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Chapter 1 : FFR and iFR in the Diagnosis and Treatment of Heart Disease | DAIC

*Coronary Artery Disease Chart (Netter Charts) [Frank H. Netter MD] on blog.quintoapp.com *FREE* shipping on qualifying offers. This chart depicts and describes the coronary arteries and their function, defining CAD as the buildup of atherosclerotic plaque within the artery walls.*

FFR and iFR in the Diagnosis and Treatment of Heart Disease Implementing FFR and iFR into daily practice As an early adopter of fractional flow reserve FFR for the diagnosis of ischemia, my initial decision to transition from angiographic-guided treatment to physiologic-guided treatment was driven by a desire to ensure that we were treating lesions appropriately. Despite countless studies indicating the weakness of the angiogram, far too many operators still rely on it for treatment guidance. The coronary angiogram is limited and does not measure the extent to which a stenosis is restricting blood flow. Accordingly, a physiological assessment such as FFR, clarifies angiographic interpretation, resulting in improved diagnosis and ultimately, superior treatment decisions. In addition to more accurately treating patients, we quickly realized cost benefits with the adoption of FFR resulting from elimination of unnecessary treatments and reduction in readmissions. And, with the recent introduction of the instant wave-free ratio iFR version of FFR, we are poised to realize greater savings due to the reduction in adenosine costs and improved patient experiences. Unfortunately, many interventional cardiologists are still making final decisions to stent a vessel based on angiographic results without taking into consideration physiologic parameters that are, in fact, objective and not subject to misinterpretation. In many cases, physicians are not aware of or trained to use new physiological assessment technologies. I find this concerning, because as medical professionals we should embrace new technologies like FFR and iFR that are game-changers. Unfortunately, clinician behavior and guidelines are changing slowly. We are, however, getting stronger support from the American College of Cardiology, American Heart Association and the European Society of Cardiology in pushing for greater objectivity in guidelines. This, coupled with ongoing focus on outcomes, will provide increased justification for diagnosis with physiological assessment and ultimately greater adoption. I recommend doctors get familiar with FFR first, so they feel comfortable with the pressure wire and making decisions based not just on angiographic data, but in conjunction with physiologic data. And when proficient, they can move on to iFR. Also a physiological assessment, iFR determines whether a stenosis is causing a limitation of flow in coronary arteries with subsequent ischemia. Like FFR, iFR is performed with high fidelity pressure wires that are passed distal to the coronary stenosis. The enhancement over FFR obviates the need for adenosine, a step that can be time-consuming and costly for cath labs that utilize infrequently and is contraindicated in some patients. During this time, competing forces waves that affect coronary flow are quiescent, and pressure and flow P_d and P_a are linearly related as compared to all other periods in the cardiac cycle. Therefore, when a stenosis is flow limiting, P_d and P_a pressures over the wave-free period diverge, with iFR values below 0. Theoretically, iFR can be calculated using a single heartbeat, but is typically averaged over five beats for normalization. With the introduction of iFR, interventional cardiologists now have more choices; and with the flip of a switch, the iFR modality provides a hyperemia-free measurement. Our staff is well-versed in the protocols and initiation of these modalities. The addition of an FFR evaluation to an initial iFR assessment adds only minutes to the overall procedure time. With everything prepped and set on the table, the consult goes very quickly; whether I choose to do iFR or FFR, we do not waste any time. My independent conclusions agreed with the data “there was almost percent correlation between the two indices. Following the initial trial period we implemented the hybrid approach. For iFR measurements greater than 0. Using these benchmarks, we are able to spare at least 60 percent of our patients from vasodilator infusion. When you introduce iFR at a facility, training is critical for rapid success. At our hospital, there were interventionalists that were initially frustrated because not all of the staff were comfortable with the technology. Like any new technology, you go through the process of understanding the why, then the how, and ultimately you become proficient and

