Supplemental Comments by James Fann, MD

"Neurological Complications after Cardiac Surgery," Jeff Gold, MD

Dr. Jeff Gold presents a superb overview of the neurologic considerations and sequelae of cardiac surgery. He provides a thoughtful distillation of the important concepts. Some of the information may be updated as noted in the following. With increased awareness and current approaches to patients with severe ascending aortic atheromatous disease, it is likely that current rates of neurologic complications are not as high as those reported in Dr. Gold's presentation. For instance, documented stroke rates range from 0.7 to 1.6% for those undergoing coronary artery bypass grafting (1,2). As expected, those with a previous stroke have a higher incidence of postoperative stroke with an incidence rate of 2.9% and an odds ratio of 1.43 (1,3). Other important risk factors for perioperative stroke include renal failure/dialysis with odds ratio of 1.49 and preexisting peripheral vascular or cerebrovascular disease with odds ratio of 1.5 (1). As noted by Dr. Gold, subtle clinical findings of neurologic injury may not well be appreciated in the postoperative period, and hence some injury may be under-diagnosed and under-reported in the literature.

It must be mentioned that recent studies have shown that the degree of cognitive deficit may not be wholly related to the impact of cardiac surgery and the use of cardiopulmonary bypass. For instance, the Hopkins group has reported that prospective longitudinal neuropsychological performance of patients with coronary artery bypass grafting did not differ from that of a nonsurgical control group of patients with coronary artery disease at 1 or 3 years after baseline examination (4). Thus, previously reported late cognitive decline after coronary artery bypass grafting may not be specific to the use of cardiopulmonary bypass, but may also occur in patients with similar risk factors for cardiovascular and cerebrovascular disease (4). Furthermore, there does not appear to be significant difference in the late cognitive decline after on-pump coronary artery bypass grafting compared to off-pump coronary artery bypass grafting (2,5). Compared with subjects with no vascular disease risk factors, patients with coronary artery disease have a lower baseline cognitive performance and greater degree of decline over 72 months, suggesting that in these patients, vascular disease may have an impact on cognitive performance (6).

Regarding the approach to patients with coronary artery disease who are found to have calcified ascending aorta intraoperatively, the management should focus on minimizing manipulation of the ascending aorta. An off-pump approach with use of left internal mammary artery graft with radial artery or saphenous vein T-graft should be considered for those with left-sided coronary artery disease. For right coronary artery disease, the use of the right internal mammary artery as the graft or as a source of inflow for an interposition graft can be considered. It is unusual to abort the surgery without an attempt at coronary revascularization using the off-pump approach. If the patient cannot tolerate an off-pump approach because of hemodynamic compromise, an on-pump approach can be considered if there is a relatively safe method of arterial or aortic cannulation; revascularization can then be performed on-pump with a beating heart without the

use of an aortic cross-clamp. TMR in this setting without attempt at grafting is a less viable option. As mentioned by Dr. Gold, more extensive surgery such as ascending aortic replacement or circulatory arrest are associated with higher surgical risk and thus the risk-benefit ratio has to be clearly defined. In the setting of calcification in the ascending aorta, mitral valve surgery may be performed on cardiopulmonary bypass using fibrillatory arrest without aortic cross-clamp placement. For patients with aortic valve disease and ascending aortic calcification, more extensive procedure such as circulatory arrest can be considered; alternatively, transcatheter aortic valve implantation has been documented and is currently being evaluated in clinical trials (7).

References

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