Mayo Clinic Q & A - Dr. Christopher DeSimone Cardiac testing...

Fri, 6/4 11:39AM 29:04

SUMMARY KEYWORDS

heart, patients, stress test, cardiologist, ecg, rhythm, chris, blood flow, function, people, ekg, arteries, hear, heart failure, arrhythmias, pump, symptoms, tests, blood, diagnoses

SPEAKERS

Dr. Halena Gazelka, Narrator, Dr. Christopher DeSimone

N Narrator 00:00
Coming up on Mayo Clinic Q&A,

D Dr. Christopher DeSimone 00:03
If someone has chest pain or chest discomfort, classic things that people feel are chest tightening, or they'll say it feels like an elephant sitting on my chest, I can't breathe, I'm panicked. That for sure requires an emergent evaluation that should never be ignored.

N Narrator 00:20
When your heart isn't functioning optimally, your risk of heart attack or stroke increases. Thankfully, today there are several simple non-invasive tests to make sure that you stay heart healthy.

D Dr. Christopher DeSimone 00:31
Whenever we order these tests, we don't mean to put you through any stress. And that's probably a bad word, we do mean to put you through some stress. But we don't want you to have anxiety and stress related to this. So, these tests are all done for a reason. So, I

hope today we can alleviate some of those concerns, and to try to bring to light some of these things to say it's not that bad, don't be worried, we'll take care of you.

D Dr. Halena Gazelka 00:54

Welcome, everyone to Mayo Clinic Q&A. I'm Dr. Halena Gazelka. When it comes to the heart, there are some signs and symptoms that absolutely should not be ignored. But it can be pretty scary and intimidating to seek care when you think you might be having a heart problem. Tests may be necessary to evaluate your heart, and the unfamiliar terminology associated with these can make it all pretty confusing. Well, here with us today to help us understand cardiac evaluation, and the testing that is done for the heart is Mayo Clinic cardiologist, Dr. Christopher DeSimone. Thanks for being here with us today, Chris.

D Dr. Christopher DeSimone 01:30

Well, it's an honor to be here today. Whatever I could do, and whatever we could do during this discussion to make our patients at ease, more understanding of the situations and comorbidities, and diagnoses that they face, I think would be a huge and tremendous comfort to them. You know, we read things in journals, and we read things in our chart, as well as hear things on TV. And then all of a sudden, one day our patients come in and four or five of these diagnoses are in their chart, and they're terrified, and maybe that they're terrified until they get into see a doctor. So, it really makes me feel comforted when I'm able to talk my patients through some of these, put them at ease, obviously discuss if things are dire, or if things are more urgently requiring attention. And also put these things into context. And as my parents always tell me, put things in so that patients can understand and use plain English. Not all these big fancy words that you doctors like to use.

D Dr. Halena Gazelka 02:28

Good for mom and dad. Appreciate that. You know, Chris, no pun intended, but I think literally almost nothing strikes fear in someone's heart, like the concern that Oh, my goodness, this is something wrong with my heart, because we all associate the heart with life, and that if something happens to my heart, it could be a really big deal. So, what are the signs and symptoms that individuals should be looking for that they should never ignore that could be associated with their heart?

D Dr. Christopher DeSimone 03:07

Absolutely. I think the same way. And I try to take that step right before I walk in to talk to the patient. You know, we're talking about their heart. If I was a patient, I would be thinking the same thing. Oh, my goodness, what's going on, this is my heart, you know, could I die from this? So, I always try to say let's step back and take it step-by-step. But, before they get to see us in the clinic, there's things they have to be aware of, that for sure get evaluated either on an emergency basis in the emergency department or speak with their primary care physician. Definitely we all kind of know about, but we'll walk through why these are important. If someone has chest pain or chest discomfort, or what people call angina. It basically differs by patient to patient, but classic things are people feel chest tightening, or they'll say it feels like an elephant sitting on my chest, I can't breathe, I'm panicked. That for sure requires an emergent evaluation that should never be ignored. Some patients they feel that pain radiating up into their neck and jaw, or sometimes down their arms, all of which are telling us things that need to be emergently investigated. I think other signs that also speak to the heart are not just things that are glaring, or that people are more likely to be aware of, but if patients notice that, hey, I used to be able to walk to three blocks, I used to be able to mow my lawn. Now I could barely start and trigger the lawnmower on, or I could barely make it up a flight of stairs. If you've noticed a decline in your ability to exercise, I think that's something that you should follow up with your primary cardiologist, or your primary care physician, because that might speak to the heart not getting enough blood flow what it needs. And when you stress the heart, it needs to pump up more blood so that you can maintain that activity that your heart desires. Another option I would say is if somebody passed out, fainted, especially without any warning, those could be signs of lethal arrhythmias. And I think those are my three major things where I would not go slow, I would bring someone right into the emergency department.

