Infections
Common infections in transplant patients

In theory, you are at a higher risk of getting all kinds of infections, even the common cold and flu. This isn’t always the case, but we know that transplant patients are more likely to get infections caused by germs called **opportunistic invaders**.

Opportunistic invaders are germs, such as viruses or bacteria, which live in your body. Most of the time they are not active and do not cause infections. If they get the chance (or “opportunity”), though, they will become active again and infect you when your defenses are down. These infections are most common in people who are chronically ill, the elderly, and in people who, for one reason or another, have a reduced immune system. If you take medicine to lower your immune system to prevent rejection, you are more likely to be affected by opportunistic invaders.

In this chapter, we describe many of the opportunistic infections that transplant patients may get. There are four main types:

1. Viral.
2. Bacterial.
3. Fungal.
4. Protozoal.

We will also take a look at common infections, such as colds and the flu.

**Viral Infections**

Viral infections can be either **primary** or **secondary**. A primary viral infection is when a virus causes an infection in a person for the first time. The virus then stays in your body, inactive (or **dormant**), waiting for a chance to make you sick again. A secondary infection is when the dormant virusreactivates and causes another infection. It is not clear what makes viruses reactivate, but we do know that people with reduced immune systems, chronic illnesses, or increased stress are at greater risk.
Infections

Herpes viruses are the most common cause of viral infections in transplant patients. There are several different viruses in the herpes family.

- Herpes simplex virus (HSV, which causes cold sores and genital herpes).
- Varicella zoster virus (VZV, which causes chicken pox and shingles).
- Cytomegalovirus (CMV, which can cause a gastrointestinal infection, pneumonia, or an illness similar to mononucleosis).

**Herpes Simplex Virus Type 1 and Type 2**

Between one-third and one-half of all transplant patients will develop skin sores (or “lesions”) as a result of infection with a herpes simplex virus (HSV). Nearly 80 percent of people have an HSV Type 1 infection by age 25, so most of these infections are secondary rather than primary.

**HSV Type 1** causes sores or lesions on the lips or mouth. These are commonly known as cold sores. HSV Type 2 causes lesions on the genitals (the private parts). These look just like cold sores. Type 1 lesions can be spread to the genital area, and Type 2 lesions can be spread to the mouth and lips. A test called a tissue culture is needed to find out which virus is causing the infection.

HSV Type 1 and Type 2 infections are both seen most often in the first 6 months after transplant. This is because you are on higher doses of immunosuppressive medicines. They are also seen quite often after treatment for rejection. Again, this is because of the higher doses of immunosuppressive medicines used to treat rejection.

As time goes on, your doses of immunosuppressive medicines will be lowered, so your chance of having an HSV infection will also go down. Other factors that may lead to a secondary infection are stress, bacterial infections, illness, anxiety, friction, or rubbing, and, in women, menstruation. Sunlight may also reactivate cold sores (HSV Type 1).

Only about 15 percent of people with healthy immune systems get secondary infections. In immunosuppressed patients, the rate is almost 100 percent. Secondary infections are usually less severe than primary infections. The immune system makes antibodies to the virus during the first infection, which provides some defense against the virus if it reactivates.

In this section we will look at the main viral infections that affect transplant patients. All of them belong to the Herpes family.
Symptoms

The Three Stages

- **Prodrome**: Symptoms include tingling, itching, numbness, or a prickly feeling on your skin. That area is likely to be contagious at this stage (that is, you can pass the virus to another person).

- **Lesions**: Reddish areas turn into water-filled blisters. DO NOT POP THESE BLISTERS! The liquid is full of viruses. These sores may last from 1 to 4 weeks. They are still contagious at this stage.

- **Scabs**: The sores will develop crusty scabs during this phase. They are probably not contagious at this point. It is important to keep them clean and dry to help them heal.

Spreading the Infection

Herpes simplex infections can be passed to other people at any time from the start of the prodrome phase until the start of the scabbing stage. It is spread when the affected skin comes into contact with another person’s skin.

