

The focal laser effects of treatment during interstitial laser coagulation in patients with prostate cancer

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Introduction: Pulse-periodic Nd:YAG laser in free running mode was used for interstitial laser coagulation (ILC) of prostate. The purpose was determination the optimal regime of the tissue exposure for prediction volumes of coagulated tissue resulting from impact of prostate tumors by laser irradiation.

Materials and Methods: A pre-clinical study has been performed «in vivo» on a canine model. Clinical testing was performed on 30 patients suffering from prostate cancer with clinical stage T1c-2N0M0. All patients subsequently underwent radical retropubic prostatectomy.

The choice of the ILC method was based on the results of experimental research and on the data gathered in the course of postoperational (after the radical retropubic prostatectomy) histomorphological analysis of damage caused by laser radiation at prostate cancer and normal prostate tissue. To evaluate the dynamic tissue changes in prostate cancer and normal prostate tissue, prostatectomy was performed on the 1st, 6th, 15th, 17th and 35th day.

The ILC procedure was performed with the «Lasurite» laser system («L.T.M.» LLC, Russia).

Results: Tumor tissue necrosis in the prostate with subsequent formation of cavity with diameter of 0,5 – 1 cm, confirmed by the results of pathomorphological analysis, was achieved by using following action parameters: radiation power - 31 W; pulse repetition rate -100 Hz; duration of exposure – 30 s per one approach.

Conclusions: For single exposure of pulsed Nd:YAG laser with fixed parameters, we have defined volume unit of prostate tissue, which has undergone necrosis with following lysis. This gives us an opportunity to model results of TRUS-controlled operations, dedicated to destroy tumors. The developed method can be applied as ILK focal treatment in the complex therapy of prostate cancer patients.