67 (210)

The effect of nephrectomy upon the toxicity of magnesium sulphate when given by mouth. — A demonstration.

By **S. J. MELTZER.**

[*From the Rockefeller Institute for Medical Research.*]

Three rabbits were shown, one normal and two nephrectomized. The nephrectomy was performed nine hours before the demonstration. One nephrectomized animal received by mouth, soon after the nephrectomy, magnesium sulphate (6 grams per kilo in a 25 per cent. solution). The normal animal received by mouth 7 grams per kilo of the same salt. The other nephrectomized rabbit received no magnesium sulphate. At the time of the demonstration the nephrectomized rabbit which had received the salts was under profound anesthesia with complete muscular relaxation, while the other two animals were in an apparently normal state. This shows that in *nephrectomized rabbits magnesium salts produce a profound general effect even when given by mouth, and that the absence of such an effect in the usual administration of the salts is due to the comparatively prompt elimination through the kidneys of a large part of the absorbed salts, thus preventing at any given time the accumulation within the organism of a quantity equal to a toxic dose.*

68 (211)

Observations on a rabbit for thirty months after the removal of the superior cervical ganglion.

By **S. J. MELTZER.**

[*From the Rockefeller Institute for Medical Research.*]

Langendorff[1] reported that in one experiment on a cat one hundred and five days after the removal of the superior cervical ganglion, the paralytic symptoms of the eye disappeared, and stimulation of the cervical sympathetic nerve caused the typical effects. Microscopically no nerve cells could be detected, and Langendorff assumed that there was a union between the preganglionic and postganglionic nerve fibers. Langley,[2] on the other

[1] Langendorff: *Centralblatt für Physiologie*, xv, 483, 1901. The number of days is quoted here from Langley and Anderson; it is not mentioned in the *Centralblatt.*

[2] Langley: *Journal of Physiology*, xxv, 417, 1900.

hand, reported, about one year before Langendorff, an experiment on a cat in which twenty-three months after the removal of the superior cervical ganglion stimulation of the cervical sympathetic did not produce the usual effects, and on microscopical examination some postganglionic nerve fibers were found to have been regenerated; but there were neither nerve cells nor any union between the postganglionic and preganglionic nerve fibers. Later Langley and Anderson [1] repeated the experiment on eight cats. In six of the animals, which lived between one hundred and eighty-three and four hundred and seventy-six days, the paralytic symptoms remained permanent, and stimulation of the cervical sympathetic caused no effect. In two of the cases there was some decrease in the paralytic symptoms, and stimulation of the cervical sympathetic caused some effect, but microscopical examination showed that in both cases not all of the nerve cells had been removed.

All the above experiments were made on cats, which have a large ganglion. The gap between the postganglionic and preganglionic nerve fibers in the cat is nearly one centimeter. In the rabbit the ganglion is barely three millimeters long, and there might perhaps be a better chance for a final union of the nerve fibers of the two poles of the ganglion. I am going to report here briefly some observations made on a rabbit which lived over thirty months after the removal of the superior cervical ganglion.

Full grown, grey, male rabbit. Left superior cervical ganglion removed October 14, 1904. Animal died April 23, 1907.

Soon after the removal of the ganglion the left pupil became quite small; a few days later it became somewhat wider again, and some weeks later it became constricted to about the original size after the operation and retained this size permanently until death. The blood vessels of the left ear, which became wider after the removal of the ganglion, gradually assumed the size of the vessels of the other ear and remained in that state permanently. *During the last eighteen months the blood vessels of both ears were never very wide and showed but little of the usual rhythmical changes.*

We [2] have shown that after removal of the ganglion, a sub-

[1] Langley and Anderson: *Journal of Physiology*, xxxi, 383, 1904.

[2] S. J. Meltzer and Clara Meltzer Auer: *American Journal of Physiology*, xi, 28, 1904.

cutaneous injection or an instillation of adrenalin into the conunctival sacs of the rabbit causes a dilatation of the pupil on the side from which the ganglion was removed. This *biological test for the absence of the ganglion* was frequently made within the two and a half years of the animal's life and it was found that a *subcutaneous or intramuscular injection or an instillation of adrenalin invariably caused a long lasting dilatation of the left pupil.* This test seemed to prove satisfactorily that the ganglion was not regenerated, or at least the postganglionic and preganglionic nerve fibres did not grow together. To obtain further proof, twenty-eight months after the removal of the ganglion the cervical sympathetic nerves of both sides were exposed and stimulated with induction currents. While stimulation of the right sympathetic easily caused the usual effects upon the ear vessels and pupil of the corresponding side, *stimulation of the left cervical sympathetic caused no changes whatsoever in the left pupil or in the vessels of the left ear.*[1]

During the last twelve months there were, however, a few changes which deserve to be mentioned. In the first place the dilatation of the left pupil never attained the same degree as during the first period. Further an intramuscular injection of adrenalin, which in the early period brought out the dilatation of the pupil within two or three minutes,[2] now developed its effect very slowly. Finally the constricting effect of eserin was only partly overcome by an injection or instillation of adrenalin, whereas in the early period the effect of eserin was completely overcome by adrenalin. Apparently the relations of adrenalin to the dilator pupillæ had somehow undergone some changes. Local stimulation of the iris was not tested.

I shall record the following observations without offering for the present any interpretation of them. Within the last ten months the *right pupil was permanently distinctly larger than normal and responded sluggishly to light. An injection of adrenalin brought out a distinct constriction* which lasted about fifteen minutes. After the above mentioned stimulation of the cervical sympathetics, *the permanent dilation of the right pupil disappeared for about five*

[1] This experiment was carried out in the presence of Drs. Flexner, Opie and Carrel.

[2] S. J. Meltzer and John Auer: *Journal of Experimental Medicine*, vii, 59, 1905.

weeks and an injection of adrenalin had no effect upon the pupil. For the last three weeks the dilation of the right pupil had again returned.

On account of the very moderate effect which the intramuscular injection of adrenalin had caused in the left pupil in the last few days, an intravenous injection of adrenalin was tried on this animal for the first time. Not more than 0.3 c.c. of adrenalin (1 : 1000) were given through the ear vein. The right pupil remained unchanged, fairly dilated. *The left pupil became gradually dilated* so that after an hour the dilation was at the maximum. Half an hour later the animal fell over on its side, blood and foam escaping through the mouth and nose. The rabbit died of acute pulmonary edema.

At the autopsy, no sign of a ganglion could be discovered macroscopically on the left side; in the neighborhood of the seat of the ganglion the sympathetic nerve was lost in strands of connective tissue. (The abdominal aorta showed a few sclerotic patches.)

69 (212)

Intra-abdominal pressures.

By **HAVEN EMERSON.**

[*From the Department of Physiology of Columbia University, at the College of Physicians and Surgeons.*]

Definition:

1. Pressures upon solid viscera.
2. Pressures within hollow viscera.
3. Pressures within blood and lymph vessels.
4. Pressures within the free peritoneal cavity.

Pressures upon solid viscera cannot be other than those present in the free peritoneal cavity.

Pressures within hollow viscera have been fairly established.

Pressures within blood and lymph spaces have been accurately determined.

Pressure within the free peritoneal cavity has been a subject of disagreement since 1865 when Braune declared it was negative.

To determine the normal pressure and its variations within the peritoneal cavity a perforated trocar was used to pierce the abdom-