

resistance, a slight increase in blood pressure, and a considerable decrease in cardiac output. The authors suggest that in the borderline hypertensive cardiac output and peripheral resistance are adjusted to maintain a slight increase in blood pressure. There was no evidence of a hyperactive pressure response to any of various stimuli. (*Julius, S., and others: Relationship between Cardiac Output and Peripheral Resistance in Borderline Hypertension, Circulation 43: 382 (Mar.) 1971.*) EDITOR'S COMMENT: The anesthesiologist frequently treats patients with labile or borderline hypertension. The changes in cardiac output and peripheral resistance described for challenges to circulatory homeostasis such as volume expansion, change in position, or administration of atropine do not follow the pattern described for the normal adult volunteer. It is time for the anesthesiologist to begin the definition of patient physiology in terms of pre-existing disease. Normal responses provide a good baseline but are not always certain to keep us out of trouble.

Coagulation

CLOTTING OF PLASTIC CATHETERS

Autopsy dissections in 55 patients who had indwelling subclavian catheters are reported. In 31 of these patients, cinefluoroscopic studies were carried out prior to dissection of the subclavian vein. The dissections revealed that circumferential fibrin sleeves had developed around each catheter studied. The catheters, made of either Teflon or polyethylene, had been *in situ* for various periods ranging from one to 76 days. One group of patients had subclavian catheters made of polyethylene coated with colloidal graphite, benzalkonium chloride, and heparin. The fibrin sleeves were still present, but smaller in length and thickness than those on the uncoated catheters. The authors suggest that special treatment of catheters can reduce thrombogenicity and that further studies should be conducted to minimize or eliminate the thrombogenic characteristic of indwelling venous catheters. (*Hoshal, V. L., Jr., and others: Fibrin Sleeve Formation on Indwelling Subclavian Central Venous Catheters, Arch. Surg. 102: 353-358, 1971.*) EDITOR'S COMMENT: This complication, associated with a technique that is gain-

ing wide acceptance, has been described as "the pathology of progress." Documentation of this nature should stimulate improvement of materials allowed to reside within blood vessels for prolonged periods.

Endocrine Function

MYXEDEMA AND IMPAIRED CON-

SCIOUSNESS Impaired consciousness in myxedema may result from mechanisms other than simple depression of the metabolic state. An evaluation of nearly 100 cases reported from 1953 to 1963 indicates that four other factors may contribute to the depression of consciousness: hypoxia, hypercarbia, hyponatremia, and hypopituitarism.

Cerebral hypoxia may result from low cardiac output or severe congestive heart failure, both of which are common in myxedema and may contribute to depression of the level of consciousness. Myocardial infarction and pericardial effusion resulting in tamponade are rare causes of stupor or coma, but their sudden onset should raise the suspicion of a cerebral vascular accident.

Hypercarbia in myxedematous patients in coma has been reported, but present data are inadequate to establish its incidence. Impaired function of the respiratory center or of the respiratory muscles may account for the reduced minute ventilation and maximal breathing capacities, while obesity may increase the work of breathing. Death resulting from administration of morphine has been reported; respiratory arrest has been known to occur after small quantities of thiopental, and coma has followed barbiturate administration.

Hyponatremia is often present, and apparently results from water retention in spite of low serum osmolality. Convulsions followed by postictal coma may occur. Therapy includes fluid restriction or the use of hypertonic saline solution, in addition to thyroid hormone replacement.

Hypopituitarism with secondary myxedema may cause hypoglycemia, coma, cardiovascular depression, and hypothermia. Until pituitary function can be evaluated, therapy with glucocorticoids is necessary.

The treatment of coma in the myxedematous patient includes therapy with thyroid hormones, but present experience is insufficient

to establish an optimal dose schedule. Large doses of thyroxine or triiodothyronine may place a severe demand on the cardiovascular system and result in the appearance of arrhythmias or a strain pattern on the ECG. Adequate respiratory support with mechanical ventilation may be indicated. The external application of heat is probably not necessary. (Royce, P. C.: *Severely Impaired Consciousness in Myxedema—A Review*, *Amer. J. Med. Sci.* 261: 46 (Jan.) 1971.) **EDITOR'S COMMENT:** A review article that covers the pathophysiology of myxedema. The anesthesiologist should be familiar with this disease, first because he may be called upon to treat patients with coma and respiratory failure due to myxedema, and second because it emphasizes the gamut of pharmacologic responses influenced by the patient's hormonal balance. Drug dosages generally recommended for the otherwise-fit human being do not apply to the hypothyroid individual.

Respiration

TRACHEAL INJURY One hundred and three patients treated with tracheostomy and assisted ventilation for various reasons were studied. At the time of removal of the tube, the stoma and distal trachea were examined endoscopically. Clinical and radiographic examinations of the trachea were performed three weeks and three months following extubation. Some loss of airway diameter at the stoma level occurred in almost every patient. Twelve patients had 25 to 50 per cent reduc-

tions in airway diameter without clinical evidence of disability, while 17 patients had symptomatic and functionally significant tracheal strictures. In the latter group, strictures occurred at the level of the stoma in 12 patients and at the level of the inflatable cuff in six. Two patients died from airway obstruction and two developed tracheoesophageal fistulas. Factors found to predispose to symptomatic stenosis were: a large tracheostomy tube; administration of large doses of steroids (more than 30 mg/day of prednisone for more than three days); and sex (women had a higher incidence than men). The following factors were not significantly related to the incidence of stenosis at either cuff or stoma level: age; length of time the cuffed tracheostomy tube was left *in situ*; peak airway pressure generated by the ventilator; pre-existing pulmonary disease; hypotension during the period of ventilation; airway infection. It is recommended that any patient who has a long-standing tracheostomy have his airway examined at the time of extubation. (Andrews, M. J., and Pearson, F. G.: *Incidence and Pathogenesis of Tracheal Injury following Cuffed Tube Tracheostomy with Assisted Ventilation: Analysis of a Two-year Prospective Study*, *Ann. Surg.* 173: 249 (Feb.) 1971.) **EDITOR'S COMMENT:** The importance of cuff design and pressure in maintaining the integrity of the tracheal mucosa has been demonstrated with overwhelming evidence. I doubt that this will cure all potential abnormalities, but clinical experience so far suggests that it has helped.