

# BIS and its effects on outcomes related to death, stroke and myocardial infarction

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**Introduction:** When anaesthesia is titrated using BIS monitoring, patients generally receive lower doses of hypnotic drugs.<sup>1-3</sup> Intraoperative hypotension and organ toxicity might also be avoided if lower doses of anaesthetics are administered, but whether this translates into a reduction in serious morbidity or mortality remains controversial.<sup>4</sup> Monk et al.<sup>5</sup> studied 1,046 patients having non-cardiac surgery. Cumulative deep hypnotic time was defined as the time that BIS was <45 and was a significant predictor of 1-year mortality (relative risk = 1.24 [95% confidence interval: 1.06 – 1.44]). Similarly, Lindholm et al.<sup>6</sup> studied 4,087 patients having non-cardiac surgery. Cumulative deep hypnotic time was a significant predictor of 2-year mortality, but only when pre-existing malignancy was excluded (hazard ratio = 1.18 [95% confidence interval 1.08 – 1.29]). We conducted a long-term follow-up of the B-Aware Trial patients<sup>7</sup> in order to test the hypothesis that survival would be improved in patients receiving BIS-guided anaesthesia.

**Methods:** The medical records of all patients were reviewed. The date and cause of death and occurrence of myocardial infarction or stroke were recorded. A telephone interview was then conducted with all surviving patients. The primary endpoint of the study was survival.

**Results:** The median follow-up time was 4.1 (range: 0 – 6.5) years. 548 patients (22.2%) had died since the index surgery, 220 patients (8.9%) had suffered a myocardial infarction and 115 patients (4.7%) had suffered a stroke. The risk of death in BIS patients was not significantly different to routine care patients (hazard ratio = 0.86 [95% confidence interval: 0.72-1.01]; p = 0.07). However, a propensity score analysis indicated that the hazard ratio for death in patients who recorded BIS values <40 for >5 min compared to other BIS monitored patients was 1.42 (95% confidence interval: 1.04-1.93; p = 0.03). In addition, the odds ratios for MI in patients who recorded BIS values <40 for >5 min compared other BIS monitored patients was 1.94 (95% CI: 1.12 – 3.35; p = 0.02) and the odds ratio for stroke was 3.23 (95% CI: 1.29 – 8.07; p = 0.01).

**Conclusions:** Monitoring with BIS and absence of BIS values <40 for >5 min was associated with improved survival and reduced morbidity in patients enrolled in the B-Aware Trial. A large randomized trial is required to determine causality.

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## References:

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