Postoperative cognitive dysfunction is seen in 40% of patients several months after cardiac surgery. Identifying the mechanisms of cognitive dysfunction is challenging. The etiology of cerebral injuries probably represents a complex interaction between cerebral microemboli, global cerebral hypoperfusion, inflammation, and genetic susceptibility. The use of transcranial Doppler to detect microemboli offers an assessment of the degree of embolic load. One of the major limitations in understanding the relationship between emboli and cognitive decline after cardiac surgery has been the relative inability to discern between gaseous and particulate microemboli. Added to this problem is that emboli likely have hybrid compositions such as protein coats or lipid cores. Studies have addressed various strategies focused on reducing cerebral emboli or minimizing the inflammatory response. In addition, the role of temperature and blood glucose management in reducing the impact of cardiopulmonary bypass on cognition has been also explored. Despite many years of research, few preventive strategies and no definitive therapeutic options exist for the management of this troublesome clinical problem. Further refinement of specific operative techniques and the use of sophisticated imaging techniques to detect aortic atherosclerosis are the thrust of investigational research. Appropriate use of future pharmacologic agents may also mitigate neurologic injury.