D Dr. Halena Gazelka 05:09

And that's great. Chris, we talked earlier about terminology. And so, I'm wondering if we could just go over a few terms that are often thrown about whether it be on TV programs or in doctor's offices, so that our listeners have a little more comfort with this topic. The first is your specialty, really, but what is a cardiac arrhythmia?

D Dr. Christopher DeSimone 05:32

So, a cardiac arrhythmia is anything that we could capture on record, either with an EKG, and that's something where we take a snapshot of the heart, a 10 second snapshot, or on longer term monitoring where we're monitoring the rhythm of the heart. If someone's in, you'd see on television, or if someone's in the hospital, they're on a heart monitored bed. But in an arrhythmia, anything we find that's different from what we call normal sinus

rhythm, that's just normal rhythm. So, in arrhythmias, some of them could be benign, and some could be not to worry about. But other arrhythmias, such as ones, especially that go down to the bottom chamber of the heart, make the bottom chamber the heart go very, very fast. Those could cause severe symptoms, and severe signs and may be a warning sign of someone about to have a cardiac arrest or something we call sudden cardiac death where the heart stops, and it doesn't pump blood.

D Dr. Halena Gazelka 06:27
Which leads me to my next question. What is a heart attack?

D Dr. Christopher DeSimone 06:31
So, a heart attack is when the heart muscle itself has not or is not getting enough blood flow it needs to form its proper function. So, some of these are based on the flow ability in the coronary arteries. So, the blood flow that's bringing blood to the heart is either blocked, or it's limited. If it's limited, you still at certain times, such as exercise, or if the heart rate is going fast, if the heart needs to pump, and it doesn't match the oxygen and nutrition that the heart needs, the heart muscle dies off, calling it a heart attack. Some of these other ones where you hear patients going in and they need emergent blockage and emergent opening of their heart arteries, is what we call a STEMI. And people might have heard that word. ST elevation myocardial infarction, again, it just means that acutely, the inside of the walls of that coronary artery have clogged up and it's a big artery, and you have three main ones and one or more of those main ones have blocked up and the heart sends out the distress signals, symptoms, chest pressure, all of these things, and that causes muscle to die. But the quicker we could get in and open that coronary artery up, the less heart muscle that dies.

D Dr. Halena Gazelka 07:53
So truly a life-threatening emergency.

D Dr. Christopher DeSimone 07:55
Absolutely.

D Dr. Halena Gazelka 07:56
And you said myocardial infarction. Is that the same as a heart attack?

D

Dr. Christopher DeSimone 08:00

Same thing, myocardial infarction, a heart attack, those are kicked around thrown around. Many reasons. All of it is heart muscle dying.

D

Dr. Halena Gazelka 08:08

Okay. So, what does it mean when someone says they have heart failure?

