Epiaortic imaging improves cardiac surgical strategies and patient outcomes

Patients scheduled to have bypass grafts or other interventions involving the ascending aorta should routinely have epiaortic imaging at the beginning of the procedure. This allows a sensitive, direct diagnosis of aortic disease, which may lead to modifications of your surgical strategy and thus contribute towards reduced rates for major adverse cardiac and cerebrovascular events (MACCE) following surgery.

Aortic assessment is the starting point
As a cardiac surgeon examining the heart and planning your surgical strategy, you normally conduct an epiaortic assessment to decide on a course of action. Where is the plaque? Does this aorta call for “no-touch” surgery, on-pump or off-pump? Where can I cannulate and clamp with minimal risks?

Aortic cannulation and cross-clamping cause shedding of debris. The dislodgement of atheroma from the ascending aorta and proximal arch is a major cause of stroke and neurological injury following cardiac surgery. Thus you should consider epiaortic imaging (also known as epiaortic scanning, or EAS) when assessing the proximal thoracic aorta, especially for patients at high risk for neurological injury.

Imaging is better at finding plaque than your fingers are
Traditional manipulation by finger palpation has been demonstrated to be inadequate and even potentially harmful. Palpation misses half of the atheroma lesions, and the soft non-calcified lesions offer little resistance to the surgeon’s fingers. Aortic palpation has a correlation with ultrasonic findings below 50%. EAS has been shown in multiple studies to be more sensitive than either palpation or transesophageal echocardiography (TEE) for detecting aortic plaque.

In a study of 129 patients, Kamler et al. reported that imaging is safe, easy and fast to perform, and detects aortic plaque and wall thickening.

Changing strategies intraoperatively
The use of EAS can often lead to modifications in intraoperative surgical management in patients undergoing CABG surgery, in some studies up to one-third of patients. Modifications mentioned in these studies include adjusting the ascending aortic or arterial cannulation site for cardiopulmonary bypass, converting to off-pump surgery, converting to ventricular fibrillatory arrest with no crossclamp application, adding a previously unplanned circulatory arrest, avoiding aortic cross clamp, or replacing or debriding the aorta or aortic valve.

Improved patient outcomes through reduced MACCE
Zingone et al. 2006 found that the use of epiaortic imaging is associated with a lower risk of intraoperative adverse events leading to early postoperative stroke.

A study of 909 CABG patients by Yamaguchi et al. suggested that the application of aortic clamping or cardiopulmonary bypass was not a risk factor of cerebral emboli when the ascending aorta was evaluated with EAS. EAS may minimize morbidity and mortality if a clamp must be used.

A comprehensive review by Whitley et al. in 2008 suggests that the routine use of ultrasound guidance in cardiac surgery may improve postoperative outcomes in patients with heart disease.

Guidelines
Epiaortic imaging guidelines published in 2007 by the American Society of Echocardiography and the Society of Cardiovascular Anesthesiologists have been endorsed by the Society of Thoracic Surgeons.
Additional quality assessment techniques

Epicardial imaging can be used intra-operatively to assess coronary quality, strategize graft placement and verify graft patency.27

Transit Time Flow Measurement (TTFM) should also be used to verify graft patency, as recommended by guidelines issued in 2010 jointly by the European Society of Cardiology (ESC) and European Association for Cardio-Thoracic Surgery (EACTS).18

These quality assurance measures are simple and not time-consuming when performed routinely, and are likely to improve both the early and the long-term results, avoiding costly interventions.

Combine TTFM and ultrasound imaging for easy access to more flow insights

All three of these techniques—epiaortic imaging, epicardial imaging and flow measurement—are provided in the VeriQ C system from Medistim. VeriQ C is adapted to the special requirements of cardiovascular surgery.

References