List of Responses

Dear Editors and Reviewers:

Thank you for your letter and for the comments concerning our manuscript entitled “Effects of stage I hypertension on the recovery of early postoperative attention networks in elderly patients undergoing elective hip or knee arthroplasty surgery” (Manuscript Code Number: SAG-1902-58). We have found the comments to be very valuable for improving our paper, as well as for guidance in our future research. We have revised our manuscript carefully, taking all comments into consideration. We hope that the new version of our paper will meet with your approval.

We tried our best to improve the manuscript and made some changes in the manuscript. In addition to edits made in response to reviewer comments, we did not list these additional changes below but have marked them in red in the revised manuscript.

We truly appreciate the hard work and careful consideration of the Editors and Reviewers. The main corrections in the paper and the responses to reviewer comments are as follows:

Corresponding author:

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E-mail: xuguanghong2004@163.com

Response to Reviewers’ Comments on Manuscript Code Number: SAG-1902-58
Comment 1): Editor's Comments: In line with the reviewers' suggestions, the article needs a minor modification in terms of grammar and has to be clarified for the purpose and methodology of the study.

Response: We have corrected the grammar error, clarified the purpose and methodology of the study and marked them in red in the revised manuscript. We hope that the new version of our paper will meet with your approval.

Reviewer 1

Comment 1): Main purpose of the study should be clarified in the introduction part. Also the manuscript should be reviewed in terms of English gramer again.

Response: Thank you four suggestions. We have re-written the introduction part to further clarify the main purpose of the study and marked them in red in the revised manuscript. We hope that the new version of our paper will meet with your approval.

Reviewer 2

Comment 1): Can the author(s) shorten introduction section (Especially the part including the definition and groups of ANT can be presented in discussion)?

Response: We have re-written the introduction sectiont and the discussion according to the suggestions. We hope that the new version of our paper will meet with your approval.

Comment 2): Can the author(s) give information about why they select only stage 1 hypertension patients and not stage 2 or stage 3?
Response: Thank you for this important comment. Hypertension is an important risk factor for cognitive impairment. Chronic hypertension has been associated with increased risks of cognitive decline, vascular dementia, and Alzheimer disease [1]. However, most people believe that stage 1 hypertension may not lead to cognitive impairment, and it will not affect the recovery of cognitive function after operation and anesthesia. Because they think the blood pressure of stage 1 hypertension is just a little bit higher than normal blood pressure, which is significantly lower than that of stage 2 and 3 hypertension. In the current study, we used the ANT test to evaluate the difference in attention functions of patients with hypertension and normotension in postoperative period, which is to arouse people's attention to stage 1 hypertension. The effect of stage 2 and stage 3 hypertension on cognitive function after operation is the focus of our future research.

Title page

Title of the Article: Effects of stage I hypertension on the recovery of early postoperative attention networks in elderly patients undergoing elective hip or knee arthroplasty surgery

Running Head: Effects of stage I hypertension on the recovery of postoperative cognition

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Effects of stage I hypertension on the recovery of early postoperative attention networks in elderly patients undergoing elective hip or knee arthroplasty surgery

Abstract

Background: Hypertension is an important risk factor for cognitive impairment. This study explored whether elderly patients with stage I hypertension (HPs) and normotensive patients (NPs) showed differences in the recovery of postoperative attention network function, according to attentional network test (ANT) performance.

Methods: Of 110 patients screened, 25 HPs and 25 NPs completed this study. The Mini-Mental State Examination were applied to all participants before the operation and the ANT (on day 2 and 7) after the operation. All participants completed 1 day preoperatively and the ANT on postoperative days (PODs) 2 and 7.

Results: Compared with NPs, HPs had significantly lower alerting network effect scores and more difficulty resolving conflict on POD 7. However, no significant difference was observed between groups on POD 2. Orienting network performance was similar between groups at all timepoints. Significant differences in alerting and executive control network performances were observed between PODs 2 and 7 within each group.

Conclusions: HPs showed selective cognitive impairment at different time points following elective hip or knee arthroplasty. Compared with NPs, HPs were more likely
to experience delayed recovery of alerting and executive control network function, but not orienting network function, during the first postoperative week.

