

## Patient information from the BMJ Group

# Appendicitis

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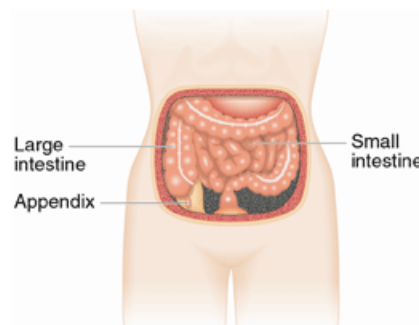
## Appendicitis

Having appendicitis can be painful and distressing. You'll most likely need an operation. But most people recover completely and don't have any problems afterwards.

We've brought together the best research about appendicitis and weighed up the evidence about how to treat it. You can use our information to talk to your doctor and decide which treatments are best for you.

## What is appendicitis?

If you have appendicitis it means your appendix is inflamed.



Your appendix is about 5 to 10 centimetres long.

Your appendix is a small tube of tissue that is attached to a part of your intestine called the **colon**.

It sits in the lower right part of your abdomen and is about 5 to 10 centimetres long (about 2 to 4 inches).

Doctors aren't exactly sure why some people get appendicitis, but they think that it tends to happen when the appendix gets blocked. Fluid, hard bits of stool, or swollen **lymph glands** can get trapped in the appendix, and when this happens the appendix becomes **inflamed** or **infected**. This leads to the painful symptoms of appendicitis. Other causes of inflammation, such as infection or inflammatory bowel disease, may also trigger appendicitis. <sup>[1]</sup>

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If you have appendicitis you will probably need surgery to remove your appendix. But the appendix doesn't do anything very important. So taking it out won't cause problems with your digestion later.<sup>[2]</sup> If your appendix is inflamed and you don't have it taken out, you could have serious problems.

### What are the symptoms of appendicitis?

The first thing you'll probably feel if you have appendicitis is pain around your belly button.

After about four to six hours, the pain may travel to the right side of your lower abdomen.<sup>[3]</sup>

You probably won't feel like eating and you might vomit. You may also:<sup>[3]</sup> <sup>[4]</sup>

- Have cramp-like pain in your abdomen
- Have a slight temperature (about 37.7 °C to 38.3 °C, or 100 °F to 101 °F)
- Have constipation or, less commonly, [diarrhoea](#)
- Have pain that gets worse when you move, take a deep breath, cough, or sneeze
- Feel like you need to pass a stool
- Feel more comfortable being bent over, or lying with your knees drawn up.

But not everybody gets all of these symptoms. You might not get these symptoms if you:

- Are very young or very old
- Are pregnant
- Have an appendix that is not in the usual place
- Have other medical problems such as [diabetes](#) or cancer.

If your child has a pain in their abdomen and a high temperature, they are more likely to have appendicitis than if they just have a pain in their abdomen.<sup>[5]</sup>

If you think that you or your child might have appendicitis, see your doctor or go to hospital immediately.

### How common is appendicitis?

Appendicitis is the most common reason to have emergency surgery.

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About 1 in 10 people get appendicitis at some time in their life. <sup>[6]</sup> Men are slightly more likely to get it than women. It can happen at any age, but it is most common between the ages of 10 and 19. Overall about 40,000 people in England each get appendicitis each year. <sup>[7]</sup>

Appendicitis seems to be getting less common, but doctors aren't sure why. It could be because people are eating more fibre. It could also be that we are better at preventing the spread of germs, so we get fewer infections. However, there's no proof of these theories.

### What treatments work for appendicitis?

If you have appendicitis, you will probably need surgery to take out your appendix. Most people recover well.

### Key messages about treatment for appendicitis

- You can have surgery through a few small cuts in your abdomen (called **keyhole surgery** or **laparoscopic surgery**), or through one larger cut (called **open surgery**).
- Keyhole surgery may cause less pain after your operation, and may allow you to leave the hospital sooner than if you have open surgery. It may also help prevent you from getting an infection where the surgeon cut your skin (a wound infection).
- Being given antibiotics around the time of your operation might reduce your chances of getting an infection afterwards.
- If you can't have surgery for any reason, antibiotics alone can be used to treat appendicitis.

Which treatments work best? We've looked at the research and given a rating for each treatment according to how well it works.

### Treatment Group 1

#### Treatments for appendicitis

##### Treatments that work

- [Appendectomy \(surgery to remove the appendix\)](#)
- [Antibiotics with surgery](#)

##### Treatments that work, but whose harms may outweigh the benefits

- [Antibiotics alone](#)

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## What will happen to me?

