

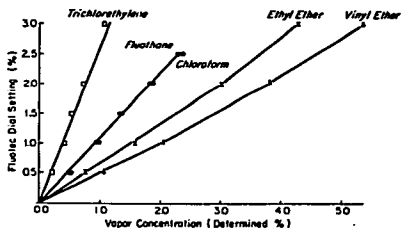
Fluotec Performance

Drs. H. H. Keasling and C. B. Pittinger of Iowa City, Iowa, report on the relation between Fluotec dial settings and delivered vapor concentrations for various anesthetic agents.

During the course of a laboratory experiment involving the use of a "Fluotec" vaporizer (Mackay, I. M., *Canad. Anaesth. Soc. J.* 4: 235, 1957) it became of interest to know the actual output of vapor in relation to the indicated dial setting for various volatile anesthetic agents.

The vaporizer was filled with the appropriate liquid * and weighed on an analytical balance (capacity 3 kgm., sensitivity 1 mg.). Then oxygen, delivered from a Foregger double kettle anesthetic apparatus, at an indicated flow rate of 8 liters/minute was passed through the Fluotec vaporizer and the outflow measured by means of a wet gas meter. The oxygen flow was discontinued when a total of 80 liters of oxygen and vapor were registered on the wet gas meter. The time required for the procedure was consistent with the indicated flow rate of oxygen. The vaporizer was reweighed and the

RELATION BETWEEN FLUOTEC DIAL SETTINGS AND DELIVERED VAPOR CONCENTRATIONS FOR VARIOUS ANESTHETIC AGENTS



loss in weight calculated. The vapor concentration, at the indicated dial setting, was calculated by adjusting the volume of the molar fraction of anesthetic agent at S.T.P. to the existing temperature and pressure. The calculated volume of vapor divided by 80 liters times 100 gave the per cent vapor concentration.

The relation between the Fluotec dial settings and delivered vapor concentrations is shown in the graph. Repeat determination with Fluothane indicated that the values agreed to within ± 2 per cent. The linearity of the curves for trichlorethylene, chloroform and Fluothane suggests that the Fluotec vaporizer provides good temperature compensation for these agents. The deviations from linearity of the curves for ethyl and vinyl ethers (at the higher vapor concentrations) suggest inadequate temperature compensation for these agents. (This study was supported in part by USPHS Grant B-1079.)

CASE REPORT

Spinal Analgesia

Dr. Thomas Davis of Iowa City describes 4 patients in which spinal analgesia precipitated pain, spasm, or both, in amputation stumps of lower extremities. Although this has been mentioned before (Harrison, G., *Anaesthesia* 6: 115, 1951; Maxson, L. H.,

* U.S.P. grades of the anesthetic agents were utilized. The vapor concentrations were computed as though the liquids were 100 per cent stated agent. The Fluothane was supplied through the courtesy of Dr. John Jewell of Ayerst Laboratories.

Spinal Anesthesia. Philadelphia, J. B. Lippincott Company, 1938, p. 305) the nature of the complication seemed sufficiently infrequent to warrant reporting.

Case 1.—A 75 year old man, had had an above-knee amputation five years previously for arteriosclerosis and gangrene. Since then, he had occasional pain in the stump, but this was not constant or severe. On April 28, 1958, he was given a spinal anesthetic for cystoscopy and urethral dilatation with 100 mg. procaine in 2.5 cc. spinal fluid. Within two to three minutes he developed severe spasmodic pain in the amputation stump and this became so excruciating that 50 mg. meperidine intravenously did not completely relieve the pain. The procedure lasted 30 minutes and analgesia was very adequate for this. The spasms of pain continued for approximately 36 hours. Flaxedil, in 8 mg. doses intravenously, helped lessen the spasms.

Case 2.—A 65 year old man, who had had bilateral above-knee amputations for Burger's disease, was given 100 mg. procaine as a spinal anesthetic for cystoscopy on March 10, 1958. About four minutes later he developed severe muscle spasm in the left stump causing it to stand up perpendicular to the hip, although paralysis was present in the other leg, and at the same time he had spasmodic pain in the end of the left stump. This persisted for 15 minutes until it was relieved with 50 mg. of sodium thiopental and 8 mg. Flaxedil intravenously. The right stump was not affected adversely, and analgesia for the procedure was quite adequate.

Case 3.—An 84 year old man, who three years previously had had an above-knee amputation for arteriosclerosis with vascular insufficiency, was anesthetized on April 25, 1958, for a transurethral resection of the prostate. He was given 150 mg. procaine intrathecally in 2.5 cc. spinal fluid. The level of analgesia was ascertained to be the eighth thoracic segment and was adequate for the procedure. Within three minutes after the drug was injected he developed excruciating pain in the stump end, which was spasmodic in nature, occurring every few minutes and lasting 10-20 seconds. This persisted 12 hours after the anesthetic had worn off.

Case 4.—This man was 72 years old and on October 4, 1957, had a below-knee amputation for arteriosclerosis and gangrene. He developed a wound infection and on November 12 was given a spinal anesthetic, for revision of the stump, of 10 mg. pontocaine in 1.5 cc. spinal fluid and 1.5 cc. of 10 per cent dextrose. About three minutes after the drugs were injected he began to have spasmodic pain in the end of the stump which was progressively more severe until it became excruciating. This persisted throughout the procedure and was not related to stimulation of the stump. As the spinal paralysis wore off in the recovery room, the pain left.

CORRESPONDENCE

Axillary Brachial Plexus Block

To the Editor.—I read with especial interest the report in the March-April 1958 Issue of ANESTHESIOLOGY [page 281] of a new (?) technique for axillary brachial plexus block as performed by Doctor Preston J. Burnham. I have used such a method for the past three years; and as one of the members of the Associated Anesthesiologists of Seattle, who have taught or used this method for several hundred patients, I wish to make the following comments:

(1) Doctor Burnham should be complimented for his accurate observations and study and for promoting a simple, effective technique for brachial plexus block.

(2) Only one landmark is necessary—a readily palpable pulsation of the axillary artery near its highest point in the axilla. Since the nerves supplying the hand, the lower arm, and most of the upper arm form a cuff around the axillary artery at this point, any technique which will deposit anesthetic solution on all sides of the artery will produce complete anesthesia for surgery, including the distal portion of the humerus and the overlying tissues. In other words, this is simply a matter of periarterial infiltration. This has been true of our clinical experience ranging from infants to octogenarians.