If you have cold sores on your mouth or lips (HSV Type 1), avoid kissing or sharing food and drinks with others. Do not place or store your toothbrush, razor, tweezers, comb, brush, or other hygienic equipment near anyone else’s. During an outbreak, use a disposable razor. After the outbreak is resolved, replace your toothbrush, comb, razor, and other items as needed. And, use boiling hot water to clean your tweezers.

If you have genital sores (HSV Type 2), avoid sexual contact that would cause the lesions to come into contact with your partner. Condoms are not good protection against herpes infection.

To prevent spreading sores around your own body, do not dry them with a bath towel and then use the towel to dry other parts of your body. Always dry the affected areas last. Also, any time you touch an affected area, wash your hands carefully before you touch any other part of your body.

Treatment

If you have any symptoms that seem like they might be Herpes simplex lesions, please call the transplant team.

Lesions will be tested for an exact diagnosis, to see if they are caused by HSV Type 1 or HSV Type 2, or by another virus.
Varicella zoster virus (VZV) is a very common virus. It is the organism that causes both chicken pox and shingles.

Your treatment will depend on how long it has been since your transplant, the severity of the infection, and how many times you have had HSV infections in the past (if at all). You will be given a medicine called Acyclovir, either as pills or as a liquid through an IV. In some cases, you may be given Acyclovir cream to put directly on the affected area.

Keep the sores clean and dry. Do not use any other medicines of any kind to treat these lesions unless we give you a prescription.

Do not re-start Acyclovir treatments on your own if you get another infection. Call your transplant team to report your symptoms.

**Varicella Zoster Virus Infections**

The first time you are infected with the varicella (ver-ih-sell-uh) zoster virus (VZV), you get chicken pox. This is the primary infection. The secondary infection of VZV is called shingles.

**Chicken Pox**

Chicken pox (primary VZV) is a very contagious disease that most often occurs during childhood. It is very common and usually not very serious. As a childhood disease, chicken pox mainly affects the skin, mouth, and throat. Most children get better in 7 to 10 days. Adults who catch chicken pox often have a more serious case of the illness, and it takes much longer for them to recover.

In transplant patients, chicken pox as a primary infection can be a very serious disease. Immunosuppression allows the virus to spread to many different body organs. In very rare cases, transplant patients who had childhood chicken pox may reactivate the virus or else get infected with a different strain of the virus (from a child or grandchild, for instance). This can lead to a new case of chicken pox.

Because this infection can be severe (including a serious viral pneumonia), transplant patients must take special care to avoid contact with anyone who is thought to have chicken pox.

**Symptoms**

- **Prodrome**: This stage involves symptoms similar to a cold or the flu such as fever, loss of appetite, and general flu-like symptoms for a day or two. The person is contagious at this point.

- **Rash**: Small, blister-like sacs filled with fluid appear on the chest, back, and belly. The rash will then spread to the face, arms, legs, and the inside of the mouth. After a few days, the sacs burst and start to scab over. The person is still contagious at this stage.
• **Crusting-Over**: No new blisters appear at this point. All sores are in the final stages of healing or scabbing over. In all, it takes about 7 to 10 days from the time the first symptoms appear to get to the healing stage. The person is no longer contagious at this point.

**Infections**

**Spreading the Infection**

Primary VZV infections are spread by getting close (usually about a foot or less) to someone who is in the prodrome or rash stage of chicken pox.

Once you have been exposed to chicken pox, it takes between 10 and 21 days before you start to show any symptoms.

**Treatment**

Transplant patients who have not had chicken pox and are exposed to it must be treated within 48 hours. They are given a shot of a medicine called V-ZIG (varicella zoster immune globulin). V-ZIG helps protect you for about 3 weeks. It cannot ensure that you will not get chicken pox, but it may help make your course of the illness less severe.

If you do come down with chicken pox, expect a hospital stay and treatment with a medicine called Acyclovir for at least 14 days. It is given through an IV.

