Cardiology is rapidly changing, making it difficult for physicians to keep abreast of the latest treatments while running a busy practice. What follows is a brief review of some recent highlights in cardiology.
EBCT is quite useful in patients with equivocal stress tests, in which the physicians or patients do not strongly believe that a heart catheterization is indicated without further information. It can be considered the “tie breaker” to help the patients and physicians decide whether or not to proceed with more invasive testing such as cardiac catheterization.

**Useful tools**

You should also be aware that although many physicians deem low calcium scores as placing patients at extremely low risk for a myocardial infarction, there are studies that do show that a significant number of patients with low calcium scores will have an acute coronary syndrome.

Also, there are studies showing that people with high calcium scores can remain cardiac stable for long periods.

Another useful tool and one that is becoming rapidly available is CT angiography. As a screening tool, CT angiography is extremely useful and will likely reduce, if not replace, diagnostic angiography.

For risk stratification, CT angiography is very good, but be aware that it requires a 16-slice cat scanner for optimal resolution.

**Lipid profile**

HDL, LDL, total cholesterol and triglycerides have now become standard for screening patients with coronary artery disease. But what about the patient who’s had a magnetic resonance imaging (MRI) or an acute coronary artery syndrome with a low or normal LDL level, the patient with an extremely strong family history of premature coronary artery disease, or the very young patient concerned about his or her risk for myocardial infarction?

In these cases, the traditional lipid profile screen is not adequate, and a more in-depth test is needed.

This is where the VAP cholesterol test is helpful. The VAP test not only measures the traditional LDL, HDL and triglycerides levels, but it also fractionates these values into subtypes.

Of particular importance is the size of the LDL particle. Small-dense LDL is highly atherogenic. And if a patient’s LDL is predominately small-dense, he or she may be at high risk for a cardiac event—even with a low total LDL level.

This can happen because small, dense LDL easily penetrates vessel walls and causes the plaque that’s responsible for acute coronary artery events. Additionally, HDL subtypes are of equal importance. A high HDL might not be protected if it is not an HDL-2 subtype.

Also available with the lipid profile test are levels of C reactive protein, plasma homocysteine, and Lysophosphatidic acid (LPA).

**Hemoglobin A1C**

Glycosylated hemoglobin is frequently used to monitor glucose control in patients with diabetes mellitus and to aid in their treatment.

An elevated glycosylated hemoglobin correlates with all-cause mortality and an increased risk of cardiovascular disease. In addition, glycosylated hemoglobin further risk-stratifies these patients.

Patients with glycosylated hemoglobin concentrations of less than 5 have the lowest 6-year rates of all-cause mortality in cardiovascular disease. For each increase of 1 in hemoglobin A1C above 5, there is a significant increase in the relative risk of death by approximately 24% of men and 28% of women. There is also a 21% increased risk of cardiovascular disease is for both men and women.
Therapeutic interventions and interventional treatments

Drug-eluting stents (DESs) are frequently used in interventional cardiology to reduce the incidence of restenosis. The use of these devices is a double-edged sword, however.

The anti-neoplastic drugs in these devices reduce the proliferation of cells involved in plaque formation and reduce reinvasion into newly dilated blood vessel. This anti-proliferative effect, however, also slows the endothelialization of the stent, thereby exposing blood constituents to the prothrombic metal of the stent for prolonged periods. This means that all patients with DES must be on anti-platelet therapy for at least 9 months.

Anti-platelet therapy typically consists of aspirin and clopidogrel (Plavix). Such an anti-thrombic regimen cannot be suspended for any reason as subacute thrombosis of the stent will result, and an acute myocardial infarction will occur.

Warfarin Sodium Tablets, USP and Heparin, a heterogeneous group of straight-chain anionic mucopolysaccharides, called glycosaminoglycans, having anticoagulant properties, are not acceptable alternatives, as they do not have significant anti-platelet activity—so clotting of the stent will result. It is vital, then, to determine which type of stents your patients have received if they have had intervention. Note that if it patients have DES, you should maintain them on clopidogrel bisulfate and aspirin for at least nine months before discontinuing one or the other of these drugs.

ICDs and biventricular pacing

Congestive heart failure and coronary artery disease are the two leading diagnoses in the United States today. Together they are the leading causes of morbidity and mortality for Americans.

Besides bypass surgery, angioplasty and cardiac transplant, what can be done for patients with congestive heart failure and cardiomyopathy to reduce their risk and improve their lifestyles?

The recent Multicenter Automatic Defibrillator Implantation Trial II (MADIT II) has shown that in patients with ejection fraction of less than 35% and previous myocardial infarctions, implanting prophylactic defibrillators will prolong life. Any patient who meets these criteria should be strongly considered for evaluation by an electrophysiologist for possible implantation of a defibrillator.

In addition to implantable cardioverter defibrillators (ICDs), biventricular pacing is now available. Biventricular pacing resynchronizes the ventricles in patients who have a low ejection fraction and a bundle branch block pattern with a QRS duration greater than 0.12 seconds.

It has been shown that by placing a third lead into the coronary sinus to pace both the right and left ventricle simultaneously, mitral regurgitation is markedly reduced. Left ventricle function is improved and ejection

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fraction improves. The patients can walk greater distances, enjoy increased functional capacity, experience fewer hospital admissions for congestive heart failure, and reduce their risk of death.

