47. Effects of Hyperventilation on Cerebral Circulation in Anesthetized Man

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In 5 subjects with raised cerebrospinal fluid pressure (CSFP) and 8 subjects with normal CSFP under halothane-nitrous oxide-oxygen anesthesia the effects of hyperventilation on CSFP, blood gases and pH and electroencephalogram were studied before, during hyperventilation.

Within 5 minutes following institution of hyperventilation, there was a rapid fall in CSFP associated with a decrease of mean arterial pCO2 from 45 mmHg to 18 mmHg with resultant increase of mean pH from 7.331 to 7.641. At the same time mean jugular PO2 decreased from 58 mmHg to 26 mmHg. This result same indicate the occurrence of metabolic acidosis in the brain. Occurrence and duration of EEG slowing (3 or 4 cps) appeared within 10 minutes after the onset of hyperventilation EEG recording showed no significant change. The CSFP gradually returned and raised over the initial value at approximately 90 minutes of hyperventilation. Initial decrease in CSFP was due to well known fact of cerebral vasoconstriction produced by a decrease in arterial pCO2. Gradual return of CSFP was considered to be a redistribution between cerebral blood volume and cerebrospinal fluid volume. As to the rise over the initial value, there would be an increase in the brain volume in addition to an increase in cerebrospinal fluid volume. As to the rise over the initial value, there would be an increase in the brain volume in addition to an increase in cerebrospinal fluid volume. The immediate cause of EEG slowing during hyperventilation remained obscure. However, it is clear that this abnormality indicative for depression of cerebral cortical activity were accompanied by direct and striking changes in cerebral hemodynamics including the changes in CSFP. Hyperventilation in anesthetic practice may result in potentially harmful situation, if continued over 90 minutes.

48. Experimental Studies on Brain Edema

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The ATPase activity of the various portions of the brain tissue was investigated at certain time interval, and the specimens thus obtained were further frac-