Correction of Morphological Shifts in Experimental Syringomyelia

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The possibility of correcting morphological shifts in experimental syringomyelia with pyrimidine derivative hydroxymethyluracil (antioxidant with a wide spectrum of biological activities) was studied. Hydroxymethyluracil in a dose of 50 mg/kg prevented the development of morphological shifts characteristic of syringomyelia in the CNS of laboratory animals. Hydroxymethyluracil prevented the development of neurological symptoms and trophic disorders of the skin in rabbits with syringomyelia.

Key Words: *syringomyelia; hydroxymethyluracil; experimental model; rabbits*

Syringomyelia (SM) is a chronic progressive nervous disease associated with early disability and significant shortening of the life span [3]. Methods of its treatment are ineffective [5]. Therefore, they search for new methods for SM treatment is an important problem.

We studied the effect of pyrimidine derivative hydroxymethyluracil (HMU) on morphological shifts in the CNS of rabbits with experimental SM.

The choice of HMU as a potential neuroprotector in this disease is explained by variegated effects of pyrimidine bases [1]. For example, pronounced antioxidant, regeneratory, and antitoxic effects of HMU were described [2]. The use of antioxidants and nucleotide derivatives as neuroprotectors in neurological diseases showed their efficiency [4,6,7].

MATERIALS AND METHODS

Experimental SM was induced in Chinchilla rabbits (n=42; 2.0-2.5 kg) by injection of serum from SM patients.

Rabbits of experimental group (n=21) received HMU suspension (50 mg/kg, *per os*) in 2% starch gel daily for 60 days. Controls (n=21) were injected with normal human serum. The serum was adsorbed on alum (25 ml serum per 80 ml distilled water and 90 ml 10% alum, pH 6.5). The precipitate was washed twice in isotonic NaCl with merthiolate 1:10,000, after which the suspension volume was brought to 100 ml. Hence, 10 ml suspension was equivalent to 2.5 ml serum. The serum was injected in the immunization mode: 4 ml suspension into each hind paw; after 1 week, the injections were repeated (5 ml into each hind paw), and after one more week 1 ml suspension into each paw.

Half of experimental animals were sacrificed by rapid bleeding from both carotid arteries 60 days after the last injection of the suspension; others were sacrificed after 120 days. Tissue fragments for morphological study were collected from the cervical portion of the spinal cord and from various brain compartments. The preparations were stained with hematoxylin and eosin.

RESULTS

Twelve rabbits injected with sera from SM patients developed trophic lesions of the fore paw skin: hair loss increased, 5 animals presented with obvious pareses of the fore limbs, which corresponded to the clinical picture of SM in humans. In experi-

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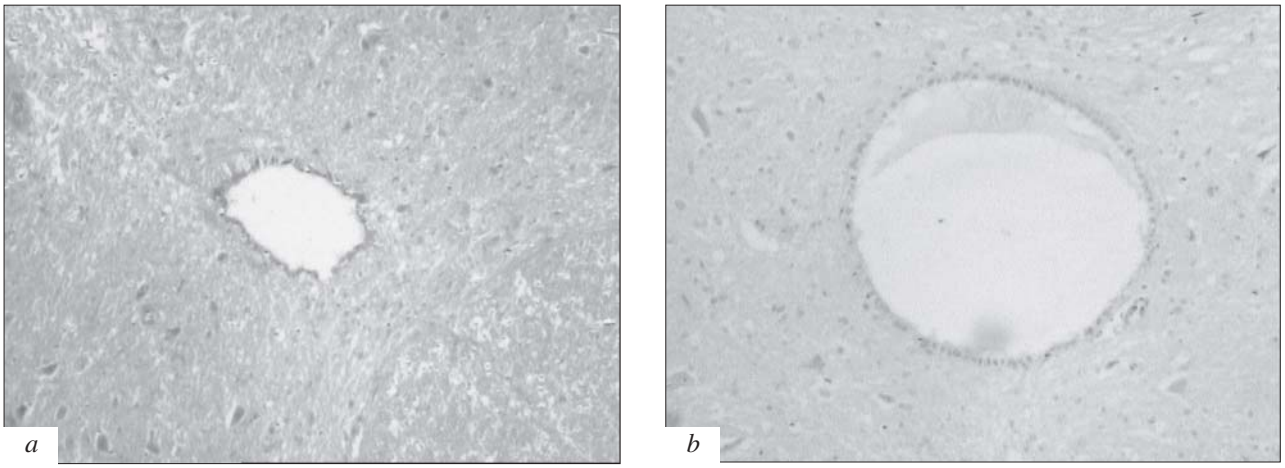

Fig. 1. Morphological changes in the spinal cord of rabbits after injection of serum from SM patients. *a*) rabbits treated with HMU. The shape of the central channel is modified. The channel is slightly dilated. *b*) rabbits not treated with HMU. The central channel is significantly dilated. Hematoxylin and eosin staining, ×450.

mental group, pareses were detected in just 2 animals and trophic disorders of the skin in only 4. None of these symptoms were detected in the control group.

Morphologic study of the brain and spinal cord showed neurodegeneration, gliosis, microcavities, and dilatation of the central channel (Fig. 1). These changes were also found in experimental rabbits treated with HMU, but gliosis was more diffuse without impairing the normal histoarchitectonics of the nervous tissue. Neurodegeneration was slightly pronounced, the configuration and size of the central channel were not as sharply modified as in animals receiving no HMU.

Hence, HMU prevented the development of neurological symptoms and trophic disorders of the skin in rabbits with experimental SM. The neuroprotective effect of HMU in this disease was confirmed by findings of morphological study of the spinal cord and brain.

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