D

Dr. Christopher DeSimone 08:13

So, I'm glad you brought that up, because lots of my patients, and I think lots of all our patients, will have seen that heart failure diagnosis in their record somewhere. So, heart failure is a clinical diagnosis. So, you could be in heart failure, where patients are having too much fluid on their heart, they're not able to meet the needs of their body to pump blood flow around their heart and around the rest of their body, and bloods backing up. You can imagine it's backing up in their lungs, their lungs are filled with fluid, it's backing up to their liver, they don't feel like eating, they feel just really nauseous, and they don't like the sight of food. It can also be making their legs really, really swollen because it just keeps backing up, backing up, backing up. So, that's something that we call heart failure. They're in clinical heart failure. And that's one of the things that we say, needs emergent attention. So, what we have to do is, we have to get the heart happier. We have to get more blood flow to it. We have to take the fluid off the heart and around the body, which is kind of pulling and worsening the heart's pumping function. Then we also have to institute medicines that help the heart work stronger. When patients also see this term heart failure, they might not be in it. And a lot of them have been scared. And a lot of them have been comforted when I've told them. It's not what you're thinking, but yes, this is something that we could talk about, and I'll explain further. There are two types. One of them is the contracting type, or what they'll call systolic heart failure. That can be a little bit weak and the normal. And again, it's funny that we all are encouraged to think 100%, the hearts working perfect, but sometimes you'll see your heart at 55-60% and some of the patients go oh my goodness, my heart's working in half the rate and it's not. Normal 55 to 65 or 70% is a normal, normal, not worry, heart pumping function. So, if you're looking at these things called echocardiograms, you might see that. Now, if the pumping function is less, let's say it's 30%, or let's say it's 40%, that we would term systolic heart failure. So, the pumping function is not at the numerical number we need it to be. And again, when we chat about that, and you talk to your cardiologist, we would take steps, including this big time would be a lot of medications, as well as look for underlying reversible causes of why that heart is not failing, but is not completely normal. How about that. The other option is, or the other kind of side of the spectrum, which is about 50/50, is when patients hear this term called diastolic heart failure. Sometimes you'll hear this word

kicked around called HFpEF. It's actually an acronym for Heart Failure with preserved Ejection Fraction. And what it is, is the pumping function, your hearts normal, so your pumping function could be 55-60%. But it's not relaxing. Now remember, it takes energy for the heart muscle to relax just as it does to contract. So, if your heart is stiffer, and we see this as our patients age, the hearts being stiffer, you might see this word called diastolic heart failure. And there's a different set of treatment options for those patients. And mainly those are more aggressively treating high blood pressure, using diuretics, medicines that try to take fluid off the heart, so it doesn't have to pump against such high pressures.

D Dr. Halena Gazelka 11:34

Chris, can I ask you to clarify what we call an ejection fraction, or that percent that you were talking about? When you talk about that 55 or 60% being normal, does that mean? My understanding is that if your heart is full at 100%, you should be able to pump 55 to 60% out of it out per beat? Is that a way to explain it?

D Dr. Christopher DeSimone 11:56

That's a great way to explain it. So, what that number, where that number comes from is, you take measurements, while the heart is filling what we call end diastole, it's just when the heart's done filling. And then end systole, when the heart is done squeezing, and then you try to see how much of that blood flow is there. Now, 100%, we'd all be in trouble, because then it would kind of squeeze the heart down to like a pancake. So, it kind of squeezes, but it doesn't completely collapse. So, 55 to 65 is a good amount, and Dr. Gazelka, you hit it right on the head. That's exactly right, 65% of it, you could think is coming out of there.

D Dr. Halena Gazelka 12:33

It is just me thinking simply as usual.

D Dr. Christopher DeSimone 12:35

Perfect.

D Dr. Halena Gazelka 12:37

Chris, I should have asked you this question earlier, maybe when we were talking about heart attack or myocardial infarction. But what does it mean when someone has a

cardiac arrest or sudden cardiac death?

D Dr. Christopher DeSimone 12:48

Yes. So, we see this on TV, right? Patient passed out, or sorry, it could be an official or an athlete passed out unexpectedly. You know, what happened to them? This was a super athlete completely healthy, what had happened? And sometimes we hear Oh, they had sudden cardiac death, or cardiac arrest. And then that's where you see especially on the TV shows people coming in with the pacer pads, or the shock, and the clear and all that stuff. What happens is for some reason, and there's multiple reasons, the big, big one is if the patient has a weak heart to begin with, and/or if the patient is suffering from an acute heart attack. Meaning there's a blockage right then and there, and that makes the heart not happy. And what it does is it goes into this chaotic rhythm, to where it's not able to pump any blood. So, it doesn't pump blood to itself, the heart, it doesn't pump blood to the major organs of the body, especially the brain, and then boom, the patient passes right out because they're not getting blood flow to the brain. And that's what you'll hear cardiac arrest, sudden cardiac death, their heart stops or goes into ventricular fibrillation. It's kind of like think about it as the bottom of the heart being squeezed like a bag of worms, and not contracting efficiently as we were just discussing,

D Dr. Halena Gazelka 14:04

Well that really is the reason that we have those cardiac defibrillators in public spaces, right?

