suggests that one action of the drug may be a relaxation of the coronary system, though if an increase in coronary flow takes place, we have no indication whether this is in response to some change in the myocardium or is itself the primary effect of the drug. We have observed marked venous pulsation when the outflow is almost completely stopped, but since increasing the venous pressure will compensate for considerable diminution in flow without producing venous pulsation, we do not believe that valvular incompetence plays any part in the diminution in flow except with abnormally large doses, in which case the flow is almost *nil*.

Conclusion. In a heart-lung-preparation amytal increases diastolic volume and decreases useful outflow.

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Changes in Temperature of the Lower Extremities Following the Induction of Spinal Anesthesia.*

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We were interested to determine whether or not spinal anesthesia would cause vasodilatation and increased blood flow in the lower extremities with a resulting rise in temperature, and whether or not such effects of blocking the sympathetic nerves would be of aid in selecting patients for surgery of the sympathetic nervous system.[1]

Temperature readings were taken with the thermo-electric apparatus designed by Bazett and McGlone,[2] which contains loop and needle thermocouples allowing accurate surface and tissue temperature measurements to be made on human subjects. Surface readings were taken from the plantar surfaces of the big and little toes of both feet and from the palmar surfaces of the index, middle and ring finger of one hand. Tissue temperatures were noted by inserting the needle thermocouple from 1 to 2 cm. into the first and fourth metatarsal spaces of both feet. One or more readings were taken before induction of spinal anesthesia and frequent observations were made for 40 or more minutes afterward. Procaine hydrochloride

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[1] This problem arose from certain suggestions of Prof. H. C. Naffziger.

[2] Bazett, H. C., and McGlone, F., *J. Lab. and Clin. Med.*, 1927, xii, 9, 913.

in doses of 120 mgm. was used as the local anesthetic agent. At the same time careful record was kept of the room temperature, mouth temperature, blood pressure, and the extent of the anesthesia. Observations have been made on 6 male patients in whom there were no circulatory disturbances, but 3 of whom had 50 mgm. of ephedrine sulphate subcutaneously 30 minutes to 2 hours before coming to the operating room.

The surface temperature observations may be criticized because of difficulty of controlling extraneous conditions of temperature, hu-

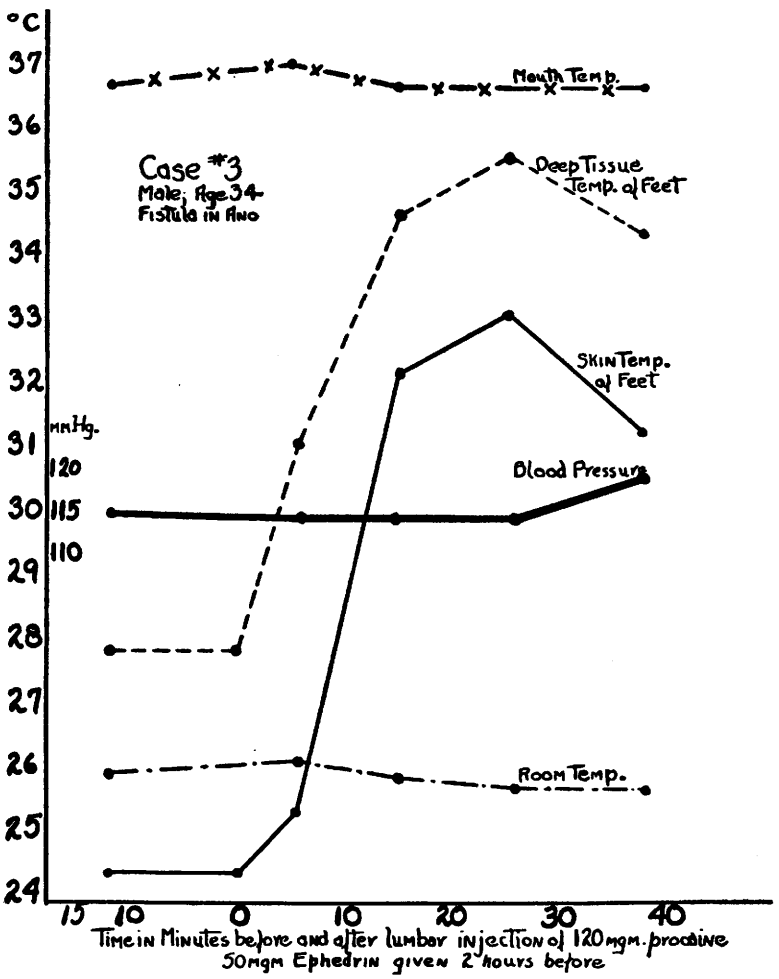

FIG. 1.