**Key words:** Hypertension; attentional network test; alerting; orienting; executive control; general anesthesia
1. Introduction

Loss of cognitive function is one the most devastating manifestations of aging and vascular disease. Chronic hypertension has been associated with increased risks of cognitive decline, vascular dementia, and Alzheimer disease [1], and is regarded as a key modifiable risk factor for age-related dementia [2]. Previous studies have shown that antihypertensive treatment can improve cognitive performance and prevent dementia in elderly people [3,4]. However, other studies have shown that low blood pressure (BP) contributes to brain atrophy and more rapid cognitive impairment in hypertensive patients with no apparent cerebrovascular disease [3,5]. These contradictory effects may be explained by differences in antihypertensive agents used, patient characteristics, and the extent of blood pressure reduction [3].

Postoperative cognitive dysfunction (POCD) is a common complication occurring after surgery and anesthesia. It affects patients in all age groups, including young and middle-aged patients, but is particularly concerning in elderly patients (age > 60 years) [6]. The POCD has been associated with various durations and types of surgery, the use of certain anesthetics, and hypertension [7]. It affects diverse cognitive domains, including memory, attention, and executive function [8,9].

The term “attention” encompasses several psychological phenomena [10]. Posner divided the human attentional system into three independent networks: alerting, orienting, and executive control. The attentional network test (ANT), has been used widely to examine these attentional functions in healthy subjects and patients with
different neuropsychiatric disorders including schizophrenia and Alzheimer disease [11,12]. So, in this study, we used the ANT to evaluate whether there is a difference in attention functions of patients with hypertensive and normotensive elderly patients in postoperative period, and to further examine the types of cognitive change and the recovery of cognitive function in patients with hypertension after surgery and anesthesia. We aimed to test whether hypertension is an important risk factor for postoperative cognitive impairment, which would present as a postoperative attentional network impairment [13,14], in elderly patients. Therefore we compared attentional network functions of normotensive and hypertensive elderly patients after surgery.

2. Methods

2.1. Participants and ethical approval

In total, 110 patients with stage I hypertension (HPs) and normotensive patients (NPs) undergoing elective hip or knee arthroplasty were screened; 50 patients (age range, 60–80 years) completed the study. Subjects with self-reported histories of essential hypertension (lasting 3–5 years) and systolic BPs of 140–159 mm Hg or diastolic BPs of 90–99 mm Hg were assigned to the HP group. Those with systolic BPs of 90–140 mm Hg or diastolic BPs of 60–90 mm Hg were included in the NP group. BP was assessed again and patients’ charts were reviewed 1–3 days preoperatively. A cardiologist reviewed all participants’ medical records and determined their hypertension status using the diagnostic criteria of the American Heart Association [15].
Study exclusion criteria were: American Society of Anesthesiologists (ASA) physical status III or IV, secondary hypertension (e.g., tumor or renal disease), history of smoking or alcohol abuse, dyslipidemia or obesity (body mass index ≥ 25 kg/m²), inadequate comprehension of Chinese language, history of psychiatric or neurological disorder, diabetes mellitus, and cerebrovascular lesion (e.g., subdural hematoma).

Patients with abnormal Mini-Mental State Examination (MMSE) results between the patients with normotension and hypertension for their levels of education (e.g., MMSE score < 22 for a patient with no education), and those unwilling to comply with the protocol or procedures at any time during the study, were excluded. Patients who had received regular antihypertensive drug treatment previously or had histories of low BP were also excluded. A flow chart summarizing patient enrollment and exclusion criteria is shown in Figure 1.

The study was approved by the Ethics Committee of Anhui Medical University, Hefei, Anhui, China. Patients were included in the study after providing written informed consent, and all procedures were conducted according to the Declaration of Helsinki.

2.2. Anesthesia

In accordance with our standard procedure, general anesthesia was induced with etomidate (0.15–0.3 mg/kg) and midazolam (0.01–0.05 mg/kg) in combination with sufentanil (0.2–0.5 μg/kg), followed by neuromuscular blockade with cisatracurium (0.2–0.3 mg/kg) to facilitate laryngeal mask airway insertion. Propofol [target controlled infusion (1–4 μg/ml) or constant rate infusion (3–6 mg/kg)], remifentanil
(0.1–0.4 μg/kg/min), and intermittent cisatracurium bromide were used to maintain appropriate depth of anesthesia. Routine monitoring included electrocardiography and the measurement of BP, oxygen saturation, end-tidal carbon dioxide concentration, and heart rate. In addition, bispectral index (BIS) monitoring (Vista, Aspect Medical System Inc., USA) was used to determine the depth of anesthesia for all of the patients. All patients received local infiltration of 0.5% ropivacaine and flurbiprofen axetil for pain relief at the end of surgery.

