancers develop when changes, or *mutations*, occur in a series of genes. Some of these abnormal

genes may be inherited or passed from parents to children. However, most mutations occur spontaneously. Certain gene changes allow mucosal cells to grow rapidly and in an uncontrolled manner. These abnormal cells often look different than normal cells when examined under a microscope – this is called *dysplasia*. As these cells multiply they form abnormal structures called *polyps*. A polyp is an overgrowth of the mucosal lining, which may be seen during endoscopy. Often, they may be removed with the *colonoscope* and then they will not develop into a cancer.

COLONOSCOPY

Colonoscopy is a fiberoptic (endoscopic) procedure in which a thin, flexible, lighted viewing tube (a colonoscope) is threaded up through the rectum for the purpose of inspecting the entire colon and rectum and, if there is an abnormality, taking a tissue sample of it (biopsy) for examination under a microscope, or removing it.

With time and additional changes in the genes, the cells acquire the ability to grow into the deeper muscular walls of the intestine. Once this mass of cells, now called a *tumor*, invades the deeper bowel wall, it is called a cancer because it has demonstrated the ability to spread. Invasion into adjacent tissues and spread to the *regional lymph nodes* located in tissue next to the intestine, called the *mesentery*, are the hallmarks of colorectal cancer. Cancer cells may further spread through the lymphatic channels and the blood stream to distant sites including the liver, lungs, and other parts of the body. This process is called *metastasis*.

Cancer located within the inner wall of the colon is considered Stage I. If removed (resected) surgically at this point there is a 90% five year survival rate and no additional therapy is needed. Cancers that penetrate more deeply into the wall or into