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# Comparison of Various Anesthesia Induction Methods for the Anesthesia in Elderly Patients in the Abdominal Surgery

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**Abstract.** Objective: To investigate the anesthesia induction methods in the elderly in surgeries. Methods: 60 cases of elderly patients in the Abdominal Surgery with ASA grade 1 to 3 were selected and randomly divided into three groups; intravenous injection of 4ug/kg of fentanyl and 0.1mg/kg of vecuronium bromide was conducted at first, and then group A was injected with 0.2mg/kg of midazolam, group B with 1.5mg/kg of propofol, and group C with 0.1mg/kg of midazolam and 1.0mg/kg of propofol for anesthesia induction within 1 min, and then the tracheal intubation was conducted. The effective time of anesthesia induction and the circulatory changes, as well as changes of PRA and Ang II values before anesthesia (T0), after anesthesia induction (T1), immediately after intubation (T3), and 5 min after intubation (T3) were observed. Results: The effective time of anesthesia induction was shorter in group C than in group A ($P<0.05$), and that was similar between group C and group B ($P>0.05$); compared with T0, the PRA and Ang II values in the three groups showed a decreasing trend at T1, T2 and T3, with the decrease being distinct at T1 ($P<0.05$); at T2, the PRA and Ang II values were significantly increased in group A ($P<0.05$), which were remarkably higher than those in group B and group C at the same period ($P<0.05$). The mean arterial pressure (MAP) and heart rate (HR) at T2 were notably increased in group A ($P<0.05$), while those were outstandingly reduced at T1 in group B ($P<0.05$), and group C had mild circulatory changes ($P>0.05$). The saturation of pulse oximetry (SPO2) was maintained between 97% and 100%. Conclusion: The combined use of midazolam and propofol is the ideal method for anesthesia induction in the elderly.

## 1 Instruction

This paper aimed to observe the effects of selecting midazolam, propofol or the combined used of the two for anesthesia induction in the elderly patients in the Abdominal Surgery on the circulatory system, so as to search for the ideal anesthesia induction method for the elderly.

### 1.1 General data

60 cases with ASA grade I to III were selected, including 43 male and 17 female, with the age ranging from 70 to 85 years and the body weight of 52 to 85kg. 36 cases received subtotal gastrectomy, 11 had cholecystectomy plus common bile duct exploration, 10 received laparoscopic cholecystectomy, and 13 had hemicolectomy. The patients were randomly divided into three groups, with 20 cases in each group, and different anesthesia induction drugs were selected, respectively.

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### 1.2 Anesthesia method

Intravenous injection with 0.3mg of scopolamine was conducted 30min before anesthesia, the vein was opened after entering the operating room and electrocardiogram was monitored. Intravenous injection of 4ug/kg of fentanyl and 0.1mg/kg of vecuronium bromide was conducted at first, and then group A was injected with 0.2mg/kg of midazolam, group B with 1.5mg/kg of propofol, and group C with 0.1mg/kg of midazolam and 1.0mg/kg of propofol through the vein for anesthesia induction; the drug injection in the three groups was completed within 1min, tracheal intubation was conducted after hyperventilation by pure oxygen mask, and the OHMI DA anesthesia machine was connected for breath control.

### 1.3 Monitoring and observation

The multifunctional circulation monitor was adopted to monitor the electrocardiogram (ECG), mean arterial pressure (MAP), heart rate (HR) and saturation of pulse oximetry (SPO2). The effective time of anesthesia induction of the three groups, which was the eyeball fixation time, was observed and recorded; and the changes of MAP, HR, SPO2, plasma rennin activity (PRA) and angiotensin II (Ang II) (radioimmunoassay) before anesthesia (T0), after anesthesia induction (T1), immediately after intubation (T2) and 5min after intubation (T3) were monitored.

## 2 Results

### 2.1 The effective time of anesthesia induction

The anesthesia induction eyeball fixation time was significantly extended in group A (8 0. 2±11 .6)s compared with that in group B (5 8．8±1 4．6)s and group C (5 9. 2± 1 4．8)s, and there was no statistical difference between group B and group C ($P<0.05$).

### 2.2

Changes of PRA, Ang II and circulation Compared with T0, the PRA and Ang II in the three groups showed a decreasing trend at T1, T2 and T3, with the decrease being obvious at T1 ($P<0.05$); the PRA and Ang II were markedly increased in group A at T2 ($P<0.05$), which were significantly higher than those in group B and group C at the same period ($P<0.05$); and they basically recovered to the levels before anesthesia (refer to Table 1).

Compared with T0, the MAP in the three groups showed a decreasing trend after drug injection. The occurrence rate of over 20% of MAP decrease after induction was 10% (2/20), 50% (10/20) and 20% (4/20) in groups A, B and C, respectively, ($P<0.05$); the HR in group B was notably slowed down relative to that before anesthesia ($P<0.05$), and the MAP and HR were apparently increased in group A immediately after intubation ($P<0.05$); and the MAP and HR in the three groups basically recovered to the levels before drug injection. Refer to Table 1. SPO2 fluctuated within the range of 97% and 100%.

