

ILLUMINATING RESEARCH FOCUSES ON SURGERY FOR RARE HEART VALVE INFECTION

University of Maryland Medical Center’s urban location means clinical teams care for some patients with a history of drug abuse — a key risk factor in a rare and dangerous form of heart valve infection for which UMMC physicians are learning that aggressive surgical treatment offers better-than-anticipated outcomes.

Cardiac surgeons here operate on about 10 patients each year with tricuspid

valve infective endocarditis (TV IE), a potentially fatal condition that occurs when bacteria enters the bloodstream and attacks the lining of the tricuspid valve. Located between the right atrium and right ventricle, the tricuspid valve is the first valve that blood flows through during normal circulation, leaving it somewhat more vulnerable to infection than valves on the heart’s left side, says Murtaza Dawood, M.D., a cardiac surgeon and clinical instructor of surgery in the Division of Cardiac Surgery at University of Maryland School of Medicine.

Intravenous drug abusers are at particular risk, accounting for about 86 percent of TV IE surgical patients at UMMC. Dr. Dawood tracked over a 10-year period to determine operative outcomes for this uncommon group. The majority of TV IE patients are treated antibiotics and other medications alone, but research hasn’t sufficiently compared surgical versus medical treatment and some physicians underestimate the serious effects of under-treated TV IE, he notes.

“The guidelines for surgical intervention have been rather vague,” Dr. Dawood explains. “It’s not the same as for the mitral valve or the aortic valve — those surgical indications are clear. A lot of clinicians tend to extrapolate the indications for the left side of the heart to the right side, but they’re not the same beast.”

RESEMBLES PNEUMONIA, BUT MORE DANGEROUS

Patients presenting with TV IE often have pneumonia-like symptoms such as fever, chills, cough, shortness of breath and chest pain. Blood tests show bacteria in the bloodstream, and these symptoms, combined

with patients’ medical history, typically prompt an imaging scan or echocardiogram that pinpoints the tricuspid valve infection.

TV IE can be especially perilous because the proliferation of growths called vegetations, may cause the valve to regurgitate or leak blood. These structural problems can’t be cured with antibiotics alone and require surgery to stem the “snowball effect” the leaky valve or vegetations can have on the rest of the body’s organs — which can be underappreciated by clinicians, according to Dr. Dawood.

“When pieces of vegetation break off valves on the left side of the heart, they may go to the brain and cause a stroke or cause other organ damage,” he says. “On the right side, when these vegetations break off, they go to the lungs. That’s ‘better tolerated’ than a stroke, so many primary care physicians treat it medically and don’t think to treat it surgically. But my argument is, lungs are there for a reason, and unnecessary damage can result in significant long-term morbidity.”

If a case of tricuspid valve infective endocarditis spirals out of control, a patient can get “profoundly sick” with sepsis, which can prompt organ dysfunction. In rare instances, the sepsis can overwhelm the patient entirely, “getting to a point where the body shuts down” and the disease becomes fatal, he says.

SURGICAL OUTCOMES SUPERIOR

The extent of valve dysfunction and the size of vegetations on the tricuspid valve both help determine which patients should have surgery to treat TV IE. “If the valve is physically



KEY POINTS:

- Tricuspid valve infective endocarditis (TV IE) a rare form of heart valve infection
- UMMC’s urban patient population includes higher proportion of intravenous drug users at particular risk for TV IE
- Cardiac surgeons operate on about 10 TV IE patients each year to resolve infection
- Antibiotics can’t cure TV IE after the infection causes structural damage to the valve
- Future research should compare medical and surgical therapies to determine superior survival and quality of life



DR. MURTAZA DAWOOD'S research focused on surgical outcomes for patients with TV IE.

damaged, there isn't a medical treatment for a mechanical problem. No antibiotic will repair it. Valve dysfunction can cause further damage to the heart," Dr. Dawood says. "That's when we recommend surgery."

In his research, presented in January 2014 at the annual meeting of The Society of Thoracic Surgeons in Orlando, Dr. Dawood demonstrated improved outcomes for surgical treatment of TV IE, which at UMMC is associated with a low complication and death rate. Prior studies had reported high surgical therapy death rates, and Dr. Dawood points out that the surgical death rate at UMMC was zero for TV IE patients whose TV IE occurred in their "native" tricuspid valve as opposed to a previously implanted replacement valve.

The procedure itself opens the sternum and requires the use of a cardiopulmonary bypass machine to stop the heart while the tricuspid valve is exposed. Surgeons visually assess whether the patients' native valve can

be repaired or — if the damage is too severe — excised and replaced. At UMMC, cardiac surgeons prefer the use of a bovine pericardial replacement valve, but mechanical valves can be used as well.

Among 56 patients who underwent surgery at UMMC for TV IE between January 2002 and December 2012, the average age was 39, while 59% of patients were female and 86% were IV drug users. Methicillin-resistant staphylococcus aureus (MRSA) was present in 41%, and 66% had moderately or severely incompetent tricuspid valves.

Dr. Dawood says future research needs to establish a head-to-head comparison between medical and surgical TV IE outcomes — data that could help determine if survival and quality of life vary differently depending on the treatment.

"It's a very safe operation, a good operation," he says. "Because we do

PATIENTS PRESENTING WITH TV IE OFTEN HAVE PNEUMONIA-LIKE SYMPTOMS.



a lot of these surgeries (compared to other centers), our results tend to show that. We have a good grasp of how to manage these patients."

RISKY PATIENT POPULATION CREATES CHALLENGE

Patient compliance is inherently poor in this population. Ongoing drug use can cause some to relapse with TV IE even after prior medical or surgical treatment for the condition. It's a conundrum that's both challenging and frustrating for physicians trying to save these patients, Dr. Dawood says.

"It's sort of a Catch-22, because if we don't operate they have a poor long-term outcome from progressive heart dysfunction and overall system failure," he says. "We try to give them the benefit of the doubt, that going through the operation will open their eyes a bit. For the majority it does, but for some the addiction is so bad they tend to relapse and can re-infect their valves. Because of their addiction, it's something we have to deal with."

Recognizing the risk factors, UMMC's substance abuse team attempts to steer affected patients into drug rehabilitation after successful TV IE surgery.

"Those patients that will make the lifestyle change do much better long-term," he says. "There's a preconceived notion that TV IE surgery is high-risk, but we can do it with really good outcomes." +



To reach the division of cardiac surgery directly, please call **410-328-5842**.