Mayo Clinic Q & A - Gosia Wamil, M.D. Ph.D., Heart failure T...

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SPEAKERS

Dr. Halena Gazelka, Dr. Malgorzata Wamil, Narrator

N   Narrator   00:01

Coming up on Mayo Clinic Q&A,

D   Dr. Malgorzata Wamil   00:03

There are many causes of heart failure, and unfortunately, the most common cause of heart failure and heart attacks and coronary artery disease. We have also learned that other diseases such as diabetes, obesity, heart failure can pose a problem with stiffening of the heart muscle, and therefore, heart failure.

N   Narrator   00:21

Heart failure, sometimes known as congestive heart failure, occurs when the heart muscle doesn't pump as well as it should. Proper treatment and a healthy lifestyle can improve the symptoms of heart failure, and may help some patients live longer.

D   Dr. Malgorzata Wamil   00:34

So we can, with good lifestyle changes, reducing the body weight, having a good diet, exercising regularly, we can train our body to reduce the risk of diabetes, high blood pressure heart attacks, and therefore, decrease our risk of developing heart failure. And that's something that we can all work on.

D   Dr. Halena Gazelka   00:54

Welcome, everyone to Mayo Clinic Q&A. I'm Dr. Halena Gazelka. You may think of heart failure

as a disease of advanced age, but it can actually develop at any time in life. In many cases, heart failure can be prevented or treated. But there are risk factors and warning signs people might not be aware of. Here with us to discuss is Dr. Gosia Wamil, a cardiologist at Mayo Clinic Healthcare in London. I'm so delighted to have you here today. Can you first tell us what is heart failure?

Dr. Malgorzata Wamil 01:28

That's a good question. So heart failure is the inability of a heart to pump blood efficiently. So the main function of the heart as a pump is to deliver the oxygen and nutrients to all the cells and organs. And in heart failure, the heart cannot do it in an efficient, normal way. Heart failure can result either from the problem with weak pumping function, and we call it then heart failure, reduced ejection fraction. And the other type we frequently encounter is heart failure preserved ejection fraction, when actually the pumping is within normal limits, but the heart is very stiff and there is a problem with relaxation between contractions. So that's a different, second type, a main type of heart failure. Initially, when there is a problem with pumping function of the heart, the body tries to compensate. So there are different mechanisms that can be applied. And so the heart stretches, becomes enlarged, the heart can also increase its muscle mass, so become thicker. Another very common mechanism is that the heart speeds up, so the pulse increases. And all those are temporary measures. But that does explain why some patients may have heart failure, but actually they do not present with any symptoms in that initial phase. This cannot last forever, unfortunately. And eventually it leads to development of symptoms. And this is when we diagnose heart failure.

Narrator 03:11

When you were describing the two types of heart failure, it reminded me that in medical school, I think we call those right and left-sided heart failure. True?

Dr. Malgorzata Wamil 03:20

So right and left-sided heart failure, so focuses our attention on the on where pumping problem is. It could be either in the main chamber of the heart, so the left ventricle, or the right side of the heart. And then this may be secondary to a problem, for example, in the lungs, rather than in the heart. So heart failure both reduced ejection fraction, preserved ejection fraction, so looks at something different. So it looks at the cause of heart failure. So is there a problem with the pumping function? Or is there a problem with relaxation? That type of terminology looks at the at the actual mechanism of developing those symptoms.

Dr. Halena Gazelka 04:03

Well, that's a great segue to my next question, I wanted to ask you what causes heart failure?

Dr. Malgorzata Wamil 04:10

There are many causes of heart failure. Still, unfortunately, the most common cause of heart

There are many causes of heart failure. Still, unfortunately, the most common cause of heart failure are heart attacks and coronary artery disease. And we have also learned that other diseases such as diabetes, obesity, heart failure can pose a problem with stiffening of the heart muscle and, therefore, heart failure. There are other causes, so a problem with a valve. Either narrowing or leaking valves can cause heart failure. Problems with rhythm. So abnormal, faster rhythm of the heart can cause heart failure symptoms as well. There are other treatments, for example, treatment of cancers that can as a result, lead to the development of problems with a pumping function of the heart. But there are also rarer causes of heart failure. We call those cardiomyopathies. Either inherited, associated with inheritance of abnormal spelling mistakes in our DNA. Or acquired, which can be associated with actually a systemic disease that just happened to affect the heart as well. So there is a long list of causes of heart failure. And our role as cardiologist is to try to diagnose heart failure first, but then to understand the etiology, and maybe find the cause that could be treated at its roots and improve the symptoms of patients.

D **Dr. Halena Gazelka** 05:40

Gosia, we mentioned in the intro, that there are some risk factors for heart failure that patients and individuals might not even be aware of. What are the risk factors?

