CONDITION

Gastrinoma

A gastrinoma is a hormone-producing tumor that causes the stomach to make too much acid.

WHAT IT IS
Gastrin-producing neuroendocrine tumor

BODY SYSTEM
Digestive and hormone systems

MAIN SYMPTOMS
Abdominal pain, ulcers, diarrhea, acid reflux

WHAT CAUSES IT
Usually sporadic; sometimes inherited MEN1 changes

HOW IT IS DIAGNOSED
Fasting gastrin, stomach acidity testing, and tumor imaging

MAIN TREATMENT
Acid-blocking medicines and tumor-directed treatment

CAN IT BE CURED?
Sometimes - surgery can remove localized tumors

IS IT AN EMERGENCY?
Sometimes - vomiting blood or sudden severe abdominal pain

LONG-TERM OUTLOOK
Often controllable; spread and tumor grade shape outlook

Overview

A gastrinoma is a neuroendocrine tumor that makes excessive amounts of gastrin, a hormone that tells the stomach to produce acid. Most gastrinomas begin in the duodenum, the first part of the small intestine, or in the pancreas. Some are very small and difficult to find on scans.

Excess acid can cause repeated peptic ulcers, acid reflux and diarrhea. This pattern is called Zollinger-Ellison syndrome. A gastrinoma is the tumor, while Zollinger-Ellison syndrome describes the effects of the extra gastrin and acid.

The acid can damage the stomach, esophagus and small intestine. The tumor may also grow or spread, most often to nearby lymph nodes or the liver. Acid-blocking treatment is usually effective, while surgery or other specialist treatments may be needed for the tumor.

Symptoms

Symptoms usually result from excess stomach acid and may resemble ordinary ulcer disease or gastroesophageal reflux disease, also called GERD.

Possible symptoms include:

Diarrhea can be an important clue. Acid entering the small intestine interferes with digestive enzymes and irritates the bowel, making it harder to digest and absorb food, especially fat.

Some people have few symptoms because acid-blocking medicines control the acid. Others are diagnosed after an ulcer complication or during testing for an inherited condition.

- Burning or aching upper abdominal pain
- Ulcers that return, appear in unusual places or do not heal as expected
- Heartburn or acid rising into the throat
- Watery or frequent diarrhea
- Nausea, vomiting or loss of appetite
- Unintended weight loss
- Black stools or vomit containing blood from a bleeding ulcer

Causes and risk factors

Most gastrinomas arise without a clear inherited cause. They develop after changes in a neuroendocrine cell, but it is usually not known why these changes occur. Gastrinoma is not caused by stress, spicy food or anything you did.

Some cases are associated with multiple endocrine neoplasia type 1, or MEN1. This inherited condition is caused by a change in the MEN1 gene and can produce tumors in hormone-producing organs, particularly the parathyroid glands, pituitary gland, pancreas and duodenum.

MEN1-related gastrinomas are more likely to be multiple and located in the duodenum. A personal or family history of MEN1-related tumors may lead to genetic counseling and testing. Having a gastrinoma does not automatically mean you have MEN1.

Diagnosis

Diagnosis usually begins with a fasting gastrin blood test. A high result may support the

diagnosis, but it must be interpreted alongside the amount of acid in the stomach.

High gastrin does not always mean gastrinoma. Proton pump inhibitors like omeprazole or lansoprazole , or PPIs, can raise gastrin by reducing stomach acid. Other causes include conditions that prevent the stomach from making enough acid and, sometimes, reduced kidney function.

Testing may include:

During a secretin stimulation test, secretin is given under supervision and gastrin levels are measured. A gastrinoma often produces an unusual rise in gastrin.

Do not stop a PPI before testing unless the specialist arranging the test provides a supervised plan. Suddenly stopping treatment when gastrinoma is possible can cause a dangerous increase in acid production.

If laboratory findings support gastrinoma, imaging is used to locate the tumor and check for spread. Tests may include CT, MRI, endoscopic ultrasound or somatostatin receptor PET/CT. Endoscopy may be used to examine the esophagus, stomach and duodenum for ulcers or other damage.

If tumor tissue is obtained, a pathologist can confirm that it is a neuroendocrine tumor and assess its grade, which indicates how quickly it is likely to grow.

- A fasting gastrin level
- Measurement of stomach acidity or pH
- A secretin stimulation test if results are uncertain
- Calcium and parathyroid hormone tests if MEN1 is possible

Treatment and management

Treatment aims to control stomach acid and treat the tumor.

PPIs are the main medicines used to suppress acid. They can heal ulcers, reduce diarrhea and prevent further damage. People with gastrinoma may need stronger acid suppression than people with ordinary reflux, but treatment must be individualized.

Surgery may offer a cure when the tumor is localized and can be completely removed. The operation depends on its location, the number of tumors and whether lymph nodes are involved. Small duodenal tumors can be hard to locate, so care is best planned by a team experienced in neuroendocrine tumors.

