Key Takeaways

- A colon polyp is a mass of tissue on the inside wall of the colon that protrudes into the colon "tube."
- Most colon cancers arise from a polyp; however, only a very small percentage of colon polyps become cancer.
- Polyps can be broadly grouped into those that do NOT become cancer (non-neoplastic polyps) and those that CAN become cancer (neoplastic polyps).
- Polyps can be detected with colon cancer screening tests, including colonoscopy.
- Removing polyps that can progress to become cancer, reduces the risk of colon cancer by up to 80%.

What is the colon?

The colon is a tube that is about 5 to 6 feet in length, which then connects to about 6 inches of rectum, and finally ends with the anus. The precise length of the colon is highly variable from individual to individual. The colon and rectum constitute the last part of the digestive tract, which includes the mouth, esophagus, stomach, small bowel and large bowel. The colon has several parts (in the order that stool travels through): the cecum and ascending colon (on the right side), the transverse colon (goes across the abdomen), the descending colon (on the left side), and the sigmoid colon. The cecum connects to the small intestine, while the sigmoid colon connects to the rectum. The colon's function is to change liquid waste into solid stool. The stool can spend anywhere from 10 hours to several days in the colon before being expelled through the anus.

What is a colon polyp?

A colon polyp is a mass of tissue on the inside wall of the colon that protrudes into the colon "tube." Colonic polyps are common, occurring in more than 25% of people over the age of 60.

Polyps usually do not cause any symptoms, but can cause bleeding or, if they are very large and have progressed to cancer, partial or total bowel obstruction. Bleeding may either be apparent in stool or occult (meaning the patient cannot see it), and can lead to iron-deficiency anemia (low red blood cell counts). Intestinal obstruction can cause nausea, vomiting, abdominal distension (bloating), and severe abdominal pain. Unresolved bowel obstruction can lead to perforation, or rupture of the wall of the colon, which can be life-threatening if not treated promptly.

What causes colon polyps?

Colon polyps develop due to a combination of environmental and genetic factors. Some factors thought to increase the risk of colon polyps include: high fat diet, diet high in red meat, and likely, tobacco, smoking and obesity. Polyps are more common as we age. Polyps and colon cancer in family members can increase your risk and this history should be discussed with your healthcare providers.

How are polyps diagnosed?

There are several tests that can be used to detect polyps and the most commonly used test is the colonoscopy.

Learn more about the tests available for colon cancer screening.

How are polyps related to colon cancer?
Most colon cancers arise from a polyp; however, only a very small percentage of colon polyps become cancer. Therefore, it is important to understand the different types of polyps and the specific risk factors that increase the chance that they will progress to cancer.

Polyps can be broadly grouped into those that do NOT become cancer (non-neoplastic polyps) and those that CAN become cancer (neoplastic polyps). There are some features that allow the gastroenterologist to determine if a polyp is neoplastic or non-neoplastic and, based on this, whether or not it needs to be biopsied.

What are the different kinds of polyps?

Polyps can be classified as neoplastic (adenoma), meaning they have the potential to become cancer, and non-neoplastic (hyperplastic), meaning they do not have the potential to become cancer. They can also be described by their shape: sessile (flat), pedunculated (having a stalk), and flat or "depressed".

Non-Neoplastic Polyps

Non-neoplastic polyps are those that have no potential to become cancer. They can be seen in a variety of clinical contexts and are a very diverse group of unrelated lesions.

- **Hyperplastic polyps** account for the majority of colon polyps. These are traditionally included in the non-neoplastic category. However, for some patients, hyperplastic polyps may be associated with hyperplastic polyposis syndrome, making them higher risk polyps. This syndrome is defined by the number of hyperplastic polyps, their size and location, but is rare.
- **Inflammatory pseudopolyps** are not truly polyps at all. They are formed when ulcers in the colon heal, leaving the mucosa (lining of the colon) in a polyp-like configuration. They can be single or multiple, and can become very large. Inflammatory pseudopolyps can develop in any form of severe colitis, including Crohn's disease, ulcerative colitis, and ischemic colitis. While inflammatory pseudopolyps have no malignant potential, they need to be distinguished from similar-appearing precancerous lesions.

Neoplastic Polyps

In contrast to non-neoplastic polyps, neoplastic polyps are ones in which there is a risk of developing cancer. Neoplastic polyps all predispose an individual to a type of cancer called "carcinoma." These polyps are distinguished by their appearance under a microscope.