D **Dr. Malgorzata Wamil** 05:51

So this relates to the causes of heart failure. So all the risks of developing heart attack, well, so if we reduce those risks, if we improve their lifestyle, reduce the risk of diabetes, hypertension, stop smoking, this will reduce the risk of heart attacks, but at the same time, will reduce the risk of heart failure. There are also causes and other causes of heart failure, such as, for example, a viral infection that leads to myocarditis. So inflammation in the heart muscle. So trying to reduce the risk of infection. So we just went through the COVID pandemic, so reducing the risk of developing COVID infection, other viral diseases by using vaccination can also reduce the risk of heart failure. Decreasing the amount of alcohol that we drink, stopping using anabolic steroids. So those are things that we know that may influence our future and reduce the risk of developing symptoms of heart failure. In patients with cardiomyopathy, so especially inherited type of heart failure, heart muscle disease, it's very important to seek medical attention early if there are cases of heart failure in the family. Because we can, these days, offer not only genetic tests, but also a comprehensive scans and investigations that will try and we can apply some preventive measure to reduce the risk of future problems.

D **Dr. Halena Gazelka** 07:36

How interesting, you had mentioned earlier that symptoms may be delayed due to the type or how the heart tries to compensate. So in medicine, we often talk about symptoms, which have a lot to do with what patients can feel and sense, and then signs, which are things that we as clinicians can see or measure. What are some of the symptoms of heart failure that individuals might experience, even before they're diagnosed?

D **Dr. Malgorzata Wamil** 08:03

So we probably, the most recognized is the most common symptom of heart failure is breathlessness. And the type of breathlessness that patients would describe most often, is inability to to lie flat. Waking up in the middle of the night or gasping for air. People will describe swelling that developed around their ankles and in the lower limbs. Very frequently, patients will also notice that their abdomen got distended, they lose appetite. The tummy feels very bloated. So those are probably the most common symptoms that patients will report. But there are there are other symptoms that are less frequent. Patients eventually will also develop some fatigue, tiredness, and may complain of low mood and depression. And those can also be the early signs of heart failure. In myocarditis, so inflammation of the heart muscle, we frequently see as an early sign, palpitations, so irregular fast heartbeats. And again, it's very important for the patients to report those symptoms to us before it is too late and before we need to deal with a very serious complication. So, there are different presentations. And unfortunately, in some cases, we diagnose heart failure at a very late stage when they already developed significant problems and they present in an acute phase. So some patients will present with pulmonary edema, so they come to the hospital with acute breathlessness. They produce lots of sputum which may have a pink discoloration. They are very, very unwell. So there is a whole range of symptoms that patients can present with.

D Dr. Halena Gazelka 10:02

So edema is excess fluid. So that would be excess fluid in the lungs?

D Dr. Malgorzata Wamil 10:07

That's right. Yeah.

D Dr. Halena Gazelka 10:09

Gosia, how do you diagnose heart failure if it's suspected?

D Dr. Malgorzata Wamil 10:14

Very good question. Um, so we all over the world, we use a very simple test called ECG. At Mayo Clinic, researchers have been developing, researching and investigating the possibility of applying AI algorithms to a simple ECG and spotting early signs of heart failure. So this has been a very successful project and colleagues at Mayo Clinic showed that using AI may be better and may spot early signs, those that may not be so obvious for a human eye. So ECG is the first, the cheapest, the most available type of test. The gold standard remains echocardiogram. So that's an ultrasound of the heart. An echo is a very versatile imaging technique. So it is able to not only distinguish between different types of heart failure. So we talked about the right, left ventricular failure. Heart failure with reduced, preserved ejection fraction. So Echo can give us a clue about all those subtypes. It can also sometimes described very specific features that will point towards a specific diagnosis such as, for example, hypertrophic cardiomyopathy, or cardiac amyloidosis. So it gives us lots of lots of information. We spoken also about the most common cause of heart failure, so coronary artery disease. So it's very frequent that patients who present with heart failure will also have another test called

an angiogram, so either invasively or in a non-invasive way more often these days. So we check for the presence of narrowing the coronary arteries. And out of all those tests, probably the most comprehensive type of scan that we offer to our patients is called cardiac MRI scan. And on top of all the information about the function, the size of chambers of the heart, it can also offer tissue characterization. So it can give us information that, these days, we can compare to a previously used and non-invasive way of taking a tissue biopsy. So biopsying the myocardium, and muscle. So it can tell us a lot about the presence of swelling in the heart muscle, the presence of scarring, or inflammation. So that's fascinating what we can do with those images these days.

D Dr. Halena Gazelka 12:57
That really is fascinating. I want to go back to what you said about AI, or artificial intelligence as it relates to EKGs. What I understand is that the way that this works is they have done so many EKGs and measured so much on them that a computer algorithm is able to make comparisons between disease states and what you see in an EKG and what you don't is that right?

