

cedures. The amount of thiopental required when nitrous oxide insufflation was employed was markedly diminished by this technic. It has been employed during long surgical procedures on other parts of the body during which the prolonged use of a face piece raises the possibility of mask burns. It may also be useful in the edentulous patient in whom a tight fit with a mask may be difficult.

Epistaxis may develop but has not been observed frequently in a small series when a vasoconstrictor or cocaine was applied

topically. Also, absolute control over the airway is obviously not achieved and the method has the limitations associated with this deficiency.

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To the Editor:

Every surgeon and physician takes particular care to be sure that inhalation anesthetic agents are harmless but effective. A description follows of the test which I employ to prove the harmlessness and effectiveness of trichlorethylene.

To ascertain the harmlessness of the preparation, its toxicity when it was used during inhalation was determined. The method differs from methods reported in the literature. From a tube with a diameter of exactly 1 mm. one drop was taken and weighed carefully. The average of many tests was found to be 14.7 mg. Thereafter, toxicity was proved on male white mice, each one weighing exactly 20 gm. The mice were placed in rows, 6 mice in each. Each mouse was kept in a glass roller, the contents of which was 2225 cc. The mice were placed on a wire netting 4 cm. high. On the bottom of the vessel there was a disk of filter paper. The upper edge of the roller was sharp. The edge was smeared with vaseline and was covered with a watch glass, or a glass disk, so that it was airtight. Before the vessel was closed an adequate amount of trichlorethylene was placed on the bottom of the container. The dosage was arranged in arithmetical row from 3 to 12 drops in one row. The drops were inserted by means of a long pipe, the mouth of which was 1 mm. in diameter. After the preparation was placed in the vessel the glass disks covering the upper edge of the vessel were applied tightly and

the mice were exposed for sixty minutes to the vapors of trichlorethylene, under constant observation. Exactly sixty minutes later, the glass disks covering the mouth of the vessel were removed and the number of dead mice in each row was ascertained. From these results, that is from the number of dead and surviving mice in successive rows, the toxicity was determined by means of the original Kärber formula. The medium digression was fixed by usual method: $LD_{50} = 5.4216 \pm 0.341$ mg./gm./2225 cc. or 2.4353 ± 0.1523 mg./gm./1000 cc. This quantity equals 7 drops of the liquid. The dead mice were cyanosed; the surviving mice showed a pink color of mucous membranes, the skin of legs and ears. The recovery period varied according to individual receptivity, from twenty to ninety minutes. When the dead mice were dissected the lungs and all parenchymatous organs were found to contain considerable blood.

The above-mentioned figure of the toxicity of trichlorethylene represents the average of numerous experiments.

The medium lethal dose, 7 drops, was used for the general test. The procedure employed was as follows: 5 male white mice, each weighing 20 gm., were placed, unfed, in the rollers described previously, one mouse in each roller. Seven drops of trichlorethylene were placed on the filter on the bottom of the vessel. The bottles were made airtight immediately and the animals were observed for one hour. Exactly sixty minutes later the experiment was interrupted and the number of dead mice as-

certained. If 2 or less mice were dead, the preparation was considered safe for use as an inhalation anesthetic. If more than 2 mice were dead, it was considered dangerous.

The effectiveness of the drug was tested as follows: a male white rabbit (albino) weighing 2500 to 3000 gm. was fastened, fully conscious, to an operating table. Absorbent cotton, folded eight times, was placed over its muzzle, and fixed to the head by a fixing-ring. The front legs were fastened to the operating table with tape; the hind legs were left free. Two drops of trichlorethylene were placed on the cotton close to the nasal openings of the rabbit. The drug was dropped from a tube similar to that used for determining the toxicity of the preparation. In a few seconds a state of excitement was noted. This state of excitement was manifested by restlessness; the rabbit tried to escape from the fastening cord and, in attempting to do so, placed its legs under its body. Soon relaxation took place and the rabbit began to breathe slowly and deeply. If breathing became too slow, the abdomen of the rabbit was massaged gently and breathing soon became visible. Loss of consciousness was de-

termined by pressing the claws of the animal on the front or the hind legs. The narcotic state usually lasted two minutes and then the rabbit recovered.

In the same way the effectiveness of ethylchloride may be proved. A dose of 10 drops was placed on the mask and the narcotic state lasted an average of two minutes. Relaxation is greater than when trichlorethylene is used.

By means of this test it was possible to determine that only a very few drops of trichlorethylene are necessary to bring about a narcotic state which can be lengthened when necessary. The effectiveness of the preparation has been demonstrated. More than 1000 animals were used for each test and the results of the tests were certified.

Trichlorethylene is an effective inhalation anesthetic agent, suitable for small domestic animals. The toxicity of the preparation can be easily regulated. Tests of toleration and effectiveness of the preparation have been described.

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