

**AMIR LERMAN:** Greetings, and thank you for joining us today. My name is Amir Lehrman. I'm the vice chair for research for cardiovascular disease at the Mayo Clinic, and I have a pleasure to introduce to my colleague Dr. Joerg Herrmann, assistant professor of medicine, who recently join our staff and is currently heading the effort for the establishment of the cardio oncology clinic. Good day, and thank you for joining us, Joerg.

**JOERG** Thank you, it's a real privilege. Thank you for having me.

**HERRMANN:**

**AMIR LERMAN:** So Joerg, we would like to talk about an emerging problem that we see with our population, with specifically the aging population, that the patients that have cancer not necessarily are dying from cancer, but actually living with cancer and facing cardiovascular disease event. Now I would like for you to again tell us what's the need of this clinic, and how do you see the future of this kind of clinic?

**JOERG** Well actually, the heart.org commented on this way back in October of 2010 with a headline saying, "New Discipline of Cardio Oncology is Evolving as Cancer Patients Now Live Longer." And this is what you're implying. And when we look at the statistics, it's quite impressive. I mean five-year survival rates for cancer patients used to be 40%-50%. Now we're talking 70%.

There are even some cancer processes, malignancies such as non-Hodgkin's lymphoma, breast cancer, prostate cancer, where we see 90-plus 5-year survivor rates. So this is quite staggering, and this really has introduced a change of mindset, what you're implying. And this is really what generated the need for the field.

**AMIR LERMAN:** So when you look at the need of the field, we can see that there are several aspects of the need of the field. The first one, of course, is, as you mentioned, to have the patient or the individual with the cancer live with their cancer and not face any cardiovascular event. But one challenging area that I see that I would like you to comment is that the cardiac toxicity of the new chemotherapy and how we can identify or screen the patient prior to the chemotherapy. What kind of method should be developed to assess the risk of this patient?

**JOERG** Well, this is an evolving field, the antibody-based therapies, the breast cancer patients that really initiated a lot of this. And there are a couple of guidelines that have come out. As far as overall assessment, it's clinical. First of all, history and physical exam and then the ECG and echo has really been a central part of it. And so these are the baseline assessments of these patients.

**AMIR LERMAN:** Are any specific parameters of the imagine and the echo that are more helpful for you to assess the patient?

**JOERG** The American Society of Echocardiography will come out with recommendations for strain imaging, for the detection of chemotherapy-related, CAR toxicity, I believe even this year, which is really an important move. It's going to be important for clinical practice, but also will have implications for clinical trials. And it has been driven by the discoveries.

Not only these breast cancer patients, but other collectives where we see that strain imaging detects an abnormality way before the standard echo parameters do. And early recognition and treatment really has been key for overall restoration of cardiac function and improvement of patient outcome. And it's staggering and saddening in a way to see some papers being published that patients are treated not only not in time, but not adequately at all.

**AMIR LERMAN:** What do you estimate the risk, in general, of having any cardiac toxicity of the new chemotherapy drug for breast cancer, prostate cancer, colon cancer? What are the numbers that we're talking about?

**JOERG** We're talking numbers as high as 30%. But have gotten more gray hair over this as we get them, I mean wiser  
**HERRMANN:** and wiser as time is going by. So we realize what risk factors there are. For instance, extremely young age or extremely old age, hypertension, any prior underlying cardiovascular disease condition essentially is putting the patient at risk for collateral damage.

**AMIR LERMAN:** What are the consequences of having this cardiac toxicity? I understand that it's not a very innocent disease.

**JOERG** There are some prominent figures which have identified two types of injuries, those that are reversible, others  
**HERRMANN:** that are not reversible. So if we're talking about the classical anthracyclines, what everyone is thinking of, prominent publications, the *New England* in 2000, showed that anthracycline's cardiotoxicity or cardiomyopathy. So actually one of the worst of all cardiomyopathies. Patients, half of them, not making it up to two-year survival.

**AMIR LERMAN:** Do you think there are need for guidelines to how to screen and how to identify patients at risk for chemotherapy? And how do you interact with our other disciplinarians work on these programs?

**JOERG** I mean that's what you need. You need a group of committed colleagues who like to interact and interact with the  
**HERRMANN:** oncologists and hematologists. And the way we do it is just an open, frank discussion. I mean we have joint meetings and we also, on a regular basis, review cases. And whenever they have a question, they approach us. And now we've come up with our e-consult mode, but also the face-to-face interactions as well. Other institutions do this as formal consultations and actually have the oncologist and the cardiologist see the patient together.

**AMIR LERMAN:** The last about thing is if you can touch about potentially more common mechanism of these two diseases. Just in one or two words, what are you working on, on the common mechanism?

**JOERG** Well, there's one prominent that relates to and androgenesis, and we've seen like smoking. I mean this is bad,  
**HERRMANN:** although others claim it is not. But it's bad for the cardiovascular system and obviously for cancer, and one mechanism really is the androgenesis, and we've seen-- I mean you've published, we've published on this as vaso vasorum, neovascularization, plaque neovascularization. It is a driving factor.

Other factors such as obesity we've seen with diseases with colon cancer, as in the cardiovascular diseases. There are a number of joint mechanisms on the vascular wall.

**AMIR LERMAN:** Again Joerg, thank you very much for joining us and sharing with us this insightful information about this new entity. And again, thank you very much for joining us and good day to all.