

may be reflective of the patient's complex anatomy and the severity of disease. One death was reported >30 days postsurgical treatment. Total repair of TOF at CEDIMAT was associated with low morbidity and mortality rates, and it appears to be a reasonable therapeutic strategy for TOF. More follow-up is needed to establish long-term treatment outcomes and to determine the risk that is associated with complications, such as right ventricular dilatation and severe rhythm disturbances. Findings from this review are promising and demonstrate that TOF strategies that are currently being utilized in the Dominican Republic confer low mortality risk.

CRT and Optimizing Cardiac Function with Echocardiography

Cardiac resynchronization therapy (CRT) devices are often used to treat heart failure and cardiac dysrhythmias. Leads that are placed in the cardiac muscle create electrical pulses that stimulate coordinated contractions within the atrium, right ventricle, and left ventricle, which fosters optimal diastolic filling and systolic contraction. Optimization of CRT devices enriches cardiac health, as demonstrated by improved ejection fraction and NYHA functional class, as well as extended distance that is covered during the 6-minute hall walk. John R. Dylewski, MD, FACC, South Miami Heart Center, Miami, Florida, USA, discussed various ways of optimizing CRT devices and how to make the most of imaging modalities, such as echocardiography.

Atrioventricular (AV) delay may be optimized using 2-dimensional echocardiography to evaluate mitral regurgitation and septal wall motion. Ideally, AV delay should be the shortest possible to allow for maximal ventricular filling while reducing mitral regurgitation and increasing left ventricular function. However, if AV delay is too short, E/A wave diastasis may ensue, resulting in almost no atrial kick. The atrium contracts too late; so, the AV delay should be increased. Conversely, E/A wave fusion occurs when the AV delay is too long. Thus, an excess of atrial kick with little or no E wave occurs, and truncation of A wave may occur by premature closure of the mitral valve. AV optimization results in improved diastolic function.

Echo-driven V-V optimization improves systolic function and is also vital to the management of CRT devices. Using the parasternal long axis view of M-Mode echocardiographic imaging, the timing between septal and posterior wall contractions should be coordinated. When the ventricles are synchronized, V-V optimization has been achieved.

Optimal delays do change over time. Therefore, it is important to check timing, recalibrate rhythm, and ensure optimization regularly. Timing is everything, and cardiac rhythm synchronization can greatly influence the burden of disease.

Additional ECG Leads May Not Provide Benefit in Detecting Brugada Syndrome

In a preliminary study, the use of additional electrocardiogram (ECG) leads was no more sensitive than standard 12-lead ECG assessment in detecting the signature ECG pattern of Brugada Syndrome (BrS), including right bundle branch block (RBBB), persistent ST-segment elevation in precordial leads V1 to V3, and normal QT interval.

BrS is a rare genetic disorder that increases the risk of sudden cardiac death (SCD). Diagnosis requires the detection of Type 1 ST-segment elevation, either spontaneously present or induced by a challenge with a class I antiarrhythmic (eg, ajmaline, flecainide). Traditional 12-lead ECG has a low sensitivity for Type 1 Brugada ECGs and may not detect the presence of this life-threatening syndrome. New research is focused on improving the detection of BrS with novel ECG lead placement.

Multichannel continuous ECG recording in the third intercostal space has been shown to be more sensitive for the diagnosis of Type 1 Brugada ECG than either repeated 12-lead ECGs or multichannel continuous ECG in the standard position [Shimeno K. *J Cardiovasc Electrophysiol.* 2009]. In the current study, Raymond Massay, BSc (Hons), MBBS, FRCP (Lon), University of the West Indies, Cave Hill, Barbados, and colleagues compared standard 12-lead placement with ECG using multiple leads that were positioned to view the right ventricular outflow tract (RVOT) in the detection of BrS.

The trial enrolled 15 patients from a private cardiology practice in Barbados. All patients had a history of syncope, a family history of SCD, and previously documented Brugada-type ECG findings. Neither ajmaline nor flecainide were unavailable as a challenge agent. Instead, patients were given procainamide 10 mg/kg IV over 10 minutes. Both standard ECG and ECG using the additional leads were recorded during drug administration and for 5 minutes thereafter.