**Shingles**

Shingles is also a form of VZV infection. It is the secondary VZV infection. After a person has had chicken pox, the virus may stay in the body, inactive, for many years. If the virus settles in the nerve roots of the spinal column and then reactivates, the result is a case of shingles.

**Symptoms**

- **Prodrome**: The main symptom is severe burning or tingling pain in the affected area of skin. This stage may last for several days.

- **Rash or Lesions**: Small, blister-like sores appear over the affected areas. The patient may continue to feel sharp, knife-like pain in the affected areas for several weeks, or even longer. Fluid from the sores can pass the virus to another person.

- **Scabbing**: No new sores or blisters appear at this point. All of the sores are in the final stages of healing or scabbing over. At this point, the person is no longer contagious.
Cytomegalovirus (CMV) is the single most important type of virus that affects immunosuppressed patients. There are many different strains of CMV that cause widespread infection.

Cytomegalovirus Infection

Almost 80 percent of people have been infected with cytomegalovirus (sigh-toe-meg-ah-loe-vigh-rus) (CMV) by the time they are 25 years old. In the general population, CMV infections do not usually cause any symptoms, or else are passed off as a mild flu-like illness.

On the other hand, between 75 to 95 percent of transplant patients have physical symptoms of CMV infection. The infection can be detected with tests done in a laboratory. CMV infections occur most often during the first 4 months after transplant or after a period of treatment for rejection. This is because your doses of immunosuppressive medicines are higher during these times.

There are 3 common patterns of CMV infection in transplant patients. Each of them can result in symptoms of infection.

1. **Primary CMV** infection occurs after transplant when the patient has never had a CMV infection in the past but gets an inactive CMV virus from an infected donor. The virus is activated when the transplant patient starts taking immunosuppressive medicines.

2. **Secondary CMV** infection occurs when the transplant patient has already been infected with CMV. As noted above, about 80 percent of all people have had a CMV infection. When the patient begins taking immunosuppressive medicines, their own virus is reactivated. Almost all patients who had a CMV infection before getting a new heart will reactivate the virus after the transplant. However, only around 20 percent of these people will have actual symptoms of illness.

3. **Reinfection** is the third type of CMV infection that can happen after transplant. This type has only recently been identified. It occurs when patients who had a CMV infection before transplant become infected with an inactive virus of a different strain from

Spreading the Infection

Shingles are very contagious if the fluid from a burst lesion comes in contact with another person.

Treatment

The best treatment for shingles is Acyclovir, given through an IV. Some transplant patients will be admitted to the hospital to start IV treatment. If the case is mild, though, large doses of Acyclovir pills may be enough to treat the illness.
their donor. It is not yet certain how often this happens, nor how
the infection progresses. This is partly due to the fact that it is
very hard to tell which virus (the transplant patient’s own virus,
or the new virus from the donor) is causing the infection.

**Symptoms**

Fever is the main symptom of a CMV infection. The fever usually
goes up and down over a 24-hour period. This pattern may go on for
days or even weeks. When the fever spikes, all the other symptoms
worsen, too. Chills may come before or after these fever spikes.

Other common symptoms include fatigue, headache, muscle and
joint aches, upset stomach, loss of appetite, and diarrhea.

A serious CMV infection may lead to CMV pneumonia. Call your
transplant team if you have shortness of breath or a cough.

**Spreading the Virus**

CMV is spread by intimate contact with an infected person. This
includes anything from sharing saliva to sexual intercourse.

CMV is very unlikely to be spread by shaking hands or being in the
same room with an infected person. Good hand washing and wearing
a mask should be enough to protect you from infection.

**Treatment**

Most patients are given an anti-viral medicine called Ganciclovir
through an IV for 4 weeks after their transplant. This is to try to delay
or prevent the onset of a CMV infection.

Patients who are diagnosed with symptoms of CMV infection are
usually given additional Ganciclovir through an IV. This treatment
usually lasts at least 14 days. However, it may go longer, depending
on how serious the illness is.

Recovery from a CMV infection may take several weeks, or even
several months. You may have stretches of time where you do not
have any symptoms, then a period where you become ill again.
Please call your transplant team if you are undergoing a cycle of
symptoms. This is especially important if you have a fever.

