

# Appendicitis— Patient Education Series: understanding trauma and emergency surgery conditions

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## BACKGROUND

### Location

The appendix is a small tube-like structure about 3–4 inches long attached to the large intestine in the right lower abdomen.

### Function

The appendix is a non-essential organ. It can become blocked by stool, a foreign body, or cancer leading to irritation and infection, or it can even rupture (burst, perforate) and form a pocket of infection or pus called an abscess.

### Symptoms

The classic symptom of appendicitis is abdominal pain that begins near the belly button and then shifts to the right lower side. This pain usually worsens with movement, coughing, or activities. Other symptoms can include nausea, vomiting, loss of appetite, fever, and a swollen abdomen. Less common symptoms include right lower back pain and pain with passing urine.

## WHAT HAPPENS IN THE HOSPITAL

### Diagnosis

At the hospital, the medical team will conduct a physical examination, focusing on the abdomen. They may also order imaging tests, such as an ultrasound or CT scan, to confirm the diagnosis. Blood tests are often done to check for signs of infection or inflammation.

Based on the above findings, appendicitis can be either acute uncomplicated (simple) or acute complicated (complex); we will discuss both.

## ACUTE UNCOMPLICATED (SIMPLE)

### APPENDICITIS

#### Medical (non-surgical) options

##### Antibiotics

Antibiotics (Abx) are used to treat the infection in the appendix. These Abx are typically administered intravenously in the hospital and may be continued by pill (orally) after discharge. In some cases, particularly with simple appendicitis, doctors will discuss with you how to manage the condition without surgery. This typically involves Abx to fight the infection and careful monitoring to ensure the appendix does not worsen. Within 90 days of treatment, about three out of 10 people will have symptoms again and may need surgery.

##### Pain control

This may include a combination of medications such as acetaminophen/paracetamol, non-steroidal

anti-inflammatory drugs (commonly ibuprofen), and sometimes stronger pain medicines called opioid narcotics, depending on the severity of the pain.

## ACUTE COMPLICATED (COMPLEX) APPENDICITIS

Complex appendicitis is when the appendix is ruptured (or burst or perforated), meaning there is a hole in the appendix which often leads to leakage of bacteria into the abdomen which then may lead to a pocket of infection in the abdomen (abscess). Approaches to complicated appendicitis are typically Abx, possible drain placement (to drain the pocket of infection and allow the Abx to work better), and possible surgery in 6–8 weeks. We try to avoid immediate surgery in these scenarios as we may cause injury to organs surrounding the appendix due to a large amount of inflammation and irritation around the infected appendix. Sometimes emergency surgery is needed if the infection causing severe sickness spreads through the blood (sepsis) and there is a risk of death due to the infection.

### Antibiotics

Abx are typically administered intravenously in the hospital and may be continued orally by pill after discharge.

### Interventional radiology drain

If an abscess (pocket of infection) has formed, it may be drained using a procedure performed by an interventional radiologist that is less invasive than surgery. Under X-ray imaging guidance (usually a CT or ultrasound), a needle is inserted into the pocket of infection to drain the fluid, often followed by the placement of a drain to allow continued drainage. Patients are often discharged home with the drain still in place and so will be taught how to take care of the drain at home. This drain will be removed by the surgeon either in the clinic or in the operating room if having a scheduled surgery to remove the appendix in the near future.

### Interval appendectomy

After the infection and inflammation have calmed down, typically within 6–8 weeks, an interval appendectomy may be performed, if your doctor decides this is needed. This surgery removes the appendix to prevent the recurrence of appendicitis. This will be done in a similar fashion as to the uncomplicated appendectomy.

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## SURGICAL OPTIONS FOR ACUTE UNCOMPLICATED (SIMPLE) APPENDICITIS AND FOR INTERVAL APPENDECTOMY

### Surgery

The definitive treatment for appendicitis is usually surgical removal of the appendix, known as an appendectomy. After permission from the patient (informed consent) is obtained, the patient will be advised not to eat or drink anything, Abx may be started or continued, and surgery will typically take place within several hours.

### Types of surgery

There are two main types of appendectomy:

- ▶ Laparoscopic/robotic appendectomy: This minimally invasive procedure involves small incisions and the use of a camera to guide the surgery.
- ▶ Open appendectomy: Open appendectomy is still common around the world, even though it is less frequent in the US. Open appendectomy is another safe approach to remove the appendix. This involves a larger incision in the middle or right lower portion of the abdomen to remove the appendix.

## CARE AFTER SURGERY

### Initial hospital care

Postsurgery patients are observed in the recovery room for a couple of hours. If surgery was straightforward, then patients will be given some fluids to drink and are discharged home with caregivers. Patients are encouraged to start moving as soon as possible. They will receive instructions on wound care, activity restrictions, and follow-up appointments.

### Typical course between surgery and discharge

If a patient undergoes an open appendectomy, or a pocket of infection was encountered during surgery, or there were any concerning findings during the surgery, the patient may be admitted to the surgical floor and observed. Most patients can leave the hospital within 1–2 days after a laparoscopic appendectomy and slightly longer after an open appendectomy.

## WHAT HAPPENS NEXT

### Discharge location

Most patients will be discharged to their homes after surgery.

## WOUND CARE

Patients should keep the incision site clean and dry. Most wounds are closed with dissolving sutures, but if staples are placed, then those will be removed at your clinic appointment. Typically, the skin is covered with skin glue which falls off on its own. Some wounds are covered with Steri-Strips (small white stickers) (3M Healthcare, USA) which also fall off on their own. Watch for signs of infection, such as redness, swelling, or drainage of the wound, and notify your doctor if any of these occur. Follow-up visits with the surgeon are typically scheduled to check the wound.

## DRAIN CARE

If you have a drain, empty it daily and keep a record of how much comes out. You will be taught how to take care of the drain prior to discharge.

## PATHOLOGY

The appendix will be sent to the pathology laboratory to be looked at under the microscope. The surgeon will discuss the results with you when you see them in the clinic.

## DIET

Regular (normal) diet is typical after surgery. Surgeons will advise otherwise if indicated.

## ACTIVITY

Patients are encouraged to walk and move around to promote circulation.

- ▶ No surgery (only Abx):
  - No activity restrictions.
- ▶ Surgery:
  - Your doctor may recommend no heavy lifting for a short time after surgery (often 2–4 weeks). ‘Heavy’ usually means nothing more than a gallon of milk or 10 lb.
  - No bathtubs/swimming pools/lakes, usually for 2–4 weeks.
  - Okay for showers and okay to run water over wounds for a brief period of time.
  - The surgeon will clear you for more activity and bathtub/swimming; instructions will usually be given during your clinic visit.

## RESOURCES

- ▶ <https://www.pcori.org/research-results/2015/comparing-antibiotics-versus-surgery-treating-appendicitis-coda-study>
- ▶ <https://www.pcori.org/sites/default/files/PCORI-Evidence-Update-Surgery-versus-Antibiotics-for-Adults-with-Appendicitis-for-Patients.pdf>

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