Coronary artery disease (CAD) refers to the accumulation of cholesterol plaques in the arteries of the heart. The arteries serve as conduits or ‘pipes’ to supply blood to the heart muscles. These plaques would gradually result in obstruction of blood flow in the arteries. When the narrowing is significant, symptoms such as chest pain or chest pressure could be experienced particularly during physical exertion or emotional distress, when there is a mismatch of demand and supply. Also, when the plaques rupture or ‘tear’, blood clots would form around the plaque and result in sudden complete occlusion of the blood flow. This event is the commonly known ‘heart attack’.

**Identifying Coronary Heart Disease**

The approach to identifying CAD is multifaceted. Some physicians rely on symptoms whilst others prefer to screen patients for the condition so that early treatment can be initiated. Frequently, by the time a person presents with a heart attack, there is already a degree of damage to the heart muscles. In addition, a significant proportion of people might succumb to the heart attack during presentation. The old adage of ‘Prevention is better than cure’ holds true for the evaluation and treatment of CAD.

Most people would undergo non-invasive test to identify CAD as an initial assessment. These tests include the treadmill electrocardiography study, stress echocardiography and coronary CT angiography. The degree of accuracy to diagnose CAD is also in the same order, with the CT coronary study, the most accurate. Although the mainstay of treatment is medication, when significant CAD has been identified, patients may be considered for invasive evaluation cum therapy. The test known as cardiac catheterization (angio) or coronary angiography is then offered.

**Carrying Out Angiogram**

In many cardiac centres in the world, including Singapore, the angiogram is carried out via an artery in the groin, the femoral artery. A puncture is made after injecting local anaesthetic and a tube, known as a catheter is advanced all the way to the heart arteries. Contrast or ‘dye’ is injected through the catheter. The coronary arteries are identified under X-ray guidance. Areas of significant stenosis or ‘tight’ areas are then treated with balloon and stents or if necessary, patients are then referred for coronary artery bypass.

Access through the femoral artery is usually not difficult technically, unless the patient is obese or has significant occlusion of the arteries supplying the lower limbs. This is the usual access route used for training doctors to perform this procedure. Whilst the femoral artery is usually a fairly sizeable artery, it can be a deeply seated structure. Therein the potential complications of this access route. There could be a higher than usual puncture at the groin. This could result in bleeding into the abdomen. This is a major complication and can necessitate blood transfusion or even result in death. When the puncture is too low, adequate compression of the artery at the end of the procedure may be difficult. This can result in the condition known as ‘pseudoaneurysm’ which is a painful ‘lump’ of the artery that can rupture. In the extreme, this may even require surgical repair. Infection of the access area is also possible.

**Complications After Surgery**

After a femoral angiography, the patient is required to lie flat for about 6 hours, failing which early mobilisation may
result in bleeding or hematoma of the access point. This is a significant inconvenience to the patient, especially for toilet and feeding needs.

As can be seen, there are many potential complications for femoral access cardiac catheterisation. In fact, more than 80% of complications of diagnostic cardiac catheterisation procedures and 50% of therapeutic procedures can be attributable to the femoral access. The femoral access truly 'labels' the invasiveness of the cardiac catheterisation procedure.

**Healing with Advanced Technology**

Advancement in equipment and techniques has now allowed diagnostic cardiac catheterisation to become minimally invasive. The radial artery at the wrist has been identified and used frequently by experts familiar with this technique for the last few years in Singapore. The utilisation rate in the United States of America is currently about 5% of all cases. In my practice, 9 out of 10 procedures are performed via the radial artery. Whilst this artery is smaller, equipment of smaller dimensions have been made available. Patients can mobilise immediately after the diagnostic procedure and can be discharged about 3 hours later. This is a major advantage over femoral access. If intervention is required such as balloon or stenting, the same access at the wrist can immediately provide this subsequent treatment. It is not usually necessary to access the groin just for intervention. Interventional cardiologists in Asia have led the way in the transradial approach for coronary intervention. This movement has been driven in no small part by the advancement of innovation and technology provided by companies like Terumo, Japan. Hopefully, patients who require cardiac evaluation will now be able to experience a less invasive approach to coronary cardiac care.

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