Recovery of cognitive function after ambulatory surgery under TIVA and inhalational anesthesia: A pilot study

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**Introduction**

Recovery from propofol has been described as rapid and clear-headed. This is advantageous for ambulatory surgery. We hypothesize that cognitive recovery as assessed by neuropsychological tests is superior after total intravenous anaesthesia (TIVA) with propofol compared to inhalational anaesthesia with sevoflurane.

**Methods**

After ethics committee approval and written informed consent, we recruited 21 ASA I-II patients between 21 and 65 years old who were scheduled for hemorrhoidectomy under general anaesthesia in our ambulatory surgical centre. Patients who could not speak English or who had difficulties with writing, vision and hearing were excluded. Patients were randomly assigned to one of 2 groups.

Group P underwent TIVA with a target-controlled infusion of propofol using the Schnider model with an effect site target of 5mcg/ml. Group S had induction of anaesthesia with 2-2.5mg/kg of propofol, followed by maintenance with sevoflurane at an end-tidal concentration of 2%. Patients and assessors were blinded to the anaesthetic technique.

The Digit Symbol Substitution Test (DSST) and Trail Making Tests A (TMT-A) and B (TMT-B) were first administered preoperatively in the holding area. No premedications were given. Standard monitors were used in the operating theatre. After induction of anaesthesia according to protocol, all patients had an LMA Supreme inserted and breathed spontaneously. Up to 200mcg of fentanyl was administered, titrated to clinical endpoints.

At the end of surgery mostly lasting less than 30 minutes, anaesthesia was discontinued and patients were transferred to the recovery room with the LMA in situ. Patients were fit for discharge from recovery when they had a modified Aldrete recovery score >= 9. The neuropsychological tests were administered by a blinded assessor just before discharge from recovery and again just before discharge home from the ambulatory surgery centre.

The DSST is scored as a count, with higher scores reflecting better performance. The TMT is scored as time taken in seconds, with lower scores reflecting better performance. Scores should improve with repeated testing. Median scores for the DSST, TMT-A and TMT-B were obtained at each time point for each group.

**Results**

Median test results are shown in Table 1. Group P and Group S were comparable at baseline, but Group P consistently performed better than Group S postoperatively. At discharge, patients in Group P did better in all 3 tests compared to baseline. Patients in Group S performed worse at discharge compared to baseline in the TMT-A and TMT-B.

**Discussion and conclusion**

The results of this pilot study support the hypothesis that TIVA with propofol produces less cognitive impairment than inhalational anaesthesia with sevoflurane. The magnitude of this difference appears to be clinically significant, given the relatively short exposure in this study. Follow-up studies are planned.

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<th>Group</th>
<th>Baseline</th>
<th>Recovery</th>
<th>Discharge</th>
<th>Baseline</th>
<th>Recovery</th>
<th>Discharge</th>
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<th>Baseline</th>
<th>Recovery</th>
<th>Discharge</th>
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<tbody>
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<td><strong>Group P</strong></td>
<td>54 ± 12</td>
<td>51 ± 14</td>
<td>63 ± 19</td>
<td>24 ± 11</td>
<td>20 ± 17</td>
<td>21 ± 49</td>
<td>55 ± 10</td>
<td>52 ± 11</td>
<td>37 ± 18</td>
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<tr>
<td><strong>Group S</strong></td>
<td>54 ± 12</td>
<td>42 ± 13</td>
<td>60 ± 55</td>
<td>27 ± 8</td>
<td>35 ± 19</td>
<td>39 ± 39</td>
<td>55 ± 12</td>
<td>60 ± 9</td>
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Table 1 - Results of neuropsychological tests. Group medians ± SD are shown.

**References**


**Acknowledgments**

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