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## Mitochondrial DNA Impairments Affect Mitochondria's Functional State in Varicose Veins

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**Background:** Molecular pathogenesis of varicose vein disease is far from being understood. In our previous studies we showed the decreased mitochondrial DNA (mtDNA) copy number and its impaired integrity in varicose veins. There is an evidence of the link between mtDNA copy number, mitochondrial membrane potential, oxygen consumption, and ATP synthesis. Varicose veins are characterized by endothelial dysfunction and reduction of smooth muscle cells' contractile function. We aimed at investigating possible alterations of mitochondria functions (in terms of mitochondrial membrane potential of the vein wall constituents: endothelial cells (ECs) and smooth muscle cells (SMCs) of t. intima and t. media layers, correspondingly) in varicose veins.

**Methods:** The study was conducted according to the principles written in the Declaration of Helsinki and approved by our institutional committee. Post-operation material of paired GSV samples (varicose (VV) and non-varicose (NV) vein segments left after surgery from a corresponding patient, C2-C4 CEAP classes) was placed in cell culture media and subjected to live-staining with mitochondrion-selective fluorescent probes: mitochondrial membrane potential-dependent TMRM and -independent MitoTracker Deep Red, as well as with nucleus-selective probe NucBlue. To visualize a particular vein wall layer, images were taken at different z-axis series using laser scanning confocal microscopy. Measurements of signal intensities were performed using ZEN 3.1 (blue edition) software (Zeiss, Germany). Relative levels of mitochondrial membrane potential were calculated as the [mitochondrial membrane potential-dependent/mitochondrial membrane potential-independent intensities] ratios within each cell/image field/sample. Statistical analysis was performed in Excel and STATISTICA packages, using Student's t-test (for comparison between multiple cells/image fields within a subgroup) and Wilcoxon-signed rank test (for comparison between paired NV and VV segments).

**Results:** We found that that mitochondrial membrane potential was decreased in ECs and SMCs of VV compared to NV segments 2.98- and 5.08-fold, correspondingly (n=5, p<0.05). The representative images are shown in [Figure 1](#). More thorough analysis will be performed in the nearest future.

**Conclusion:** Though preliminary, these findings provide a possible link between vascular ECs and SMCs functional activity and their mtDNA content in varicose veins. The work was supported by the Russian Science Foundation (project No. 22-25-00832).

**Keywords:** varicose veins, endothelial cells, smooth muscle cells, mitochondrial membrane potential

according to the ROC-analysis (AUC  $0.851 \pm 0.073$ , 95% CI 0.708-0.993,  $p=0.003$ ). 6 of 7 patients with venous obstruction were on antiplatelet therapy (OR 11.63, 95% CI 1.28-111.11,  $p=0.015$ ). Age, gender, BMI, type of anticoagulation, other comorbidities, indications for PM implantation or type of PM were not associated with venous obstruction.

**Conclusion:** central venous obstruction incidence in patients after permanent pacemaker placement was 13.7%. Antiplatelet therapy and D-dimer level above  $900 \mu\text{g/l}$  DDU were associated with central venous obstruction in patients with a permanent pacemaker.

**Keywords:** central venous occlusion, D-dimer, venous thromboembolism, anticoagulation, deep venous thrombosis

### Post-thrombotic syndrome prevention on patients after COVID-19

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**Background:** Arterial and venous thromboses are most frequent complications after COVID-19. According to JAMA Open Network, on 2/3 patients after coronavirus infection developed arterial and venous thromboses. Rupin Aria discovers thrombotic events on 70% after coronavirus infection despite taking antiplatelet therapy.

**Methods:** There were 64 male gender patients from December 2020 until July 2021 in Multidisciplinary clinic of Tashkent Medical Academy with acute iliofemoral venous thrombosis, which were divided into 2 groups. All patients had had coronavirus infection 2-2.5 months before hospitalization. Main group included 29 patients, whom peroral anticoagulant had been carried out in the next scheme: Rivaroxaban 40 mg qDay 1st week, then Rivaroxaban 30 mg qDay for 2 weeks and Rivaroxaban 20 mg qDay for 3 months. Control group had taken standard scheme of therapy.

**Results:** Retrospective analysis allowed to detect, that the main group's patients had significant recanalization progress per month over the control group's ones ( $23.7 \pm 4.2\%$  over  $16.3 \pm 3.8\%$ ). Nevertheless, lab indications of INR did not have significances ( $2.6 \pm 0.3$  over  $2.4 \pm 0.4$ ). At 4 (11.4%) patients from control group was established post-thrombotic syndrome, whereas on main group no one analogical case did. No episodes of re-thrombosis and bleeding were detected during the observation term.

**Conclusion:** Postponed coronavirus infection has an influence to coagulation system, tipping the balance in favor of hypercoagulability. Our scheme of peroral anticoagulant therapy has been effective and decreased the

risk of post-thrombotic syndrome. Poorly studied long-term results of this scheme dictates the necessity for the further studies.

**Keywords:** Deep vein thrombosis; post-thrombotic syndrome; COVID-19; anticoagulant therapy

### The Effect Of Compliance With Elastic Compression Stockings On Severity Of Post-thrombotic Syndrome After 2 Years In Patients Who Underwent Pharmacomechanical Catheter-Directed Thrombolysis For Acute Iliofemoral Deep Vein Thrombosis

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**Background:** Elastic compression stockings (ECS) decrease venous pressure by improving venous flow and optimising calf muscle function in deep venous thrombosis (DVT). Due to low compliance with compression therapy in several trials, long term effects of compression stockings on post-thrombotic syndrome (PTS) have not been assessed. We aimed to evaluate the effect of patients' compliance with compression stockings on prevention of PTS and D-Dimer levels in patients who underwent pharmacomechanical catheter-directed thrombolysis (PMCDT) for acute iliofemoral DVT.

**Methods:** Of the 230 patients who had undergone PMCDT to treat acute IFDVT from January 2017 to December 2018, 74 patients showed 100% compliance with graded ECS for 2 years with the help of a doning device. Compliant patients were compared with non-compliant patients in terms of patient characteristics, incidence and severity of PTS using Villalta scale, Venous clinical severity score (VCSS) and D-Dimer levels.

**Results:** The proportion of female patients was higher in the compliant group (48.6% vs 30.7;  $p<0.001$ ). Severe PTS was diagnosed more frequently in non-compliant group according to the VS (VS>15 or ulceration) and VCSS (VCSS>8) levels (4.05% vs 8.97%) after 2 years. ECS continued for two years reduced mild-moderate PTS incidence from 30.7% to 18.9%. There was no significant difference between the groups in terms of D-Dimer levels at postoperative 6th month ( $148 \pm 44 \text{ ng/ml}$  vs  $156 \pm 41 \text{ ng/ml}$ ;  $p>0.05$ ), whereas compliant group D-Dimer levels were significantly lower than the non-