



Fund “Nauka” Project № 20022 Resume – Competition-based Session 2020:

“Study of biomarkers, characterizing the peritoneal membrane in drained peritoneal solution in patients, treated with peritoneal dialysis”

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Peritoneal dialysis (PD) is one of the replacement treatment methods for patients with end-stage renal disease. Prolonged treatment with PD leads to structural changes in the peritoneal membrane (PM) – epithelial-mesenchymal transformation and loss of mesothelial cells, thickening of the submesothelial compact zone, changes in vascularization. These changes are related to subsequent functional changes – ultrafiltration insufficiencies, altered transmembrane transport of substances with low molecular weight, etc. Structural changes in PM can be detected by repeated biopsies of PM – invasive examinations that can have serious complications and adverse consequences and therefore are not routinely used. In recent years, non-invasive studies have been developed to replace peritoneal biopsy, such as the study of biomarkers in a drained peritoneal solution. CA 125 is secreted by mesothelial cells and is discussed as a marker of mesothelial cell count. Vascular endothelial growth factor (VEGF) is a glycoprotein that is produced by mesothelial cells, vascular endothelial cells, fibroblasts, macrophages, etc., induces neoangiogenesis and peritoneal fibrosis in patients treated with peritoneal dialysis.

The **aim** of the study is to test the hypothesis “The levels of CA 125 and VEGF in drained peritoneal solution at the start of PD and their changes during treatment correlate with functional changes – ultrafiltration capacity of PM and transport of substances with low molecular weight”; as well as to investigate whether and to what extent the levels of the studied biomarkers depend on the glucose load, episodes of peritonitis, etc.

Main tasks:

1. To examine CA 125 and VEGF in drained peritoneal solution at the start of treatment and after a period of 1 year;
2. To determine ultrafiltration capacity and glucose load;
3. To seek and analyze correlations between the studied parameters;
4. To standardize a method and to formulate indications for laboratory examination of biomarkers in drained peritoneal solution in clinical practice.

Patients: 50 patients aged over 18, conducting PD and who signed informed consent.

Methods:

1. CA 125, VEGF-ELISA METHOD;
2. Transmembrane transport of substances with low molecular weight and ultrafiltration capacity – determination of PET;

3. Glucose load – calculated on the basis of the applied glucose solutions.

Expected results: it is expected to confirm the stated scientific hypothesis for one or more of the studied markers, which will be a reason to recommend their study in routine clinical practice.

Achieved results:

1. The results obtained support CA-125 as an informative marker for the functional status of the peritoneal membrane: there is a significant decrease in CA-125 within the observation period of one year. In the present study, there is no significant change in VEGF levels over the observation period and this does not support the applicability of VEGF for assessing functional status.
2. The results of the study suggest that CA-125 is applicable as an additional marker for assessing the functional status of the peritoneal membrane in patients on peritoneal dialysis, while VEGF is not suitable for this.

Contributions:

1. As far as the team is aware, for the first time in Bulgaria, the markers CA 125 and VEGF have been studied in drained peritoneal solution.
2. Data were obtained in support of the applicability of CA-125 as a biomarker for assessing the functional status of the peritoneal membrane in patients on peritoneal dialysis.
3. The present work falls under the institutional priority “prevention, management of diseases and health systems”.