Q & A: What heart patients should know about the Coronavirus (COVID-19)

I have a heart condition. Am I at more risk of getting COVID-19 than somebody who doesn't have a heart condition?

No - the infection can be caught by anyone. However, people with underlying heart conditions might be more likely to show symptoms of the infection or to have a more severe infection than others.

So far, most people that get COVID-19 have a mild viral illness including sore throat, cough and aches and pains and a fever, but some (up to 5%) people develop a chest infection/pneumonia. We are not yet certain if people with heart conditions are more likely to get a chest infection with COVID-19, but this is likely since this is the case with other viruses like flu.

There is a lot of discussion in my patient support group about which heart patients are at high risk to develop severe COVID-19 symptoms. Is the risk similar for all patients with a heart condition or are there differences?

- Heart failure, including heart transplant (immune compromised), cardiomyopathies
- Valvular heart disease
- Cardiac arrhythmias (specifically atrial fibrillation, but also pacemaker patients, etc.)
- Coronary heart disease (chronic, stable/unstable)
- Congenital heart disease

The basis of contracting the infection is the same for all individuals. The virus is transmitted via droplets from the respiratory tract (nose and lungs) from an infected person. Once the virus enters the system it causes direct damage to the lungs and triggers an inflammatory response which places stress on the cardiovascular system by (i) infecting the lungs and dropping blood oxygen levels and (ii) dropping the blood pressure through its inflammatory effects. In such cases the heart has to beat faster and harder to supply oxygen to major organs.

Individuals who are immunocompromised (have a weak immune system) , such as patients who have had an organ transplant (e.g. kidney, liver, heart), patients with cancer who have received chemotherapy or radiotherapy as well as the elderly and pregnant women with heart disease are theoretically at greatest risk of contracting and succumbing to the effects of the virus. The full list of high-risk clinical conditons is present in the following link. (https://www.gov.uk/government/news/major-new-measures-to-protect-people-at-highest-risk-from-coronavirus). These individuals should receive a letter from NHS England, followed by text and phone call by Sunday 29 March 2020.

Individuals with precarious heart conditions, such as heart failure, dilated cardiomyopathy, advanced forms of arrhythmogenic right ventricular cardiomyopathy and patients with congenital cyanotic heart disease are at highest risk. Patients with the obstructive form of hypertrophic cardiomyopathy and affected patients with reduced function of the left ventricle (main pumping chamber) may also be placed in the same high-risk category.

Based on the inflammatory effects of the virus, there are theoretical risks that the viral infection could cause rupture of atherosclerotic plaques in the coronary arteries (blood vessels of the heart), leading to acute coronary syndromes (minor or major heart attacks). In this respect, individuals who develop severe chest pain during symptoms of COVID-19 infection, should contact the emergency services.

Severe systemic inflammatory conditions may aggravate arrhythmias or even precipitate atrial fibrillation in some individuals.

Patients with Brugada syndrome are particularly vulnerable to fatal arrhythmias in situations where the body temperature exceeds 39^{o}C. Such patients must treat fever aggressively with paracetamol and cool tepid sponging. There have been suggestions that non- steroidal anti-inflammatory drugs may reduce the body's cytotoxic response to the virus, however this is not proven as yet.

Patient with long QT syndrome who contract the virus and are ill enough to be admitted to hospital for treatment will have to be treated with care because some of the experimental drugs being used to treat the virus such as chloroquine can prolong the QT interval and cause serious electrical disturbances.

There are emerging reports that the virus may directly cause problems with the heart such as acute inflammation, heart failure and arrhythmias. Current reports suggest that approximately 7% of patients admitted to hospital develop cardiac problems. This does NOT mean that many individuals with mild symptoms who do not warrant hospital admission will have the same risk of heart problems.

There is no evidence that the virus infects implanted devices such as ECG loop recorders (REVEAL or LINQ), pacemakers and cardioverter defibrillators or causes infective endocarditis in those with valvular heart disease. Interrogation or these devices (when required) should be performed remotely during the pandemic.

Are cardiac patients who also have diabetes and/or hypertension at greater risk and, if so, why?