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benefits accrue to the various stakeholders. FFR requires adenosine, which could be expensive in the IV form. With the advent of iFR, we are saving hospitals money by reducing the use of adenosine. So why not use something that will immediately save costs, with no degradation in diagnostic accuracy? Memorial Regional Hospital has experienced at least a 60 percent reduction in adenosine use with the adoption of iFR. As adoption increases in other hospitals, cost savings will accelerate. With iFR, those impacts are avoided and patient experiences improve. Without the need for adenosine, iFR affords greater diagnostic flexibility. For example, measuring pullbacks in different areas that I want to assess can be accomplished quickly and easily. I can pull back my wire and do the iFR measurements from vessel to vessel, and from distal to mid and mid to proximal within those vessels. That kind of capability is invaluable. As well, determining the impact of revascularization or stenting is likewise simpler with added value. Transitioning to Physiological Assessment

It is rare when I opt not to perform a physiologic assessment. With its ease of use, improved accuracy, greater objectivity and significant reductions in inappropriate procedures, it is indefensible to forego this technology. If I have a significant lesion strongly correlating with stress tests, then I will go ahead and revascularize the indicated lesion. The healthcare industry is still in the early stages of implementing physiological assessments as the most objective pathway to diagnose and treat significant lesions. Though FFR has been with us for about 15 years, we still have many doctors who have not had experience with FFR, and that could lead to poor treatment decisions and outcomes. According to the International Survey on Interventional Strategy published in *Circulation* in October, 71 percent of cardiologists who participated in the international Web survey used visual assessment only to assess intermediate stenosis over requesting FFR measurements, even when resources were not an obstacle and it was contrary to guidelines. Of those, only 53 percent of purely visual decisions were concordant with FFR. The evidence is clear – we must continue to promote and support transition from angiographic-based decisions to physiology-based decisions with FFR and iFR. The modifier indicates to the payer that the service described by the FFR codes was reduced because administering pharmacologic stress is not required to obtain an iFR value.

Summary We are fortunate to have technological advances such as iFR and FFR to aid in our decision-making, improve patient outcomes and even reduce healthcare costs. It is incumbent upon each of us to embrace these technologies and lead change within our organizations. The healthcare system will ultimately demand it through more stringent guidelines and reimbursements tied to patient satisfaction, improved outcomes and reductions in costly readmissions.

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Chapter 2 : CT Coronary Calcium Scoring Predicts Long-term Cardiac Health | DAIC