Graphic representation showing effects of the intraspinal administration of procaine hydrochloride on skin and tissue temperatures of feet in a patient with no circulatory disturbance.

midity, and air currents in the operating room. Changes in position and covering brought about by moving the patient for the administration of the anesthetic also affect the surface temperature. We believe that the deep tissue temperatures are little altered by these factors.

As may be seen by examination of some of our data, submitted graphically for conservation of space, both skin and deep tissue temperatures of the feet rise rapidly after induction of low lumbar spi-

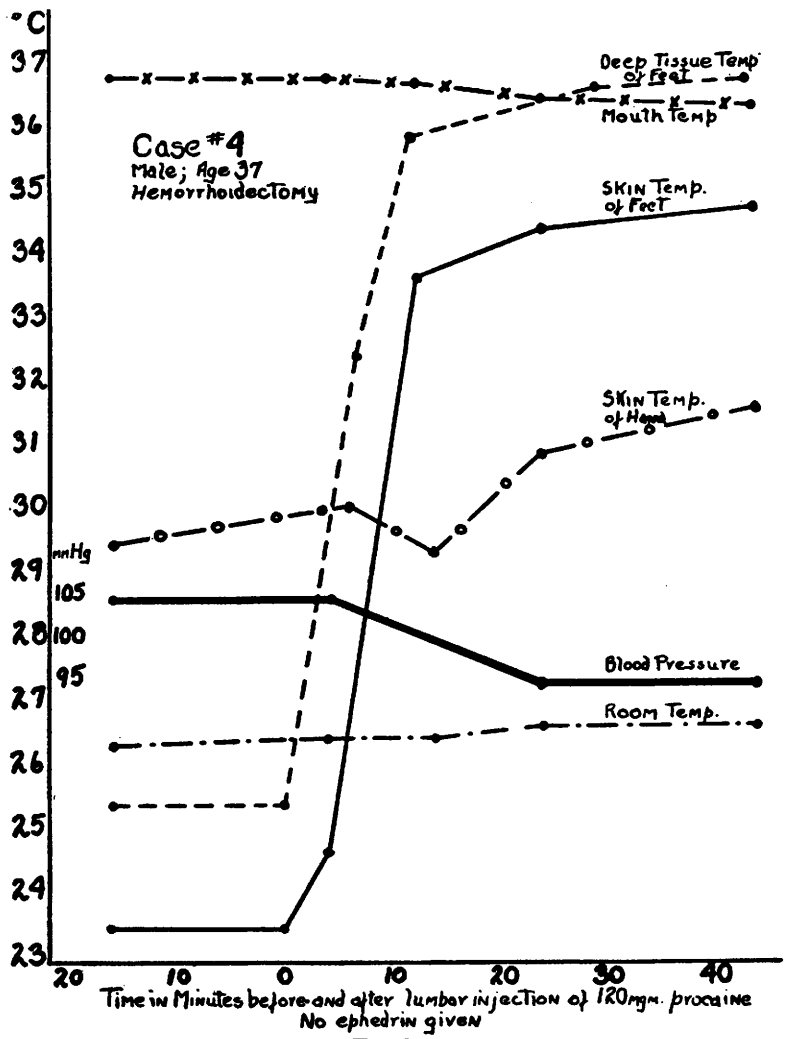

FIG. 2.

Graphic representation of effects of spinal anesthesia on skin and tissue temperatures of feet in comparison with temperature changes elsewhere in a patient with no circulatory disturbance.

nal anesthesia. In patients who are placed on their backs immediately following the administration of the local anesthetic, there is approximately equal anesthesia and an almost equal rise in temperature in both legs, although in one instance there was a difference of 2°C. We noted in 3 cases a drop in the hyperthermia of the extremities occurring with return of sensation.

Summary: Direct observations by accurate technique show that skin and deep tissue temperatures of the feet rise markedly following the induction of spinal anesthesia and begin to fall again as sensation in the feet returns. This may be interpreted as a result of vasodilatation in the feet following chemical blocking in the spinal canal of the significant nerves controlling vascular tone in the lower extremities.