2.3. ANT

The ANT used in this study was created by using E-Prime (version 1.1; Psychology Software Tools, Pittsburgh, PA, USA). Stimuli were presented on a 17-inch color monitor controlled by a personal computer. Participants viewed each stimulus and responded by pressing one of two keys (“←” or “→”) with the left or right index finger, respectively. Each stimulus was presented with a row of five horizontal black lines with arrowheads pointing left or right. The target was a left- or right-pointing arrowhead at the center of the field against a gray background, flanked on either side by two arrows pointing the same direction (congruent condition) or the opposite direction (incongruent condition), or by nothing (neutral condition; Figure 2).

The arrow appeared below or above a fixation point (“+”), preceded or not by a warning cue (“*”), and accompanied or not by flankers (two arrows on either side). Participants were told to focus on a centrally located stationary cross throughout the task and to respond as quickly and accurately as possible by pressing the key.
corresponding to each target arrow’s direction. The first fixation duration varied randomly (400–1600 ms). The second fixation, presented with or without a warning cue, was 100 ms in duration. Four hundred milliseconds after cue offset, the target and flankers appeared simultaneously and remained on the screen until the participant responded with a button press (or for a maximum of 2,700 ms).

The ANT was performed with four cue conditions: (1) no cue, in which a cross appeared in the same location as the first stationary cross for 100 ms; (2) center cue, in which an asterisk was presented at the center of the monitor; (3) double cue, in which asterisks were presented at two target locations (above and below the central point) simultaneously; and (4) spatial cue, in which one asterisk was presented at a target location above or below the central point (Figure 2).

In accordance with the ANT design principles, the experiment included a 24-trial practice block and three randomly ordered experimental trial blocks. Each experimental block consisted of 96 trials (48 conditions: four cue types × two target locations × two target directions × three congruencies, with two repetitions). The entire ANT was completed in 30 min. Both patients and postoperative observers were blinded to group allocation.

2.4. Calculation of attentional network efficiency

The ANT uses differences in response times (RTs) derived from network-specific experimental conditions to measure the alerting, orienting, and executive control networks [16]. Alerting network effect scores were calculated by subtracting the mean
RTs from double-cue trials from those from no-cue trials, with higher scores indicating more readiness to respond to an impending stimulus. Orienting network effect scores were calculated by subtracting the mean RTs from spatial-cue trials from those from center-cue trials, with higher scores reflecting faster covert orienting of attention to a spatially cued location. Executive control network effect scores were calculated by subtracting the mean RTs of congruent-target trials from RTs of incongruent-target trials. A higher execution effect score indicated more severe execution dysfunction because a longer time was needed to execute correctly upon the incongruent cue, and there were more difficulties in resolving conflict.

2.5. Statistical analysis

Gender, age, education level, duration and type of surgery, MMSE score, and the three attention network scores were compared between groups using independent-sample t tests and chi-squared tests. We used repeated-measures analysis of variance to evaluate differences in the three attention network scores, with timing [postoperative days (PODs) 2 and 7] serving as the within-subject factor and group (HP and NP) serving as the between-subject factor. All analyses were conducted with SPSS software (ver. 13.0; SPSS Inc., Chicago, IL, USA). Two-sided p values < 0.05 were considered to be significant.

3. Results

Of the 110 patients screened in this study, 9 male and 7 female patients were excluded because of serious lung or heart disease (ASA physical status III or IV), 3 male and 2
female patients were excluded because of insufficient oral bowel preparation, 2 male and 3 female patients were excluded due to the alteration of the anesthetic plans (epidural anesthesia), and 16 male and 18 female patients declined to participate postoperatively. In total, 50 patients (25 HPs and 25 NPs) completed the study. Patient characteristics; duration and type of surgery; blood loss; transfusion volume; and propofol, midazolam, remifentanil, and sufentanil doses did not differ significantly between groups (Table 1).  

3.1. Accuracy  
In this study, accuracy was measured as the percentage of overall correct responses in ANT trials. The overall mean RTs and accuracy values for the ANT did not differ significantly between groups for any of the three attentional networks at any timepoint (Table 2).  