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Switch to Metric Units This heart disease risk assessment is most accurate for people between ages 20 and 74. For people younger than 20 or older than 74, the presence of two or more cardiovascular risk factors suggests a higher risk of cardiovascular disease. Have you ever had any of the following conditions or procedures? Heart attack or coronary bypass surgery Stroke or transient ischemic attack TIA Peripheral artery disease "reduced blood flow in arteries in your legs, arms or other areas Angioplasty or stent placement" a procedure to open narrowed or clogged arteries by placing a small tube stent in an artery to keep it open and prevent it from narrowing Abdominal aortic aneurysm "enlargement of the lower area of the major blood vessel aorta that supplies blood to the body None of the above Have your parents, siblings or children had any of the following at an early age younger than age 55 for men and younger than age 65 for women? Heart attack or coronary bypass surgery Stroke or transient ischemic attack TIA Peripheral artery disease "reduced blood flow in arteries in your legs, arms or other areas Angioplasty or stent placement" a procedure to open narrowed or clogged arteries by placing a small tube stent in an artery to keep it open and prevent it from narrowing Abdominal aortic aneurysm "enlargement of the lower area of the major blood vessel aorta that supplies blood to the body None of the above Have you smoked at least cigarettes? Yes If yes, have you smoked a cigarette, cigar or pipe in the last 12 months? Yes No Have you been told by a doctor, nurse or other health care provider that you have diabetes? Yes Do you know your total cholesterol and "good" high-density lipoprotein HDL cholesterol levels? Yes What are your cholesterol levels? Total cholesterol level Do you know your blood pressure measurements? However, the estimate will be more accurate if you supply your actual blood pressure measurements. Have you ever been told by a doctor, nurse or other health care provider that you have high blood pressure? Yes Do you currently take blood pressure medication? Yes No Which one of the following statements best describes your usual weekly physical activity? Vigorous physical activity is any activity that makes you breathe much harder than usual, such as aerobic exercise or fast bicycling. Moderately intense physical activity makes you breathe somewhat harder than usual, such as bicycling at a regular pace or doubles tennis. At least 75 minutes of vigorous physical activity or minutes a week of moderately intense physical activity each week Less than 75 minutes of vigorous physical activity or less than minutes of moderately intense physical activity each week No physical activity How many servings of fruits and vegetables do you eat in a typical day? Base your answers on your eating habits last month. One serving is about the size of a small apple or small potato. Serving sizes of common foods with saturated fat: Risk factors Take action to reduce your risk If you were to control your risk factors for cardiovascular disease heart attack or stroke to acceptable levels, then your risk would be: Your risk of cardiovascular disease is at or near the acceptable level. Keep up the good work! Gradually increase your physical activity toward a goal of at least minutes a week of moderate aerobic activity, 75 minutes of vigorous aerobic activity, or an equal combination of moderate and vigorous activity a week. Perform at least 10 minutes of aerobic exercise at one time, and spread aerobic exercise throughout your week. Include strength training exercises at least two days a week. Gradually increase your physical activity toward a goal of at least minutes a week of vigorous aerobic activity, minutes a week of moderate aerobic activity, or an equal combination of moderate and vigorous activity a week. Eat a healthy diet. Eat a healthy diet that emphasizes: Fruits, vegetables and whole grains Low-fat dairy products and low-fat proteins, such as poultry, fish and legumes Moderate amounts of healthy fats, such as unsalted nuts, and vegetable and olive oils Maintain a healthy weight. Reduce the number of calories in your daily diet. Ask your doctor if he or she suggests that you have screening tests and treatments regarding your cardiovascular disease risk. Limit the amount of salt in your diet. Limit how much alcohol you drink. Take blood pressure medications if your doctor recommends them. Check your blood pressure and check with your

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doctor if your measurements are too high. Take diabetes medications as recommended by your doctor. Check your blood sugar and keep it under control as recommended by your doctor. Seek counseling or medication therapy to help you quit smoking or using tobacco. For more information about how to quit smoking, talk to your doctor. Go to the doctor and get your blood pressure checked. You have a personal history of heart disease. To help keep your heart as healthy as possible: Gradually increase your physical activity toward a goal of at least minutes a week of moderate aerobic activity, 75 minutes a week of vigorous aerobic activity, or an equal combination of moderate and vigorous activity a week. Take medications your doctor has prescribed for your heart condition and other conditions, such as aspirin, statin medications or blood pressure medications. Make sure you have follow-up appointments with your doctor on a regular basis. Additional factors that may influence your risk include:

