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EVALUATION OF RADIONUCLIDE STUDIES OF THE REGIONAL LYMPHATIC SYSTEM IN PATIENTS WITH DEEP VEIN THROMBOPHLEBITIS OF THE LOWER EXTREMITY

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Abstract

The introduction of radionuclide research methods into clinical practice, along with X-ray methods [3,4,5], allowed the most objective assessment of the functional state of the lymphatic system. For the first time using indirect lymphography in 1950, Walker [5] visualized the lymphatic vessels of rats with a radioactive colloidal solution. The author subcutaneously injected a radioactive colloid into the interdigital spaces of the foot, then determined the concentration of the radioactive colloid in the lymph taken from the femoral lymphatic vessel. When labeled colloidal particles are introduced into subcutaneous tissue, as a result of changes in osmotic pressure, colloidal particles move into lymph nodes in the lymph gums and through lymph vessels.

The problem of treatment of vascular, purulent-septic, a number of therapeutic and oncological diseases with medications remains relevant to date. When administered into the body, medications do not always have a sufficiently high effect due to their low concentration in the lymph nodes. Endolymphatic therapy creates a high concentration of drugs in regional lymph nodes [1, 2], where microbes of many diseases and their toxins from the primary focus accumulate and usually spread through them. During treatment, the use of lymphostimulants enhances the effect of lymphotropic drugs.

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Introduction

MATERIALS AND METHODS

To determine the effectiveness of radionuclide studies of the regional lymphatic system, we analyzed the results of examinations of 42 patients diagnosed with deep vein thrombophlebitis of the lower extremity who were on inpatient treatment at the clinic of the Andijan State Medical Institute. The control group included 15 volunteers (clinically healthy individuals and patients without vascular pathology). Radionuclide examination of the lymph system was performed on a Gamma camera (Hungary) with pulse registration in the areas of interest: in the depot, i.e. at the injection site of the radionuclide and in the regional lymph nodes (inguinal region). To register the pulses, an ex-position was used for one minute with an hour interval. During the study, the surface of the gamma camera detector was installed parallel to the skin from the back of the foot and groin at a distance of 8 cm from the skin surface. Radionuclide examination of the lymph system does not require special training of the patient. The drug was injected subcutaneously into the interdigital spaces of the foot in a small volume (0.2-0.5 ml) with a thin needle after preliminary anesthesia of the injection site with 1.5 ml 0.25% solution of novocaine with or without the addition of any stimulant (heparin 2500 units). The value of the introduced activity was strictly dosed and was for colloidal particles gold-198 = 4,OMBk, and for technetium-labeled technetium-99m = 10.0MBk (technetium-labeled technetium-99m technephrite, as a colloidal solution of gold-198, is a lymphotropic radionuclide). Scintigraphy and radiometry were performed in the depot projection at the time of injection, one hour and two hours after it, in the regional inguinal lymph nodes one and two hours after injection. At the time of injection, the activity of the radionuclide in the depot (at the injection site of the radionuclide) was assumed to be 100%. The percentage decrease in isotope activity in the depot minus the background and the amount of radiation of the physical half-life after 60 and 120 minutes is taken as an indicator of the absorption of radionuclide into the lymph vessels. Further, the activity of the radionuclide in the depot at the time of injection, taking as initial for 100%, the process of migration of the radionuclide through the lymph vessels to the inguinal lymph nodes was observed and the percentage of isotope accumulation in the inguinal lymph nodes was determined by comparing them with the initial indicators of absorption of radionuclide from the depot. For statistical processing of the material, due to the dispersion of the absolute values of radioisotope radiation per unit of time at the recorded points of the lower limb, we used their percentage expressions, which, reflecting the degree of absorption of the radioisotope into the vessels and their accumulation in the regional inguinal lymph nodes, do not distort the results of the data obtained. All the results obtained were processed statistically according to Fischer-Student using criteria for the reliability of differences in the compared indicators.