D Dr. Malgorzata Wamil 13:24
That's correct. So with using machine learning algorithm, so the idea is that you need to have a very, very large database. And that is what is available in Mayo Clinic. So we then apply algorithms that are comparing the observations against the outcome, and the gold standard outcome is the result of an echocardiogram with a diagnosis of impaired pumping function of the heart. And those algorithms can be trained and detect signs that we cannot even as cardiologists, detect those early signs. And we've seen similar examples in other pathologies. So for example, AI algorithms these days can detect very subtle abnormalities that relate to a level of potassium in the blood, in the blood of the patient. And similar technology has been applied to identify those early signs and detect signs of heart failure.

D Dr. Halena Gazelka 14:40
Very interesting. How do you treat heart failure?

D Dr. Malgorzata Wamil 14:44
So we have been observing a revolution in the heart failure field over the last decade. We have got lots of treatments these days for our patients and this has changed. And so for heart failure reduced ejection fraction, we've got five different pharmacotherapies that have been shown to not only to improve symptoms, but also reduce frequency of admission to the hospital with heart failure and prolong patient's life, which is the most important. We have also more interventional type of treatments. So devices such as CRTs, are a special type of pacemakers. In certain groups of patients with heart failure, we use defibrillators. In those patients that had evidence of abnormal fast, sinister type of abnormal rates. And we sometimes may also use surgery to improve the survival of patients with heart failure. And those patients the this will be in the group of patients that have a problem with a valve. So we repair or replace the valve, or often even a bypass surgery to improve that pumping function of in our patients. So there are

many different options. What is the most exciting for me as a cardiologist works in the heart failure field is that for the first time, we have new treatments for patients with stiff heart muscle, so those are the patients with diabetes and high blood pressure, who develop symptoms of heart failure. And those are SGLT two inhibitors. So for the first time, we can offer them, that group of patients that is increasing in numbers, a treatment that will prolong their life. And that's extremely exciting for me.

D Dr. Halena Gazelka 16:39

Very exciting. Can heart failure be prevented?

D Dr. Malgorzata Wamil 16:44

Yes, in the same way as we can prevent heart attacks and development of serious infections in the heart muscle. So we can with a good lifestyle changes. So with reducing the body weight, having a good diet, exercising regularly, we can train our body to reduce the risk of diabetes, high blood pressure, heart attacks, and therefore, decrease our risk of developing heart failure. So that's very important. And that's something that we can all work on. In families of patients, where there are cases of inherited cardiomyopathy, so certain groups of heart failure, we can also these days, offer some genetic tests try to figure out who are the members of their relatives who may be at major risk of developing heart failure. So there are lots of things that we can offer our patients these days.

D Dr. Halena Gazelka 17:49

What about tobacco use?

D Dr. Malgorzata Wamil 17:53

So smoking can obviously increase the risk of coronary artery disease and therefore, lead to heart attacks and scarring in the heart muscle. And this remains to be one of the main causes of heart failure. So by stopping smoking and applying healthy changes in our lifestyle, we can reduce the risk of heart failure.

D Dr. Halena Gazelka 18:19

I had to ask you Gosia, because pretty much everyone that we interview on Q&A says that you would be healthier if you didn't smoke! Seems universal. So I thought I'd give in there.

D Dr. Malgorzata Wamil 18:32

That's very important and applies to many pathologies that we treat in medicine.

Dr. Halena Gazelka 18:38

Right? Gosia, I understand that heart failure is an area of interest for you. Can you share with us what it is that you study?

Dr. Malgorzata Wamil 18:46

I have a particular research interest in the link of diabetes, high blood pressure, insulin resistance and heart failure. There are two interests within my research. So one is the use of large databases, such as randomized controlled trials, electronic healthcare records, and applying statistical methods, but also the new AI, so machine learning models and algorithms, and trying to identify with AI new ways, and how we can detect early signs of heart failure risks for our patients with diabetes and hypertension and prevent them in future. So that's one. The second area of my interest is, as you probably would guess, is the use of multimodality cardiac imaging. So echocardiography, cardiac computer tomography and cardiac MRI, and new techniques within the new modalities that allow us to find new imaging markers that will help us in future to screen asymptomatic patients for early signs of heart failure. And so that is the area that I'm very passionate about. And we have observed lots of new, novel innovations in that side. That's wonderful.

Dr. Halena Gazelka 20:18

We're so glad that you are working on this topic. It affects a lot of people. Thanks for being here today, Gosia.

Dr. Malgorzata Wamil 20:26

Thank you so much for inviting me.

Dr. Halena Gazelka 20:29

Our thanks to cardiologist Dr. Gosia Wamil for being here today to talk to us about heart failure. I hope that you learn something. I know that I did. And we wish each of you a wonderful day.

Narrator 20:41

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