

# RELATIONSHIPS BETWEEN THE PREOPERATIVE HbA1c LEVELS AND THE CHANGES OF MAP, HR AND BLOOD GLUCOSE DURING THE INDUCTION WITH TRACHEAL INTUBATION IN THE GERIATRICS

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**Background:** As a criteria for screening and diagnosing diabetes mellitus (DM), Glycated hemoglobin (HbA1c) has been increasingly concerned. Geriatrics usually accompany with cardiovascular disease (CVDs) and DM. HbA1c was an independent risk predictor for the outcome of CVDs and/or DM[1]. The severe cardiovascular reaction following tracheal intubation has threatened geriatrics' safety. So we investigated the relationship between the different preoperative HbA1c levels and changes of mean arterial pressure (MAP), heart rate (HR) and blood glucose (Glu) during intubation in geriatrics.

**Methods:** 112 geriatrics scheduled for noncardiac surgery were induced with midazolam 0.05mg/kg, propofol 1.5mg/kg, fentanyl 3µg/kg, vecuronium 0.15mg/kg. After 3 mins, tracheal intubation was done through oral way. MAP and HR were recorded before induction (T0), just before intubation (T1), at intubation (T2), 1, 2, 3, 5, 8 and 10 mins after intubation (T3-8). Blood samples were taken at T0 to test HbA1c. Glu was measured at T0, T1, T6 and T8. In view of stratified analysis, cases were divided into 4 groups: group A (HbA1c < 5.7%, 24 cases), group B (5.7% ≤ HbA1c ≤ 6.4%, 34 cases), group C (6.5% ≤ HbA1c < 7%, 27 cases), group D (7% ≤ HbA1c ≤ 8%, 27 cases). Comparison within groups was done by single factor analysis of variance, comparison among groups by ANCOVA; The relationship of variable was analyzed by the linear correlation analysis (R as correlation coefficient), 0.5 < R ≤ 0.8 as significant correlation, 0.8 < R ≤ 1 as highly significant correlation.

**Results:** Compared with group A or B, MAP decreased markedly at T1-8 in group C or D (P < 0.05). Compared with group C, MAP decreased markedly at T1, T6-8 in group D (P < 0.05). HR had no significant difference between group A and B at T0, while HR of group C and D was more higher than that of group A and B (P < 0.05). Compared with T0, HR decreased markedly at T1, T6-8 in group C and at T1-3, T5-8 in group D (P < 0.05). Compared with group A or B, HR decreased markedly at T1-2, T6-8 in group D (P < 0.05). Compared with group C, HR decreased markedly at T6-8 in group D (P < 0.05). The  $\Delta$  (the difference value of MAP between T0 and T8 points) of all elder patients was significant correlation with preoperative HbA1c levels (R = 0.637); The  $\Delta$  (the difference value of HR between T0 and T8 points) was significant correlation with preoperative HbA1c levels (R = 0.502). The levels of Glu were gradually increased at T0-1, T6, T8 respectively in the four groups. There were significant difference among four groups (P < 0.05). But after induction, except the Glu levels at T6 was significantly lower than that at T0 in group B (P < 0.05), there were no significant difference in each group (P > 0.05). Levels of Glu of 112 patients at different times are highly significant correlated with preoperative HbA1c levels (R = 0.871, 0.845, 0.847, 0.859, respectively).

**Conclusions:** Changes of MAP, HR and Glu levels during the induction with tracheal intubation were significant correlated with preoperative HbA1c levels. MAP and HR of geriatrics with higher preoperative HbA1c level dropped more obviously after tracheal intubation.

**Key words:** Geriatrics; Glycosylated hemoglobin; Tracheal intubation; Mean arterial pressure; Heart rate; Blood glucose

## References

1. Colayco DC, Niu F, McCombs JS, et al. Glycosylated hemoglobin and cardiovascular outcomes in type 2 diabetes A Nested Case-Control Study. *Diabetes Care*, 2011;34 (1):77-83.

Table 1: Patients Characteristics<sup>4/</sup>

Groups	Cases	Sex(male/female)	Weight(Kg)	Age (year)	Induction time (s)
A	24	12/12	60.21±8.17	68.25±4.95	54±3
B	34	25/9	61.56±9.67	66.18±4.81	55±5
C	27	16/11	63.93±10.64	68.26±4.78	54±4
D	27	18/9	63.04±9.39	67.11±3.83	55±3

Table 2: Changes of MAP during anesthesia induction ( mmHg,  $\bar{x} \pm s$  )<sup>4/</sup>

	Group A	Group B	Group C	Group D
T <sub>0</sub>	98±6	95±8	94±9	98±8
T <sub>1</sub>	66±7*	64±9*	53±6***	47±6***
T <sub>2</sub>	89±14*	90±20	67±11***	66±7***
T <sub>3</sub>	103±13*	94±16*	80±14***	83±12***
T <sub>4</sub>	95±11	91±16	78±13***	79±7***
T <sub>5</sub>	83±10*	81±13*	69±13***	68±7***
T <sub>6</sub>	74±8*	74±10*	63±7***	55±6***
T <sub>7</sub>	70±6*	69±7*	59±7***	51±7***
T <sub>8</sub>	70±6*	66±7*	57±5***	48±6***

Compared with T<sub>0</sub> ●P < 0.05 ; Compared with A, ▲P < 0.05 ; Compared with B, ◆P < 0.05 ; Compared with C, ★P < 0.05 ;<sup>4/</sup>

Table 3: Changes of HR during anesthesia induction ( bpm,  $\bar{x} \pm s$  )<sup>4/</sup>

	Group A	Group B	Group C	Group D
T <sub>0</sub>	72±8	73±11	80±10**	80±10**
T <sub>1</sub>	64±8*	64±12*	64±10**	61±10***
T <sub>2</sub>	81±12	80±14	78±14	74±7***
T <sub>3</sub>	91±11*	85±13**	87±13*	89±9*
T <sub>4</sub>	85±12*	78±13*	87±15	84±9
T <sub>5</sub>	79±11	72±11*	74±11*	73±6*
T <sub>6</sub>	70±8	68±9	69±12*	64±6***
T <sub>7</sub>	65±7*	65±8	64±9*	59±6***
T <sub>8</sub>	62±6*	63±8*	61±8*	57±7***

Compared with T<sub>0</sub> ●P < 0.05 ; Compared with A, ▲P < 0.05 ; Compared with B, ◆P < 0.05 ; Compared with C, ★P < 0.05 ;<sup>4/</sup>

Table 4: Changes of blood glucose during anesthesia induction( mmol/L,  $\bar{x} \pm s$  )<sup>4/</sup>

	Group A	Group B	Group C	Group D
T <sub>0</sub>	5.10±0.51	6.06±0.62*	6.89±0.91***	8.73±1.38***
T <sub>1</sub>	4.82±0.62	5.79±0.64*	6.45±0.88***	8.34±1.30***
T <sub>2</sub>	4.86±0.54	5.70±0.72**	6.62±0.94***	8.40±1.29***
T <sub>8</sub>	5.14±0.57	5.92±0.65*	7.03±0.93***	8.87±1.32***

Compared with T<sub>0</sub> ●P < 0.05 ; Compared with A, ▲P < 0.05 ; Compared with B, ◆P < 0.05 ; Compared with C, ★P < 0.05 ;<sup>4/</sup>