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Could the effect of therapy depend on the prostate movements during irradiation?

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Introduction and Objectives: Prostate could change localization during fractionated irradiation. We want to estimate the displacements of prostate position during radiotherapy and we want to check if the effect of therapy depend on those displacements.
Material and Methods: The study is based on 40 patients treated with radical radiotherapy for localized prostate cancers between October 2004 and May 2006. Thermoplastic Orfit masks and Orfit HP System Leg Support and Foot Support were used. The PTVs included prostates with reasonable margins. All patients were treated conformally, using high energy photons. The total dose was 74 Gy, delivered in 37 fractions, 7.5 weeks. The positions of prostate were evaluated once a week using CT scans. CTs, all planning procedures and irradiation were performed using the same positioning system. Prostates were delineated and the changes in their positions were measured using appropriate device the 'Eclipse' program. All procedures were performed by the same experienced two radiation oncologists and three radiation technologists. The patients have been observed after therapy every 3 months for the first two years after treatment and every 6 months for next years.
Results: We observed major prostate displacements first of all in anterior-posterior (AP) axis. The mean of prostate movement in AP axis was 4.6 mm and ranged between 0.0 mm and 30.1 mm. We find that only 19 (47.5%) patients had all measured displacements smaller than 10 mm. Displacements larger than 20 mm were observed in 5 patients (25%). Two patients died 29 and 32 months after treatment without recurrence. 38 patients are being observed still. Median follow-up was 41 months. We have found biochemical relapse in 3 patients (7%), all of whom had major displacements: two of them had the largest prostate displacement (median 14.0 and 12.1 mm) and the third one had the fourth largest displacements (median 11.9 mm). We have not found any clinical relapse.
Conclusions: Prostate displacements seem to be the main reason of biochemical relapse in analyzed group.

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Surgical anatomy of the prostatic urethra. A pilot ex vivo study

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Introduction and Objectives: According to literature the majority of urologist become familiar with prostate anatomy. However, the perception of the prostatic urethra (PU) anatomy is based on personal endoscopic experience. PU seems to be integrated, non removable part of the prostate. Nevertheless, a robotic laparoscopy has potential for performing microsurgical movements and the idea to perform urethra-sparing operations of prostate could be taken into consideration. Before we formulate the concept of clinical use, the pilot study on surgical anatomy of prostatic urethra has been done. The aim of the pilot study was to discover and evaluate surgical anatomy of PU by performing ex vivo post-prostatectomy preparation.
Material and Methods: 50 specimens of prostate and PU collected from 32 radical prostatectomies (RP) and 18 radical cystectomies (RC) were analyzed postoperatively ex vivo. An individual programme of the anatomical preparation of PU was engaged in all cases prior to the pathological examination. A three-stage procedure was performed: 1) a preparation of prostate gland and PU excision, 2) a pre-pathological specimen preparation with photo documentation, 3) final pathological report. Immediately after the surgery, each specimen was placed on the posterior surface and fixed with the basis upward. Then, it was prepared gently with the incision dissecting the anterior surface of the gland leading towards PU. In order to minimalize the risk of PU disruption, a catheter was inserted intraurethrally. Along with the dissection, the prostate was flattened gradually and the urethra was separated intact from its site, being only attached by ejaculatory duct. In overall, two specimens: prostate and PU were prepared. Next, the standard pre-pathological preservation was performed along with the special tools immobilizing specimens that flattened the prostate. Subsequently, both prostate and PU were analyzed microscopically.
Results: The time of ex vivo preparation of a single specimen varied from 10 to 21 min. (mean 12 min.). In all cases, PU was excised intact. Mean lenght of PU was 19 mm (9–27 mm). PU was involved by the cancer in none of the cases (0%). The number of ejaculatory ducts was found to be as follows: one – 80% of cases, two – 14%, three – 4%, four – 2%. Pathologies of PU site were not found. Each step of the study procedure was documented digitally and will be presented on the poster. The findings of final pathological examinations were as follows: RP – adenocarcinoma pT1c-18 cases (56%), pT2a-9, pT2b-4, pT3a-1; RC – TCC pT0–1 case, pT1–1,pT2–12, pT3–3, pT4–1.
Conclusions: The study and photo documentation may improve our knowledge on the anatomy of PU and revealed feasibility of PU excision being attached. The fact that PU is cancer negative enables the idea to do urethra sparing surgery theoretically promising. The individual protocol occurred to be an interesting alternative for the standard oncological assessment of prostate specimens.