- **Adenomatous polyps** are precursors to invasive colon and rectal cancer. Based on their appearance under a microscope, they are grouped into villous, tubulovillous, and tubular adenoma subtypes. Villous polyps are the most likely to progress to cancer, followed by tubulovillous and finally, tubular polyps.
  - It is estimated that 10-30% of adenomas are familial, related to certain genetic variations. Other risk factors for developing an adenoma include increasing age and perhaps, excess dietary fat. Aspirin and non-steroidal anti-inflammatory drugs (NSAIDs) reduce adenoma formation or reducing progression to colon cancer are unclear. Due to the risk of progressing to colon cancer, adenomas should be removed.
- **Carcinomatous polyps** are those that contain cancer, and are usually considered as a subset of adenomas. Malignant polyps account for about 5% of adenomas, and are generally managed similarly, with polypectomy. However, they are more likely to have an adverse outcome—some will have residual cancer or spread to lymph nodes at the time of polyp removal. Surgical resection of malignant polyps should be done when certain high risk factors are found, such as invasion of blood vessels or lymphatics, invasion of deeper tissues, involvement of polypectomy margin with cancer, and poor degree of differentiation.
- **Serrated polyps** may be sessile (flat) or pedunculated. Recently, there has been increasing evidence that serrated polyps are a part of a distinct pathway that can lead to cancer. Three distinct types of serrated polyps are now recognized, including hyperplastic polyp, sessile serrated adenoma (SSA), and traditional serrated adenoma (TSA).
  - Hyperplastic polyps (see above) are small sessile lesions, on average less than 5 mm. Hyperplastic polyps are common, but are not precursors to cancer.
  - SSAs and TSAs contain features of both a hyperplastic polyp and an adenomatous polyp. SSAs and TSAs are...
much rarer than hyperplastic polyps, accounting for <1% of all polyps. These lesions are definitely precancerous. There are not currently any universally agreed upon guidelines for the management of serrated polyps, but it is generally recommended that they be treated like adenomas.

**What are "polyposis syndromes?"**

Polyposis syndromes are conditions in which individuals are predisposed to having a large number of polyps. They are usually associated with a known genetic abnormality and for that reason, often run in families. Most are associated with an increased risk of colon cancer, and often carry increased risk for other forms of cancer, such as pancreatic cancer, thyroid cancer, and breast cancer.

**Familial adenomatous polyposis (FAP)**

FAP is the most common polyposis syndrome and is characterized by hundreds to thousands of adenomatous polyps throughout the large intestine. Polyps can also be seen in the stomach and small intestine. FAP results from a mutation in the APC (adenomatous polyposis coli) gene. All varieties of adenomatous polyps can be seen, including tubular, villous and tubulovillous. Its diagnosis is made easily by having a colonoscopy that finds at least 100 adenomas. Individuals with a family member with FAP should undergo genetic testing at 10-12 years of age. In FAP, colorectal cancer is virtually inevitable; if untreated, 100% of affected individuals will develop colon cancer, typically before 40 years of age. For that reason, these patients are offered prophylactic surgery to remove the colon. The preferred surgery is a total abdominal proctocolectomy, which involves removing the entire colon and rectum with ileo-anal anastomosis (J-pouch). Individuals with FAP are also at increased risk for cancer of the duodenum (first part of the small intestine), stomach, pancreas, thyroid, liver, bone, and brain. In addition, they are at risk for intra-abdominal growths are called desmoid tumors.

Turcot's syndrome also results from mutations to the APC gene, and is characterized by colonic polyposis and a rare type of brain tumor. Family members of an affected individual should have screening colonoscopy along with imaging of the brain (e.g. MRI). Turcot's may be similar to Lynch syndrome or FAP, and depending on which of these the patient's syndrome is most similar to will determine the exact risks.

Gardner's syndrome also results from APC mutations, and is characterized by colonic polyposis, osteomas (benign bone tumors), dental abnormalities, and a variety of other benign tumors. Osteomas most commonly affect the mandible (the jaw bone); because they are benign, they are only removed to improve symptoms or cosmetic appearance. People with Gardner's Syndrome have a similar risk of colorectal cancer as those with FAP and should have recommendations from genetic specialists on their lifelong screening program.

**Peutz-Jeghers Syndrome**

Peutz-Jeghers syndrome is characterized by abnormal pigmentation around the mouth, nose, lips, hands and feet, along with polyps of the stomach, small intestine, and colon. The polyps are characterized as hamartomatous and they are most prominent in the small intestine but can be found in the colon. Patients should have a colonoscopy at least every 2-3 years beginning at symptom onset or late teens (if asymptomatic) as well as small bowel investigation every 1-3 years depending upon the presence of polyps (with diagnostic capsule endoscopy, and as needed, small bowel endoscopy, e.g. double balloon small bowel endoscopy). Polypectomy remains the treatment of choice, while surgery is reserved for large, difficult to remove or recurrent polyps. Individuals with Peutz-Jeghers syndrome are also at increased risk of cancer of the small intestine, pancreas, breast, uterus, ovaries, lung, cervix, or testes. Mutations occur in the STK1 (LKB1) gene.