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All the major CT vendors offer plaque characterization software to ID plaques and calcium based on Hounsfield units. CT offers views of the coronaries to see if there are any obstructions and if the vessels contain plaque. This data convinced the American College of Cardiology ACC to include CT calcium scoring in its revised guidelines for prevention and cholesterol released last fall. The test has been available for decades, but doctors and scientists debate whether and how it should be used to improve patient care. Mounting Evidence for Calcium Scoring The new calcium scoring studies presented at ACC earlier this year, some of which tracked patients for 10 years or more, show calcium scans to be better at predicting long-term heart problems than other available tests, particularly when evaluating low-risk patients. Although the calcium itself is not dangerous, it contributes to the hardening of the arteries and its presence and pattern of accumulation reflects other conditions, such as narrowing of the arteries or an increased risk of dangerous blood clots, which can lead to heart attacks and impaired heart function. The ACC late-breaking trials included the following: Value as a First-line Test for People With No Cardiac Symptoms In a study of nearly 1,000 people tracked for an average of seven years, researchers at Houston Methodist Hospital in Texas found coronary calcium scores were significantly better at predicting cardiac events than two other heart disease tests, the Framingham year risk calculator and the exercise treadmill test. The advantages of calcium scoring were especially prominent in the approximately 80 percent of participating patients considered to be at low risk for heart disease based on their treadmill test results. Lead study author Su Min Chang, M.D. Twenty Years of Data Help Refine Assessments of Low-risk Patients A year study of nearly 5,000 people offers new insights about the relative mortality risk of patients with no, low, moderate and high calcium scores who are otherwise considered to be at low risk for heart disease. Over an average follow-up period of 10 years, researchers at Los Angeles BioMed at Harbor UCLA Medical Center found that even patients with low calcium scores were 50 percent more likely to die than patients with a calcium score of zero. Moderate scores were associated with an 80 percent greater likelihood of dying and high scores above were associated with a three times greater risk of dying as compared to patients with zero calcium. Lead study authors Rine Nakanishi, M.D. Researchers tracked the long-term eight-year likelihood of death or heart attack among patients who were referred for CT scanning after experiencing chest pain but who had not been previously diagnosed with coronary artery disease. Comparing three measurements taken during the scans: A Reflection of Overall Heart Health Calcification in the coronary arteries is a common manifestation of unhealthy vascular aging and serves as a good predictor of poor cardiovascular outcomes. In contrast, a finding of a coronary artery calcium score of zero in a middle age or older adult is a sign of healthy aging and a good predictor of longevity. In a study of 1,000 participants from the Multi-Ethnic Study of Atherosclerosis MESA, researchers at the Johns Hopkins Ciccarone Center for the Prevention of Heart Disease showed that no single risk factor predicted which individuals would maintain a coronary artery calcium score of zero over a year period. Analyzing demographic and lifestyle risk factors of study participants who had a calcium score of zero at the start of the study, they found that younger participants and those without multiple traditional cardiovascular risk factors were more likely to maintain a score of zero during a second scan taken 10 years later. Lead author Seamus Whelton, M.D. The frequency of ischemia rose with an increasing calcium score. Because the tests reflect different aspects of heart health, the two can be complementary, with coronary calcium scans offering valuable insights about long-term heart disease risk and SPECT-MPI offering a clearer picture of the short-term risk of an adverse cardiac event, said lead study author Chirag Bavishi, M.D. CT Angiography The use of coronary CT angiography CCTA has been growing rapidly over the past few years because of its noninvasive nature, ease of use and access as more

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hospitals install 64 or higher slice CT systems, and as evidence of its clinical utility continues to be positive. Budoff said the ACC late-breaking sessions have included CCTA trials for the past several years, highlighting the advances in the technology. In addition, he said its predictive value for triaging chest pain patients is excellent. Trials are also underway to expand the utility of CCTA with functional data in the form of perfusion imaging and fractional flow reserve FFR -CT, which can measure blood flow through lesions to identify the ischemia culprits. CTA creates a dataset, which can be manipulated in advanced visualization software to create 3-D images of the cardiac anatomy and 2-D images of on any imaging plane. Budoff said this is increasing being used to plan more complex interventional and hybrid transcatheter procedures, including transcatheter aortic valve replacements TAVR. Dose Reduction One of the biggest issues preventing expansion of cardiac CT over the past decade has been the significant levels of patient radiation exposure. However, Budoff said new iterative and model-based image reconstruction software and new X-ray tube and detector technology has slashed the radiation dose. The vendors have really stepped up to the plate to reduce the amount of dose.

Chapter 4 : Anatomy Of Coronary Arteries - ANATOMY CHARTS

This chart depicts and describes the coronary arteries and their function, defining CAD as the buildup of atherosclerotic plaque within the artery walls. Shows the possible consequences of CAD-angina, myocardial infarction, congestive heart failure, and dysrhythmias-along with specific guidelines for reducing or preventing CAD.

Chapter 5 : CDC - DHDSP - Heart Disease Facts and Statistics

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Chapter 6 : Tool: Heart disease risk calculator - Mayo Clinic

Atlas Of Coronary Artery Disease charts frank h netter md on amazoncom free shipping on qualifying offers this chart depicts and describes the coronary an.

Chapter 7 : Netter Clinical Charts: Complete Set of 10 Charts - free PDF, CHM, FB2, RTF

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