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Vascular disorders in cavernosal bodies limit the effectiveness of treatment of erectile dysfunction following radical prostatectomy

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Introduction and Objectives: Blood flow disturbances in cavernosal bodies develop in many patients after radical prostatectomy (RP). Impaired hemodynamic of the penis may limit the ability to attain and maintain rigid erection either after natural or pharmacological stimulation, therefore it seems to be an important factor influencing the severity of erectile dysfunction (ED) in men who underwent radical resection of the prostate. The aim of the study is to evaluate: 1) The correlation between impaired blood flow in penile arteries and type of reaction to intracavernosal injection of PGE1. 2) The influence of penile vascular disorders on severity of erectile dysfunction.
Material and Methods: The prospective study comprised 67 preoperatively potent men. The preoperative diagnostics of potency consisted of anaemnesis, IIEF-5 questionnaire, Power Doppler evaluation of blood flow in penis following intracavernosal injection (ICI) of 10 ug of Alprostadil and assessment of reaction to ICI (rigid erection, tumescence, no visible reaction). Only potent men – with normal results were enrolled. These tests were repeated at six months after RP. Correct vascular blood flow was found in 31 patients (46%) –

group 1. In the remaining 36 men (54%) blood flow disturbances were diagnosed – group 2.
Results: At six months after RP mean IIEF5 score in group 1 was 16.6; while in group 2 it was seriously lower – 3.3; ($p < 0.000001$) and indicated severe ED in men with impaired blood flow in penis. In group 2 the most frequent type of vascular disorders was venous leakage (18 men – 50%). Arterial and mixed disorders were found in 3 (8%) and 15 (42%) patients respectively. Rigid erection following ICI was attained by 45 men. Between them correct blood flow, arterial, venous and mixed disorders were found in 31 (68.89%), 3 (6.67%), 7 (15.56%) and 4 (8.89%) patients respectively ($p = 0{,}00001$). Tumescence was observed both in 8 men (50%) with venous and mixed disorders. 6 patients presented no reaction following ICI (venous leakage – 3(50%), mixed disorders – 3(50%)). Mean values of Doppler study in men with erection, tumescence and no reaction after ICI were: PSV: 32.5; 26.6; 25.1 cm/s ($p = 0.0012$); EDV: 1.5; 3.7; 12.8 cm/s ($p = 0.000001$); RI: 0.936; 0.877; 0.515 ($p = 0.000001$) respectively.
Conclusions: 1) Impaired blood flow in cavernosal bodies correlates with higher severity of ED 2) Presence of vascular disorders in penis deteriorates the reaction to intracavernosal injection of PGE1 and limits the effectiveness of ED treatment following radical prostatectomy.

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TMPRSS2: ERG gene fusion and epigenetic changes in tumour suppressor genes are associated with clinical markers of poor prognosis in prostate cancer patients

