Comparison among closed-loop coadministration of propofol and remifentanil guided by bispectral index vs volatile anesthesia and...
The purpose of this study was to compare postoperative cognitive status after general anesthesia performed by a closed loop controller guided by Bispectral index (BIS), allowing the automated titration of propofol and remifentanil in comparison with the manual titration of sevoflurane, desflurane or propofol with remifentanil.

METHODS

116 patients scheduled for elective urologic surgery under general anesthesia with or without epidural anesthesia, after obtaining informed consent and ethics committee approval, were allocated into the four groups: automated coadministration of propofol and remifentanil guided by BIS (G0), manual titration of desflurane (G1) sevoflurane (G2) or propofol (G3) with or without remifentanil. All patients received routine intraoperative monitoring including BIS in the range of 40-60. The Mini-Mental State Examination (MMSE) was performed in the recovery room (MMSE PRE=T0), and at 15 min after the wake of the end of general anesthesia with Aldrete score >9 (MMSE POST=T1). At 24 h postoperative time the structured Brice interview was given to detect intraoperative awareness.

RESULTS

MMSE decreased significantly from T0 to T1 in G1 group (25.6±2.77 vs 22.8±3.19, P<0.001), in G2 group (26.0±3.39 vs 23.3±2.74, P<0.001) and in G3 group (25.5±2.58 vs 24.3±2.39, P=0.004), but the MMSE score was not statistically different in G0 from T0 to T1 (25.39±3.17 vs 25.2±3.19).

Temporal orientation was lower in G1 and G2 groups at T1 vs T0 (4.88±1.33 vs 4.52±0.87, P=0.04; 4.92±1.27 vs 4.64±0.63, P=0.01), Attention and calculation were lower in three groups G1, G2 and G3 at T1 vs T0 (3.75±1.53 vs 2.88±1.78, P=0.002; 4.24±1.45 vs 3.41±1.78, P=0.001; 4.32±1.24 vs 3.68±1.4, P=0.013) and Constructional apraxia was lower in all 4 groups at T1 vs T0 (4.72±1.27 vs 4.32±1.21, P=0.015; 4.36±1.7 vs 3.36±1.7, P=0.002; 4.84±1.1 vs 4.16±1.21, P=0.018; 5±1.25 vs 4.2±1.63, P=0.02).

Our results suggest that the use of closed loop avoids cognitive dysfunction. The BIS value was maintained in the significant higher range in the Closed Loop group then in other three manually controlled group.

CONCLUSIONS

We reported a cognitive impairment during the immediate postoperative period after manual titration of volatile and intravenous with remifentanil anesthesia while the automated titration of propofol and remifentanil using a controller avoids cognitive dysfunction. The BIS value was maintained in the significant higher range in the Closed Loop group then in other three manually controlled group.

In terms of the costs of general anesthesia, the use of Closed Loop render the expenses reduction, as well.