venous blood concentration following 600 mg. of lidocaine with 1:200,000 epinephrine reached 2.7 μg./ml. following which it gradually decreased to 2.3μg./ml. in one hour and 1.5 μg./ml. in four hours. *Summary and Conclusions:* (1) The systemic toxicity of lidocaine is lower than suggested by some authors. (2) Citanest possesses a lower systemic toxicity than lidocaine and the blood levels of this agent decrease more rapidly which suggest that it is more rapidly metabolized than lidocaine. (3) It is not logical to utilize weight in determining the dose of local anesthetic agents to administer peridurally. (4) It is the total dose rather than the concentration of these anesthetic agents which determines the venous blood levels. (5) Epinephrine 1:200,000 markedly reduces systemic toxicity by decreasing absorption from the peridural space. (6) The maximum concentration of these agents in venous blood occurs in approximately 20 minutes.

Preanesthetic Medication: Untoward Effects of Certain Drug Combinations. SPYROS G. MACRIS, M.D., and LOUISE LEVY, M.D., *The George Washington University Hospital, Washington, D. C.* Pentobarbital, scopolamine and promethazine are all well-established drugs for use in preanesthetic medication. Occasional clinical impressions from our practice showed the presence of agitation and confusion after the combined administration of these agents. The present study was undertaken in an effort to determine the nature and frequency of these responses. *Methods:* The study included 160 patients, divided into 8 groups. Premedication consisted of: (1) sodium pentobarbital 100 mg.; (2) scopolamine 0.4 mg.; (3) promethazine 50 mg.; (4) sodium pentobarbital 100 mg. and scopolamine 0.4 mg.; (5) sodium pentobarbital 100 mg. and promethazine 50 mg.; (6) scopolamine 0.4 mg. and promethazine 50 mg.; (7) sodium pentobarbital 100 mg., scopolamine 0.4 mg. and promethazine 50 mg.; and (8) normal saline (2 ml.). All dosages were per 150 pounds of body weight. *Results:* When compared to the placebo group, it was found that: the incidence of preoperative agitation and confusion increased significantly with the combination of the three drugs ($X^2 = 34.3$, $P < 0.001$), slightly with the combination of scopolamine and promethazine ($X^2 = 2.73$, $0.1 < P < 0.05$), and none in any other group. The incidence of movements of the limbs after the injection of thiopental was significant only after scopolamine, promethazine, pentobarbital premedication ($X^2 = 7.8$, $0.001 < P < 0.01$). There was no statistically significant difference in the amounts of thiopental needed for the disappearance of the eyelid reflex in the various groups. The time needed for recovery was significantly higher where promethazine, promethazine and scopolamine or promethazine, scopolamine and pentobarbital were given. (Respective values of $t = 2.72$, 2.7 and 3.9; values of $P < 0.001$, $0.01 < P$ 0.02 and $P < 0.001$.) The incidence of postoperative agitation was significantly increased when the three drugs were given in combination ($X^2 = 7.8$, $0.001 < P < 0.01$). *Conclusion:* It is postulated that the latent excitatory state produced by the combined administration of promethazine and scopolamine becomes prevalent after the addition of a barbiturate, and that therefore, the combination of the three drugs should be avoided.

Halothane in Obstetric Anesthesia. JERRY R. MILLER, M.D., *Associate Professor*, and V. K. STOELTING, M.D., *Professor and Chairman, Department of Anesthesiology, Indiana University School of Medicine, Indianapolis, Indiana.* Halothane for obstetrical anesthesia showed promise of being an ideal agent. Recommendations have been made contraindicating the use of halothane for normal obstetric deliveries because of uterine relaxation and bleeding. Recent reports (Stoelting, V. K., Anesth. Analg. *43:* 243, 1964; Bosomworth, P., and others: ANESTHESIOLOGY *23:* 140, 1962) indicated that light halothane–nitrous oxide anesthesia, if adequately controlled, was an excellent agent in obstetric anesthesia. *Methods:* Halothane and oxygen were used in this study. The maternal parameters observed were (1) blood pressure, (2) pulse, (3) condition of the uterus after placental delivery, and (4) amount of bleeding during the stay in the delivery room. Maternal arterial and fetal cord blood samples were drawn immediately after delivery and before clamping the umbilical cord. The newborn was classified as

