MORPHOLOGICAL ASSESSMENT OF THE HEALING OF SKIN WOUNDS WITH DIFFERENT METHODS OF REGIONAL TREATMENT

A.A. Glukhov, N.T. Alexeeva

N.N. Burdenko Voronezh State Medical Academy, Voronezh, Russia

The main research areas — regenerative biology and medicine.The purpose of the study was to prove the effectiveness of the use of various regional methods of the treatment of skin wounds by evaluating the structural and functional state of the regenerate. The experiment was conducted on 98 outbred male albino rats weighing 200–220 g. The animals were divided into two blocks, since the morphological evaluation of the regenerate was performed in the treatment of aseptic and septic wounds. The first block consisted of one control and two experimental groups. Under anesthesia, the animals were given aseptic wounds (1,0x0,5 cm) on the front surface of the thigh. In the control group, there was no treatment. In the first experimental group, jet sanation (JS) by the 0.9% solution of NaCl was used to treat aseptic wounds. In the second experimental group, platelet-rich plasma (PRP) was utilized. For the animals of the second block, the modeling of purulent wounds was performed using the culture of St. aureus. The second block included one control and three experimental groups. The treatment of purulent wounds began with debridement on the third day from the onset of the experiment. Then, the methods of regional therapy were used in accordance with the selected groups. In the control group, JS was used once daily for the first three days. In the first experimental group, the wound was treated by an alternating magnetic field (AMF) after JS. In the second group, phototherapy was performed after changing bandages. In the third group, JS and PRP were utilized once daily for the first three days of the treatment. The animals were taken from the experiment under anesthesia on the 21st day. The material of nearby wound zones was taken and fixed in 10% neutral formalin. For the assessment of the strength of formed scars, the tissue was subject to rupture with fixed force. It was noted that regeneration with the formation of sufficient in strength tissues occurs by the 21st day. Tensile strength of aseptic wounds is higher (1.8N) given the treatment by PRP. High tensile strength (after application of AMF-3.1N, PRP-3.3N) is associated with the predominance of fibrotic manifestations. Thus, application of PRP strengthens collagenogenesis, improves the architectonics of fibers and provides the predominance of fibrous component over cellular one.

QUANTITATIVE ANALYSIS OF MEMANTINE IN BIOLOGICAL FLUIDS

A.A. Karlitskaya, N.D. Bunyatyan, L.M. Krasnykh, G.F. Vasilenko

Scientific Center for Evaluation of Medical Products, Center of Clinical Pharmacology, Moscow, Russia

Studying of the drug in vivo involves determination of concentration of the drug in the blood. Therefore, the aim of this study was to develop a selective and sensitive method for the quantitative analysis of memantine in blood plasma.

According to published data [1] concentration of memantine in the blood plasma is low, that is why we chose high-performance liquid chromatography coupled with mass spectrometry for the quantitative analysis of memantine. Mass spectral acquisition was done in multiple reaction monitoring (MRM) mode using positive electrospray ionization (ESI). There was an intense peak in mass spectrum of memantine obtained by ionization mode in MS-MS analyzer with m/z 180. This peak corresponded to the protonated molecular ion (M+H)+ of the target substance.

The best chromatographic separation was accomplished on an Agilent XDB-C18 column (2.1mm×30mm, 8μm), with acetonitrile and 0.1% formic acid (65:35, v/v) as the mobile phase at a flow rate of 0.5ml/min. Retention time of memantine was 1,35 ± 0,05 min. Plasma samples were extracted by precipitation with methanol. Quantitative analysis of memantine in plasma was performed by the method of an absolute calibration. Calibration curves were linear

over the concentration range of 1 to 50 ng/ml. Linear calibration was obtained with correlation coefficients R2 = 0,996. The limit of detection was 1 ng/ml.

CONCLUSIONS

The highly sensitive and selective method of extraction and quantitative analysis of memantine in the blood plasma by high-performance liquid chromatography coupled with mass spectrometry was developed. The method is characterized by repeatability and low limit of detection (1ng/ml). With the help of developed HPLC/MS/MS method pharmacokinetics of memantine-containing drugs (10 mg) was studied after a single oral intake of the drug by volunteers.

REFERENCES

1. **Liu M-Y, Meng S-N, Wu H-Z, Wang S, Wei M-J.** Pharmacokinetics of single-dose and multiple-dose memantine in healthy chinese volunteers using an analytic method of liquid chromatography-tandem mass spectrometry. Clinical Therapeutics. 2008;30(4):641–653.

MICROCIRCULATORY BED IN ORGANS SUPPLIED BY DRAINING DUCTS SYSTEM: FOUR COMPARTMENTS INSTEAD OF THREE

D.J. Kordzaia, M.A. Dgebuadze

Iv. Javakhishvili Tbilisi State University,
Tbilisi State Medical University, Georgia

The paper describes the microcirculatory modules of the liver and kidney and generalizes the obtained results on microcirculatory beds of all organs, having the system of draining ducts. The research is conducted on 60 white Wistar rats (equal amount of male and female animals) using standard Histology, Histology after injection of contrast mass into tubular structures, Transmission Electron Microscopy and Scanning Electron Microscopy of Corrosion Casts of blood vessels and ductular/tubular systems.

The microcirculatory module for every given organ is specific, multiply repeated, more or less standard minimal fragment of microcirculation network. Classically it includes the finest blood vessels (arterioles, capillaries, venules), lymphatic initials (Lymphatic capillaries and post-capillaries) and interstitial spaces (channels). Taking into account the results of our research, we suggest to consider the liver and kidney (as well as other organs supplied by draining ducts system) as the basis of four different liquid circulation: blood, lymph, tissue juice and organ specific liquid — bile and urine. Correspondingly, the four compartments have to be identified in the microcirculatory beds of organs with draining duct system. Three of them are classical, but the fourth is organ specific. The organ specific compartment of the microcirculation starts blindly (in similar to the lymph capillaries) and gets its specific liquid through secretion (bile) or filtration (urine) by/through the cells, which create/border its lumen. The classical compartment of the microcirculatory network in the organs supplied by draining duct system contains two components with different architectonics: the first is typical (universal) for all organs. It is located in stroma, particularly around the ducts/tubes and contains standard arterioles, capillaries, venules, tissue channels and lymphatic capillaries; the second compartment of the microcirculatory network is sharply organ specific. It contains portal terminals and arterioles — sinusoidal capillaries — the central/sublobular venules (in liver); afferent arterioles — glomerular capillaries — efferent arterioles (in kidney). This second component is realizing the specific function of the given organ: to produce/drain the organ specific liquid (bile, urine). All four compartments of the microcirculatory modules of liver and kidney and their liquids are in dynamic morpho-functional relation to each other and reveal the great opportunities of mutual replacement; e.g. in condition of bile or urine congestion the lymphatic capillaries successfully undertake the evacuation of the mentioned liquids on the early terms of pathology.