

The Effect of Anesthesia and Muscle Relaxants on the Elastic Properties of the Human Thorax. WALTER H. MASSION, M.D., AND J. M. WHITE, M.D. *Department of Anesthesiology, University of Oklahoma School of Medicine, Oklahoma City, Okla.* Recent studies on dogs have shown that total chest compliance decreases after the administration of curare (Safar, P., and Bachman, L.: *Anesthesiology* 17: 334, 1956; Massion, W. H.: *J. Appl. Physiol.* 11: 309, 1957). There is also evidence that anesthesia as such will affect the pressure volume characteristics of the human thorax (Nims, R. G., et al.: *J. Clin. Invest.* 14: 744, 1955). The present investigation was undertaken to determine the effect of curare and thiopental on lung volume and chest distensibility in men. Twelve patients scheduled for minor surgical procedures have been studied. The static total chest compliance and the functional residual capacity (FRC) were measured with the subject in the recumbent position. Determinations were made during the conscious state, during thiopental anesthesia, and after curarization. Endotracheal intubation was performed with a cuffed endotracheal tube which was then connected to a Benedict-Roth spirometer in such a manner as to permit inflation of the lungs and collection of expiratory volumes. The pressure in the airway was recorded with a water manometer. By relating the expired volume to the corresponding airway pressure the value for static total chest compliance was determined. FRC was measured by a closed system rebreathing method. A rubber bag containing a measured volume of oxygen was connected to the endotracheal tube at the end of an expiration. The patient was allowed to breathe and rebreathe from the bag for a time adequate for complete equilibration of gases between the lungs and the bag. A sample of the air in the bag was then analyzed on the Scholander micro-gas analyzer. The FRC was calculated from the initial volume of oxygen in the bag and the fraction of nitrogen after equilibration with the air contained in the lungs (Rahn, H., et al.: *J. Appl. Physiol.* 1: 725, 1949). The results of our study indicate a decrease of chest compliance as the patient passes from the conscious state to the anesthetized state. The mean static compliance at 20 cm. H₂O pres-

sure in the conscious patients was 0.126 l./cm. H₂O. During anesthesia the compliance decreased 44 per cent. Curarization increased compliance in 9 out of 12 patients, a decrease was found in 2 patients and no change in one patient. The average change of chest compliance after curare was + 4 per cent. FRC showed an increase of 8 per cent after induction of anesthesia and gained another 2 per cent after curarization. In summary, these studies show that curare does not appreciably affect human chest compliance as had been expected on the basis of earlier dog experiments. The decrease of compliance after induction of anesthesia is interpreted as the result of the abolition of intercostal muscle tone. Functional Residual Capacity changes encountered during anesthesia and curarization were minimal.

Histopathological Effects of Prolonged Exposure of Nerves to Local Anesthetics. PHILIP PIZZOLATO, M.D., AND O. J. RENEGAR, M.D. *Clinical Laboratory, Veterans Administration Hospital and Department of Anesthesia, Charity Hospital, New Orleans, La.* Since Lemmon's (*Ann. Surg.* 111: 141, 1940) contribution to continuous spinal anesthesia, many modifications have been added. Although these procedures appear safe, it is possible that long and continuous exposure of a nerve to an anesthetic agent may produce irreversible damage. As no human material was available for study, a histopathologic study on animals was undertaken. In a previous publication (Pizzolato, P., and Renegar, O. J., *in print*), we have demonstrated mild and apparently reversible changes in nerves after instilling certain local anesthetics. These experiments were conducted after surgical exposure of the sciatic nerve and application of a polyethylene tube adjacent to the nerve. Since these procedures may cause injury, and consequently pathologic changes, another series of animals was studied without exposure of the nerve. Twenty-five rats were anesthetized with pentobarbital. Using sterile technique, a 23 gauge needle connected to a Baxter administration set R 33 was inserted through the skin and muscle to the underlying sciatic nerve. The other end of the tube was connected to a 5-ml. syringe, and the anesthetic was injected