follows: Class (*A*) Apgar 8, 9, 10, (*B*) Apgar 5, 6, 7, (*C*) Apgar 3, 4, (*D*) Apgar 0, 1, 2, and (*E*) stillborn. The length of anesthesia from the beginning of administration to the birth was recorded and divided into four groups: (*1*) 0–2 minutes, (*2*) 2–5 minutes, (*3*) 5–10 minutes, and (*4*) 10 minutes or longer. A second group of patients were delivered under pudendal block and contractility recorded using an external tocodynamometer to record uterine response to halothane. *Results:* Data on anesthesia time revealed 33 per cent of the patients fell in group *1*, 33 per cent in *2*, 23 per cent in *3*, and 11 per cent in *4*. The condition of the newborn was as follows: class *A*—78 per cent, class *B*—11 per cent, class *C*—9 per cent, and class *D*—2 per cent. This indicated more fetal depression than with halothane–nitrous oxide because of lower percentage in class *A* and much higher percentage in class *C*. Halothane was detected in cord blood in infants in the 0–2 minute period. Uterine tone as judged clinically was normal in 67 per cent. Eleven per cent had moderate relaxation, and 22 per cent had marked relaxation. Fifty-six per cent of the patients had minimal uterine bleeding, 11 per cent moderate, and 33 per cent had severe bleeding. External tocodynamometer readings showed uterine contractility depression with concentration as low as 0.5 per cent. The depression occurred with the onset of administration of halothane, and contractility returned within five minutes after cessation of halothane. Under halothane the sensitive pregnant uterus became insensitive to an intravenous Syntocinon drip. Contractions occurred at ten-minute intervals; whereas, normal controls occurred at one to two minutes. *Conclusions:* Halothane depresses the newborn more than halothane and nitrous oxide. Halothane passes the placenta easily and quickly. Halothane has a profound effect on uterine relaxation and contractility. Halothane and oxygen should be reserved for obstetrical procedures were uterine relaxation is desired and necessary. (This study was supported by a Grant from Ayerst Laboratories.)

Hepatic and Renal Effects of Methoxyflurane in Surgical Patients. WILLIAM C. NORTH, M.D., and C. R. STEPHEN, M.D., *Divisions of Anesthesiology and Pharmacology, Duke University Medical Center, Durham, North Carolina.* The recent concern about hepatotoxic effects of various anesthetic drugs has demonstrated the need for a careful evaluation of postoperative damage to organs as a result of the entire surgical process. To that end a study was begun to evaluate the effect of methoxyflurane upon the liver and the kidney. Preliminary papers on limited series of patients had indicated that methoxyflurane had approximately the same degree of hepatotoxicity as diethylether when studied by the Bromsulphalein retention method. There are few data available on the renal effects of this drug. *Methods:* The present investigation estimated liver function by means of serum glutamic-oxalacetic transaminase (SGOT) or serum glutamic-pyruvic transaminase (SGPT) levels. The latter is more specific for liver damage, but the determination was not available at the beginning of the study. When abnormal values were found, other hepatic function tests were determined in an attempt to delineate the pathologic changes. There is no similar practical screening test for renal damage. However, patients with severe renal damage were examined for increases in blood urea nitrogen and alterations in urine formation. Blood was drawn prior to anesthesia and on the fifth postoperative day. At that time the patient was seen and his record reviewed in an effort to ascertain whether there was any symptomatic evidence of hepatic or renal disease. Patients were selected at random with the exception that only patients who stayed in the hospital five days after operation could be included. *Results:* To date results are available from 298 patients who had SGOT or SGPT levels less than 70 units/ml. prior to operation. Of the 157 who received methoxyflurane, 18 (11.5 per cent) showed abnormal elevation on the fifth day and 12 of the 141 who received some other anesthetic showed a similar elevation (not significant). There is a suggestion that the surgical procedure and duration of anesthesia are related to the enzyme elevation, but the data are too limited at the moment to permit valid comparisons. In only one patient in each group was there abnormality of the other liver function tests, and both these patients gave no clinical evi-