D Dr. Christopher DeSimone 14:10

Absolutely, that's the lifesaver. It's time to get those patients out because they're not getting blood flow to the brain, or other parts of their body. In some patients if, unfortunately, they're not gotten to soon enough, they could either 1) pass away from this, or 2) have significant neurologic effects. Because not having blood to the brain is not a good thing, just as not having blood to the heart.

D Dr. Halena Gazelka 14:34

Sure. Chris, tell me what it means to have a leaky valve and what's the importance of that?

D Dr. Christopher DeSimone 14:41

Very important, and especially nowadays, when we have really, really good imaging techniques. So, we've had me and my wife, I should say my wife has had two children. I've had them with her. And we've gone and used the ultrasound machine. Well, the OB GYN has used the ultrasound machine. And the same sort of thing we do for the heart, we try to look at the baby with ultrasound waves, we use an ultrasound machine to look at the heart. And because of that, we're able to look at the heart pumping function, as well as the structure, the valves are the gateway from the top of the heart to talk to the bottom of the heart and vice versa. What happens when patients are told, or they've read that they have regurgitation, or a leaky heart valve, or a valve that needs surgical intervention, I try to explain it to my patients is look you have your heart has a hinge, and a doorframe, and a door. And when that door frame gets too big, there's going to be people walking in and out no matter if you have the door closed or not. If the door doesn't work itself, same thing, people are just going to keep walking in and out. So,either the hinge and the door apparatus need to be repaired, or the door itself needs to be repaired. Now, with this modern echocardiography, we have very, very good techniques to say, Okay this is mild, this is early leakage, we really don't worry about it, we just monitor it. Some patients we classify as moderate. And it's not so much to worry, but we could kind of intervene with medicines or kind of still watch, it's when it really gets severe is when we need to do something about it and depends on which valve. But all it means is that instead of the valve closing, after the heart bottom chamber is filled, it pumps blood not only to the rest of the body, but backwards where it came from. So, you can imagine that it puts a hindrance on what the heart's trying to do in the first place.

D Dr. Halena Gazelka 16:42

I love those little people going through the door, and I saw them in the house before and you just topped out. Now, Chris, we've talked about some of the terms for various diseases of the heart, I guess, and parts of the heart. And I'm wondering, can we talk just a little bit about some ways that you diagnose issues with the heart. And the first one would be an electrocardiogram, you kind of talked about this a little bit before. And the other thing, is an ECG the same as an EKG?

D Dr. Christopher DeSimone 17:14

it is so ECG, the only thing that's different is if a cardiologist or noncardiologist, just switched these up. It's basically electrocardiogram, and the ECG and EKG are the same, it's just the German term is electrokardiogram with a K. And that's how EKG came back. And then others want to use a C. So, then they use ECG. It's the same thing. It's about a 10 second snapshot in time, where I like to tell my patients is that we put all these electrodes

over their body, none of this is painful, none of this is harmful. It's just sticky stuff. And it's basically giving us a look at the electric electrical activity of the heart, both the electricity as well as the healthiness of the pumping function of the heart. So, it gives you a sneak peek at how healthy the muscle tissue is, as well. But it's a snapshot in time. And it's very helpful and a very common procedure done to almost all of our patients that we see.

D Dr. Halena Gazelka 18:08
Is it invasive in any way?

D Dr. Christopher DeSimone 18:10
It is non-invasive. So, all the electrodes will be on the skin. It will be non-painful, it will be a very quick thing. So, nothing for patients to be worried about. It's one of our most informative tests. It's a very cheap test, inexpensive, and it's quick.

D Dr. Halena Gazelka 18:26
So, what is an echocardiogram?

D Dr. Christopher DeSimone 18:29
Echocardiogram is what we were just chatting about. It's kind of like the sonography. Instead of looking at the baby, we're looking at the heart. And what that does is with ultrasound waves, and again, not painful, so I don't want patients to worry one bit. What it does is, we'll take a good look at the heart, and we could learn lots of things. How thick is the heart muscle? How thin is the heart muscle? Is the heart wall pumping effectively like it should? Is it filling up with blood? Is it contracting as it should? How are the valves or doorframes and doors we we're just chatting about, how are they functioning? Is there something wrong with the valve? Is there something flapping away that shouldn't be? Or is it filling and contracting as it should be? We could also get insight into how healthy the tissue is, and a surrogate of how high the pressures are in certain chambers of the heart. Again, all of this non-invasive? It depends some of these could take on the range of 30 minutes to an hour. But it's because we want to be very comprehensive, but nothing's painful, ad patients should be very well reassured. This is going to give us the best look at the heart, literally alive view at it.

