

STRESZCZENIE ROZPRAWY DOKTORSKIEJ W JĘZYKU ANGIELSKIM

Summary

Title of the doctoral dissertation:

„Application of magnetic resonance relaxation times to assess the effects of photodynamic therapy on prostate cancer”

Prostate cancer is the second most common malignant neoplasm in men. The incidence of prostate cancer is steadily increasing. In Poland, it accounts for approx. 20% of all diagnosed malignant neoplasms. Due to the scale of the problem and the number of therapeutic options, new, innovative methods of treatment are implemented, giving a chance to fully or partially cure the disease.

In this study, prostate tissue samples collected during radical prostatectomy were subjected to photodynamic therapy with the use of various photosensitizers. Histopathological examination and 1.5 Tesla magnetic resonance imaging were used to evaluate the effects of the therapy.

Post-treatment histopathological examination revealed condensation of most neoplastic cells, stromal edema, testicular-shaped architectural disturbances, thrombotic necrosis and the presence of protein in the stroma. After photodynamic therapy, the number of cancer cells decreased compared to the number of cancer cells before the therapy. In the clinical MRI study, the tissues treated with PDT had lower T_1 and T_2 relaxation times compared to the T_1 and T_2 values of the tissues before treatment. The observed differences were statistically significant. The reduction in values for both times may have been due to tissue water loss due to PDT.

Both methods used (histopathological examination and magnetic resonance imaging) enable the assessment of the treatment effects. The conducted experiments confirmed the effectiveness of PDT treatment, which gives opportunities and hopes for the application of this method also in in vivo studies of patients with prostate cancer.