If you have appendicitis, you will probably need surgery to take out your appendix. Your doctor may call this an appendectomy.

Your appendix can be removed through **open surgery**, when the surgeon makes a cut in your lower abdomen. Or it can be done through **keyhole surgery**, which is done using three or four smaller cuts, and with the help of cameras. Keyhole surgery is also called **laparoscopy**.

When you go to your doctor with pain in your abdomen, he or she will feel the area to see if it is tender. If your doctor thinks you might have appendicitis, he or she may do some tests, such as blood tests. If you are a woman, your doctor may suggest a test to see if you're pregnant. That's because appendicitis can be more difficult for your doctor to spot if you're pregnant.

At the hospital, you may have a scan to see whether your appendix is inflamed or has burst. This could be an **ultrasound** or a **computed tomography (CT) scan**. A CT scan may be a little more accurate, but an ultrasound is quicker to do. <sup>[8]</sup>

Sometimes your doctor may still not be sure whether you have appendicitis. This is more likely if you are a woman. To find out for certain whether you have appendicitis, your doctor may do keyhole surgery (laparoscopy) to look inside your abdomen. If you have appendicitis, your appendix can be taken out during the operation.

It's difficult to say what would happen to you if you got appendicitis and didn't have surgery. Sometimes an **inflamed appendix** bursts. This can cause a dangerous **infection** in your abdomen, called **peritonitis**. Between about 2 in 10 and 4 in 10 people get a burst appendix a day or two after they first get symptoms of appendicitis. <sup>[9]</sup> So doctors think it is very important to take out a person's appendix quickly.

A burst appendix is more common in babies, young children, and older people. That's because appendicitis is harder for doctors to spot in children and older people. <sup>[9]</sup>

If your appendix does burst, you'll probably need emergency surgery. And you'll be given **antibiotics** to treat your infection. A burst appendix is more serious than ordinary appendicitis, but most people still recover well.

We don't know what happens to people who don't have treatment for appendicitis. It wouldn't be fair to do studies, because we know that a burst appendix can be dangerous. However, some people do seem to get appendicitis that goes on its own. <sup>[10] [11] [12]</sup> And one study found that at least 10 in 100 people seem to get better without treatment. <sup>[13]</sup>

After surgery, most people recover very well from appendicitis. However, all operations have risks. It is possible for someone to die during surgery to remove their appendix. But the risk is very small. Less than 3 in 1,000 people die during the operation or soon afterwards. <sup>[14]</sup> If someone's appendix bursts before surgery, the risk is slightly higher,

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but most people still recover completely. About 17 in 1,000 people die if their appendix bursts before they have surgery. <sup>[14]</sup>

Some other problems that might happen after surgery for appendicitis are:

- An infection in the place where the surgeon cuts your skin
- An infection and sac of pus inside your abdomen (an abscess)
- Problems from the **anaesthetic**: for example, some people are **allergic** to anaesthetic. Tell your doctor if you have any allergies.

It will take time to recover from surgery, and you'll need to build up your strength before returning to your normal activities. Talk to your doctors or nurses about what you can expect.

Sometimes, after a surgeon has removed someone's appendix, tests show that it was normal. Although surgery has some risks, there's a chance someone's appendix could burst if they don't get treatment. So most doctors think it's better to have the operation and be on the safe side. That's why surgeons sometimes end up removing a healthy appendix.

Studies show that people who've had their appendix taken out are more likely than other people to be diagnosed with [Crohn's disease](#) during the next four years. <sup>[15]</sup>

But that's not because the operation causes Crohn's disease. It's more likely that some people who had undiagnosed Crohn's disease were wrongly thought to have appendicitis and had their appendix taken out. When the symptoms continued, they had more investigations and were diagnosed with Crohn's disease.

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## Treatments:

### Appendectomy

In this section

If you have appendicitis, you'll probably need surgery to take out your appendix. If your appendicitis isn't treated, your appendix can burst. This is called a ruptured or perforated appendix. A burst appendix can cause a serious **infection** inside your body. So doctors think that it's important to take out your appendix before this happens. If your appendix does burst, you'll probably need emergency surgery. You'll also be given treatment to prevent infections.

There are two types of surgery for appendicitis:

- **Open surgery**: your surgeon makes a cut in the lower right part of your abdomen to take out your appendix

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- **Keyhole surgery** (laparoscopy): your surgeon makes three or four smaller cuts, and does the operation with the help of cameras.

You'll be given a **general anaesthetic** so you will be asleep during the surgery. After your operation, the surgeon will close the cut or cuts on your abdomen with stitches or clips. You'll have these taken out after a few days. The cut will leave a scar, or several smaller scars if you had keyhole surgery. These scars fade away slowly over time.

