100 per cent of nutritionally deprived dogs following chloroform anesthesia. Less severe changes were observed in the animals given methoxyflurane, fluroxene and halothane. It was believed that electron microscopy would offer a more sensitive method of detection of subtle changes. *Experimental Methods:* Twenty-one mongrel dogs weighing 20–50 pounds were subjected to 72 hours of food deprivation. Water was allowed *ad lib.* Anesthesia was induced with thiopental, 10 mg. per pound of body weight, after which tracheal intubation was accomplished and anesthesia maintained for five hours with one of the following combinations: oxygen and chloroform, oxygen and halothane, or oxygen and methoxyflurane. The first two agents were vaporized with a Copper Kettle, and the methoxyflurane was vaporized with an in-circuit Heidbrink wick vaporizer. Deep surgical anesthesia was consistently maintained as monitored by absent corneal reflex and appropriate electroencephalographic pattern. Liver biopsies under direct vision with a Menghini needle were obtained. The first biopsy, which was taken during the first hour of anesthesia, served as a control and to rule out pre-existing liver disease. A second biopsy was taken 24 to 72 hours after anesthesia to demonstrate the associated submicroscopic changes. Arterial blood pressure was monitored from a cannulated femoral artery. *Results:* Electronmicrographs from the biopsies of animals exposed to chloroform revealed changes consistent with observations under light microscopy. Marked cellular damage was seen, progressing to frank necrosis particularly in the area of the central vein. Halothane and methoxyflurane changes by electronmicroscopy were not associated with any nuclear change. The cytoplasm showed change, both in the organelles and within the ground substance. The change in the endoplasmic reticulum was the most consistent finding as depicted by prominent distension of the cisternae. Some of the ribosomes of the rough endoplasmic reticulum tended to be dislodged. These changes were seen as hydropic degeneration by light microscopy. The mitochondria showed only minimal swelling, occasional disruption, but were all within a reversible range. An associated ground substance change, indicative of a degeneration, was the finding of occasional fatty droplets. An interesting observation was the ability of the cell to replete, within a short period of time, the cytoplasmic glycogen following exposure to the anesthetic agent. (Supported by Institutional Research Grant 65-3, The University of Texas Southwestern Medical School, Dallas, Texas.)

Corticosteroids for Prophylaxis of Post-intubation Inflammation: A Double-Blind Study. JAMES E. GODDARD, JR., M.D., OTTO C. PHILLIPS, M.D., and JOSEPH H. MARCY, M.D., *Department of Anesthesiology, University of Pittsburgh School of Medicine, the Magee-Womens Hospital, and the Children's Hospital of Pittsburgh, Pittsburgh, Pennsylvania.* Many reports have appeared in the recent literature concerning the use of steroids to reduce the inflammatory response in tissues. Recently the use of steroids has been advocated to reduce inflammation in the trachea due to endotracheal intubation. This current project was undertaken to confirm or refute a clinical impression that a single intravenous dose of corticosteroid would reduce the morbidity of endotracheal intubation for anesthesia. A double-blind study was performed to observe the influence of the synthetic anti-inflammatory corticosteroid, betamethasone (Celestone), on post-intubation pharyngeal and laryngeal irritation. *Method:* All intubated patients were included in the study except those who underwent pharyngeal, laryngeal or tracheal surgery. Also excluded were patients taking corticosteroids at the time of the operation. As soon as possible after the establishment of the endotracheal airway, each patient received intravenously from a coded vial either betamethasone or placebo, administered on the basis of 1 mg. per 10 pounds of body weight, with a 10 mg. maximum dose. Each patient was evaluated by a member of the anesthesia department: (1) within three hours of completion of the operation, (2) after 24 hours, and (3) every 24 hours as long as complicating symptoms persisted. The adult patients were asked specifically whether or not they had any soreness or irritation in their throats. *Collection of Data:* The patient was evaluated postoperatively with regard to the following *objective findings* rated as to increasing degree of severity: (1) none, (2) brassy cough or ab-