Be patient with your recovery from a CMV infection. If you feel
tired, get lots of rest. Let your body tell you what it can and cannot
do. Try not to overdo activity or exercise. Keep in mind that this is
one infection that you won’t be able to just “snap out” of.
The Epstein-Barr virus (EBV) is another member of the herpes family. It is a common cause of infection in transplant patients. EBV causes an illness called mononucleosis, or “mono.” Epstein-Barr virus can appear as either a primary or secondary infection.

**Epstein-Barr Virus Infection**

Primary Epstein-Barr virus (EBV) infections in transplant patients can have some very serious effects. The most important one is an increased risk of lymphoma (lim-foh-muh). Lymphoma is a type of cancer that affects the lymphatic system.

**Symptoms**

The symptoms of both primary and secondary Epstein-Barr virus infections are very similar to those that occur with CMV illness. These include fever and chills, nausea, pain in the belly, loss of appetite, a sore throat, and swollen lymph nodes in the neck. As a rule, primary EBV infections cause a more severe illness than secondary infections.

**Spreading the Virus**

EBV is spread through close physical contact with an infected person. Several large studies have proven the old saying that mono is “the kissing disease” to be true. It is important that transplant patients avoid people with EBV infections.

**Treatment**

If you do get an EBV infection, the main treatment is to lower the doses of your immunosuppressive medicines. This will let your immune system help fight off the illness. At this time, anti-viral medicines such as Acyclovir or Ganciclovir do not seem to have much effect on EBV.

**Bacterial Infections**

**Nocardiasis**

Nocardiasis (noh-kar-die-uh-sis) has recently been found to be an opportunistic infection. As such, it is a common infection in people with lowered immune systems. The bacteria live in soil, and infection most often happens when you inhale them. Lungs are the usual site of nocardiasis infection.

**Symptoms**

There are many possible symptoms of a nocardiasis infection. The most common are:

- Fever.
- Night sweats.
- Loss of appetite.
- Cough.
Bacteria cause about 40 percent of infections in transplant patients. They often happen soon after transplant, while you are still in the hospital, but can happen any time afterward. Three of the most common bacterial infections are nocardiasis, legionellosis, and listeriosis.

Treatment
Nocardiasis is treated with a long-term course of antibiotic pills. This is usually very effective if treatment is started soon after you become infected.

Legionellosis (Legionnaire’s Disease)
Legionellosis (lee-jon-ell-oh-sis) is a lung infection that occurs in about 2 percent of heart transplant patients. Legionella, the germ that causes the illness, lives in both soil and water. However, it may travel through the air as well, where it can be inhaled. Once in the lungs, the infection causes a type of pneumonia. Some sources of legionella are air conditioners, water condensers, portable water sources (such as tanks or barrels), and areas where large amounts of soil have been dug up or disturbed, such as construction sites or crop fields. It is unknown for one person to pass the infection directly to another person.

Symptoms
The symptoms of legionellosis can vary widely from patient to patient. Some of the most common symptoms are:

- A vague sense of feeling unwell (“malaise”).
- Fever.
- Muscle aches.
- Headaches.
- Diarrhea.
- A dry cough.

Legionellosis can happen in other parts of the body besides the lungs, but this is uncommon. Should you have a legionella infection somewhere besides the lungs, you may have any of the symptoms listed above, except for the cough.

Treatment
Legionellosis can be treated with a number of different antibiotics. The length of time you will need to take them will depend on the type of medicine and how bad the infection is.

Listeriosis
Listeriosis (lis-tere-ee-oh-sis) is caused by a bacterium called listeria. About 75 percent of listeria infections show up as a kind of meningitis (men-in-jigh-tis). This is an illness where the lining of the
If you are given a course of antibiotics to treat an infection, it is important to finish the medicine. Even if you are feeling better, you must take all of it. Otherwise, the bacteria may only be weakened, not eliminated, and can cause further infection.

brain and spinal cord are inflamed. Most times, listeria meningitis occurs in children under a year old or in adults over age 55. However, patients with a lowered immune system are also at a greater risk of getting the infection no matter what their age.