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Introduction and Objectives: Prostate cancer (PCa) is the most prevalent malignancy of males characterized by the high mortality rates. There is a need for new molecular biomarkers with a significant potential to recognize patients with potentially lethal disease who will benefit from more radical treatment. The most common genetic defect so far described in prostate cancer is the androgen-regulated TMPRSS2:ERG gene fusion. In order to investigate whether epigenetic changes in collaboration with the fusion transcript expression may improve characterization of PCa, we analyzed a wide panel of molecular markers, including TMPRSS2:ERG gene fusion, activation of telomerase gene (hTERT) expression and hypermethylation of eight tumour suppressor genes.
Material and Methods: Molecular changes were investigated in clinical PCa samples obtained from radical prostatectomy specimens of 83 previously untreated patients. Reverse transcription (RT) PCR, real-time PCR, and sequencing of cloned product was used for detection and detail analysis of TMPRSS2:ERG gene fusion. hTERT gene expression was analyzed by means of RT-PCR and real-time PCR. Methylation-specific PCR was used for assessment of hypermethylation in promoter regions of tumour suppressor genes GSTP1, RARb, p16, p14, RASSF1, DAPK, MGMT, and ZAC1.
Results: Chimeric TMPRSS2:ERG transcript was detected in 57% (47 of 83) of tumours. Expression of telomerase gene was active in 51% of cases. Among the tumour suppressor genes most frequently hypermethylated in PCa were the GSTP1 (61%) and RARb (68%) genes. TMPRSS2:ERG positive tumours tended to be of higher stage ($p = 0.04$) and higher grade ($p = 0.07$). The activation of the hTERT transcription was also more frequently ($p = 0.01$) observed in patients with TMPRSS2-ERG positive tumours. We found a significant positive correlation between frequency of hypermethylation of the GSTP1 gene and tumour grade ($p = 0.04$), and the frequency of hypermethylation of the RARβ, RASSF1A and GSTP1 genes tend to increase with the increasing stage of tumours. However, no apparent associations between epigenetic changes in analysed tumour suppressor genes and expression of the TMPRSS2:ERG fusion transcript were established in present study.
Conclusions: Preliminary results of our study suggest that detection of the TMPRSS2:ERG gene fusion together with epigenetic biomarkers may be used as novel prognostic indicators for PCa distinguishing patients with unfavourable prognosis.

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How to improve the reconstruction of prostate MRI imaging to transrectal ultrasound imaging?

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Introduction and Objectives: Carcinoma of the prostate is one of the most common male neoplasms. We have been observing tendency to increase both number of CaP cases and deaths caused by this cancer. Strong corelation between age (over fifty) and number of positive diagnosis can be observed. In 2004 prostate cancer took 2nd place in incidentality and 3rd in mortality among all malignant neoplsms. In 2020 20% of polish population will be over 65 years old thats why problem of treating prostate diseases is important and actual..
Aim of the study: The aim of this study is to answer the question: How to improve the reconstruction of prostate MRI imaging to transrectal ultrasound imaging?
Material and Methods: 34 males suspicious of prostate cancer and negative result of sextant core biopsy were qualified to this study.All of them undergone with positive result transrectal MRI-Sp examinaton. All of them had transrectal core biopsy targeted on atypical suspicious findings in MRI-Sp. Transrectal biopsy was performed using ultrasonography B-K Medical-2101 Falcon and core biopsy automat Pro-Mag 2.2L Biopsy System Urotech. Biopsies were performed in patients randomly divided into two groups. Group I in which MRI-Sp positive places were localized by use of our own electronical method of MRI images reconstruction and then tranfering them to TRUS image. Group II in which MRI-Sp positive places were localized by use of MRI image only.
Results: Biopsies were performed in patients randomly divided into two groups I-with reconstruction images from MRI-Sp and II without this reconstruction.

Result of histopathological examination	Group II, N = 17 (without image reconstruction)		Group I, N = 17 (with image reconstruction)	
	N	%	N	%
Prostate cancer	4	23.5	8	47.0
PIN II	1	5.8	2	11.7
Inflammatory changes	3	17.6	5	29.4
No changes	9	52.9	2	11.7

Conclusions: Proton Magnetic Resonance Spectroscopy Imaging when compared to morphological MR provide additional informations about metabolic changes in prostate tissue. Our own method of localizing and transfering Proton Magnetic Resonance Spectroscopy Images to ultrasonography image increase prostate cancer detectability.