

Within groups the individual prostate and seminal vesicle weights varied considerably. Since the animals used in this procedure also varied in age (32 to 38 days) and in weight (65 to 85 g) it seems probable that some of the intragroup variation in weight of the accessories may be due to these factors. In spite of the intragroup variation, however, the mean seminal vesicle weights in the treated groups showed a fairly consistent direct relationship to the logarithm of the dose as is characteristic of biological responses.

It is possible that a procedure similar to this might be useful as an assay method. The matter of greater accuracy (less group variability), the specificity of the response and the possibility of a shorter time period are being investigated.

Summary. Twenty-four hours after the administration of testosterone propionate to the immature male rat there is an increase in the weights of the prostate and seminal vesicle. This weight increment is proportional to the dosage used.

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Infusion of Blood and Other Fluids into the Circulation via the Bone Marrow.

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Substances injected into the bone marrow enter the general circulation apparently unchanged and almost as rapidly as when injected intravenously.¹ In the parenteral administration of fluids to adult men it is sometimes impossible to use the intravenous route. Such is the case in widespread mutilations, burns, oedema, poorly developed, obliterated veins, states of shock. In the newborn and in early infancy the venous system is so poorly developed that the superior longitudinal sinus reached through the anterior fontanelle is often the only available direct path to the circulation. The risk of injecting substances through this route is high. These facts seemed to justify an attempt at a wide clinical application in man of the intramedullary route for parenteral therapy. Trial of this route has been carried out in 14 persons. Ten infusions of citrated blood were given by this method to 7 patients, plasma infusions to 2 patients

¹ Tocantins, L. M., *PROC. SOC. EXP. BIOL. AND MED.*, 1940, **45**, 292.

and infusions of 5% glucose and salt solution to 4 patients. In 17 trials there was one failure (Case 10); little marrow could be aspirated from the sternum and no fluid could be injected by gravity. In 2 children the fluids were introduced into the tibia and femur. In all the other patients the sternum or the clavicle were used. From 100 to 1050 cc have been injected, the infusion needle being left in place for a duration of from 1½ to 16 hours. Some signs of discomfort are evident during the first steps of the procedure (aspiration of marrow and injection of salt solution with a syringe). Throughout the course of the infusion practically no discomfort has been felt. The average rate of infusion varied between 0.4 and 9 cc per minute. Strict asepsis has been observed throughout. Indications that the infused citrated blood had been rapidly absorbed were a substantial increase in the amount of hemoglobin and number of erythrocytes in the blood of the patients 24 hours after the infusion. Readings of the intramedullary pressure as obtained with a water manometer before the start and after completion of the infusion have not differed by a significant margin. The readings varied between 50 and 120 mm of water and often corresponded closely with readings of the pressure in the veins of the forearm. There have been no local or constitutional reactions as evidenced by clinical or X-ray findings following any of the infusions. The 2 children that received the blood infusions were under one year of age and in neither of them were there veins available for transfusions. The method and apparatus used and the results obtained will be described in detail elsewhere.

Within the limitations outlined the intramedullary route for the parenteral administration of blood and other fluids seems to have its indications and has proved to be feasible. Application of the method should be limited to such times as when the intravenous route is not available and only by those familiar with the technic and favorable points of approach. Work now in progress indicates that other bones may have equal or greater advantages over those previously employed.

Summary. The intramedullary route for parenteral therapy has proved practicable in 16 out of 17 trials in 14 patients. Citrated blood, plasma, glucose and salt solutions have been infused without any immediate or delayed local or constitutional reactions.