

DIABETES AND INFECTION

People with diabetes are more prone to infection than those who do not have diabetes. Professor Paul Ananth Tambyah, Head, Division of Infectious Diseases, and Dr Michelle Balm, Senior Teaching Fellow, Department of Medicine, National University of Singapore, delve into the different kinds of infections that plague diabetics as well as what the H1N1 virus means for them.

Why are people with diabetes more prone to infection?

Infection tends to occur with greater frequency and severity in diabetic patients. Diabetics are more than twice as likely to need to be hospitalised due to infection as those without diabetes. Hyperglycaemia decreases the ability of many types of immune cells to function properly resulting in reduced efficiency in fighting invading germs, especially pyogenic (pus forming) bacteria and some fungi. In turn, infection results in uncontrolled hyperglycaemia which will further worsen the infection.

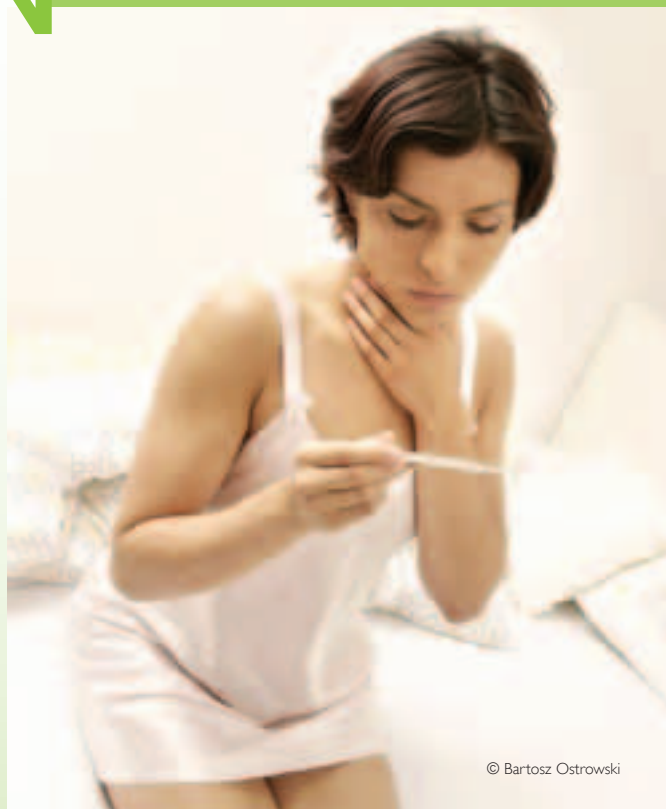
High glucose in tissues and body secretions provides an excellent environment for germs to thrive. Poorly controlled diabetes is associated with bladder and kidney infections, abscesses, skin and soft tissue infections, including diabetic foot infections and necrotising fasciitis, pneumonia and some fungal infections.

Other infections occur disproportionately often in diabetics. These include some severe illnesses such as melioidosis, invasive external ear infections (malignant otitis externa) and mucormycosis, a life threatening invasive fungal infection.

How do I recognize a urinary tract infection?

Urinary tract infections are common in diabetics due to high levels of sugar in the urine and often, incomplete bladder emptying from damage to bladder nerves. There is usually burning pain when passing urine, a need to pass urine frequently or sometimes discomfort in the lower abdomen or blood in the urine (hematuria). Most simple urinary infections respond well to three to five days of oral antibiotics. Generally a fever, back or flank pain suggest kidney infections which will usually need intravenous antibiotics. A scan of the kidneys is useful in diabetics with urinary infections.

Bacteria in the urine without any symptoms of infection (asymptomatic bacteriuria) are three times more common in people with diabetes. This does not predispose to infection and does not require antibiotics.



© Bartosz Ostrowski

What about abdominal infections?

People with diabetes are more prone to developing infections from pyogenic (pus forming) bacteria. These germs can cause infections in the skin and soft tissues and also cause abscesses in the liver, spleen or other abdominal organs. Usually infections like these will cause high fever, often with chills, and abdominal pain. Often the infections will respond very quickly to intravenous antibiotics but sometimes will require drainage to cure them.

What is Melioidosis?

Melioidosis is an illness that is caused by bacteria found in the soil and infections often occur following heavy rains after breathing in the bacteria or from contact with contaminated soil or water. It is found in many parts of Asia Pacific, particularly north-eastern Thailand, Singapore, and tropical Australia. Diabetics are much more likely to get melioidosis.

Often it will cause pneumonia or fluid around the lung, but sometimes can cause abscesses in abdominal organs such as the liver or spleen, or the prostate gland in men. It can cause bone and joint infection. Often drainage of the pus is necessary. Melioidosis needs prolonged antibiotics to cure otherwise it will relapse and can be very serious.

Why is looking after your skin so important in diabetics?

Up to a third of diabetics will have a skin disorder due to or affected by diabetes at some point. Bacterial infections are common, ranging from boils and cellulitis, an infection involving the upper layers of the skin, deep abscesses, sometimes with involvement of adjacent bone or joints, to rapidly evolving destructive infections of the soft tissues (necrotising fasciitis). Mild cellulitis appears as painful reddening of the skin, often in the legs and usually responds well to oral antibiotics. If fever occurs, or if the area is large, intravenous antibiotics are often needed. Urgent assessment by a doctor is necessary if the area of skin discolouration spreads rapidly, severe pain is present, if the skin blisters or if the area affected is over a joint. Rapidly evolving skin infections are a medical emergency and often need surgical intervention as well as antibiotics to cure them.



