Objectives

The detection of embedded coronary arteries is difficult especially in off-pump coronary bypass surgery. From June 2010, we introduced high-frequency epicardial ultrasound (ECUS) to assess and evaluate embedded arteries during off-pump coronary bypass surgery.

Methods

Between June 2010 and June 2011, a total of 89 consecutive patients underwent isolated coronary bypass surgery at our institution. The patients consisted of 72 men and 17 women with a mean age of 67.9 years. We routinely use the VeriQ C™ system (Medistim, Oslo, Norway) to detect the target vessels in the operation. The patients were assigned to one of two groups, depending on whether ECUS was used in the operation (n = 10, ECUS group) or not (n = 79, non-ECUS group). We analyzed the impact of introducing the ECUS in terms of operative outcome.

Results

All patients underwent revascularization using the off-pump technique without emergent conversion to cardiopulmonary bypass during surgery. The total number of distal anastomoses was 299, and 12 target vessels could not be identified either visually or on palpation. Thus, the frequency of the embedded coronary arteries was 4.01% (12/299 cases). The preoperative profiles of the two groups were not significantly different. Operation time was significantly longer in the ECUS group (P = 0.02). There were no significant differences in postoperative outcome between the two groups.

Conclusions

In the present study, in which the target coronary arteries could not be detected either visually or on palpation in 12 (4.01%) of 299 cases, the use of high-frequency ECUS allowed all patients to undergo off-pump coronary bypass surgery without conversion to cardiopulmonary bypass during the operation. High-frequency ECUS is therefore useful in off-pump coronary bypass surgery.

Medistim comments

ECUS is used routinely to detect the target vessels by this group. 11% of the 89 consecutive patients in this selection had an embedded coronary artery that could not be identified visually or by palpation. ECUS supported complete revascularisation in all patients without abandoning or changing anastomotic site or converting to cardiopulmonary bypass.

In this study, a 10 MHz transducer was used. The latest generation Medistim imaging probe, with a 15 MHz transducer, would give even higher near-field resolution and should give equally good results. For optimal imaging results, it is strongly advised to use the coronary target setting on the system.

One of the patients had the LAD embedded at a 4mm depth in the myocardium. The LAD was very difficult to identify without ECUS. By using the VeriQ C, the surgeon could perform an instant qualified assessment during CABG.