Data from China, where the disease emerged, indicate that a significant proportion of non survivors and those who developed severe disease had comorbidities such as diabetes and hypertension. The exact reason for this remains unclear. It is likely that both hypertension and diabetes are prevalent in the general population particularly in the age group (over 70 years) where the mortality from COVID-19 infection is highest.

There have been articles linking this observation to the use of Angiotensin converting enzyme (ACE) inhibitors and angiotensin II receptor blockers (A2RB). The theory is that COVID-19 virus binds to ACE2 on epithelial cells to enter the respiratory system. Most patients with diabetes and a large proportion of patients with hypertension are treated with ACEI and A2RB which increase ACE2 levels. It is important to emphasise that this is a theory and has yet to be substantiated by evidence, and major health organisations such as the European Society of Cardiology, British Cardiac Society and the American Heart Association recommend to continue with these medications but to monitor the progress of patients with hypertension and diabetes who have become infected with COVID-19.

There are reports that COVID-19 may induce myocarditis or pericarditis. If you have had myocarditis/pericarditis previously, are you more vulnerable to contracting it a second time? If so, since myocarditis can be asymptomatic, what should I look out for if I contract COVID-19?

There is no evidence that an individual who has suffered from myocarditis or pericarditis in the past is at higher risk of the developing the same complication with COVID-19. It is recognised that some cases of myocarditis have a relapsing and remitting course and it is unclear whether patients who do develop myocarditis as a result of COVID-19 will show the same pattern or develop worse heart failure and scarring of the heart. If you have had myocarditis recently, then there is a risk that contracting COVID-19 infection could result in worse consequences for the heart.

Myocarditis may not cause any symptoms, or, may be masked by the symptoms of the inflammatory response to the virus such as fever, aches and pains and breathing difficulty. Sharp central chest pain, radiating to the neck, the back or the arms, worsening breathlessness, being unable to lie flat due to breathing difficulty and an erratic pulse would be suggestive of myocarditis.

Are there any additional measures that I should take to limit my risk of getting sick, as I have a heart condition?

There are things that everyone should do to limit their risk. If you have a heart condition, the following are important:

- Limit the time you are outdoors and follow Government regulations.
- Avoid people who are sick.
- Keep a minimum of 2-meter (6.6 feet) distance from each other, except for household members who do not have symptoms or a positive COVID-19 test.
- Wash hands thoroughly with soap and warm water for at least 20 seconds after going outdoors or touching foreign surfaces. The virus can survive on cardboard for up to 1 day and on steel surfaces for up to 3 days.
- Cover your mouth with a tissue when you cough or use the inside of your elbow
- Cover your nose with a tissue you sneeze, or use the inside of your elbow
- Avoid touching your eyes, nose, and mouth.

- Clean often touched surfaces like doorknobs, handles, steering wheels, or light switches, with a disinfectant to remove the virus.
- Importantly stay at home as much as possible (see government advice https://www.gov.uk/coronavirus).

Should I consider self-isolating to avoid catching the virus?

Self-isolating means staying indoors as much as possible and avoiding contact with others. The advice on self-isolation is summarised below and can be found online. https://www.nhs.uk/conditions/coronavirus-covid-19/self-isolation-advice/

- If you have symptoms of fever, cough or a chest infection you should self-isolate.
- If you do not have symptoms, avoid contact with anyone who is sick, even if they "just have a mild cold".
- Stay at home as much as possible, including working from home if this is feasible as recommended by the government.
- In some countries you may be asked to follow a stricter isolation (such as is the case with Italy, France, Spain, Belgium).
- Individuals with established cardiovascular disease should be extra vigilant with self isolation.

Am I safe outside of the house, provided I avoid crowded areas e.g. can I go to the park or walk outside?

Yes, to some extent. The virus is caught from people who have the infection and so there is no problem in going outside by yourself. What is important is to avoid contact with anyone who might be ill. Events outside that bring together a large number of people have been cancelled around Europe, so you should not be attending any events or meetings with friends where large numbers of people are gathering. Similarly, you should not allow visitors except one or two individuals who are specifically providing domestic assistance for you if you are ill or fragile.

Are people with heart disease more likely to die of COVID-19 than those without?