RESULTS AND DISCUSSION

The condition of lymphatic vessels and regional inguinal lymph nodes was studied in a control group of individuals and in patients with deep vein thrombophlebitis of the lower extremity before and after lympho stimulation using a technetium-99m labeled technefit colloidal solution. The results of the conducted studies showed that radionuclide injected into the interdigital spaces of the foot from the subcutaneous depot penetrates into the lymphatic vessel in a sufficiently high percentage. Already at 60 minutes after subcutaneous injection into the interdigital spaces of the foot (depot) of radionuclide, its percentage of absorption from the depot into the lymph vessel in

healthy individuals was 10.8 ± 1.7%, in patients with thrombophlebitis of the lower limb this indicator was higher: 15.9 ± 2.0%. 120 minutes after the injection of the radionuclide, the percentage of absorption reaches 18.1 ± 2.1% and 25.2 ± 2.7, respectively%

If we compare these two indicators (after 60 and 120 minutes) with each other, the absorption intensity has a fairly high degree of difference both in healthy individuals (P<0.01) and in patients (P<0.01). In the inguinal lymph nodes of healthy individuals, after 1 hour, the isotope accumulated to 8.1 ± 1.2% of the activity of the radioisotope that entered the lymph vessel from the depot and after 120 minutes - to 13.4 ± 2.4%. In patients, they were 11.9 ± 1.3% and 14.3 ± 2.2%, respectively. When comparing the parameters 60 and 120 minutes after the injection of radionuclide, healthy and sick also had a high degree of difference: healthy and sick had P <0.01. After stimulation of the lymph system with heparin at a dose of 2500 units, the rate of absorption of radionuclide from the depot into the lymph nodes and then into the lymph vessels accelerated, and their concentration in the inguinal lymph nodes was significantly higher than before lymphostimulation. Statistical analysis of their indicators between 60 and 120 minutes after injection in the areas of interest, i.e. in the depot and inguinal lymph nodes, high differentiation is given both in healthy individuals (P<0.05 and P<0.01) and in patients (P<0.05 and P<0.01). When the results of the study of a healthy limb were compared with the results of the affected limb , it turned out that in patients the process of absorption of the radioisotope from the depot was faster than in healthy individuals 60 and 120 minutes after injection. A similar pattern was observed with the accumulation of isotope in the inguinal lymph nodes. However, after lymphostimulation with heparin (2500 units), there was no differentiation in the absorption of radionuclide from the depot (P<0.8) and its migration to regional lymph nodes (P<0.2) after 60 and 120 minutes in the affected limb.

Statistical analysis of the absorption of radionuclide from the depot into the lymph vessels and their accumulation in the inguinal lymph nodes before and after lymphostimulation revealed that in healthy individuals, 60 minutes after injection into the depot and in the regional inguinal lymph nodes, differentiation has a high degree of difference (P<0.05 and P<0.05). A similar pattern was observed 120 minutes after injection (P<0.05 and P<0.01). But in patients with thrombophlebitis of the deep veins of the lower extremity, patients show a lack of differentiation in the reaction of the results of absorption of radionuclide from the depot into the lymph vessels and their accumulation in the inguinal lymph nodes before and after lymphostimulation after 60 minutes (P<0.8 and P<0.8) (and 120 minutes (P<0.8; P<0.2)

Conclusions

1. Using the example of absorption of technephrite radionuclide labeled with technetium 99m from the interdigital spaces of the foot into the lymph vessels and their migration to the inguinal lymph nodes, it is possible to determine the degree of elimination of lymphotropic colloidal radionucleides in the lymph system.

2. In healthy individuals, the percentage of absorption of technetium 99m-labeled technetium colloidal solution is quite high for two hours. The accumulation of radionuclides in regional lymph nodes in the same time intervals is statistically significant. After stimulation, the absorption of the colloid accelerates with a high degree of difference.

3. In patients with deep vein thrombophlebitis of the lower extremity, the absorption of radionuclide was accelerated and its accumulation in the inguinal lymph nodes was higher than in

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healthy ones. However, after stimulation with heparin in the affected individuals, the absorption of radionuclide was slightly higher and their comparison with the indicators of healthy individuals gave unreliable differences in contrast to the high differentiation of the study groups without stimulation.

4. So, in patients with deep vein thrombophlebitis of the lower extremity, the compensatory possibilities of the osmotic state of the subcutaneous depot were limited compared with healthy individuals.

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