**Pharmacologic treatment**

Aspirin, NSAID and Cox-2 inhibitors all fall under this category.

No one debates aspirin’s effectiveness in preventing stroke, myocardial infarction and vascular death. But some patients appear to be aspirin-resistant.

In addition, some current pharmacologic data suggest a competitive inhibition between aspirin and ibuprofen, reducing aspirin’s effectiveness. But clinical studies are lacking, and a review of the research fails to show any significant clinical interaction between aspirin and ibuprofen.

As a cautionary measure, however, aspirin should be taken before ibuprofen to allow for platelet inhibition before any possible competitive effects of ibuprofen might occur. It now becomes an important concern as the Cox-2 inhibitors have been implicated in an increase in cardiac events and death.

**Diet**

High-protein, low-carb, glycemic index: These are all current buzzwords in the diet language of Americans today. But with so many different diets available and so many different studies conducted in support of each of them, which diet should we recommend?

There really is no one diet for all patients. Each patient needs to find the diet that works for him or her.

Our job as physicians is to check our patients’ vital parameters, including labs, to ensure that successful weight loss is not offset by metabolic derangement. Overall, I would suggest that a more Mediterranean-based diet would be most suitable for most patients.

**Fish oil**

During the past 10 years, more and more data have demonstrated the benefits of fish consumption, in particular fatty fish such as herring, salmon and tuna.

The first benefit noted in the data was a decrease in plasma triglycerides. Subsequent studies have shown that consumption of fatty fish with a high content of omega-3 fatty acids can actually decrease inflammation and inflammatory markers, such as C-reactive protein (CRP). Evidence also suggests that these omega-3 fatty acids have a membrane-stabilizing effect. In addition, they have decreased premature atrial contractions (PACs) and premature ventricular contractions (PVCs) as well as decreased the incidents of ventricular tachycardia, sudden cardiac death, and possibly arterial fibrillation.

The Gruppo Italiano per lo Studio della Sopravvivenza nell’Infarto miocardico (GISSI) III study specifically demonstrated a 45% decrease in sudden cardiac death in postinfarct patients who had ingested increased amounts of omega-3 fatty acids.

Based on these studies, I would recommend that patients take 1,000 to 4,000 mgs of omega-3 fatty acids a day, specifically eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). This may be done by frequently eating fatty fish such as wild salmon, tuna and herring.

Supplementing with fish oil capsules is acceptable, but these must be true fish oil capsules with 1,000 mgs of omega-3 fatty acid types and not just standard fish oil. Patients with fish allergies and those who cannot tolerate fish oil can use flaxseed oil as a substitute, but there are less data to support the benefits of flaxseed oil.

**Exercise**

Everyone knows that exercise is good for you. But motivating patients to exercise is not so easy. What can we tell our patients to increase their interest in and help them maintain a regular exercise program?

- **Exercise is cumulative.** If your patients use lack of time as an excuse for not exercising, tell them that their goal should be 10 minutes
of exercise, three to four times a day. Anyone can carve out 10-minute increments of time.

Such a regimen is a great opportunity to vary the type of workout done: 10 minutes of walking, 10 of stair-climbing, 10 of jogging, etc. Not only will this decrease the monotony of doing 30 to 40 minutes of one type of activity, but different muscle groups will be used, resulting in increased strength and fitness. It’s also easier to work 10-minute activities into a full workday.

—you burn calories at a higher rate.

Every time you exercise, you elevate your basal metabolic rate for about 24 hours. This means that you continue to burn calories at a higher rate than you would if you did not exercise at all. This should motivate patients to exercise at least every other day, if not every day.

Ask your patients this: Would they be interested in a therapy that would reduce aging; the risk for cancer, heart disease, arthritis and depression; and improve physical well-being? Then tell them that the wonder therapy is regular exercise.

Final notes

You may be asking what the future of cardiology holds. The latest, most promising study techniques involve cardiac MRI and CT angiography.

At this point, cardiac MRI is still in its infancy. Imaging of the coronary artery is markedly improving but is still approximately 5 years or more off from being available for use for diagnosis.

However, when this study is available it may likely eliminate catheterizations and echocardiograms, as you will be able to see coronary arteries, as well as thickness of myocardium, valve structure and chamber sizes. This will give cardiologists and primary care physicians an amazing amount of information about the heart in one quick study.

In the meantime, CT angiography is becoming more and more available. This requires using a 64-slice CT scanner with contrast that allows for imaging of the coronary arteries with excellent resolution. In the next 3 to 5 years, this technology will replace diagnostic cardiac catheterization.

On the therapeutic front, more and more research is being done using pleuripotent stem cells from bone marrow to try to regrow myocardial tissue in infarcted hearts that are suffering from significant myopathy. This research offers a great opportunity for returning patients with previous myocardial damage to normal cardiac function.

In addition, electrophysiology continues to make outstanding strides in electrical therapy for dysrhythmia, ablation of atrial fibrillation and supraventricular tachycardia. And biventricular pacing is likely to supplant right side or single-chamber pacing in the near future.

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