You may have some pain after your operation. You'll be given painkillers to help with this. If the painkillers don't help your pain, tell a doctor or nurse. They'll give you a different painkiller or a bigger dose.

You'll probably go home within a few days, depending on what kind of surgery you have. Most people do very well after surgery for appendicitis.

There isn't much difference between the two kinds of operation. Three big summaries of the research found that there were some differences in how people recovered after these operations. Adults who had keyhole surgery rather than open surgery: <sup>[16]</sup> <sup>[17]</sup> <sup>[18]</sup>

- Were less likely to get an infection where their skin was cut (a wound infection)
- Had less pain after their operation
- Went home from hospital sooner
- Got back to work faster
- Were more likely to get a small pocket of pus inside their abdomen (an abscess) after the surgery. If this happens, you'll probably have a tube put into your abdomen to drain the pus.

Five studies of children found that those who had keyhole surgery rather than open surgery: <sup>[16]</sup>

- Were less likely to get a wound infection
- Went home from hospital sooner.

Pain, time spent in bed, and the risk of getting a sac of pus (an abscess) in their abdomen were the same in children who had keyhole surgery and those who had open surgery. <sup>[16]</sup> <sup>[19]</sup>

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## Antibiotics with surgery

In this section

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If you have appendicitis, you'll be given **antibiotics** to help prevent any infections after surgery. Your doctor will give you the antibiotics as a drip (also called an **intravenous infusion** or IV). You may need to carry on having the antibiotics for a few days after your operation.

If your appendix bursts, it can cause a serious infection. Most people will need emergency surgery and treatment with antibiotics.

One big summary of the research (called a **systematic review**) looked at 20 studies. It found that if you're an adult, having antibiotics with surgery for appendicitis can reduce the risk of getting an infection afterwards. <sup>[20]</sup>

- With antibiotics, 7 in 100 people got a wound infection.
- Without antibiotics, 15 in 100 people got a wound infection.
- With antibiotics, less than 1 in 100 people got an infection inside their abdomen (called an abscess).
- Without antibiotics, 2 in 100 people got an infection of some kind.

We're not certain how much antibiotics help children with appendicitis. There hasn't been as much research in children as there has for adults. If a child gets to hospital with a burst appendix or a sac of pus inside his or her abdomen, antibiotics help prevent wound infections after their operation. <sup>[20]</sup> But we need more research to be able to say whether antibiotics help children who don't have these problems.

We don't know which antibiotics are best for appendicitis surgery because there hasn't been much research about this. Here are some antibiotics that might be used (and their brand names): <sup>[21]</sup> <sup>[22]</sup> <sup>[23]</sup>

- Ceftriaxone (brand name Rocephin)
- Gentamicin (Cidomycin, Genticin)
- Tobramycin (Tobi)
- Metronidazole (Flagyl)
- Ciprofloxacin (Ciproxin).

Antibiotics can have side effects. You may get pain where the drip goes into your body (this will probably be in your forearm or the back of your hand). Some people get an **allergic reaction**, feel sick, or get **diarrhoea**. <sup>[21]</sup> <sup>[22]</sup> <sup>[23]</sup> But the side effects you get will depend on which antibiotics you take.

## Antibiotics alone

In this section

An operation is the usual treatment for appendicitis. But if you aren't healthy enough to have surgery, your doctor will probably recommend that you have **antibiotics** instead. There's some evidence to show that this can help.

One study showed that antibiotics help reduce pain from appendicitis.<sup>[24]</sup> People in the study who took antibiotics were able to leave hospital after a couple of days. A year later, two-thirds of those who had antibiotics needed no further treatment. One-third of them had to go back to hospital to have their appendix taken out.<sup>[24]</sup>

A second study showed that men treated with antibiotics and men treated with surgery needed about the same amount of time off work (8 to 10 days). But more than one-quarter of men treated with antibiotics needed to have their appendix taken out during the next year.<sup>[25]</sup>

A third study showed that people treated with antibiotics were more likely to get peritonitis (an inflammation of the thin tissue that lines the inner wall of the abdomen), than people who had surgery.<sup>[26]</sup>

A review of the research (a **systematic review**) pooled the results of these studies and one additional study.<sup>[27]</sup> It found that people treated with antibiotics weren't any more likely to have their appendix rupture than those who had surgery. About 20 in 100 people treated with antibiotics ended up having surgery to remove their appendix in the following year. However, the high number of people taking antibiotics who didn't need surgery - 80 in 100 - suggests antibiotics may be a reasonable first treatment for some people with appendicitis, even if they're able to have surgery. But we need more research to explore this.