Listeria usually enters the body in food that is contaminated with the bacteria. The most common foods are raw or under-cooked poultry, fresh salads, soft cheeses, and milk products. It is unknown for the infection to be passed directly from one person to another.

**Symptoms**

There are many symptoms of listeria meningitis. The most important are:

- Headaches.
- Fever.
- Increased irritability (feeling cranky).
- Personality change.
- Forgetfulness.

**Treatment**

Treatment involves high doses of antibiotics for up to several months. As with all infections that occur in immunosuppressed patients, successful treatment starts with early detection of the illness and prompt treatment.

**Fungal Infections**

Fungal spores that cause infections are most often found around construction sites or near farms, where there are compost piles and bird or chicken droppings. Exposure to these types of places on a regular basis can increase your risk of getting a fungal infection.

Three common fungal infections that occur in transplant patients are described below, along with their symptoms and treatments.

**Candida Infections**

Candida is a type of yeast spore that normally lives in your stomach and intestines (the gastrointestinal tract). It also lives in the female genital tract. Candida infections that spread through the body can lead to a serious or even life-threatening illness for a transplant patient. The most common sites for candida infection are the mouth (also called “thrush”), fingernails, toenails, and skin. In women, spores that live in the vagina can cause urinary tract infections as well as other symptoms. These may last for quite some time and come back often.
Fungal infections account for about 10 percent of infections commonly seen in transplant patients. Fungal spores are normal airborne particles. They are just about everywhere.

Symptoms

Because there are several sites for candida infection, there are also several groups of symptoms.

*Candida infection in the mouth:*
- White patches on the tongue or inside the mouth.
- Slight burning sensation in the mouth.
- Sores in the mouth or on the tongue.

*Candida infection of the skin or nails:*
- Itching or burning sensation.
- Scaly patches on skin.
- Thickening or yellowing of fingernails or toenails.

*Candida infection of the genitals:*
- Itching or burning sensation.
- Thick, white “cottage cheese” discharge.
- Unpleasant odor.
- Pain or discomfort during urination.

Treatment

Treatment of candida infection can happen on two levels. Transplant patients are usually given antibiotics to prevent infection soon after the transplant surgery. A very common one is Clotrimazole troches, which are dissolved in the mouth. Another is Nystatin liquid, which is swished around the mouth and swallowed. These are more fully described in the appendix, *Medications.* Ongoing or active candida infections can also be treated with other antibiotics.

*Aspergillosis*

Aspergillosis (ass-per-jill-*oh*-sis) is caused by a type of mold called aspergillus. This mold can grow on almost any organic material. It usually enters the body when it is inhaled into the lungs. Once there, it can cause a form of pneumonia.
Symptoms

Symptoms of aspergillus pneumonia may include:

- Fever.
- A cough that brings up phlegm or mucus (which may have spots of blood).
- Wheezing.
- Pain in the chest and sides.

There may be several other symptoms. In transplant patients, lung infections are generally diagnosed with a chest X-ray rather than based on symptoms.

Treatment

Treatment for aspergillosis must take place in the very early stages of the infection. The patient is given high doses of an anti-fungal medicine. The preferred medicine is called Amphotericin-B, which is given through an IV. Treatment lasts for several months.

Cryptococcosis

Cryptococcosis (krip-toe-koh-sehs) is caused by a yeast-like fungus called cryptococcus. The spores are found in the soil and in pigeon droppings. Cryptococcosis can occur in healthy people, but it is usually seen in immunosuppressed patients. Infection occurs when the spores are breathed into the lungs. The most common sites of cryptococcal infection in transplant patients are the lungs and spinal cord. In the lungs, it causes a type of pneumonia. When it infects the spinal cord, it leads to a form of meningitis.

Symptoms

Symptoms of cryptococcal pneumonia include:

- Chest pain.
- Fever.
- Cough.