So far, older age and the presence of underlying conditions - including heart conditions - have been risk factors for death. Nevertheless, it is important to emphasise that most patients, even those with underlying heart disease, have had mild infections and have fully recovered.

Should I wear a mask to protect myself from the virus?

For the general population wearing a mask is only recommended in people who are experiencing symptoms, such as a cough or a fever, or if they are caring for someone with these symptoms.

Wearing a mask in people with a heart condition is not recommended as this may make breathing more difficult. If you have a heart condition and are concerned about catching COVID-19, please note the high-risk conditions above and discuss this with your doctor if you have further queries.

To prevent shortages of face masks it is important to use them only if needed. When wearing a mask, it is important to use and dispose it correctly. The World Health Organization has useful information about this.

Can I catch COVID-19 from my pet?

There is currently no evidence that humans can catch the disease from common household animals such as cats and dogs.

Can people catch COVID-19 more than once?

The current research suggests that immunity to COVID-19 develops after the first infection, so it is not possible to catch it again. There are examples of viruses, like flu and the common cold, which can be caught more than once because of the way the virus changes over time. We won't know for a while whether this can happen with COVID-19.

Should I change any of my heart medication doses?

What is clear, is that stopping or changing your medication could be very dangerous and could make your condition worse. These drugs are very effective for heart failure, and to control high blood pressure to help prevent a heart attack or stroke, and so on. Any changes to your treatment that have not been recommended by a healthcare professional could put you at higher risk of a flare-up of your heart condition.

There have been reports in the media suggesting that some commonly used drugs to treat high blood pressure (so called ACE-Inhibitors and Angiotensin Receptor Blockers) may increase both the risk of infection and the severity of an infection with the Coronavirus. However, this warning does not have a sound scientific basis or evidence to support it. Therefore, it is strongly recommended that you continue to take your blood pressure medication as prescribed.

Patients who are on immune compromising medications, for instance after a heart transplant, should continue to take these medications as prescribed. Reducing the doses is associated with a high risk of suffering a rejection of the transplanted heart.

Please take all your medications exactly as prescribed. If in doubt, please contact your doctor or nurse but do not make any changes before having spoken to them.

The news says that the worst affected by COVID-19 are the older age population and people with pre-existing conditions. Are 'people with pre-existing conditions' also older or does this refer to people of any age?

Most people dying from COVID-19, in the reports from China and other countries, have been aged over 80 years and have had advanced heart and lung conditions. They have had a combination of older age and severe pre-existing conditions. The majority of older people and people with pre-existing conditions have had a mild viral illness and have fully recovered.

I know that I should not go to the hospital if I think I am infected, but when should I seek medical attention if I have a pre-existing heart condition?

If you think you have COVID-19 infection, ask yourself if you can manage the symptoms at home. Fever can be managed with paracetamol and drinking lots of fluids.

There are news reports, especially on social media, suggesting that medications such as ibuprofen (so called non-steroidal anti-inflammatory medicines or short: NSAIDs) to lower fever and treat pain could worsen COVID-19. Based on currently available information, the World Health Organization (WHO) and the European Medicines Agency (EMA) do not recommend against the use of ibuprofen as there is, at the moment, no scientific evidence establishing a link between ibuprofen and worsening of COVID 19.

If you experience worsening shortness of breath, palpitation, fainting or chest pain you should call your emergency services provider who will make an assessment based on your symptoms and general examination before making a decision to transfer you to hospital. .

Should I go ahead with scheduled appointments or should I avoid going to medical centres or hospitals?

Most hospitals and GP surgeries have cancelled routine appointments or conducting them over the phone or via video online chat wherever possible. There are certain conditions such as severe heart failure where face-to-face visits are still required, and you should not miss a visit without first consulting your consultant, doctor, nurse or other healthcare provider.

I had the flu vaccine this year, am I protected from this virus?

The flu vaccination only protects against the flu (influenza virus) and does not protect against COVID-19. There is no vaccine for COVID-19 and it is not likely that one will become available during the current pandemic.

Should I be worried about medication shortages?

Everything is being done to ensure that the supplies of essential medications are maintained. There is no cause for concern. The European Medicines Agency are monitoring the situation and to date have reported no shortage of essential medications.

Can I still travel or use public transport?