The antibiotics used in the studies included amoxicillin plus clavulanic acid (brand name Augmentin), cefotaxime (Claforan), ofloxacin (Tarivid), metronidazole (Flagyl), and tinidazole (Fasigyn).

You'll probably start off having antibiotics as a drip (also called an **intravenous infusion** or IV). You may switch to tablets when you're well enough to eat.

Antibiotics can have side effects. You may get pain where the drip goes into your body (this will probably be your forearm or the back of your hand). Some people get an **allergic reaction**, feel sick, or get **diarrhoea**.<sup>[21]</sup> <sup>[22]</sup> <sup>[23]</sup> But the side effects you get will depend on which antibiotics you take.

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## Further informations:

**Glossary:**



# Appendicitis

## **colon**

Your colon is the first 2 metres (6 feet) of your large intestine. During digestion, food travels from your stomach to your small intestine and then to your large intestine. What's not digested then leaves your body as a stool.

## **lymph nodes**

Lymph nodes (also called lymph glands) are small, bean-shaped lumps that you can't usually see or feel easily. You have them in various parts of your body, such as your neck, armpits, and groin. Lymph nodes filter lymph and remove unwanted things from your body, such as bacteria and cancer cells.

## **inflammation**

Inflammation is when your skin or some other part of your body becomes red, swollen, hot, and sore. Inflammation happens because your body is trying to protect you from germs, from something that's in your body and could harm you (like a splinter) or from things that cause allergies (these things are called allergens). Inflammation is one of the ways in which your body heals an infection or an injury.

## **infection**

You get an infection when bacteria, a fungus, or a virus get into a part of your body where it shouldn't be. For example, an infection in your nose and airways causes the common cold. An infection in your skin can cause rashes such as athlete's foot. The organisms that cause infections are so tiny that you can't see them without a microscope.

## **diarrhoea**

Diarrhoea is when you have loose, watery stools and you need to go to the toilet far more often than usual. Doctors say you have diarrhoea if you need to go to the toilet more than three times a day.

## **diabetes**

Diabetes is a condition that causes too much sugar (glucose) to circulate in the blood. It happens when the body stops making a hormone called insulin (type 1 diabetes) or when insulin stops working (type 2 diabetes).

## **fibre**

Fibre is all the parts of food that the body can't absorb. This is why foods that are high in fibre make you have more bowel movements. When your body can't absorb something, it leaves your body in your stools. Foods high in fibre include wholemeal bread and cereals, root vegetables and fruits.

## **ultrasound**

Ultrasound is a tool doctors use to create images of the inside of your body. An ultrasound machine sends out high-frequency sound waves, which are directed at an area of your body. The waves reflect off parts of your body to create a picture. Ultrasound is often used to see a developing baby inside a woman's womb.

## **CT scan**

A CT scan is a type of X-ray. It takes several detailed pictures of the inside of your body from different angles. CT stands for computed tomography. It is also called a CAT scan (computed axial tomography).

## **antibiotics**

These medicines are used to help your immune system fight infection. There are a number of different types of antibiotics that work in different ways to get rid of bacteria, parasites, and other infectious agents. Antibiotics do not work against viruses.

## **anaesthetic**

An anaesthetic is a chemical that blocks the ability to feel sensations like pain or heat. A local anaesthetic blocks the feeling in a specific area of the body. For example, your dentist uses a local anaesthetic like lignocaine in your gums so that you don't feel the pain of having a cavity filled. A general anaesthetic makes you completely unconscious and is usually used only in a carefully controlled environment like an operating room.

## **allergic reaction**

You have an allergic reaction when your immune system overreacts to a substance that is normally harmless. You can be allergic to particles in the air you are breathing, like pollen (which causes hay fever) or to chemicals on your skin, like detergents (which can cause a rash). People can also have an allergic reaction to drugs, like penicillin.

## **general anaesthetic**

You may have a type of medicine called a general anaesthetic when you have surgery. It is given to make you unconscious so you don't feel pain when you have surgery.

## **intravenous infusion**

When a medicine or a fluid, such as blood, is fed directly into a vein, it's called an intravenous infusion (or IV). To give you an intravenous infusion, a nurse, technician or a doctor places a narrow plastic tube into a vein (usually in your arm) using a needle. The needle is then removed and the fluid is infused (or dripped) through the tube into the vein.

## **systematic reviews**

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A systematic review is a thorough look through published research on a particular topic. Only studies that have been carried out to a high standard are included. A systematic review may or may not include a meta-analysis, which is when the results from individual studies are put together.

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