

Marine and his associates² that the goitre producing power of cabbage was due to its cyanogen content. Further experiments are in progress.

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Effect on Kidney Function of Ether, Ethylene, Ethylene and Amytal, and Ethylene and Avertin.

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Although the suppression of kidney function by anesthetics has been studied under various conditions there is yet considerable speculation involved in their selection when considered on this basis. Marx¹ has shown, in dogs, that higher dosages of amytal exert a strong anti-diuretic effect and cause retention of substances ordinarily excreted through the kidneys. The clinical observations of Emge and Hoffmann² indicate a suppression of diuresis for the 2 post-operative days following amytal. Bruger, Bourne and Dreyer³ consider that kidney function is more depressed with avertin than with amytal. Kugel⁴ and Bonsmann⁵ have reported marked variations in the anti-diuretic effect of various hypnotics.

The work reported here is an attempt to compare the anti-diuretic influence of some common anesthetics under conditions which may have a bearing on their clinical usefulness. Normal dogs were maintained for several days on a regulated intake of food and water while the total 24 hour excretion of urine, urea, chloride and phosphate was ascertained. The excretion of phenolsulphonephthalein (1 cc. of 0.6% solution intramuscularly) and water (20 cc. per kg. by stomach tube) was determined each morning over a 2 hour period. The volumes of urine secreted in the afternoon and night were also noted. (For convenience in catheterizing, female dogs were used after making a posterior vaginal slit.) Approximately constant amounts of food and water, given in the late afternoon

² Marine, D., Baumann, E., Spence, A., and Cipra, A., *Proc. Soc. Exp. Biol. and Med.*, 1932, **29**, 772.

¹ Marx, J. *Pharm. Exp. Therap.*, 1931, **41**, 483.

² Emge and Hoffman, *Am. J. Surg.*, 1930, **9**, 16.

³ Bruger, Bourne and Dreyer, *Am. J. Surg.*, 1930, **9**, 82.

⁴ Kugel, *Arch. Exp. Path. Pharm.*, 1922, **142**, 166.

⁵ Bonsmann, *Arch. Exp. Path. Pharm.*, 1930, **156**, 160.

were so adjusted that the dogs consumed the full diet almost immediately. At about the middle of each period of days, anesthesia was instituted for one hour immediately following the morning administration of water and phenolsulphonephthalein. Satisfactory surgical anesthesia, with abolition of leg and abdominal muscle tone, was obtained with sodium isoamyl-ethyl barbiturate (32 to 40 mg. per kg. intraperitoneally) and tribromomethyl alcohol (400-500 mg. per kg. rectally) when supplemented by ethylene-oxygene mixtures of 90-10 ratio or of less ethylene concentration. Ether was administered by cone and a comparable depth of anesthesia was maintained. Ethylene-oxygene mixtures alone, serving as something of a control both for excitement and ethylene effects, were administered for an hour in one series and, with the ratio used (85-15), no anesthesia was obtained. In all experiments on which conclusions are based the animals were sufficiently recovered by late afternoon to consume their regular diet of food and water.

The results of 3 to 6 experiments with each anesthetic combination indicated clearly that the 24-hour output of urine was not substantially diminished by such anesthetics, either on the day of administration or the few days immediately following. The average decrease noted (10 to 15% on the day of anesthesia) was not considered a significant diminution in that the normal fluctuations were of the same order. Likewise, the 24 hour secretion of urea and of chloride was not significantly affected. In some cases, the 24 hour phosphate output was definitely augmented by the administration of ether, as has been reported by Stehle and Bourne,⁶ but no definite effect on phosphate excretion was noted with the other anesthetics. The 2 hour water diuresis response was almost totally inhibited by each type of anesthesia and, correspondingly, the urine output was considerably increased in the afternoon period immediately following. This recovery of diuretic function was not as prompt with amytal as with the other anesthetics used. The average of the 2 hour phenolsulphonephthalein excretions was depressed by anesthesia (to about 40% of the total dye injected) but on the subsequent day was manifested to the normal degree (about 70%), no marked variations being noted among the different anesthetics.

⁶ Stehle and Bourne, *J. Biol. Chem.*, 1924, **60**, 17.