METHODS

Experimental Model of Syringomyelia in Rabbits

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We studied the possibility of reproducing syringomyelia in rabbits by injection of serum from patients with syringomyelia. Clinical signs of syringomyelia and morphological changes in the central nervous system (cavities, dilatation of the cerebrospinal channel, neurodegeneration, gliosis) developed in laboratory animals over 60-120 days. This laboratory model is easily reproducible, stable, and maximally similar to the natural disease, which suggests it for the studies of the pathogenesis and development of new therapeutic methods.

Key Words: *syringomyelia; experimental model; rabbits*

Syringomyelia is a chronic neurodegenerative disease characterized by the development of gliosis in the central nervous system and formation of cavities in the spinal cord. The etiology and pathogenesis of this disease remain little studied. The majority of authors investigating syringomyelia explain the mechanism of cavity formation predominantly from the hydrodynamic viewpoint [2-4]. The known therapeutic methods are little effective; the use of laboratory models is limited [1,5]. An experimental model of syringomyelia in laboratory animals maximally approximated by its characteristics to the actual disease, will appreciably stimulate the study of the pathogenesis and development of effective therapeutic methods.

Experimental model proposed in our paper is based on the syringomyelia concept as a whole-body disease with predominant involvement of the central nervous system. The possibility of syringomyelia reproduction in laboratory animals by our method indirectly confirms correctness of this viewpoint.

MATERIALS AND METHODS

Syringomyelia was induced by injection of serum from patients with this disease to 42 Chinchilla rabbits (2-2.5 kg). Animals from the reference group (n=20) were injected with donor sera.

The serum was adsorbed on potassium alum (25 ml serum/80 ml distilled water/90 ml 10% potassium alum at pH 6.5). The precipitate was washed twice in isotonic NaCl with methiolate (1:10,000), after which the suspension volume was brought to 100 ml (10 ml suspension were equivalent to 2.5 ml serum). The serum was injected in the immunization mode into each hind paw: 4 ml suspension into each paw (injection 1), 5 ml into each after 1 week, and 1 ml into each paw after 1 week more. Sixty days after the last dose half of experimental animals were sacrificed by rapid bleeding from both carotid arteries, the remaining animals were sacrificed after 120 days. Fragments of tissues from the cervical portion of the spinal cord and various sites of the brain, liver, and spleen were used for morphological studies. The preparations were stained with hematoxylin and eosin.

RESULTS

Twelve rabbits from the main group developed trophic changes on the fore limbs (loss of hair), 5 rabbits developed pareses, which corresponded to the clinical picture of syringomyelia in humans. No symptoms of this kind were observed in the con-

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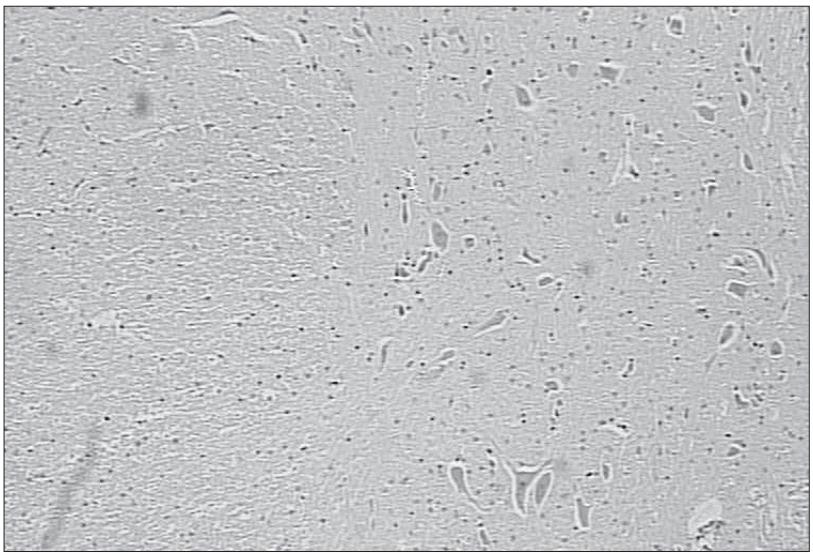

Fig. 1. Morphological changes in rabbit spinal cord after injection of serum from syringomyelia patients: neuron degeneration, gliosis. Here and in Figs. 2, 3: hematoxylin and eosin staining (×450).