normal voice, but no signs of obstruction, (3) moderate retraction on effort, none at rest, (4) inspiratory stridor, severe sternal retraction, presumptive indication for tracheostomy, and (5) total airway obstruction. *Results:* Fifteen of 256 patients (5.5 per cent) who received placebo, and 11 of 268 patients (3.9 per cent) who received betamethasone had postoperative objective findings such as brassy cough or hoarseness. By far, most of the objective findings among patients receiving either placebo or betamethasone fell into the 0–9 year old age group, and most of the subjective complaints of soreness occurred among the adults. Thus 9.2 per cent of the children up to 10 years who received placebo, and 7.3 per cent of those receiving betamethasone had objective findings. Only one of 71 patients under one year of age fell into the 0–9 year old grouping (a patient with moderate postoperative retraction on effort who had received betamethasone). Among pediatric patients in general, most of the morbidity fell into the 1 and 2 year old, and 5 and 6 year old groups. Nineteen of 252 patients (7.0 per cent) who received placebo, and 20 of 259 patients (7.2 per cent) who received betamethasone complained of postintubation irritation or soreness. When patients 10 years old and over were evaluated, 19 of 132 patients (12.6 per cent) who received placebo, and 18 of 137 patients (11.6 per cent) who received betamethasone had subjective complaints. Application of the chi-square test to the foregoing data indicated that the differences between placebo and betamethasone were insignificant. *Conclusion:* From the results of our study to date, betamethasone does not significantly reduce postintubation morbidity from either the objective or the subjective standpoint.

Pulmonary Mechanics and Blood Gas Tensions During Anesthesia in Asthmatics. MARTIN I. GOLD, M.D., YONG H. HAN, M.D., and MARTIN HELRICH, M.D., *Department of Anesthesiology, University of Maryland Hospital, and School of Medicine, Baltimore.* Ten asthmatics and 12 normal patients who acted as controls were studied. The asthmatics were on maintenance therapy and 5 of the 10 were in a clinical attack, the pulmonary resistance being significantly elevated. Three were in acute status asthmaticus. All were given barbiturate-anticholinergic premedication. After insertion of an esophageal balloon and an intra-arterial needle, pulmonary compliance (C_L) and resistance (R_L) and blood gas tensions were measured, first with air and then with 50 per cent O_2 in N_2 as the inhalant. Instrumentation consisted of an esophageal balloon, transducers, pneumotachograph, an electronic recorder, a unit with O_2 and CO_2 electrodes, and a flame ionization gas chromatograph. After control measurements in the supine position, anesthesia was induced with 50 per cent O_2 in N_2O and halothane. All patients were intubated and placed on a mechanical ventilator. Arterial halothane levels were measured during maintainence. *Results:* EFFECT OF TRACHEAL INTUBATION: The three groups of patients studied were: (1) 5 during an asthmatic attack; (2) 5 asthmatics in remission; and (3) 12 nonasthmatics. All had blood halothane levels ranging from 5–10 mg. per 100 ml. during spontaneous breathing and 10–15 mg. per 100 ml. during intermittent positive-pressure breathing (IPPB). All patients were studied under three conditions: (1) awake control; (2) anesthetized, with mask; and (3) anesthetized after tracheal intubation (prior to IPPB). After tracheal intubation R_L increased and C_L decreased significantly in active asthmatics (group 1). These included 2 active asthmatics who developed bronchospasm, R_L's being at the 35 cm. of water/liter/second level. For all groups blood gases changed in a similar manner. EFFECT OF INTERMITTENT POSITIVE-PRESSURE BREATHING (IPPB): All patients were given succinylcholine, made apneic, and placed on a ventilator. The period of IPPB varied from 15–30 minutes. After IPPB, C_L changed little. The elevated R_L in group 1 decreased during spontaneous breathing. Blood halothane levels before and after IPPB in the three groups were similar. Once again, group 2 (asthmatics in remission) and group 3 (not asthmatics) reacted similarly to the IPPB. After IPPB arterial P_{O_2} was less than before IPPB, but never lower than 100 mm. of mercury. The P_{CO_2} in all groups was high (average 50 mm. of mercury), probably because of decreased alveolar ventilation ($\dot{V}_A$) during spontaneous breathing. In group 1 during IPPB with a 10 liters/minute $\dot{V}_A$, arterial P_{CO_2}