Respiration

TRACHEAL SIZE Relation of tracheal size to body size was studied in 24 tracheas taken from autopsies of children ranging in age from premature to 14 years and in weight from 1½ pounds to 155 pounds. Weight had the best correlation and the most nearly linear relationship with the length of the trachea and cross-sectional area of glottis and trachea. The findings of this study confirm clinical estimates of the same variables represented by available endotracheal tubes and bronchoscopes. (*Butz, O.: Length and Cross-section Growth Pattern in the Human Tracheas, Pediatrics 42: 336 (Aug.) 1968.*)

ABSTRACTER'S COMMENT: This paper has an excellent collection of tables and graphs which should be part of the collection of all of us who put tubes in infant tracheas.

LUNG FUNCTION AFTER PORTACAVAL ANASTOMOSIS Three patients developed progressive dyspnea on exertion after portacaval anastomosis. Unequivocal evidence for defective gas transfer and overperfusion of lung with respect to ventilation was found. The findings were consistent with dilatation of the precapillary vessels of the lung. (*Cotes, J. E., and others: Impairment of the Lung Function After Portacaval Anastomosis, Lancet 1: 952 (May) 1968.*)

OXYGEN CONSUMPTION The effects of xenon, krypton, nitrogen and nitrous oxide on the oxygen consumption of rat liver slices was studied. Inert gas pressure was 550 torr and total pressure near one atmosphere, the remaining partial pressure being oxygen. Contrary to previously-published findings, no detectable effect was found. It is postulated that in previous studies, glucose substrate and not oxygen availability was the limiting factor, with the effect of the inert gases being on glucose metabolism. (*Longmuir, I. S., and others: Effect of Xenon, Krypton, Nitrogen and Nitrous Oxide on Oxygen Consumption of Rat Liver Slices, Aerospace Med. 39: 1287 (Dec.) 1968.*)

RESPIRATORY FAILURE Alveolar ventilation values greater than 4.2 l/min were found in patients in acute respiratory failure. Associated findings were arterial CO_2 tensions less than 40 mm Hg and alveolar–arterial oxygen tension differences greater than 100 mm Hg. The line relating alveolar–arterial oxygen tension difference to alveolar oxygen tension characteristically rose steeply to oxygen tension differences of 400 to 600 mm Hg. This was assumed to indicate pulmonary arteriovenous shunting. There is an increase in cardiac output to alleviate arterial hypoxia; a later decrease in cardiac output would contribute to ventilatory failure. (*Border, F. R., and others: Hypoxic Hyperventilation and Acute Respiratory Failure in the Severely Stressed Patient, Surgery 64: 710 (Oct.) 1968.*)

RESPIRATORY RESISTANCE In normal subjects and patients with pulmonary disease, total respiratory resistance (R_t) was measured by applying a sine wave of airflow to the mouth at the resonant frequency of the respiratory system. Mean functional residual capacity was also measured. Airway resistance determined in the same subjects with the body plethysmograph at a mean panting thoracic gas volume was similar to R_t obtained by oscillation. Hence, comparison of R_t by the two techniques was favorable. (*Fisher, A. B., DuBois, A. B., and Hyde, R. W.: Evaluation of the Forced Oscillation Technique for the Determination of Resistance to Breathing, J. Clin. Invest. 47: 2045 (Sept.) 1968.*)

ABTRACTER'S COMMENT: Oscillation and plethysmographic techniques are similar in cost and in technical skills and time required to obtain the measurements. Both require determination of lung volume at which resistance is measured. This is made routinely with the plethysmograph but requires an independent technique with the oscillation method. The oscillation method does not require subject cooperation, can be made portable, and may be of some value in the study of R_t in the acutely ill, anesthetized or otherwise unresponsive patient.