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THE EFFECTIVENESS AND CORRESPONDING ENERGY PARAMETERS OF HIGH-INTENSITY FOCUSED ULTRASOUND IN THE TREATMENT OF HEMANGIOMAS IN INFANTS

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Abstract:

Hemangioma in children is a benign neoplasm that manifests itself in the first few weeks after birth. According to a study by the Medical College of Wisconsin, boys suffer from the disease 3 times less often than girls. The tumor is localized on the neck, head, face, arms and legs, in rare cases it develops on the larynx or liver. Often, the hemangioma goes away on its own. But sometimes it causes bleeding and complications, such as destruction of cartilage of the lips, nose, ears and strabismus. Often, a hemangioma is a sign of a disease, for example, Castroviejo syndrome. Therefore, when the first symptoms appear, an examination is recommended. Treatment of hemangiomas in children is different: if necessary, the doctor will individually select the procedures and timing.

Keywords: children; hemangioma, ultrasound treatment.

INTRODUCTION. A hemangioma is a benign tumor consisting of vascular tissue cells. Usually, such a disease is diagnosed in newborns and children who have reached the age of several months. In them, the neoplasm progresses quite quickly and, reaching a large size, may represent a visible cosmetic defect. The site of hemangioma localization is often the chest, neck, face, in some cases the disease affects fatty tissue, bone tissue and spreads to internal organs. Hemangioma is considered a benign vascular neoplasm of the skin, the prevalence of which reaches 45.7% of all tumors. Among newborns, pathology may occur in a quarter of the population. The disease is typically manifested in the first 2-6 weeks of life. Hemangiomas in young children are not invasive, that is, they do not grow into other tissues and organs. Formations have different sizes, ranging from 1 mm to 15 centimeters and more.

The main sign of a tumor in children is a vascular formation located on the surface of the skin. It often has a red tint and rises above the skin, but it can also be slightly pink or burgundy. When a hemangioma is located under the skin, the color of the integument may be bluish.

Hemangiomas grow not only in breadth, but also in depth. The process is accompanied by pressure on the tissues. As a result, the functionality of the organs may be impaired. Tumors are easily damaged, which leads to bleeding, which is difficult to stop. This often leads to infection through microcracks.

Hemangioma in children (or infantile hemangioma) is the most common benign neoplasm of the skin and blood vessels that occurs immediately after birth or in the first months of life. It can appear anywhere on the body, but is most often found on the face, neck and upper torso. In very rare cases, hemangiomas affect internal organs, such as the liver or larynx.

Such a tumor consists of blood vessel cells that are susceptible to involution — reverse development. Therefore, in most cases, the hemangioma goes away on its own. However, there is no need to wait for this. Be sure to show the child to a doctor. First of all, this is a pediatrician. However, after that they are also referred to a pediatric surgeon, dermatologist and oncologist.

According to statistics, hemangiomas occur in about 10% of newborns. In almost 90% of cases, they are formed in the first days or weeks of a baby's life. Sometimes a child is already born with a tumor. Girls experience this phenomenon two to three times more often than boys.

In most cases, a single hemangioma forms on the child's body. If there are more than five of them, then they talk about hemangiomatosis. It can be benign and diffuse. The first is the presence of more than five formations only on the skin. If they are also present in the internal organs, then this is diffuse hemangiomatosis. As for

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genetic factors, the role of certain genes that could contribute to the appearance of hemangiomas in infants has not yet been established.

Several theories are currently being considered. One of the most common involves the viral etiology of the tumor. If a woman suffered from a viral infection (it has not yet been established which viruses it may be) in the first trimester of pregnancy, this can lead to damage to the placenta, followed by migration of some placental cells into the fetal skin. An indirect confirmation of this theory is the fact that hemangioma cells are immunologically identical to placental cells.

Hemangiomas are clearly distinguishable tumors. They have the appearance of knobby bumps on the skin, usually purple or bluish in color. Such growths are warmer to the touch than the surrounding skin. The diameter varies from 1 mm to 1.5 cm. In rare cases, the formations are too large, the size is several centimeters. Since a hemangioma is a vascular tumor, even minor damage to it can lead to bleeding that does not stop for a long time.

The reverse development of the tumor, as a rule, begins with the appearance of a small whitish spot in the center. Over time, it increases until the hemangioma completely disappears. As for the duration of the involution period, it also varies. In some children, tumors disappear already in the first year of life, and in others — only in adolescence.

The aim of the study was to study the effectiveness and corresponding energy parameters of high-intensity focused ultrasound in the treatment of hemangiomas in infants.

Materials and methods of research. In the period from January 2023 to March 2024, 60 infants with hemangioma were treated. There were 23 boys and 37 girls, aged 3 to 30 months, an average of 10 months. These hemangiomas were located on the head and face (24 cases), trunk (15 cases), limbs (16 cases), buttocks (2 cases), perineum (1 case) and multiple lesions (cervix, abdomen and upper extremities — 2 cases). The sizes of hemangiomas ranged from 0.8 cm x 0.6 cm to 6.0 cm x 5.0 cm. 60 infants were randomly divided into 3 groups: groups A, B and C (n = 20) based on the different ultrasound energies used in the treatment. The lesion surface was irradiated at a rate of 3-5 mm / s for 5 days with an ultrasound therapeutic device with a frequency of 9 MHz, a pulse of 1,000 and 10% of the scan overlap; Power 3.5, 4.0 and 4.5 W were used in groups A, B and C, respectively, 3 times as a course of treatment with an interval of 1 month. The effect and risk of ulceration and scarring in the irradiation area were observed after 6 months of treatment.

THE RESULTS OF THE STUDY: All patients were treated with the same course. After 6 months of treatment, no significant difference in effect was found among the 3 groups according to the hemangioma treatment evaluation criterion ($P > 0.05$). In group A, there was neither ulcer nor scar; ulcer occurred in 4 cases (20%) of group B with superficial scars, and in 7 cases (35%) of group C with obvious scars. The incidence of ulcers and scars in groups B and C was significantly higher than in group A ($P < 0.05$).

CONCLUSION HIFU irradiation is one of the effective methods of treating hemangioma in infants, but the corresponding energy was below 3.5 watts. Thus, modern medicine does not fully know why hemangiomas appear in some children and do not develop in others. Neoplasms occur in the first months of a child's life. That is why many experts associate the formation of tumors due to impaired formation of blood vessels.

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