

used. The number of pulmonary vessels obstructed by 1 mg albumin was calculated with the assumption that microspheres of albumin (a) are perfectly spherical; (b) are of uniform diameter; (c) have a density of 1 g/ml and (d) will each block one vessel only. Particles 60-90 μ in diameter will block 0.31 per cent of vessels, and particles 15 μ and 525 μ in diameter will block 0.14 and 0.12 per cent of vessels, respectively. These calculations are in accord with the clinical experience of the safety of lung scanning technique with macro-aggregated albumin. (Harding, L. K., and others: *The Proportion of Lung Vessels Blocked by Albumin Microspheres*, *J Nucl Med* 14:579-581, 1973.)

Obstetric Anesthesia

LABOR SEDATION Thirty-two patients were evaluated to determine the effects of meperidine and promethazine administered during active labor, with continuous electronic monitoring of fetal and maternal cardiovascular function and uterine activity. Meperidine produced no apparent significant fetal or maternal cardiovascular change. In contrast, maternal tachycardia occurred in all patients receiving promethazine. There were minimal heart rate level changes in the fetuses, but a striking change in the beat-to-beat variation was encountered. A quantitative on-line method was used to measure uterine activity, which was found to increase in all patients but one. (Riffel, H. D., and others: *Effects of Meperidine and Promethazine during Labor*, *Obstet Gynecol* 42:738-745, 1973.)

Circulation

MEASUREMENT OF CARDIAC FUNCTION Left ventricular ejection fraction (LVEF) was determined in 16 patients using a radionuclide technique. The results obtained from 10 patients were compared with those obtained using a standard cineangiographic technique involving the intracardiac injection of Hypaque-M. The radionuclide technique involved the intravenous injection of ^{99m}Tc -human serum albumin and imaging of the heart with a gamma scintillation camera. The electrocardiogram was

displayed simultaneously on the computer's oscilloscope. The R-wave and the end of the T-wave were used to define end-diastole and end-systole. At each of these points in the cardiac cycle, image information was collected during a 45-msec period. The image information was processed by computer, digitized, and stored on magnetic tape. Data obtained from more than 300 cardiac cycles were integrated for each determination. The calculation of LVEF was performed by first displaying the integrated end-diastolic and end-systolic images and their difference, and outlining manually the region of the left ventricular blood pool. The difference in counts between end-diastole and end-systole was divided by the counts in end-diastole after subtracting the background counts. The time required for calculation was only 5 minutes. The correlation between LVEF determined by the radionuclide technique and that obtained by the cineradiographic technique was 0.87, with the radionuclide values being about 10 per cent higher. The authors conclude that the method can provide "reasonably reliable" determinations of LVEF. **ABSTRACTER'S COMMENT:** This sophisticated technique requires some rather expensive hardware. However, if the deficiencies in spatial and temporal resolution discussed in the paper can be corrected, the technique will have several advantages over cineradiography. The technique is less invasive in that it does not require left-heart catheterization. Also, allergic reactions to ^{99m}Tc have not been reported, whereas reactions to Hypaque are fairly common. Finally, the total radiation dose is much lower and the results are available more quickly. (Secker-Walker, R. H., and others: *Measurement of Left Ventricular Ejection Fraction*, *J Nucl Med* 14:798-802, 1973.)

Transfusion

INTRAOPERATIVE AUTOTRANSFUSION Intraoperative autotransfusion of blood was used to treat 11 exsanguinating patients, with the result that five survived, five died of uncontrollable bleeding, and one died of an air embolism, unrelated to the autotransfusion. Three of the survivors, who received 6, 131, and 30 liters of autotransfused blood

were thought definitely to have been saved by the procedure. The apparatus consisted of a roller-pump that sucked blood from the operative field and pumped it through 125- μ m and 170- μ m filters and then into the patient. The patients on whom this technique was used were undergoing vascular surgery or surgery for trauma; they were free of head injury, gastrointestinal tract contamination of the blood pool, and distant closed-space blood loss. Laboratory studies performed before and for several days following autotransfusion included coagulation studies, liver function studies, various blood chemistry studies, blood gases, and chest roentgenograms. Interestingly, posttransfusion pulmonary insufficiency was not observed, suggesting that the technique did not present the lungs with large numbers of microemboli.

The major problem was a coagulopathy, which interfered with hemostasis sufficiently to prolong the operative procedures to as long as three hours. All patients were heparinized to prevent clotting in the autotransfusion apparatus. However, heparin therapy could not explain the hypofibrinogenemia, thrombocytopenia, and appearance of fibrin split products these patients manifested. More likely was a "defibrination syndrome," triggered by banked blood and trauma and aided by the autotransfusion process. Protamine sulfate and fresh-frozen plasma were not helpful in treating the coagulopathy. More information is needed to determine for which patients this procedure is indicated. (*Rakower, S. R., and others: Massive Intraoperative Autotransfusion of Blood. Surg Gynecol Obstet* 137:633-636, 1973.)