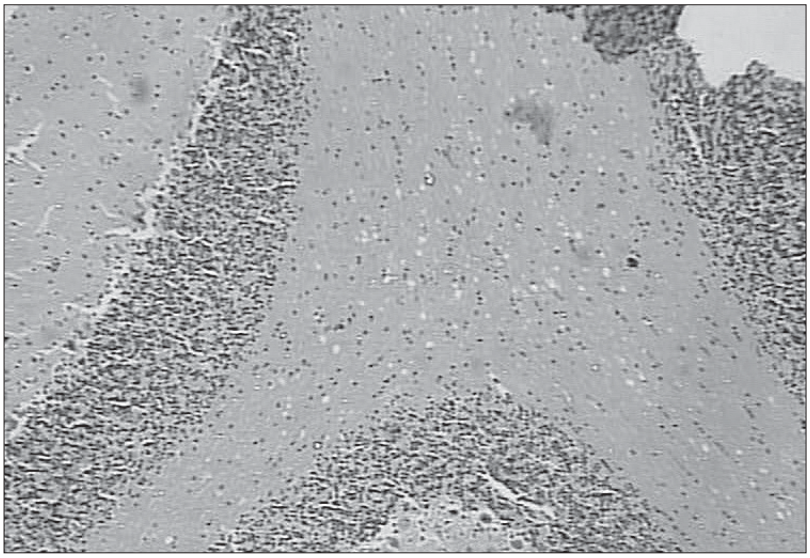

Fig. 2. Morphological changes in rabbit brain (cerebellum) after injection of serum from syringomyelia patients: microcavities.

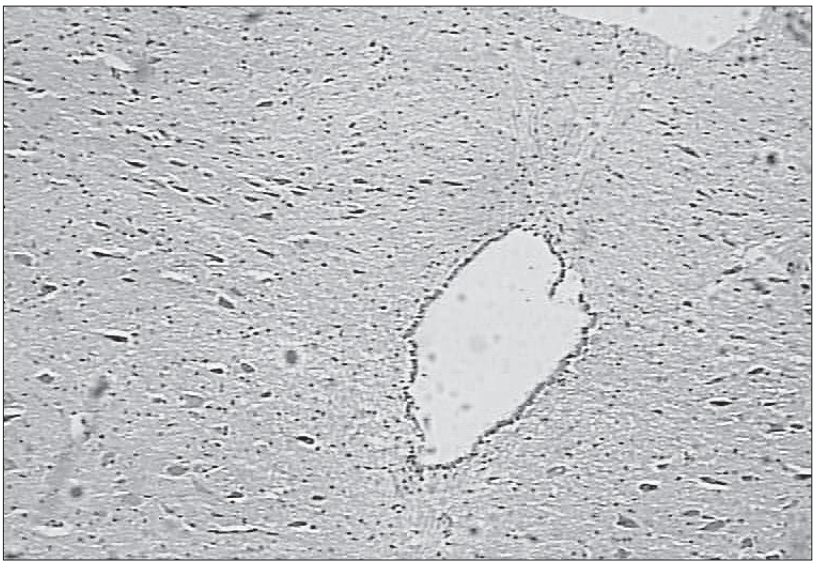

Fig. 3. Morphological changes in rabbit spinal cord after injection of serum from syringomyelia patients: dilatation and deformation of the cerebrospinal channel, neurodegeneration and gliosis.

trols. Morphological changes in the brain and spinal cord, neurodegeneration, gliosis (Fig. 1), microcavities (Fig. 2), dilatation of the cerebrospinal channel (Fig. 3) were detected in experimental rabbits. No pronounced changes of this kind were detected in control animals.

Hence, the serum from syringomyelia patients had a negative impact on the nervous system of laboratory animals. The pathological changes developing in rabbits corresponded to those in patients with syringomyelia, which confirmed reproduction of this disease in an experimental model. The proposed laboratory model is technologically easy to reproduce and by its characteristics is maximally close to syringomyelia under natural conditions, which suggests it for studies of the pathogenesis of this disease and development of new therapeutic methods.

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