3.2. Attentional network effect scores  
Effect scores did not significantly differ between groups on POD 2 (Table 3). However, effect scores for the alerting and executive control network tasks differed between groups on POD 7 and within each group between PODs 2 and 7 (Tables 2 and 3). Compared with NPs, HPs had significantly lower alerting network effect scores and more difficulty in resolving conflict on POD 7. No significant difference in the score for the orienting network task was observed between groups at any timepoint (Tables 2 and 3). Both groups had significantly lower alerting network effect scores and more
difficulty in resolving conflict on POD 2 than on POD 7, with no significant difference for the orienting network task.

4. Discussion

Attention is an umbrella term for various psychological phenomena[10]. Posner divided the human attentional system into three independent networks: alerting, orienting, and executive control. These networks have been distinguished at the biochemical and cognitive levels, and they have been confirmed to have distinct neuroanatomical correlates [17,18]. The ANT is based on the flanker and exogenous cueing paradigms, measures the activities of all three networks simultaneously and evaluates their interrelationships [16], which has been used widely to examine attentional functions in both healthy individuals and patients with various diseases[11,12]. In the current study, we used the ANT test to evaluate the difference in attention functions of patients with hypertension and normotension in postoperative period, and to further examine the types of cognitive change and the recovery of cognitive function in hypertensive patients after surgery and anesthesia. We found no significant difference in the function of the three attentional networks in the ANT test between groups on POD 2, but reduced alerting and executive control network function in HPs on POD 7. Elderly HPs undergoing elective hip or knee arthroplasty displayed significant cognitive impairment on POD 7 relative to NPs on POD 7 and to both groups on POD 2. Taken together, the two groups had similar cognitive impairment (affecting the alerting and executive control networks) on POD 2 and obvious cognitive improvement on POD 7. However,
the findings indicate that stage I hypertension can delay the rate of cognitive recovery in elderly patients undergoing surgery with anesthesia.

Cognitive decline is an important cause of disability and mortality [19], and growing evidence suggests that hypertension is a risk factor for cognitive decline [1]. However, the relationship between hypertension and cognition has not been clarified and may be complex. Particular cognitive functions involve specific brain regions (e.g., the medial temporal lobe for memory). Disruption of any brain system during the perioperative period has the potential to induce cognitive changes. The alerting network, which is localized to the thalamus and the right frontal and parietal areas, is responsible for the activation and maintenance of a vigilant state [20]. Executive network function involves the frontal areas, and can be impaired by lesions on the prefrontal cortex [21]. Because HPs had reduced alerting network effect scores and greater difficulty resolving conflict than did NPs on POD 7 in this study, we suspect that they sustained more substantial damage to the frontal and parietal areas of the brain. Magnetic resonance imaging (MRI) studies have revealed altered patterns involving the parietal and frontal lobes in HPs relative to NPs [22]. The frontoparietal network is important for executive function, attention control, and working-memory processing [23]. Thus, the impairments in executive functioning and alerting exhibited by HPs in this study could relate to damaged functional connectivity of the frontal and parietal regions. HPs have shown deficits in executive function, memory, and attention [24]. In a recent perfusion MRI study, Hajjar et al. [25] found that hypertensive patients had blunted responses to
carbon dioxide in the frontal and parietal regions, which correlated with poor outcomes in microvascular ischemic injury and macrovascular brain disease. Dysfunctional connectivity in the frontal and parietal regions may be related to hypertension pathology; if so, it may reflect the neural mechanism mediating the increased risk of cognitive deficits, including POCD, in HPs. Our findings provide new insight on the mechanisms of cognitive dysfunction and the recovery of cognitive function in HPs after surgery and anesthesia.

In the current study, we found no significant difference between groups in the performance of the orienting network at any time point, suggesting that this network is less sensitive than the other two attention networks. Although hypertension may eventually affect all of these domains, executive function is commonly affected earlier [26]. In a previous study, HPs showed declines in mainly executive function and attention compared with NPs, possibly due to the impact of white matter on executive function mediated by the frontoparietal network in the former [22]. In this study, HPs manifested mainly executive function impairment, with no orienting network decline, indirectly supporting this evidence.