D Dr. Halena Gazelka 19:39
What is a Holter monitor Chris?

D Dr. Christopher DeSimone 19:41

So, a Holter monitor is something you wear. Imagine it as an EKG but you could wear it for long periods of time. Long periods of time being 24 hours, 48 hours. Some of these we have patients wear for 30 days, we call them event monitors. What we're trying to do when patients have arrhythmias, or we have symptoms that we think could be related to something wrong with the heart's normal rhythm, we want to make sure that the symptoms they have, say they have every so often this feeling of faint or lightheadedness, or they've passed out, or they get this chest palpitation and uncomfortability. To be able to treat them appropriately, we need to know what rhythm they're in. And to know what rhythm they're in, we need to have them wear this EKG for long periods of time. So, we could say, ah, here's where you press the button, here's where you wrote down in the journal, here's where our Holter monitor recorded. And we could say this is a rhythm we could treat you for. This was atrial fibrillation, here are the next steps. So, it's really like a monitoring outside of the hospital or outpatient clinic environment to where you could go in your day-to-day life and recapitulate your symptoms for us.

D Dr. Halena Gazelka 20:50

That's great. What is a coronary angiogram?

D Dr. Christopher DeSimone 20:54

Angiogram is probably what people have heard about, you know, when someone has a heart attack, or when someone has had a stress test that showed concerning findings. What the angiogram does, again, this is really not painful. Sometimes people could feel the poke, you know, but we use lots of lidocaine, a numbing medicine. And this can be either done through the groin, or through the wrist. And what we do is once we're in there, we take a sheath and it's kind of like a little straw that we put into either the vein or the artery. In the angiogram, it would be in the artery, either through the wrist or through the groin. And then we could thread a wire followed by a catheter sheath. It's almost like I tell patients the thinnest fishing pole you can imagine. And what you do is once you thread it up into the heart, we could guide these into the areas of the heart called the coronary arteries, which feed blood to the heart. And then with contrast, it's like kind of putting in a highlighter or a little bit of ink, you could light up the areas and it almost looked like this Christmas tree pattern. But you could look and see areas that don't light up or may have blockages, or certain areas that are getting no blood flow. So, it's kind of a diagnostic way to say, hmm, there are blockages and where are they located? It's where the dye is not flowing, which it normally should.

D Dr. Halena Gazelka 22:14
It's kind of interesting, Chris, that the heart is full of blood, but it also needs arteries just like other areas of the body to get blood.

D Dr. Christopher DeSimone 22:22
Exactly. So, it needs the arteries as well as the veins, just like every other organ, to fill as well as give nutrients to its muscle as well. The nice thing about being an electrophysiologist is that those are avenues for us to get our catheters so we can treat arrhythmias.

D Dr. Halena Gazelka 22:40
Spoken like a cardiologist.

D Dr. Christopher DeSimone 22:41
It's God's gift to electrophysiologists.

D Dr. Halena Gazelka 22:45
Chris, what is a stress test, and why might you do one?

D Dr. Christopher DeSimone 22:48
So, stress test, you know, you hear that word and oh, my doctor sent me for a stress test.

D Dr. Halena Gazelka 22:53
Run on a treadmill.

