



Literature Reviews

Cognitive Outcomes in elderly high-risk patients after off-pump versus conventional coronary artery bypass grafting; a randomized trial

Jensen BO, Hughes P, Rasmussen LS, Pedersen PU, Steinbruchel DA.. *Circulation*.113:2790-2795, 2006

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Abstract Excerpt:

The proponents of off-pump coronary artery bypass graft (OPCAB) surgery suggest that there may be a decreased incidence of cognitive dysfunction postoperatively compared to conventional coronary artery bypass graft surgery (CCAB) with cardiopulmonary bypass (CPB). This study attempted to compare OPCAB with CCAB treatment in elderly patients (mean age of 76 years). Subjects underwent a battery of preoperative psychometric testing, were randomized to either receive OPCAB or CCAB and then were retested 3 months postoperatively. Cognitive dysfunction was defined as the occurrence of at least 2 out of 7 possible deficits (as defined by the testing). In the OPCAB group, 4/54 patients, and 5/51 in the CCAB group had cognitive dysfunction by these definitions. There was no significant difference between the two groups at three months.

Reviewer's Comments:

Coronary artery bypass graft surgery (CABG) continues to be one of the most commonly performed surgical procedures. Despite improvements, it still is associated with the potential for significant morbidity of several organ systems. Cognitive dysfunction has been well described postoperatively in patients undergoing CABG, but because of different patients populations studied, different methods of detection, and different definitions applied, a true incidence of cognitive dysfunction is difficult to ascertain.

Historically, it was felt that the use of CPB with the manipulation of a presumably calcified aorta led to embolic events that triggered cognitive decline. With the rise in interest in performing OPCAB and avoiding CPB it was felt that there was potential for decreasing the risk of cognitive dysfunction postoperatively. However, several trials and meta-analyses have failed to establish any advantage for OPCAB with respect to this outcome.

This study as a subset of a larger study was a randomized trial that focused on the elderly-a patient population that has been identified as having a higher risk for postoperative cognitive dysfunction. The two groups were similar with respect to age, duration of surgery and comorbidities. All surgeries were performed by the same group of surgeons. Intraoperative mean pressures were kept between 50-60 mmHg per the authors, but the data were not presented. There was no significant difference in the two groups at 3 months with respect to cognitive function.

While well designed with respect to being a randomized trial and also considering the testing involved, there were some limitations to the study. First while the two groups were described as being equal, no p-values were presented to guarantee there was no significant difference statistically between the two groups. This was important given the seemingly large difference in education levels between the two groups. The OPCAB group had 9 patients with a university education, versus 1 in the CCAB group and 30 of the CCAB group had no education versus 17 in the OPCAB. While it is debatable how much difference this might have in cognitive dysfunction (especially when it is tested pre and postoperatively), further statistical analysis of incidence by education level might have been interesting. Additionally, the mean pressures were alluded to by the authors as being kept between 50-60 mmHg throughout the case, however no data was presented. This is important because the etiology of postoperative cognitive dysfunction has also been linked to hypotension during the procedure. Finally, the authors chose a 3 month follow-up period, perhaps a longer interval prior to postoperative testing might be beneficial in providing clues to long-term outcomes.

Overall, the role of OPCAB is still being defined. Benefits of avoiding CPB may be mitigated by concerns inherent with the nature of OPCAB. The potential for labile pressure changes, and prolonged hypotension (especially when the heart is suspended for exposure to distal anastomoses) might trigger cognitive decline as well as the aortic manipulation seen with traditional CABG and CPB. While it may be beneficial in certain patient populations, the current literature still has not borne out significant advantages in all patients. This study provides additional evidence that OPCAB may not be the panacea for avoidance of complications seen with CABG surgery.