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## Neurocognitive dysfunction after coronary artery bypass surgery: a systematic review

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Coronary artery bypass grafting, neurological outcome

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## Comments

The number of studies rejected by this review was large, yet the papers included had serious drawbacks in terms of power and methodology. This highlights the difficulty of performing a good study due to problems of follow up and numbers required. The reviewers conclude that the contribution of cardiac bypass to the neurological deficit remains to be evaluated and that a study of off-pump versus cardiopulmonary bypass surgery will answer this question. That conclusion is flawed in that off-pump procedures produce different conditions in terms of anaesthetic management and mechanical manipulation of the heart which may cause neurological injury via different mechanisms. This review does not provide any new insight into this important topic but does highlight the need for further work and provides a comprehensive background to future investigation.

## Introduction

This study sets out to review the data on the neurological decline following coronary artery bypass surgery. There have been a large number of studies investigating the cerebral morbidity associated with cardiac surgery. Many of these report a high incidence of both stroke and cognitive decline. However, comparison of one study with another is difficult. Studies use different measures of neurological performance at different times after the operation, making comparison of results difficult, if not impossible. A consensus meeting in 1994 made several recommendations. These included collecting baseline information, assessing individual rather than population change and following up patients for 3 months.

## Methods

Studies were reviewed if they were primarily on cognitive decline within 1–12 months of coronary artery bypass grafting (CABG) and reported individual change. Studies published before 1980 involving open chamber procedures, with unclear timing of tests or with data duplicated from other studies, were excluded.

## Results

Overall 256 articles were found yet only 23 matched the selection criteria. A panel of anaesthetists and psychiatrists reviewed the papers. Results were subsequently subdivided into cohort studies, intervention studies and an assessment made on a pooled average of comparable studies. The incidence of cognitive defect after CABG varied from 4% to 47% within 12 cohort studies identified. One of these studies ( $n = 65$ ) found an association between a variant form of the apolipoprotein E gene and short-term memory dysfunction. Interventions that may reduce cognitive decline include a combined approach with epiaortic scanning, single cross clamp technique and left ventricular venting, the use of arterial line filters and alpha stat blood gas management for greater than 90 min bypass times. Many of these intervention studies lacked the power to detect clinically meaningful results. Of 23 studies using neuropsychological tests, six included the core battery of tests as recommended in the Statement of Consensus. These six papers studied a total of 505 patients. Performing a weighted average on these studies gave an average of 22.5% of patients with a decline of at least one standard deviation from the mean in at least two neuropsychological tests.

## References

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