Surgical decisions may be more complex with MEN1 because several small tumors can be

present. Specialists weigh the likely benefit against the extent and risks of surgery.

If the tumor cannot be completely removed or has spread, options may include:

Treatment depends on the tumor's location, grade, growth rate, receptor test results and spread. Acid suppression usually continues during tumor-directed treatment.

- Somatostatin analogue medicines
- Peptide receptor radionuclide therapy
- Targeted medicines
- Chemotherapy for selected tumors
- Procedures directed at liver tumors
- Surgery to reduce tumor burden in selected cases

Complications

Uncontrolled acid production can cause ulcers in the stomach or small intestine. An ulcer may bleed, perforate the digestive tract or cause scarring that blocks food from leaving the stomach.

Repeated acid exposure can inflame or narrow the esophagus, causing painful or difficult swallowing. Ongoing diarrhea can lead to dehydration, weight loss and poor nutrient absorption.

Gastrinomas may spread to lymph nodes, the liver or, less commonly, other areas. The outlook depends on the tumor's grade, growth rate and extent. Even when disease has spread, treatment can control symptoms or slow growth.

Prevention

Most sporadic gastrinomas cannot be prevented. No food, supplement or lifestyle change is known to stop one from developing.

An inherited MEN1 gene change also cannot be prevented. If MEN1 runs in your family, genetic counseling can explain testing and surveillance. Monitoring may identify related hormone problems or tumors earlier.

Taking acid-blocking treatment as directed helps prevent ulcers and other complications. Avoiding smoking and discussing stomach-irritating medicines, including some anti-inflammatory pain medicines, may reduce added ulcer risk, but these measures do not

treat the tumor.

Living with it and what to expect

Pain, reflux and diarrhea often improve substantially once excess acid is controlled, even before the tumor is treated directly. Acid suppression may be needed for months, years or longer.

Follow-up usually includes symptom reviews, blood tests and periodic imaging. After surgery, gastrin testing and imaging may check for persistent or returning disease. The schedule depends on the tumor's grade, whether it was fully removed and whether MEN1 is present.

A localized gastrinoma may be cured by surgery, but continued follow-up is important because tumors can return. Disease that has spread is often managed as a long-term condition, with treatment adjusted if it begins to grow.

Your healthcare team may monitor for effects of long-term acid-blocking therapy based on your health, treatment duration and other medicines. Smaller meals and avoiding foods that clearly worsen reflux may improve comfort, but there is no specific diet that removes the tumor. Ask about dietitian support if diarrhea or weight loss continues.

People with MEN1 also need ongoing checks for other hormone-producing tumors.

When to get medical help

Arrange a medical appointment for recurring ulcer symptoms, ongoing watery diarrhea, unexplained weight loss or reflux that does not improve with usual treatment. These symptoms have many possible causes and do not necessarily mean you have a gastrinoma.

If you have a diagnosed gastrinoma, contact your treating team promptly if symptoms return despite acid-blocking medicine, you cannot keep the medicine down, swallowing becomes difficult, or diarrhea causes weakness or dehydration. Report treatment side effects that interfere with daily life.

Seek urgent or emergency care for:

These symptoms may indicate ulcer bleeding, perforation, obstruction or severe dehydration.

- Vomiting blood or material resembling coffee grounds
- Black, tar-like stools, especially with dizziness or weakness
- Sudden, severe or rapidly worsening abdominal pain

- Fainting, confusion, severe weakness or signs of major blood loss
- Persistent vomiting that prevents drinking or taking essential medicine

Common questions

Is a gastrinoma cancer?

A gastrinoma is a neuroendocrine tumor with the potential to spread. Some remain localized for long periods, while others reach lymph nodes or the liver. Its grade and extent provide important information about its behavior.

Is gastrinoma the same as Zollinger-Ellison syndrome?

No. A gastrinoma is the tumor producing excess gastrin. Zollinger-Ellison syndrome is the resulting pattern of severe acid production, ulcers, reflux or diarrhea.

Can a gastrinoma be cured?

Sometimes. Complete surgery can cure a localized gastrinoma. Tumors that cannot be removed or have spread may not be curable, but treatment can often control acid symptoms and slow growth.

Why can't I simply stop my acid medicine before testing?

PPIs can affect gastrin results, but stopping one when gastrinoma is possible may cause a rapid, dangerous return of acid production. Any change must be planned and supervised by the specialist arranging the tests.

Is gastrinoma inherited?

Most cases are not known to be inherited. Some occur with MEN1, particularly when there are multiple tumors or a personal or family history of parathyroid, pituitary, pancreatic or duodenal tumors.

What should I eat if I have a gastrinoma?

No diet cures gastrinoma. Choose foods you tolerate and avoid those that clearly worsen reflux or diarrhea. Discuss persistent weight loss, greasy stools or difficulty eating with your care team.

Sources

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- North American Neuroendocrine Tumor Society: Consensus Guidelines for Surveillance and Medical Management of Pancreatic Neuroendocrine Tumors, Pancreas , 2020
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