Symptoms of cryptococcal meningitis may include:

- Headaches.
- Nausea.
- Reduced mental awareness.
- Unsteady or staggering walk.
- Blurry vision.
Protozoan Infections

Protozoan infections make up about 10 percent of the infections most often seen in transplant patients. Protozoa are tiny, single-celled organisms, such as the amoeba and certain kinds of simple plankton.

Protozoa are single-celled parasites that can cause disease in humans. They are common in the world, but only a few cause disease. The two protozoan illnesses most often seen in transplant patients are described below.

**Pneumocystis Carinii**

Pneumocystis carinii (noo-moh-sis-tiss care-in-eye) is an opportunistic invader that normally lives in the lungs, waiting for the chance to infect you. It causes pneumonia. Pneumocystis pneumonia is the common type of pneumonia that affects transplant patients. It is easily treated if it is diagnosed early. However, if it is left untreated, it can be fatal.

Some outbreaks of pneumocystis pneumonia in hospitals and medical centers have been shown to be due to person-to-person infection. However, pneumocystis infection in transplant patients is usually caused by the reactivation of a past infection, rather than catching the infection from another person.

**Symptoms**

The symptoms of pneumocystis pneumonia almost always include:

- Shortness of breath.
- A non-productive or dry cough.
- Fever and chills.
- Night sweats.
- Weight loss.

**Treatment**

Treatment of pneumocystis pneumonia begins with prevention. Most transplant patients are given a medicine called sulfamethoxazole/trimethoprim (also called SMZ/TMP, Bactrim or Septra) on a daily basis. Sometimes the treatment is an inhaled...
Infections

There are also several types of protozoan illnesses that you can catch from drinking unclean water. If you go on a hike or camping trip, be sure to bring a water sterilization kit, or plenty of clean, bottled water – do not drink directly out of rivers, lakes, or streams.

medicine that is given once a month. If pneumocystis pneumonia occurs, then the dose of these medicines is increased. Fortunately, prevention of the illness has been very successful in most transplant patients.

Toxoplasmosis

Toxoplasmosis (tock-so-plaz-moh-sis) is caused by a protozoan parasite called toxoplasma. These parasites usually live in members of the cat family, especially in pet housecats. In healthy people, toxoplasmosis is most often a symptom-free infection that goes away without any treatment.

However, in immunosuppressed patients, toxoplasmosis is an opportunistic infection that can lead to serious and widespread disease. While it can affect any organ system, it most often affects the central nervous system (the brain and spinal cord) in transplant patients.

The life cycle of toxoplasma is fairly complicated. It begins when the organism enters a cat’s digestive system. The parasite is called an oocyst at this point. It reproduces in the cat’s intestines, then leaves the animal’s body in its droppings. The parasite then moves into the soil where it is eaten by birds, mice, cattle or other animals. In this stage, the organism develops into another form called a tissue cyst. Once it gets to the tissue cyst phase, it can remain, inactive, in the host animal’s tissues for the rest of the animal’s life. However, it can reactive at any time.

How the Disease Is Spread

Toxoplasmosis infection in humans can occur in two ways. The first is by eating raw or under-cooked meat from an infected animal (beef, chicken, lamb, etc.). The second is exposure to cat feces containing the parasite, typically while cleaning out a pet cat’s litter box.

Symptoms

Symptoms of toxoplasmosis infection in immunosuppressed patients may vary widely from person to person. However, they often involve the central nervous system. Fever and changes in coordination (such as unsteady walking or problems holding or grasping objects) are very common.

Treatment

Treatment of toxoplasmosis infection is with high doses of antibiotics given through an IV. The best treatment, though, is prevention.
There are several steps you can take to reduce your chances of getting a toxoplasmosis infection.

- If you have any pet cats, they should be tested for toxoplasma before your transplant. Have them treated if the test comes out positive.
- Absolutely avoid contact with any cat droppings. If you have cats, someone else will need to clean out their litter boxes.
- Avoid eating any raw or undercooked meats.
- Uncovered food, including pet food, can get infected by flies or cockroaches. Do not leave any food sitting open to the air.

