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Myocarditis is a disease that mimics many more common diseases. Patients will present with chest pain that could resemble a heart attack, or they present with heart failure that could represent valvular heart disease. But it is actually the great mimicker which people often forget to include in their differential diagnosis.

The reason it's important is because there are specific management strategies for myocarditis which can improve outcome. For example, the number of patients in the world diagnosed with myocarditis last year was 3.1 million. And that works out to 22 per 100,000. So in a city of a million, there will be about 220 patients per year diagnosed with myocarditis.

Of those, many have chest pain, and they do very well with medications that control pain. The problem with patients who have chest pain is that they get recurrent chest pain. 10% to 15% of patients will have a chronic recurrent inflammation, which causes significant morbidity, but doesn't usually result in a heart transplant.

At the other end of the spectrum are the few patients who present with a bad heart failure. And those patients, although they often recover, sometimes require specific immunosuppression. At the Mayo Clinic, what we do is differentiate those patients who need specific therapy from those who are going to do well with general guideline-based therapy. And then we have extensive experience over the past decades with those therapies. We often will get them started and return patients home to their primary care provider.

Testing to confirm myocarditis does not always require a heart biopsy. For example, cardiac MRI in the first weeks of the disease is highly accurate for inflammation. The trick is that you need to have specific sequences. For example, we published in December the criteria for myocarditis, which includes T1 and T2-weighted parametric maps. Using those maps, which are relatively new and highly accurate, you can make a diagnosis of myocarditis with about a 90%.

At different ages, the risk of myocarditis varies substantially. Although if you look at the overall population of the world, the average age of myocarditis diagnosis is 42 years, but that's highly variable. For example, in the first year of life, infants with an immature immune system have a susceptibility to a very severe form of myocarditis, which can cause bad heart failure and even death in the first year of life.

Between year 1 and about 12 years of age, there's a very low incidence of myocarditis. And the children who do get myocarditis tend to have a very severe disease. Beginning at puberty, the rate goes up considerably, both for viral myocarditis, particularly in men, as well as for autoimmune myocarditis, which is balanced between men and women.

The peak after puberty is about age 42, but the late incidence of myocarditis is largely due to drug reactions. The average age for hypersensitivity myocarditis is actually 60 years old. And that is the kind of myocarditis which is related to an antibiotic or a anti-seizure medication. At Mayo Clinic, we have written or participated in the guidelines for the US, Europe, and Asia management of myocarditis for the past 20 years. Most of the guidelines are based on the research that we published. And therefore, coming to Mayo makes a lot of sense for patients who have complicated or concerns about their management of myocarditis.

We are actively involved in two NIH grants, which are both enrolling patients to diagnose the mechanisms of myocarditis between men and women, and how they differ between different ethnic groups, between black Americans and white Americans. We believe that the mechanisms of disease are distinct, and that will ultimately lead to specific and safer therapies. We are also beginning a trial of exosomes, which are a special kind of regenerative cell therapy for the treatment of myocarditis. That study is currently at the FDA under review.

The largest misconception about myocarditis by providers today is that there is no specific therapy, that general therapy for heart failure or general therapy for arrhythmias is equally applicable to patients with myocarditis as to those patients who do not have myocarditis. In fact, myocarditis has many causes, and there are specific therapies for many causes of myocarditis that are different than general heart failure.

At Mayo Clinic, we work as a team, all different medical specialties. Sometimes it's surgery with medicine, sometimes it's expert pathology who bring to the table a high level of expertise in their window on the disease. And it could be molecular biology, it could be a clinical diagnosis in the pathology lab, or it could be imaging. We bring everyone together to focus our resources to give the best possible care for each patient.