Please pay attention to guidelines published by your national and local authorities. In many countries all non-essential travel has been forbidden and citizens have been asked to stay at home. In many places it is recommended to avoid using public transport, if possible, or to keep at least a distance of 1.5 m from other passengers.

I feel very anxious. Is there anything I can do to feel better?

This is an anxious time for everyone, and we are providing tips to help you cope with the uncertainties surrounding a pandemic that none of us were prepared for only a few months ago.

(1) **Eat well**, regularly and healthily. You need to keep your bodily strength up, but good food also gives you vital vitamins and minerals which help to combat anxiety. Whole grains, fruit and vegetables (all the colours) will work away like magic on your anxiety levels and help to reduce them. I know cakes, biscuits and chocolate are delicious, but the extra sugar hit really isn't good for anxiety. A little now and then is a good thing, but in fact eating sweet stuff can make you feel psychologically worse. The same goes for alcohol; keep it to a minimum.

(2) **Drink plenty of water**, and some tea and coffee if you like tea and coffee. A nice cup of tea or coffee and a sit down quietly is surprisingly helpful for calming and soothing anxious thoughts.

(3) **Exercise**. Although we all have to keep a safe distance from each other now, this doesn't mean that you can't go out. In fact, going out in the daylight (even if it's cloudy) will be beneficial for your mental health. If you have a garden, walking round the garden, performing gentle (or not so gentle, depending on your ability) aerobic exercises, skipping with a rope, stepping up and down on

a low step to music, all these are examples of exercise you can perform which will help alleviate anxiety. If you haven't got a garden think of a route you can take from your home where you will not have to be in close proximity to others and go for a walk. Every day. (If you need advice on how much exercise you can do in relation to your heart condition please do email me and I will check with Professor Sharma). Indoors- got an exercise CD sitting in the back of the cupboard? Now's the time to get it out, put it on and have a go. It will take your mind off your anxiety, raise your heart rate positively, and help you to feel good. Dance- put some upbeat music on, sing along and dance.

(4) **Use virtual methods of socialising.** If you are able to Facetime/Skype friends and family do this, even once a day, to the same or a different person each day, to take your mind off your anxiety. Or ring them. It will give you a plan- something to look forward to- and will keep you in touch with your world. Thinking of others, listening to what's happening for them and offering support works surprising well in helping to reduce our own anxiety.

(5) **Stay busy with important chores**. Make a list of things you can do. i.e. Clear out that cupboard, rearrange the room, declutter the wardrobe, weed the garden, etc. You do not have to do everything on the list, and not all at once, but it gives you further plans for you to tackle when you are feeling anxious. The feel-good factor when you have achieved something on your list is priceless.

(6) **Recreational activity.** Listen to music, read a book, tackle crosswords, knit, sew, paint, draw, etc., etc. Any of the things which you enjoy doing but often haven't the time to do. Anything which will either provide an escape from anxious thoughts or will require concentration will help you.

(7) **Avoid excessive negative messaging**. Listen to the news, watching the news on TV or phone/laptop just once a day. Whilst we all need to know the latest advice regarding coronavirus and self-isolation, it is seriously anxiety-provoking to have it constantly in our ear. All you need to know will be available in one news-read. Please do not put yourself through more than this daily.

(8) **Breathing.** This simple exercise really can help when you are feeling anxious. Sit or stand in a relaxed position (tighten and untighten your muscles so that you can feel the difference between relaxed and unrelaxed). Concentrate on the breath and breath in deeply for a count of 5 and breathe out slowly for a count of 10. Do this several times, until you start to feel the anxiety subside enough for you to do one of the above activities.

The NHS also provides guidance in the following link.
https://www.nhs.uk/oneyou/every-mind-matters/

Specific advice regarding exercise

Can I exercise during this pandemic?

Yes. There is evidence that moderate exercise performed for 20-30 minutes 3-4 times per week strengthens the immune system and reduces the risk of viral infection. Scientific studies have also shown that regular moderate exercise prior to developing a potentially serious viral infection such as flu protects people from dying from it. There is also evidence that people who continued to remain active during the 1998 Hong Kong flu were more likely to survive compared to people who did not perform any exercise.

