

and the delayed growth of timothy bacilli in serum. (b) There was no evidence of the growth-inhibitory effects hitherto ascribed to hemoglobin or to "autolytic products" of blood. (c) The failure of tubercle bacilli to grow suitably on solid medium inoculated with blood was again confirmed. Positive results cannot be obtained with small numbers of bacilli.

Since these results were confirmed by quantitative studies on human tubercle bacilli in human blood, it seems that the surest way to demonstrate bacilli in human blood is by the incubation of the blood.

Growth of small numbers of bacilli was obtained also in liquid substrates composed of: serum-leucocyte mixtures, blood or serum diluted with water or with Long's medium, in polymorphonuclear leucocytes and saline, and in the washed cellular fraction of blood suspended in saline or dilute Long's medium. The more dilute systems appear equally favorable for growth and offer the advantages of economy of materials and greater ease in seeing the growth.

10325

Intra-Arterial Hypertonic Saline Solution in Experimental Shock.

DOUGLAS B. KENDRICK, JR., AND KHALIL G. WAKIM. (Introduced by Hiram E. Essex.)

From the Institute of Experimental Medicine, The Mayo Foundation, Rochester, Minn.

Davis and his coworkers^{1, 2} have reported prolonged elevation of blood pressure after intra-arterial administration of 5 to 10 cc of 25% solution of sodium chloride. The pressor effect of such injections was thought by these workers to be predominantly nervous in origin, since it disappeared after section of the spinal cord. The possibility of using hypertonic solutions of sodium chloride as an emergency treatment of traumatic shock was suggested. The experiments reported in this paper were done to determine the efficacy of such treatment.

The experiments were carried out on dogs anesthetized by means of nembutal (pentobarbital sodium), given intravenously in doses

¹ Davis, H. A., *M. Ann. District of Columbia*, 1937, **6**, 344.

² Davis, H. A., Jermstad, R. J., and Choisser, R. M., *PROC. SOC. EXP. BIOL. AND MED.*, 1937, **37**, 144.

of 25 mg for each kilo of body weight. Observations were made on normal anesthetized dogs, on anesthetized dogs in a state of shock produced by intestinal manipulation and on dogs whose spinal cords had been sectioned at the level of the seventh cervical vertebra. Observations were also made on dogs following adrenalectomy.

In both normal animals and those in a state of shock, 5 to 10 cc of a 25% solution of sodium chloride injected intra-arterially gave a vasopressor effect. In a few experiments the blood pressure was elevated from 60 or 70 mm of mercury to over 100 mm of mercury. Given intravenously, the same doses of hypertonic saline solution produced vasodepressor responses both in the normal animal and in animals in a state of shock. Whether the injections of hypertonic saline solution were given intra-arterially or intravenously the animals appeared to be harmed by their use.

Following section of the spinal cord, injections of 5 to 10 cc of 25% saline solution given intra-arterially gave a small but transient rise in blood pressure. Intravenous injections gave a slight elevation of blood pressure, which was followed by a transient fall.

In bilaterally adrenalectomized animals that were otherwise intact, the same doses of concentrated saline solution given intra-arterially caused a small transient rise in blood pressure. After shock had been produced in these animals, the same dose of hypertonic saline solution given intra-arterially produced little if any effect on the blood pressure. Intravenous injections into these animals produced a sudden, marked fall in the blood pressure, which soon returned to the former level and then rapidly dropped to a critical level.

In a single trained animal an intra-arterial injection of 25% solution of sodium chloride resulted in such untoward effects that further injections were considered inadvisable. Even under surgical anesthesia intra-arterial administration of a concentrated solution of sodium chloride resulted in marked spasms and contractions of the skeletal muscles and drastic purgative and diuretic effects.

It was found that the blood pressure of animals that had received 5 to 10 cc of 25% solution of sodium chloride was rapidly lowered by subsequent slight intestinal manipulation. Furthermore, the blood pressure of dogs in shock could not be raised by a second injection when the effect of the first injection had been dissipated. It was a consistent finding that the blood pressure of animals in shock gradually declined to critical levels. Death appeared to be hastened rather than delayed by the injections.

Davis and his coworkers attributed the vasopressor effects of intra-arterial injections of 25% solution of sodium chloride to "stimulation of the peripheral nerve endings in the involved area with a

resultant generalized vasoconstriction affected by the central nervous system."

Conclusions. The findings of Davis and coworkers on the effect of administering a concentrated solution of sodium chloride have been corroborated. However, it seems apparent from our observations that the intra-arterial administration of 25% saline solution cannot be recommended as an emergency treatment for secondary shock. In spite of the immediate vasopressor response and in spite of the fact that the increased blood pressure may be maintained for a while, the final result of the injections is severe injury to the recipient.

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Technic for the Study of Secretions from the Oral Mucosa in Humans.

A. L. WINSOR AND B. KORCHIN. (Introduced by J. A. Dye.)

From Cornell University.

To our knowledge the secretion from the oral mucosa of humans has been observed^{1, 2} but has neither been collected nor measured. Shafer³ wrote that, "Secretion of the mucus glands of the mouth have not been obtained in man." However, Montgomery and Stuart⁴ found that secretions from the oral mucus membrane can be directly observed in dogs and humans. They reported that, "Like the salivary glands they do not secrete continuously, but only in response to a large number of unconditioned and conditioned reflex stimuli." But the repeatedly confirmed findings of a continuous parotid gland flow in humans in the absence of marked extero-stimulation and the fact that the oral mucosa and the parotid glands have a similar type of neural innervation suggested the possibility that more accurate measures would be more revealing. We were able to collect and measure both inactivated as well as activated secretion from the oral mucosa of human subjects by means of the following technic:

Small discs similar to those used for the collection of parotid secretion⁵ are fastened by suction over different regions of the oral

¹ Cerutti, P., and Verzola, M., *Gior. ital. di dermate. esif.*, 1935, **76**, 1269.

² Montgomery, M. F., *PROC. SOC. EXP. BIOL. AND MED.*, 1934, **31**, 717.

³ Shafer, E. A., *Textbook of Physiology*, 1898, Vol. 1, p. 344.

⁴ Montgomery, M. F., and Stuart, J. S., *Am. J. Physiol.*, 1936, **115**, 497.

⁵ Lashley, K. S., *J. Exp. Psychol.*, 1916, **1**, 461.