One potential limitation of the current study was the lack of brain imaging, which may have allowed us to identify injured brain regions. In addition, we administered only the MMSE, with no ANT, at baseline. However, the MMSE is a widely used and accepted cognitive assessment scale. Moreover, our results also showed no significant difference between groups in the three attentional networks on POD 2, but significant differences
in the type and severity of ANT between groups on POD 7, indicating that surgery and anesthesia can induce cognitive impairment in elderly patients undergoing elective hip or knee arthroplasty. However, compared with NPs, HPs may experience delayed postoperative recovery cognition. In addition, the long-term effects of hypertension on postoperative cognition were not examined in this study. In future studies, we will examine the impacts of antihypertensive drugs and hypertension type (systolic versus diastolic) on postoperative cognition.

In summary, HPs undergoing elective hip or knee arthroplasty appeared to have selective cognitive impairment at different postoperative time points. Compared with NPs, HPs were more likely to experience delayed recovery of alerting and executive control network function. The orienting network was not affected. Functional disconnection of the frontal and parietal regions may play an important role in POCD in HPs. We believe that the monitoring of cognitive function for hypertension is necessary after anesthesia and surgery.


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Figure legends

Figure 1. Flowchart showing details of clinical procedures throughout the study.

Figure 2. Experimental paradigm of the ANT. (a) The four cue conditions; (b) six stimuli used in the present experiment; and (c) an example of the procedure.
Figure 1. Flowchart of patient recruitment and enrollment.
Figure 2. Experimental paradigm of the attentional network test. (a) The four cue conditions; (b) six stimuli used in the present experiment; and (c) an example of the procedure.
Table 1. Demographic characteristics and intraoperative data.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Hypertensive group</th>
<th>Normotensive group</th>
<th>P</th>
<th>$X^2$ OR</th>
<th>t value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years</td>
<td>65.80 ± 4.65</td>
<td>64.56 ± 3.84</td>
<td>0.31</td>
<td></td>
<td>0.91</td>
</tr>
<tr>
<td>Sex (M/F)</td>
<td>13/12</td>
<td>12/13</td>
<td>0.78</td>
<td>8</td>
<td>0.08</td>
</tr>
<tr>
<td>Weight, kg</td>
<td>67.60 ± 9.97</td>
<td>65.92 ± 12.58</td>
<td>0.60</td>
<td>0.53</td>
<td></td>
</tr>
<tr>
<td>MMSE</td>
<td>23.60 ± 3.39</td>
<td>23.44 ± 3.27</td>
<td>0.86</td>
<td>0.21</td>
<td></td>
</tr>
<tr>
<td>Educational level (years)</td>
<td>6.48 ± 5.52</td>
<td>5.13 ± 5.3</td>
<td>0.39</td>
<td>0.86</td>
<td></td>
</tr>
<tr>
<td>Illiteracy (No educated), n (%)</td>
<td>10 (40.00)</td>
<td>11 (44.00)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary school, n (%)</td>
<td>7 (28.00)</td>
<td>6 (24.00)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Junior middle school, n (%)</td>
<td>2 (8.00)</td>
<td>3 (12.00)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senior middle school, n (%)</td>
<td>2 (8.00)</td>
<td>3 (12.00)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University, n (%)</td>
<td>4 (16.00)</td>
<td>2 (8.00)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASA class</td>
<td></td>
<td></td>
<td>0.77</td>
<td>0.08</td>
<td></td>
</tr>
<tr>
<td>I, n(%)</td>
<td>12 (48.00)</td>
<td>13 (52.00)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>II, n(%)</td>
<td>13 (52.00)</td>
<td>12 (48.00)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration of surgery, min</td>
<td>113.72 ± 28.18</td>
<td>110.00 ± 16.89</td>
<td>0.57</td>
<td>0.56</td>
<td></td>
</tr>
<tr>
<td>Intraoperative bleeding, ml</td>
<td>490.00 ± 210.16</td>
<td>500.00 ± 129.10</td>
<td>0.84</td>
<td>-0.19</td>
<td></td>
</tr>
<tr>
<td>Intraoperative fluid infusion, ml</td>
<td>2080.0 ± 471.7</td>
<td>2272.0 ± 566.1</td>
<td>0.19</td>
<td>-1.3</td>
<td></td>
</tr>
<tr>
<td>Midazolam dose, mg</td>
<td>1.64 ± 0.2</td>
<td>1.74 ± 0.2</td>
<td>0.1</td>
<td>-1.6</td>
<td></td>
</tr>
<tr>
<td>Propofol dose, mg</td>
<td>436.80 ± 103.44</td>
<td>480.80 ± 78.10</td>
<td>0.09</td>
<td>-1.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Remifentanil dose, mg</td>
<td>Sufentanil dose, ug</td>
<td></td>
<td></td>
<td></td>
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<td>------------------</td>
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<tr>
<td></td>
<td>1.42 ± 0.32</td>
<td>45.50 ± 7.47</td>
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<tr>
<td></td>
<td>1.60 ± 0.36</td>
<td>47.80 ± 4.10</td>
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</tr>
<tr>
<td></td>
<td>0.07</td>
<td>0.18</td>
<td></td>
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<tr>
<td></td>
<td>-1.8</td>
<td>-1.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of surgery</td>
<td>0.57</td>
<td>0.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hip arthroplasty surgery, n (%)</td>
<td>11 (44.00)</td>
<td>13 (52.00)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knee arthroplasty surgery, n (%)</td>
<td>14 (56.00)</td>
<td>12 (48.00)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Data are presented as mean ± standard deviation or n (%). *p < 0.05. MMSE, Mini-Mental State Examination; ASA, American Society of Anesthesiologists.
Table 2. Attentional network test response times and accuracy on postoperative days 2 and 7.