© Liv Friss-larsen



Necrotising fasciitis of the arm

Why do so many people with diabetes get foot infections?

Persistently elevated blood glucose levels result in irreversible damage to blood vessels and nerves, resulting in neuropathy and peripheral vascular disease. In the feet this results in poor circulation, loss of sensation (to pain and position sense), and loss of normal sweating and oil production, making the foot vulnerable to repeated minor trauma including the normal wear and tear stress that we put on our feet every day. Ulcers may form in areas of pressure. 10 to 15% of diabetics develop foot ulcers at some point in their lives, and foot problems are responsible for almost 50% of diabetes related hospital admissions. Due to reduced blood supply and impaired immune function, wound healing is slower and wounds are more vulnerable to invasion by bacteria. More than half of all foot ulcers in diabetics will become infected. Infection can spread to the soft tissue around the ulcer or to the bone nearby (osteomyelitis) or may progress to gangrene, where the infected tissue becomes devitalised

and dies. With severe infection, surgery is often needed, and amputation may be necessary in as many as 20%. You should check your feet every day for wear and tear damage. Infection may show itself with pain, redness, swelling or warmth at the site of infection or there may simply be an ulcer which does not heal. In many diabetics, these signs can be quite subtle until the infection is fairly advanced and often if the nerves are damaged, there will be no pain to warn of problems. Treatment of diabetic foot infections is multi-faceted and adequate foot care including pressure off-loading, antibiotics and in more severe infections, debridement (surgical removal) of dead or devitalised tissue are all extremely important. Revascularisation procedures to improve blood supply to the feet may also be necessary to allow good wound healing and access to the site of infection by antibiotics. Amputation is only performed when the infection is so advanced that healing is not possible.

Everyone is talking about H1N1 flu at the moment! What does this mean for people with diabetes?

Influenza is highly contagious viral illness that is spread through contact with respiratory droplets, either when someone with influenza coughs or sneezes on you, or when you touch a surface that they have recently coughed or sneezed on and then touch your own mouth, nose or eyes.

People with diabetes are more prone to developing severe infection with influenza and suffering serious complications such as pneumonia, respiratory distress and death.

H1N1 flu is caused by a novel Influenza A virus. It was originally derived from pigs, but has adapted to spread very efficiently between people. The way it is spread is identical

medical conversation

to other Influenza viruses. Pandemics of influenza occur periodically, with three occurring in the last century. They occur when a new influenza virus, to which few people have immunity, becomes able to transmit effectively between people. This is the situation now with H1N1 flu, thus a worldwide pandemic is possible.

What symptoms should I look out for?

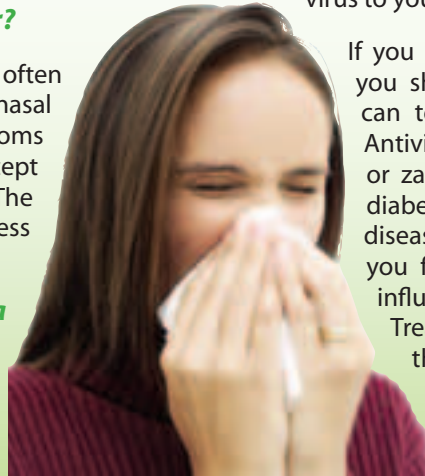
Influenza causes sudden onset of fever, often with muscle aches, runny nose or nasal congestion, sore throat, or cough. Symptoms are essentially the same for H1N1 flu, except that diarrhea may also be present. The incubation period for influenza is usually less than two days but may be up to a week.

How can I prevent getting influenza or H1N1 flu?

Influenza vaccines provide excellent protection against seasonal influenza and annual vaccination is recommended by Ministry of Health for all people with diabetes. It is not possible to catch influenza from the vaccine as the viruses used are inactivated. Work is already in progress to develop a vaccine against H1N1 flu.

Covering the mouth or nose when you cough or sneeze can limit spread of influenza. This should preferably be done with

a tissue which can then be disposed of. Washing your hands frequently, especially before you touch your face, is extremely important in breaking the cycle of infection. Surgical masks can reduce the amount of droplet spread when people cough or sneeze. It is important to have a comfortable mask, and not to touch it frequently as this will just transfer the virus to your hands!



If you have a high fever and flu-like symptoms, you should consult your doctor. A nasal swab can test for both seasonal flu and H1N1 flu. Antiviral medicines, such as oseltamivir (Tamiflu) or zanamivir (Relenza) are recommended for diabetic patients with heart disease or respiratory diseases such as asthma. Your doctor will monitor you for the development of complications of influenza such as heart failure or pneumonia. Treatment of complications can help to ensure that even older people with multiple medical problems can have good outcomes from this potentially dangerous disease.

So what can I do?

Tight glucose control is vital to prevent the complications of diabetes which increase infection risk. Good hygiene for hands and body, good skin care and foot care will also help to keep you well. If you develop fever or pain, or any other symptoms that may suggest infection, see your doctor promptly as early treatment can often prevent severe infections from developing.