Dr. Massay found no Brugada ECG patterns by either conventional or additional lead placement. Procainamide was well tolerated, with no arrhythmias, hypotension, or allergic reactions reported. A larger trial of patients who are

challenged with either ajmaline or flecainide is necessary to provide any definitive conclusions about the use of additional ECG leads in screening for BrS.

Public Hospital Training Program Increases Access to PCI in Trinidad and Tobago

Routine percutaneous coronary intervention (PCI) can be performed safely by a specially trained team of cardiologists, registered nurses, and cardiovascular technicians in a public hospital, according to findings from a pilot PCI training program. Clifford Thomas, MD, Eric Williams Medical Sciences Complex (EWMSC), Mount Hope, Trinidad and Tobago, described outcomes from the first 101 procedures that were performed as part of the pilot program at EWMSC.

With a high prevalence of coronary artery disease (CAD) and few interventional cardiologists in Trinidad and Tobago, the growing needs for PCI were not being met. Physicians at the EWMSC initiated a PCI training program for cardiologists, nurses, and technicians in September 2008. During the first 20 months of the program, 101 patients were treated.

The mean patient age was 56 years, and 69 patients (69%) were male. At the time of presentation, the mean left ventricular ejection fraction (LVEF) was 56%. The majority of patients (71%) had class III or IV angina, and one patient required primary PCI for ST-segment elevation myocardial infarction. Patients were more likely to receive drug-eluting stents than bare-metal stents. Following PCI, all patients were started on 2 years of anticoagulation therapy with clopidogrel.

All procedures met the standard of clinical success, which was defined as a combination of procedural success (<10% stenosis) with no major complications. The mean diameter stenosis was reduced from 86% at baseline to 8% after PCI. No patients required repeat revascularization during the index hospitalization, and no deaths were reported. One patient required elective coronary artery bypass grafting after PCI failed to dilate a calcified lesion.

These preliminary results support the expansion of the PCI training program, Dr. Thomas said. The program will continue to increase the number of skilled interventional cardiologists and provide increased access to PCI for public sector patients. The team is currently evaluating procedural success rates by lesion severity, as well as long-term outcomes among patients who have received treatment as part of the program.

New Technologies in Pulmonary Arterial Hypertension

Pulmonary arterial hypertension (PAH) is a rare cardiopulmonary disease that is associated with remodeling within the small pulmonary arteries, increased pulmonary vascular resistance, and right ventricular failure. Identifying PAH is a challenge for clinicians, in part due to its nonspecific symptoms, such as dyspnea, chest pain, heart failure, and palpitations. As a result, the accurate diagnosis of PAH is often delayed up to 2 years after symptom onset. Pierre Gacon, MD, Centre Hospitalier Universitaire, Dijon, France, described the role of new imaging technology in improving the diagnosis and assessment of patients with PAH.

Among Caribbean patients with PAH, approximately 40% has idiopathic disease. Additional etiologies include connective tissue disease (15%), HIV infection (10%), and hemoglobinopathy (5%). Current guidelines from the American College of Chest Physicians recommend Doppler echocardiography as a noninvasive screening test for patients who are suspected of having PAH. Echocardiographic abnormalities, such as pericardial effusion, right atrial enlargement, septal displacement, and left ventricular eccentricity index, predict adverse outcomes in patients with PAH and identify patients who may be candidates for more intensive medical therapy or earlier transplantation.

Additional tools are also emerging as valuable options for patient assessment. For instance, echocardiographic measurement of the tricuspid annular plane systolic excursion (TAPSE) adds valuable prognostic information about RV systolic function in patients with PAH. The measurement of TAPSE is easy to obtain in patients with PAH, irrespective of heart rate and rhythm, and significantly improves the prognostic value of other echocardiographic measures.

New technologies for measuring key prognostic variables, such as regional contractility, left ventricular eccentricity index, and myocardial performance index, can also improve risk assessment in patients with PAH. Compared with conventional Doppler echocardiography, new options, such as Doppler tissue imaging, 2-dimensional strain echocardiography, and speckle tracking echocardiography, provide more accurate prognostic information for determining PAH severity.

Improving outcomes for patients with PAH will require collaboration among primary care physicians, cardiologists, and other members of the health care team. By incorporating new technologies, physicians can improve the diagnosis, risk assessment, and management of patients with PAH.