THESIS TITLE : VENTILATORY RESPONSE TO HYPOXIA IN ASTHMATIC PATIENTS AFTER UNILATERAL CAROTID BODY RESECTION

AUTHOR : MISS ORATAI TUNKAMNERDTHAI

THESIS ADVISORY COMMITTEE:

.....Chairman

(Associate Professor Dr. Wilaiwan Khrisanapant)

.....Member

(Assistant Professor Dr. Watchara Boonsawat)

ABSTRACT

The carotid bodies are the main arterial detectors of hypoxia since bilateral carotid body resection abolishes most of the ventilatory response to hypoxia. In humans the ventilatory response to sustained hypoxia is biphasic which is characterized by an initial brisk increase followed by a decline to levels that are usually above the normoxic baseline, namely, "ventilatory roll-off". To study whether unilateral carotid body resection (UCBR) halves that of the ventilatory response to hypocapnic hypoxia and alters the biphasic ventilatory response or not. Three groups of seven subjects with a mean age of 40 years were studied. They were control and patients having mild or moderate asthma with or without a carotid body. All subjects breathed, in succession, room air (10 min), hypoxia (15 min, 15% O_2 in N_2), room air (60 min), hypoxia (15 min, 12% O_2 in N_2). Expired total ventilation ($\dot{V}_E$), tidal volume (V_T), respiratory rate (RR), heart rate (HR) and arterial O_2 saturation (SaO_2) were measured breath by breath by the 2900 Metabolic Measurement Cart.

The results revealed that, in air, $\dot{V}_E$ was 7.70±0.14 l/min, 7.89±0.24 l/min and 7.98± 0.30 l/min in the three groups of subjects. On exposure to 12% O_2 in N_2 (SaO_2 = 82%), initial brisk increases in $\dot{V}_E$ at 2-3 min of 142±6 %, 139±6 % and 141±5 % of their own preceding air values ($p < 0.001$) were observed in the control, asthmatic and UCBR groups, respectively. $\dot{V}_E$ then declined and reached the steady state within 5-12 min to the 116±4 %, 110±6 % and 118

±3 % of their own preceding air values ($p < 0.01$). This increase in $\dot{V}_E$ was due to an increase in V_T ($p < 0.001$) not RR. HR of the control, asthmatic and UCBR subjects increased ($p < 0.001$) from 74.86±2.34 /min, 74.21±1.89 /min and 70.86±1.90 /min respectively to 117±2 %, 121±2 % and 121±3 % of the preceding air values. Identical $\dot{V}_E$ and HR responses to 15% O_2 in N_2 were observed, although of less extents, in all groups of subjects.

In conclusion, unilateral carotid body resection had no effect on the ventilatory and cardiovascular responses to mild and moderate hypoxia.