<table>
<thead>
<tr>
<th>Item</th>
<th>Normotensive group</th>
<th>Hypertension group</th>
<th>P value</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alerting (ms)</td>
<td>36.84 ± 15.41</td>
<td>62.64 ± 34.82</td>
<td>0.001*</td>
<td>28.48 ± 23.52</td>
</tr>
<tr>
<td>Orienting (ms)</td>
<td>29.80 ± 26.52</td>
<td>36.52 ± 39.32</td>
<td>0.753</td>
<td>30.88 ± 15.62</td>
</tr>
<tr>
<td>Executive (ms)</td>
<td>87.52 ± 27.16</td>
<td>48.48 ± 36.65</td>
<td>&lt;0.001</td>
<td>83.00 ± 34.36</td>
</tr>
<tr>
<td>Accuracy (%)</td>
<td>96.32 ± 4.43</td>
<td>96.84 ± 3.04</td>
<td>0.903</td>
<td>98.24 ± 2.31</td>
</tr>
<tr>
<td>Overall mean</td>
<td>1019.9 ± 905.6</td>
<td>1030.0 ± 1001.4</td>
<td>0.076</td>
<td>0.762</td>
</tr>
</tbody>
</table>

Data are presented as the mean ± standard deviation. *P < 0.05, **P < 0.01. POD, postoperative day; RT, response time.
Table 3. Attentional network test response times and accuracy on postoperative days 2 and 7.

<table>
<thead>
<tr>
<th>Item</th>
<th>Normotensive group 2 DPO</th>
<th>Hypertension group 2 DPO</th>
<th>P value</th>
<th>Normotensive group 7 DPO</th>
<th>Hypertension group 7 DPO</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alerting (ms)</td>
<td>36.84 ± 15.41</td>
<td>28.48 ± 23.52</td>
<td>0.144</td>
<td>62.64 ± 34.82</td>
<td>40.44 ± 23.21</td>
<td>0.011*</td>
</tr>
<tr>
<td>Orienting (ms)</td>
<td>29.80 ± 26.52</td>
<td>30.88 ± 15.62</td>
<td>0.871</td>
<td>36.52 ± 39.32</td>
<td>38.24 ± 24.54</td>
<td>0.212</td>
</tr>
<tr>
<td>Executive (ms)</td>
<td>87.52 ± 27.16</td>
<td>83.00 ± 34.36</td>
<td>0.608</td>
<td>48.48 ± 36.65</td>
<td>69.20 ± 26.48</td>
<td>0.026*</td>
</tr>
<tr>
<td>Accuracy (%)</td>
<td>96.32 ± 4.43</td>
<td>98.24 ± 2.31</td>
<td>0.610</td>
<td>96.84 ± 3.04</td>
<td>97.36 ± 2.27</td>
<td>0.830</td>
</tr>
<tr>
<td>Overall mean</td>
<td>1019.9 ±</td>
<td>1030.0 ± 129.7</td>
<td>0.816</td>
<td>905.6 ± 255.2</td>
<td>1001.4 ± 177.3</td>
<td>0.130</td>
</tr>
<tr>
<td>RT</td>
<td>172.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Data are presented as the mean ± standard deviation. *P < 0.05. POD, postoperative day; RT, response time.