

[MUSIC PLAYING]

KEVIN LANDOLFO: Pericardial disease is often under-recognized and difficult to diagnosis, requiring a team of dedicated professionals.

JAE OH: It can really presents with a variety of symptoms. Can mimic other conditions.

LESLIE COOPER: Sometimes it's classic pericarditis, which is chest pain. It is worse with a deep, breath better with leaning forward, and worse if you lay on your back. But often, it can change with exertion, or it can not vary classically with position. Furthermore, it often overlaps with shortness of breath, which is notoriously a nonspecific symptom. In that setting, constriction may have developed.

KEVIN GREASON: Some of the most common symptoms that patients present with with pericardial diseases would be related to right sided heart failure. Swelling in the ankles, lower extremities, early satiety, filling up easy, early when they eat, abdominal bloating after they eat, shortness of breath, other signs of heart failure.

LESLIE COOPER: In the acute setting, constriction can be due to a viral infection and get better, particularly when there are high inflammatory biomarkers. In the more chronic setting, when the pericardium is truly thickened and scarred, it does not usually reverse without surgery.

KEVIN GREASON: Oftentimes we will like to repeat at least an echocardiogram here. You can't really see inflammation on an echocardiogram that well. What we're looking for are subtle signs of constriction, how the two ventricles interrelate to each other during respiration. And in addition, we're looking for associated valvular lesions and the pumping function of the heart. Those are the most important things that we're going to see with echocardiography.

LESLIE COOPER: Pericarditis is common. In North America and Europe, it's due mostly to acute viral infections that happen to affect the heart. In that setting, the majority of people get better with standard anti-inflammatory agents. It's a monophasic illness that, over the course of several weeks, will usually resolve. In the acute setting, we recommend management with colchicine, with or without a non-steroidal anti-inflammatory agent such as ibuprofen or naprosyn.

A monoclonal antibody, anakinra, against the interleukin-1 receptor is extremely effective at treating recurrent pericarditis. We have more than a 90% effective treatment rate with very few side effects.

KEVIN GREASON: Constrictive pericarditis, effusive pericarditis, and chronic relapsing pericarditis. Those are the three that usually have some aspect of surgical treatment. And following surgical treatment, the outcomes are quite reasonable.

LESLIE COOPER: At Mayo Clinic, we have pioneered the use of non-invasive imaging to make the diagnosis of constrictive pericarditis. Specifically, when the pericardium encases the heart and is inhibiting the filling of the right and left ventricle, there is ventricular to ventricular dependence. Such that with each inspiration, the volume of the right ventricle changes. And as a consequence, the volume of the left ventricle changes in a reciprocal way.

There are specific imaging features on echocardiography that can reliably make this diagnosis in a non-invasive manner. Dr. Jae Oh at Mayo Clinic was one of the first people to describe the echocardiographic features of pericardial constriction.

- JAE OH:** We have four diagnostic features. The mitral inflow velocity with respiratory variation. And number two, very characteristic ventricular motion with inspiration and expiration. And thirdly, we have the hepatic vein flow reversal during diastole with expiration. And number four is the augmented motion of the cardiac motion longitudinally. And we can do that by tissue sampling.
- LESLIE COOPER:** Chronic constriction is due to the encasement of the whole heart by a fibrous pericardium. That requires a total pericardiectomy. Not only the front of the heart, but the back side as well.
- KEVIN LANDOLFO:** Prior operations, in fact, now has become the most common cause of pericardial constriction or pericardial scarring. As the number of patients who've lived and are living following heart surgery, the number of patients representing with scar in their pericardium and symptoms related to that continues to go up. Once we have definitively demonstrated that the scarring is causing the problem with how the heart is functioning, then surgery remains really the best and only option to cure the patient of their symptoms.
- KEVIN GREASON:** Constrictive pericarditis results in a scar around the heart so it cannot relax and fill with blood. So once we remove the pericardium, the heart can go back towards its normal physiologic state. And it wants to be in that state. We'll see immediately patients start to diurese or get rid of water after operation. Some patients will lose 20 kilograms within a week of surgery. So once we relieve the constriction from the heart by removing the pericardium, the body wants to return back to a normal physiology.
- LESLIE COOPER:** In chronic pericarditis with constriction, there are elevated right heart pressures. These pressures back up into the renal veins and cause kidney failure. Once the pericardium is treated, either with medical management or not uncommonly surgery, the pressure in the renal veins decreases and the kidney failure resolves.
- KEVIN GREASON:** Pericardiectomy is very effective at reversing heart failure. Over 80% of patients will return to a very robust quality of life and function of life. Their heart symptoms will resolve.
- LESLIE COOPER:** At Mayo Clinic, we've performed more than 1,000 pericardiectomies. We have a lot of experience.
- JAE OH:** The future of pericardial disease patients is very bright.
- LESLIE COOPER:** We are every year coming up with new therapies, both medical, and improved surgical therapies for pericardial disease at the Mayo Clinic.