D Dr. Christopher DeSimone 22:55
Yeah exactly, run on a treadmill. And it's more so of what we're trying to do is stress test the heart. Can the heart augment its ability to pump whenever our demands are increased? So, for running up the stairs, running on a treadmill, playing a sport, mowing the lawn, you need more blood flow, because the heart has to work harder. So, the stress test is a way for us to artificially create that, either in the lab or through a test to say, are we getting out enough blood and to where. And there's a couple different versions. So,

one, as you mentioned, would be an ECG stress test. We literally put patients on a treadmill, or on an exercise bike, and we monitor to see if there's anything that the ECG tells us and/or the patient while they're working out, bringing the heart rate up and asking for their heart to do more. That might bring on their symptoms. Another one, patients because their heart might not be in great shape, they can't achieve or do the walking that's required to stretch their heart enough to give us an idea of where and if there's a blockage in the heart occurring. For those we give drugs to mimic the heart working harder or faster. Or we could give radionucleotide, you know, we use this term, you know radioisotopes and things like that, like it's nuclear, it's a nuclear stress test. These are short lived, they go away, they empty out of the body very soon, but they are taken up by abnormal tissue different than normal tissue. So, you might have any number of those stress tests performed, and they all give us different information. Which one your doctor chooses depends on the situation.

D Dr. Halena Gazelka 24:36

You know, we talked about ECGs or electrocardiograms earlier. And I think one of the things that absolutely fascinated me when I was learning about cardiology was how much you can learn out of that simple little 10 second rhythm strip. You can learn about the rhythm, you can learn about whether the heart might not be getting enough oxygen. It's pretty amazing.

D Dr. Christopher DeSimone 24:58

It's incredible. My favorite tool in our whole toolbox, everything starts from there. You can tell, exactly like you said, what rhythm you're in. And big things too, you can also tell sometimes there are signatures that patients have, you know, issues with their thyroid or issues with potassium. There's lots of hidden things. You can also tell which side of the heart is bigger, the top, the bottom, the right side, the left side, there's lots of cool things you could tell about the ECG.

D Dr. Halena Gazelka 25:26

I think that enthusiasm might be why you are a cardiac electrophysiologist as a cardiologist. Anything else you want to tell the listeners?

D Dr. Christopher DeSimone 25:38

I just want to tell the listeners, when we order these tests, they're really to get you a diagnosis and to make you feel better. We know that lots of things are in the media or in

print or on television. And these are done in maybe more of a not so much symbolic but an acting out fashion. But really, whenever we order these tests, we don't mean to put you through any stress. And that's probably a bad word, we do mean to put you through some stress. But we don't want you to have anxiety and stress related to this. So, these tests are all done for a reason. And we don't want you to have any worry about these big, lengthy fancy words, we want you to have some comfort from our discussion today about what this entails, what to expect, and hopefully just have some ease, especially if some of these tests are done, you know, a couple of weeks out. And whenever they could get scheduled, you know, I could imagine my patients and I feel really bad for them. When they say oh, I have this stress test, do I have this Holter to do, I have this angiogram to do, and it's one month away. And they sit there for one month, and I just have a picture on my mind where they're concerned. And it makes me feel really bad. So, I hope today we can alleviate some of those concerns and try to bring to light some of these things to say, it's not that bad. And these are the reasons we do it. And here's what to expect. Don't be worried we'll take care of you.

D Dr. Halena Gazelka 26:57

And I think it's really important for people to remember, just as your parents said, to ask their doctor to break it down, make it into English that I can understand, because sometimes we forget to do that as physicians.

D Dr. Christopher DeSimone 27:09

I completely agree with you. Reason being, is because now we have the great thing called the Internet, and Google, and people can look up things and terrify themselves. And I tell a lot of my patients, we're going to start this medicine, you're going to go home and Google it and you're going to be terrified. Don't worry, here's what to expect. I'm going to tell them we're going to order these tests. I am sure when you leave this office, you're going to go home or on the way home in the car, you're going to look on your phone, and Google what I'm telling you these big fancy words supraventricular tachycardia, ventricular tachycardia, ischemic cardiomyopathy. Those are things that could be unsettling, especially with someone that hasn't had that distilled down for them. So, I think having that little bit of expectation or things that are out there that could scare them, if patients are more aware and educated about that, I hope that alleviates their stress.

D Dr. Halena Gazelka 28:04

Chris, it is always a pleasure to have you here. Thanks for being here today.

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Dr. Christopher DeSimone 28:08

My pleasure. Thank you so much for this opportunity.

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Dr. Halena Gazelka 28:12

Our thanks to Dr. Christopher DeSimone, cardiologist at Mayo Clinic for being with us here today to kind of break it down about heart evaluation and heart testing. I hope you learned something. I know that I did. And we wish each of you a very wonderful day.

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Narrator 28:29

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