

## MEASUREMENT OF ARTERIAL PRESSURES IN INTACT RABBITS

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The most popular methods of taking indirect arterial blood pressures in rabbits under conditions of a long-range experiment utilize the central ear artery [3] or else an external skin flap holding the carotid artery [2]. Many fairly successful modifications of these procedures do not remove their serious defects.

In the first place, there is no way of recording the very high sensitivity of the rabbit ear vessel network, as shown by rapid and considerable blood stream fluctuations in response to the most varied exogenic and endogenic factors. Actually, the very act of taking the blood pressure markedly affects the width of the vessel lumina. The use of this method permits only a moderate accuracy in measuring the systolic pressure alone.

In regard to taking carotid arterial pressures, there is the obvious previous surgical interference which is not altogether physiological. It is well known that interference with carotid flow and mechanical irritation of the arterial stem leads to general reflex alterations in the circulation. The disadvantages of these methods become still more evident when repeated readings are taken over a short time interval, especially in animals already having a disturbance of the regulation of the cardiovascular system.

Having measured blood pressures in intact dogs by the Korotkov method, and being convinced of its simplicity and reliability, we applied this method in rabbits. In spite of the almost universal application of the Korotkov method in medicine, it is used relatively little in the physiological practice of taking pressures in animals. This is in spite of the fact that auscultatory methods have the very important advantage of determining both the systolic and diastolic pressures quickly and accurately.

In view of the lability of rabbit blood pressure, one should avoid fixation methods exciting the creature. Thus, for example, a rabbit tied in the usual manner to a table has a much higher pressure than does a relatively free animal. At the same time it is obviously necessary that the rabbit be more or less immobilized so that its movements would not affect the readings. For fixing the rabbit in one position, the stand described by A. M. Ivanitsky [1] has been found most useful. We altered its construction only slightly, cutting right angled openings  $10 \times 10$  cm in the anterior part of the side walls; these openings could be closed by means of little wooden doors. These cut-outs are needed to permit free access to the fore limbs of the animal.

To take blood pressure in adult rabbits, we made a cuff measuring  $2.7 \times 10$  cm, which is attached to the shoulder by means of metallic clips. The cuff fits snugly to the shoulder, but does not compress it. When the cuff is applied too loosely, the pressure readings usually rise; while a too-tightly-applied cuff soon leads to the appearance of stasis phenomena. A T-tube was used to connect the cuff with a glass jar holding 500 cc thus markedly increasing the volume of the system, and allowing gradual and smooth alterations in the pressure within the cuff.

The Korotkov sounds in a rabbit are clear and distinct, even if much feebler than in dogs. In rabbits, the phases of the sounds cannot be distinguished as they can in man and dog. With just a little practice, the tones

can be readily heard in the radial artery as it passes over the medial aspect of the elbow. The moment of appearance and disappearance of the sounds is best determined during gradual deflation of the cuff; usually, there is no difficulty in hearing them.

The blood pressure of adult rabbits, as measured by this method, varies within 95-120 mm Hg pressure for the diastolic reading and 110-140 mm Hg for the systolic pressure reading.

Occasionally, some rabbits exhibited asymmetrical blood pressure readings.

In comparison with dogs, the rabbit blood pressure readings exhibited much greater lability. In our opinion, this is associated not only with species differences due to rabbits having such sudden and energetic movements accompanied by corresponding rapid hemodynamic alterations, but also is associated with a less developed, less "economical" mechanism in regulating blood pressures in animals lower on the scale of mammalian evolution.

### SUMMARY

Measurement of arterial blood pressure in intact rabbits is described by Korotkov's method. Animals were fixed to a special stand during investigation. A pneumatic cuff, measuring  $2.7 \times 10$  cm, was applied to the shoulder. Korotkov's sounds were auscultated with a phonendoscope on the radial artery from the medial surface of the elbow joint. Systolic pressure in adult rabbits ranged from 110 to 140 mm Hg, while the diastolic was from 95 to 120 mm Hg.

### LITERATURE CITED

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\* In Russian.