The current pandemic means that exercising in gyms and other communal exercising areas or performing team sports is no longer possible.

Individual exercise is recommended. The Government currently permits 1 outdoor sporting activity per day such as walking briskly, jogging or cycling. Avoid jogging or cycling in groups. When jogging outdoors, anticipate and avoid a less than 2 metre distance from other individuals. You may exercise together with members of your own household. It is possible that in the long-term all outdoor activity may become prohibited if the infection continues to surge.

Individuals who have exercising facilities at home such as treadmills, static bicycles or rowing machines should be encouraged to use them to stay physically fit especially if the pandemic has resulted in working from home or social isolation because a household member or close contact is expressing symptoms. All hard surfaces on these machines should be wiped down with a soapy sponge, some other mild detergent or anti-septic wipes. You can perform press ups and sit ups in your rooms. There are many on-line programmes and telephone apps to allow you to perform yoga, strength training or high intensity exercise in your homes or in the garden.

I am a competitive athlete and need to keep fit for when the competitive season starts again. What advice do you have for me?

Individuals competing at club level and professional athletes need to maintain fitness to return to competition in the foreseeable future. Many elite athletes will have been provided with a remotely supervised training schedule and others may have developed their own exercise programme. Many athletes will have static exercise machines at home to allow them to keep fit. Some clubs from the highest echelons of sport will also provide wearable GPS devices to monitor physical activity remotely. In the current situation the exercise programmes recommended may not fully reflect your sport e.g. football or rugby. The key is to remain as fit as possible for when the season resumes. Full match fitness is unlikely with most team sports and it is anticipated that a mini pre-season training week will be organised by most clubs before formal competition recommences.

I was going to run a marathon next week, but this has been postponed for 6 months. Shall I continue training as usual?

Most people who were planning to run a marathon in the next few weeks will have trained for several months and will be reaching peak performance. Such individuals would usually rest after the event. It is highly unlikely that any marathon events will take place in Europe for at least 5 months. Indeed, the duration of this pandemic is uncertain therefore you should pace yourself and prevent the risk of over training and reducing your immunity (see below). Train as if the event is 4 months away and take at least 3 rest days per week. Try not to attempt a personal best this year and focus on running for a good cause and in celebration of the end of the pandemic. Hospitals are likely to be deplete for several months and medical directors would be keen to keep the number of transfers to hospital to a minimum.

I have heard that if I exercise too much, I will increase my chances of getting the infection. Is this true?

Not necessarily. Although athletes are accustomed to exercising much more intensively than the general population, it is recognised that intensive exercise can cause stress on the body and cause it to become run down and more prone to infections. There is currently no evidence at the moment that athletes are particularly susceptible to COVID-19 infection. The pragmatic position however is that an athlete should not try to exceed their usual training programme during this period of uncertainty.

What other precautions should I take to protect myself?

Athletes should respect social isolation guidelines to protect themselves from contracting COVID-19 infection. Consultations with club coaches, physiotherapists, team colleagues and doctors should be via telephone, skype, Zoom or face time. Face to face consultations are not advised. Do not invite team colleagues to your homes. Wash your hands carefully for 20 seconds if you have been outdoors or handled foreign surfaces such as door handles, petrol pumps, exercising machines etc.

Please take all the other precautions provided below:

- Limit the time you are outdoors and follow Government regulations.
- Avoid people who are sick.
- Keep a minimum of 2-meter (6.6 feet) distance from each other except for household members who do not have symptoms or a positive COVID-19 test.
- Wash your hands thoroughly with soap and warm water for at least 20 seconds after going outdoors or touching foreign surfaces. The virus can survive on cardboard for up to 1 day and on steel surfaces for up to 3 days.
- Cover your mouth with a tissue when you cough or use the inside of your elbow
- Cover your nose with a tissue you sneeze, or use the inside of your elbow
- Avoid touching your eyes, nose, and mouth.

- Clean often touched surfaces like doorknobs, handles, steering wheels, or light switches, with a disinfectant to remove the virus.
- Importantly stay at home as much as possible (see government advice https://www.gov.uk/coronavirus).

Will any vitamin supplements protect me from the infection?

