

Neuropsychological Effects of Cardiac Surgery

The patient who has had cardiac bypass surgery is usually not warned about possible cognitive problems after the surgery, and thus the person can sink into a depression because they do not understand why they cannot function the way they used to. Sometimes there is tremendous fatigue, especially in the late afternoon (this can also happen with a mild head injury). Sometimes apparent memory problems are experienced, far out of proportion to their memory problems before the surgery.

Since there are thousands of such surgeries every year, there are likely many cases which are similar to those described above. Even if there has been some resulting brain damage as a result of the surgery, there is some hope: There is a treatment called neurofeedback which might be able to help "tune up the brain" to some extent.

The following bibliography provides references about the cognitive problems which can occur after cardiac bypass surgery. It was compiled in 2006 to convince an insurance company that the patient in question was not suffering from chronic fatigue syndrome, but had suffered a brain injury from his cardiac bypass operation the previous year. We won the case after doing a detailed neuropsychological evaluation.

Additions to this list would be appreciated, and can be sent to nurosvcs@aol.com.

Aberg, T., & Kihlgren, M. (1974). Effect of open heart surgery on intellectual function. *Scandinavian Journal of Thoracic and Cardiovascular Surgery* 15 (Supplement): 15.

Aberg, T., & Kihlgren, M. (1977). Cerebral protection during open-heart surgery. *Thorax* 32: 525-533.

Aberg, T., & Ronquist, G., Tyden, H., Ahlund, P., & Bergstrom, K. (1982). Release of adenylyate kinase into cerebrospinal fluid during open-heart surgery and its relation to post-operative intellectual function. *Lancet* 2 (1139-1142).

Aberg, T., Ronquist, G., Tyden, H., Brunnkvist, S., Hultman, J., Bergstrom, K., & Lilja, A. (1984). Adverse effects on the brain in cardiac operations as assessed by biochemical, psychometric, and radiologic methods. *Cardiovascular Surgery* 87 (99-105).

Aberg, T., Ronquist, G., Tyden, H., Brunnkvist, S., & Bergstorm, K. (1987). Cerebral damage during open-heart surgery. *Scandinavian Journal of Thoracic and Cardiovascular Surgery* 21 (159-163).

Ahlgren, E., & Aren, C. (1998). Cerebral complications after coronary artery bypass and heart valve surgery: risk factors and onset of symptoms. *Journal of Cardiothoracic and Vascular Anesthesia* 12 (Jun): 3270-3273.

Aris, A., Solanes, H., Camara, M. L., Junque, C., Escartin, A., & Caralps, J. M (1986). Arterial line filtration during cardiopulmonary bypass: Neurologic, neuropsychologic, and hematologic studies. *Journal of Thoracic and Cardiovascular Surgery* 91: 526-533.

Arrowsmith, J. E., Harrison, D.M., Newman, S.P., Stygall, J., Timberlake, N., & Pugsley, W.B. (1998). Neuroprotection of the brain during cardiopulmonary bypass. *Stroke* 29 (11): 2357-2362.

Barnett, H. J. M. (1983). Heart in ischemic stroke - a changing emphasis. in *Neurologic Clinics. Symposium on Cerebrovascular disease*. H. J. M. E. In: Barnett. Philadelphia: WB Saunders: 291-315.

Becker, R. K., J., Polonius, Speodel, Ed. (1982). *Psychopathological and neurological dysfunctions following open heart surgery*. Berlin: Springer-Verlag.

Benedict, R. B. (1994). Cognitive function after open-heart surgery: Are postoperative neuropsychological deficits caused by cardiopulmonary bypass? *Neuropsychology Review* 4: 223-255.

Blachy, P. H., Blachly, P. J. (1968). Vocational and emotional status of 263 patients after open-heart surgery. *Circulation* 38: 524-532.

Blumental, J. A., Madden, D. J., Burker, E. J., Croughwell, C. R. N., Schniebolk, S., Smith, R., White, W. D., Hlatky, M., & Reves, J. G. (1991). A preliminary study of the effects of cardiac procedures on cognitive performances. *International Journal of Psychosomatics* 38: 13-16.

Bojar, R. M., Furian, A.J., Hanson, M.R., et al (1983). Neurological complications of coronary revascularization. *Ann Thorac Surg* 36: 427-432.

Boll, A., Dahme, B., Meffert, H. J., & Speidel, H. (1990). Psychological adaptation of patients 3 to 5 years after heart surgery. in *Impact of cardiac surgery on the quality of life: Neurological and psychological aspects*. A. E. Willner, & Rodewald, G. (Eds.). New

York: Plenum Press: 61-72.

Bornstein, R. A., & Kelly, M. P. (1991). Risk factors for stroke and neuropsychological performance. in *Neurobehavioral Aspects of Cerebrovascular Disease*. New York: Oxford University Press.

Borowicz, L. M., Goldsborough, M. A., Selenes, O. A., and McKhann, G. M. (1996). Neuropsychologic change after cardiac surgery: a critical review. *Journal of Cardiothoracic and Vascular Anesthesia* 10 (Jan): 1105-1111.

Branthwaite, M. A. (1972). Neurological damage related to open-heart surgery. *Thorax* 27: 748-753.

Branthwaite, M. A. (1975). Prevention of neurological damage during open-heart surgery. *Thorax* 30: 258-261.

Braunwald, E. (1983). Editorial retrospective: Effects of coronary artery bypass grafting on survival. *New England School of Medicine* 369: 1181-1184.

Breuer, A. C., Furlan, A. J., Hanson, M. R., et al. (1983). Central nervous system complications of coronary artery bypass graft surgery: prospective analysis of 421 patients. *Stroke* 14: 682-687.

Brierley, J. B. (1967). Brain damage complicating open-heart surgery: A neuropathological study of 46 patients. *Proceedings of the Royal Society of Medicine* 60 (34-35).

Bruggemans, E. F., F., J.R. V., & Huysmans, H. A., (1997). Assessment of cognitive deterioration in individual patients following cardiac surgery: Correcting for measurement error and practice effects. *J. Clinical and Experimental Neuropsychology* 19 (4): 543-559.

Bruggemans, E. F., V. D., J. G., & Huysmans, H. A., (1995). Residual cognitive dysfunctioning at 6 months following coronary artery bypass graft surgery. *Euro J Cardiothorac Surg* 9 (636-643).