

tool in the differential diagnosis of apnea, and that it is much simpler to accomplish than the ulnar nerve stimulation test advocated by Churchill-Davidson (Churchill-Davidson, H. C.: *Canad. Anaesth. Soc. J.* 8: 91, 1961). In addition, it is frequently of therapeutic as well as diagnostic value, for in the vast majority of cases where the apnea is of central origin, doxapram results in the reinstatement of spontaneous respiration and in the almost immediate arousal of the patient.

Hemodynamics During Neurolept Analgesia. HOWARD L. ZAUDER, M.D., PH.D., LOUIS R. M. DEL GUERCIO, M.D., NEIL FEINS, M.D., NEIL BARTON, M.D., and STEWART WOLLMAN, M.D., *Departments of Anesthesiology and Surgery, Albert Einstein College of Medicine, New York City.* A hallmark of neurolept analgesia as produced by nitrous oxide-oxygen supplemented with a 50:1 mixture of droperidol (1 mg./ml.) and fentanyl (0.02 mg./ml.) is the stability of the cardiovascular system as monitored clinically. Direct measurement of cardiac output and related hemodynamic parameters are required to properly assess the action of this combination of drugs on the circulation. *Methods:* Twenty-two observations were carried out, prior to major surgery, in 9 geriatric patients. The average age was 69, the range extending from 46 to 94 years. Sixty to ninety minutes prior to study, 0.4 mg. of atropine was administered intramuscularly. All cannulations were performed on the night prior to study. Cardiac output, central venous pressure, mean circulation time, systolic, diastolic and mean blood pressure and pulse rate were determined by standard techniques. Arterial and venous P_{O_2} , P_{CO_2} and pH were determined with the appropriate electrode. From the data stroke index, total peripheral resistance, stroke work, mean ejection rate, central blood volume and buffer base were calculated. Following the control studies 2-14 ml. of droperidol-fentanyl were given rapidly intravenously. Within 3-4 minutes N_2O-O_2 in a 50:50 mixture (7-9 liters total flow) was administered by mask. Determinations of the cardiorespiratory parameters were made 15 minutes later. In 4 patients these were repeated 15 minutes later. The cardiac index rose from 3.15 ± 0.32 ° liters/minute/

$m.^2$ to 3.36 ± 0.18 ° liters/minute/ $m.^2$. The stroke index was constant, 42.2 ± 2.4 ° ml./ $m.^2$ before and 42.7 ± 5.4 ° ml./ $m.^2$ after drug administration. Stroke work was likewise unchanged, amounting to 81.9 ± 10 ° gram meters before and 80.9 ± 10 ° gram meters during anesthesia. The mean ejection rate rose from 123 ± 10 ° ml./systolic second/ $m.^2$ to 138 ± 10 ° ml./systolic second/ $m.^2$. Total peripheral resistance, on the other hand, fell from 1545 ± 131 ° dynes/second/ $cm.^{-5}$ to 1265 ± 299 ° dynes/second/ $cm.^{-5}$. The mean circulation varied little, from 17.4 ± 1.9 ° seconds before to 16.0 ± 1.2 ° seconds after drug administration. The central venous pressure rose from 7.1 ± 3.3 ° cm. of water to 9.6 ± 3.0 ° cm. of water. While the mean blood pressure fell from 97.6 ± 1.5 ° mm. of mercury to 87.4 ± 2.0 ° mm. of mercury. Central blood volume declined as did the pulse rate, the former from 1.49 ± 0.05 ° liters to 1.47 ± 0.17 ° liters, the latter from 81.3 ± 5.5 ° to 75.6 ± 3.7 °. Arterial P_{CO_2} rose from 36.1 ± 1.0 mm. of mercury to 41.2 ± 2.2 ° mm. of mercury, this was reflected in the pH which fell from 7.43 ± 0.04 to 7.40 ± 0.04 . Buffer base was unchanged from the central value of 50.0 ± 1.9 ° mEq./liter. When scrutinized by the paired *t* test only the fall in blood pressure is statistically significant ($P = 0.1$). *Conclusion:* From these results it is concluded that neurolept analgesia as produced in these patients is without significant effect on the cardiovascular system of the unstressed surgical patient.

° Standard error of the mean.

Effect of pH on Activity of Topical Anesthetics. RICHARD ZEPERNICK, M.D., EDWIN HYDE, M.D., and JOHN ADRIANI, M.D., *Department of Anesthesiology, Charity Hospital, New Orleans, Louisiana.* In a recent study comparing the activity and potency of topical anesthetics, we observed that the maximum duration of anesthesia topically was obtained by using solutions of the salt of the drug whose pH ranged from 6.2 to 6.9. It is often stated that alkalization of solutions enhances their activity. In view of the fact that our findings are not in agreement with accepted thinking and that we did not study this aspect