Other Common Infections

**Common Cold or Upper Respiratory Tract Infection (URI)**

The common cold can be caused by many viruses. Only about a third of the colds that affect the general population can be traced back to one virus. The common cold cannot be treated with an antibiotic, but you should be seen by the transplant team to make sure you do not have a more serious infection.

Any time you have a fever, shortness of breath, or cough, you need to report these symptoms to the transplant team. Also, any cold that hangs on for more than a few days needs to be checked by a doctor.

Even if you are trying to fight off “just a cold,” you can help your immune system by resting, eating properly, and drinking 6 to 8 glasses of water or healthy juice a day. Also, avoid other people who are ill. These things will not cure your cold, but they will help you recover faster.

**Influenza (Flu)**

This is a viral infection of the lungs and bronchial tubes. New strains of flu appear each year, often causing outbreaks or epidemics.

**Symptoms**

Common symptoms of the flu are:

- Fever.
- Chills.
- Sore throat.
- A runny nose.
- Headache.
- Cough.
- Muscle aches.
- Nausea and vomiting.
Most times, the flu lasts from 2 to 7 days. If you have any of these symptoms, call your transplant team. As with the common cold, we need to make sure you do not have a more serious infection.

**Respiratory (Lung) Infections and Pneumonias**

Respiratory or lung infections and pneumonias are common after transplant. They can be a very serious threat to your health. They are caused by viruses, bacteria, fungi, or protozoa. There are certain symptoms you should report to your transplant team. This will help us start your treatment faster.

**Symptoms**

Symptoms of lung infection and pneumonia include:

- A dry, hacking cough; or a cough that brings up yellow or green sputum.
- Fever.
- Shortness of breath.
- Pain in the chest when you breathe or cough.

Most lung infections and pneumonias will have at least some of these symptoms, but some opportunistic infections do not show any symptoms at all until the illness is quite far along. Chest X-rays are done on a regular basis after transplant to screen for lung problems, including infections.

**Treatment**

Treatment of lung infections and pneumonias depends on what is causing the illness. If you report symptoms to the transplant team early, it will help us make a quicker diagnosis and we will be able to start the right treatment faster. Many, but not all, lung infections and pneumonias are treated with antibiotics.

**Urinary Tract Infections (UTIs)**

The urinary tract is also a common site of infection for transplant patients. UTIs are most often caused by bacteria and fungi.
Symptoms

Symptoms of a UTI include:

- Fever.
- Cloudy or blood-tinged urine.
- Pain or burning when you urinate.
- Having a hard time starting a urine stream.
- A feeling of pressure over the area of the bladder.
- Urinating often, but feeling like you have not emptied your bladder.
- Urine that smells foul or especially strong.
- Pain in the right and/or left side of your back between your ribs and hip bones.

Diagnosis and Treatment

Most times a urine sample reveals what kind of germ is causing the UTI. UTIs can be very easy to treat if they are diagnosed and treated early. However, if the symptoms are ignored and treatment is not started, the infection may travel to the kidneys, or even into the blood. This can lead to a very serious illness. If you think you have a UTI, let the transplant team know right away.

Wound or Skin Infections

Skin sores and lesions are a common sign of infection, especially in immunosuppressed patients. Any new mole, rash, or irritation of your skin should be reported to your transplant team.

After your transplant, you will still have minor, everyday accidents that may result in a cut or scrape. You will need to rinse the cut or scrape with clean, cold water for several minutes. This will both help wash the area and slow any bleeding. Clean the wound with hydrogen peroxide and wrap it with a sterile gauze bandage. Keep it dry and clean until it scabs over.

If you have redness, swelling, pain, tenderness, warmth at the site of the wound, or draining pus, call the transplant team for further advice.
Questions?

Call 206-598-8181

Your questions are important. Call your doctor or health care provider if you have questions or concerns. UWMC Clinic staff are also available to help at any time.

Cardiac Transplant Office: 206-598-8181

Cardiology Clinic: 206-598-4300

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