The first thing is to eat well and sleep well. Fresh fruit and vegetables are advised but may require queueing. Vitamin C (500 mg daily), D (4000 iu/daily and omega oil supplements (1000 mg daily) have shown benefit in improving the immune system that helps fight infection. Elite sports people should continue with supplements provided by the club nutritionist and seek advice on any additions.

How will I feel if I develop the infection?

Common symptoms of COVID-19 infection include cough, sore throat and a temperature (usually above 37.8^{o}C), however athletes may also note other symptoms during exercise such as easy fatigue, breathlessness, and unusual muscle pain. In such cases, stop training completely and consult the club doctor (if applicable) who may be able to arrange testing COVID-19 infection on a private basis. If you are not in a position to obtain private COVID-19 testing, stop all exercise for 2 weeks and only resume training if you feel completely well again. Never exercise if you have a temperature, a cough, diarrhoea or feel weak, weak unless a doctor has seen you and said that it is OK for you to exercise.

How should I look after myself if I develop these symptoms?

Most individuals (80%) will have mild disease and will need to rest, drink an adequate amount of fluid (2-2.5 litres per day) and treat any fever with Paracetamol (up to 2 x 500 mg tablets) every 6 hours, as required. There are reports that drugs known as non-steroidal anti-inflammatory drugs (NSAIDS) which are effective at treating fever and are commonly prescribed to treat muscle pains, may not allow the immune system to fight the infection adequately. Therefore, it is advised that you do not use them.

I heard that the virus can affect the heart and am worried that exercise may risk my life.

A proportion of individuals will be bed ridden for a few days (14%) and others will have very serious disease that requires hospital admission (5%). There is evidence that around 7% of people who need admission to hospital shows signs that the heart muscle is also inflamed. This condition is known as myocarditis. It is unlikely that your heart will be affected if you have mild symptoms such as a common cold. Symptoms of myocarditis include chest pain that may be made worse by breathing in deep, increasing breathlessness and palpitation (racing heart). In such cases you should contact your doctor or emergency services immediately. Do not exercise if you experience any of these symptoms until you have consulted your doctor.

Is there a test I can have to check if my heart is affected by the virus?

Yes. Individuals with myocarditis can be diagnosed by measuring a protein termed cardiac troponin in the blood. This protein is released by damaged heart muscle and is found in high levels in people with myocarditis. This blood test may be performed by the club doctor (if the club have effective protective clothing for the doctor in stock) or elsewhere where that has the facilities to test you without allowing anyone else to become infected. If the cardiac troponin level in blood is increased, the doctor will also arrange an electrical tracing of the heart (ECG) and a heart scan and an appointment (via facetime, skype or Zoom) with a cardiologist (heart specialist). Elite sports club doctors will have a list of cardiologists that they can liaise with about their athletes.

What will happen if I have myocarditis?

Myocarditis can be serious in some people especially if they continue to exercise. Exercising with myocarditis can cause the heart to become damaged permanently and may even cause sudden death.

The first thing is to rest the heart by stopping exercise completely for at least 3 months. Depending on the results of the heart scan the cardiologist may also prescribe medications to help the heart if it appears to have been weakened by the infection. You will have another assessment after 3 months to determine if your heart is strong enough to go back to play sport and some athletes may need to rest for another 3 months.

I have a known (and possibly) serious heart condition affecting the muscle (or the electrical system) of my heart. I have no symptoms and have decided to continue my sporting career after having a discussion with a heart specialist. Until now I was being carefully monitored by my club doctors and physiotherapist whilst I was training in the event that I had a cardiac arrest. I am now training alone. How much can I do safely?

This is a difficult question to answer with certainty but the fact that your cardiologist has allowed you to continue to train under supervision means that your risk was perceived to be still relatively low (up to 2% per year). In the absence of supervision, it is advised that you do not increase your maximal heart rate above 80% of that predicted for your age. Your maximum heart rate is generally 220 minus your age. You need to exercise at 80% of this. For example, if you are 22, then your maximal heart rate is 220-22 = 198. You should exercise not exercise beyond at 80% of this which is 158 beats per minute. You must stop immediately if you experience chest pain, you are more breathless than you think you should beat, if your heart is racing faster than it should be or if you feel you are about to blackout.