Table 1. Changes of PRA, Ang II and circulation in the three groups

| Group | T0 | T1 | T2 | T3 |
|---|---|---|---|---|
| PRA（ng/ml） | | | | |
| A Group | 0.47±0.41 | 0.27±0.18[1)] | 0.58±0.22[1)] | 0.45±0.24 |
| B Group | 0.46±0.32 | 0.24±0.15[1)] | 0.38±0.21[2)] | 0.43±0.25 |
| C Group | 0.48±0.40 | 0.25±0.17[1)] | 0.40±0.22[2] | 0.41±0.22 |
| Ang Ⅱ (pg/ml) | | | | |
| A Group | 64.42±14.98 | 56.48±15.32[1)] | 75.65±21.21[1)] | 64.87±15.65 |
| B Group | 63.23±13.45 | 54.56±13.87[1)] | 63.21±14.68[2)] | 63.38±15.21 |
| C Group | 63.56±15.21 | 54.98±13.89[1)] | 64.38±13.87[2)] | 63.25±15.36 |
| MAP(kPa) | | | | |
| A Group | 15.61±2.91 | 15.32±2.68 | 17.31±2.82[1)] | 16.12±2.67 |
| B Group | 15.76±2.25 | 12.35±2.01[1)] | 15.87±2.56 | 14.98±2.70 |
| C Group | 15.12±2.71 | 13.99±2.12 | 15.52±2.31 | 14.97±2.68 |
| HR（bpm） | | | | |
| A Group | 78.00±18.45 | 80.38±12.60 | 90.16±19.72[1)] | 83.23±14.86 |
| B Group | 77.69±19.26 | 60.44±15.72[1)] | 80.53±15.28 | 79.99±14.65 |
| C Group | 78.51±16.96 | 81.63±12.92 | 81.62±16.71 | 80.89±15.84 |

Compared with T0: 1) $P<0.05$, and compared with group A: 2) $P<0.05$

## 3 Discussion

The midazolam or propofol is frequently served as the intravenous anesthesia induction drug in clinic. Midazolam has strong sedative and hypnotic effects with short elimination half life, the equivalent dose of which is only 1/10 but the effect is 1.5 to 2 times of the stabilizer. The propofol has rapid and reliable action, which can completely produce the anesthesia induction effect within a brain-arm cycle and rapidly achieve the depth of anesthesia [1]. These two drugs are adopted in this paper to implement anesthesia induction in the elderly patients, which have definite effects, and the two groups that utilize propofol have remarkably reduced anesthesia induction time that the group using midazolam.

The PRA, Ang II, blood pressure and HR in the midazolam group were markedly higher than those in the other two groups during anesthesia induction and tracheal intubation ($P<0.05$), which is basically identical to the reports by Kwa et al [2] that midazolam anesthesia induction can not reduce the cardiovascular response during tracheal intubation. Attention should be paid to the fact that fierce hemodynamic fluctuation in the elderly patients is likely to induce heart, brain and kidney events. Propofol is the rapid and short acting intravenous anesthetic that mainly exerts the sedative and hypnotic effects through the action of GABA [3, 4]; it has certain cardiovascular inhibitory effect, which can result in 20% drop of blood pressure, 17% decrease of cardiac output and reduced heart rate, and these may be contributed to the instable hemodynamics or hypovolemia of the patients [5]. The occurrence rate of drop of blood pressure in the propofol group in this paper reaches 50%, with concurrent decreased heart rate after drug injection. The fierce hemodynamic changes in the elderly are likely to induce cerebrovascular events; consequently, importance should be attached to the elderly with existing cerebrovascular diseases or poor functional compensation since the above changes will aggravate heart, brain and kidney function damage.

It is discovered in this research that the combined use of midazolam and propofol has short

effective time of anesthesia induction and little cardiovascular response, which guarantees the anesthesia induction effect, reduces the dose of each drug and minimizes the drug adverse reaction. When conducting anesthesia induction in clinic, the combined use of two drugs can produce synergistic effect, and it is believed that the combined use of midazolam and propofol is one of the ideal methods for anesthesia induction in the elderly patients.

## References

1. Chavorro C , Latorre FJ , Montero A ,et al. Comparative study of propofol versus midazolam in the sedation of critically ill patients : results of a prospectrive, randomized, multicenter trial [J] .Crit Care Med,1996,24:932
2. Kwar P ,Carson TW ,Clake RSJ ,et al. Haemodynamic changes during induction of anesthesia with midazolam and diazepam in patients undergoing coronary artery bypass surgery [J ] .Anaesthesia ,1985,40:767
3. Schwieler L ,Dellbro DS ,Engberge ,et al. The anesthetic agent propofol interacts with GABA(B)-receptors : an electrophysiological study in ract [ J ] , Life Sei ,2003,72: 2793-2801
4. Sonner JM ,Zhany Y ,Stabernack C ,et al. GABA(A) receptor blockade antagonizes the immobilizing action of propofol but not ketamine of isoflurane in a dose-related manner[J] .Anesth Analg ,2003 ,96 :706-12
5. Brussel T ,Theissen JL , Vigfusson G ,et al. Haemodynamic and cardiody-namic effects of propofol and etomidate : negative inotropic properties of propofol[J] .Anesth Analg, 1989,69:35-40