**Juvenile Polyposis Syndrome**

Juvenile polyposis consists of multiple benign hamartomatous (juvenile) polyps throughout the colon and rectum. They typically cause GI bleeding, intussusception, or bowel obstruction. Intussusception is a condition where the intestine telescopes on itself causing intermittent abdominal pain, nausea, vomiting, and blood in the stools. These patients are at increased risk for cancers of the colon, small intestine, and possibly stomach. Colonoscopy should be performed at least every 3 years, beginning at symptom onset or early teens (if asymptomatic). Juvenile polyps should be removed by polypectomy; colectomy can be considered if there are numerous polyps. Mutations may occur in PTEN, BMPR1A or SMAD4.

**Lynch Syndrome (HNPCC or Hereditary Non-Polyposis Colorectal Cancer)**
Lynch syndrome accounts for approximately 3-5% of all colon cancers. It is the most commonly inherited known condition that predisposes a person to develop colon cancer. Women with Lynch syndrome are also at increased risk to develop endometrial cancer (cancer of the uterus). There are additional cancer risks associated with Lynch syndrome, including breast, gastric, and ovarian cancers.

There are other polyposis syndromes including Bloom's syndrome, familial tooth agenesis syndrome, MUTYH polyposis, PTEN hamartoma tumor syndromes, neurofibromatosis, Cronkhite-Canada syndrome, hyperplastic polyposis syndrome, and nodular lymphoid hyperplasia. Refer to the resources below for further information.

**How are polyps treated? What follow-up do I need?**

Polyps are treated by removal (polypectomy) during colonoscopy using electrocautery. This means they are cut out and the tissue burned to seal the tissue and blood vessels and stop any bleeding. If the polyps were detected with a screening test other than colonoscopy, you will need to have a colonoscopy to remove the polyps.

Small polyps can be removed entirely by biopsy. The overall complication rate of polypectomy is about 1-2%, with bleeding as the most common complication. Other rare complications include bowel perforation, and electrocautery burn. Though rare, these complications can be serious and may require surgical repair. The goal of polypectomy is to remove the entire polyp. When one polyp is found, it is important to examine the entire colon to look for additional polyps.

Polyps can also be treated surgically, but this is usually reserved for patients with polyps that could not be removed via colonoscopy or patients with polyposis syndromes that require more radical treatment. Surgery for polyps and polyposis syndromes should be performed by a colorectal surgeon.

While adenomas are associated with cancer, removing the adenoma significantly decreases the risk of developing colon cancer. Based on the National Polyp Study, polypectomy reduces the risk of colon cancer up to 80%. However, the number, size and location of the adenomas affect the colon cancer risk. Adenomas are prone to recur after removal. Because individuals with a history of neoplastic polyps may have a higher risk of colon cancer compared to the average population, it is recommended that they receive screening colonoscopy more often. Once a person has their first screening colonoscopy, further follow up is recommended based on the findings of that first test.

The U.S. Multi-Society Task Force on Colorectal Cancer (including the American Gastroenterology Association) and the American Cancer Society generated a consensus statement for surveillance recommendations after first colonoscopy, with the following recommendations:

<table>
<thead>
<tr>
<th>Colonoscopy Finding</th>
<th>Recommended Surveillance Interval</th>
<th>Other Comments</th>
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<tbody>
<tr>
<td>No adenomas or polyps</td>
<td>10 years</td>
<td></td>
</tr>
<tr>
<td>Small (&lt;10 mm) hyperplastic polyps, no adenomas</td>
<td>10 years</td>
<td>No increased risk of cancer compared to average population</td>
</tr>
<tr>
<td>1-2 tubular adenomas (&lt;10 mm)</td>
<td>5-10 years</td>
<td>Specific interval depends on clinical judgment, patient preference and prior history</td>
</tr>
<tr>
<td>3-10 adenomas, or Tubular adenoma &gt;10 mm, or Villous adenoma</td>
<td>3 years</td>
<td>May increase interval to 5 years if first colonoscopy is normal or low-risk</td>
</tr>
<tr>
<td>&gt;10 adenomas</td>
<td>&lt;3 years</td>
<td>Consider polyposis syndrome</td>
</tr>
<tr>
<td>Serrated adenomas</td>
<td>American Gastroenterological Association recommends: 5 yrs (for serrated polyps with no dysplasia &lt;10mm) and 3 yrs (for those &gt;10mm, with dysplasia or adenomas).</td>
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