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Initial report of the changes of prostate volume during irradiation and hormonal therapy

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Purpose: The aim of this study is on evaluation of the prostate and seminal vesicles volume and their changes during radiotherapy and on assessment of the impact of neoadjuvant hormonal therapy on those changes.
Material and methods: The study is based on 12 patients treated with radical radiotherapy for non advanced prostate cancers between the October 2004 and the May 2005. All patients were treated conformally, using high energy photons. The total dose was 74 Gy, delivered in 37 fractions, 5 times a week. The volumes of prostate and seminal vesicles were evaluated once a week using CT. Prostate and seminal vesicles were delineated and their volume was measured, using appropriate device "Eclipse" program. Seven patients were treated using goserelin for one month (six patients) or two months (1 patient) before irradiation, five of those patients were treated using both goserelin and flutamide. Two other patients were treated using flutamide only. Three patients did not receive any hormonal therapy. The Kolmogorov-Smirnov was used for the character of data distribution assessment and t-Student test was used for data comparison.
Results: We could observe changes of the prostate volume during irradiation. Prostate volume minimally increased after first week of irradiation (up to 103.8% of initial volume) and decreased during next weeks (to 84.3% of initial volume). We did not observe major changes of seminal vesicles volume during irradiation. But, seminal vesicles volume depended on hormonal, first of all goserelin, administration ($p<0.05$), we observed that the mean seminal vesicles volume before and during irradiation was 56% lower in the group receiving short-term goserelin administration.
Conclusions: Prostate volume could change during irradiation, what should be taken under consideration during radiotherapy planning. Seminal vesicles volume could be decreased using neoadjuvant hormonal (goserelin) administration.

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High-dose-rate brachytherapy as monotherapy for prostate cancer: Osaka University experience

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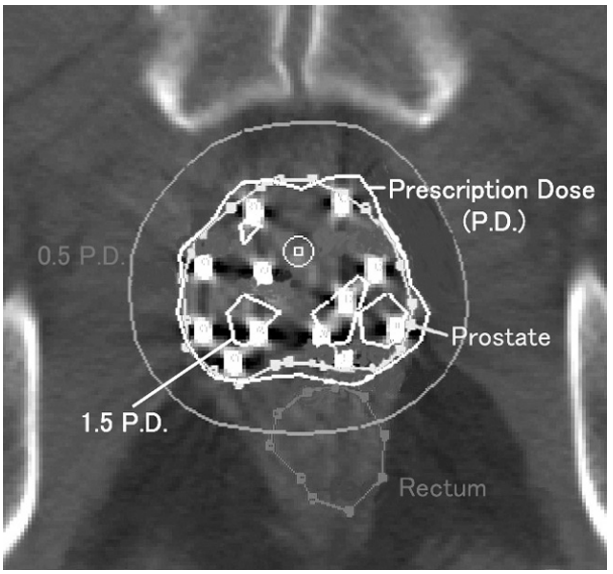
Background and purpose: I-125 or Pd-103 permanent brachytherapy has become a standard treatment option for early prostate cancer. High-dose-rate temporary brachytherapy (HDR-BT) is at a clinical trial phase, with an expectation that it can treat even an extracapsularly invaded tumor with a precise dose distribution. HDR-BT had been performed only in a combination with external beam irradiation (EBI) until our previously reported initial and unique experience of HDR-BT alone without EBI (Int J Radiat Oncol Biol Phys, 2000). The purpose of the current report is to evaluate the feasibility, toxicity and efficacy of HDR-BT without EBI for prostate cancer, with more patient accrual and longer follow-up.
Patients and methods: From May 1995 through December 2003, 87 patients with prostate cancer without nodal or distant metastasis were treated with HDR-BT without EBI at Osaka University Hospital Japan. Median age 69 (range 45–81), T1: T2: T3: T4 = 22:27: 34:4, median Gleason Score 6 (range 2–10), median pretreatment PSA 16.7 ng/ml (range 3.8–233.0). Metallic needles were implanted transperineally under real-time transrectal ultrasonography guidance, followed by the computer-aided treatment plan determining optimal dwell positions and dwell times of the HDR Ir-192 stepping micro-source.
Twice daily irradiation with more than 6-hour intervals was adopted, with the total dose of 48 Gy/8 fractions/5 days or 54 Gy/9 fractions/5 days. Seventy-four patients also received neoadjuvant and/or adjuvant hormone therapy. Median follow-up time was 25 months.
Results: All the patients completed the treatment regimen. No significant intra- or peri-operative complications occurred. Acute toxicities of Grade 4, 3, 2 and 1 occurred in 1, 9, 18 and 30 patients, respectively. Late toxicities of Grade 2 and 1 in 11 and 24 patients, respectively. Late toxicity of Grade 3 or more did not occur. Among 87 patients, 15 showed PSA failure. Among those 15 patients, 5 died (4 of prostate cancer metastases, 1 of an intercurrent disease), 3 are alive with bone metastases and 7 are alive without any clinical event. Only one patient from all 87 showed local recurrence. He died of prostate cancer metastasis.



Conclusions: HDR-BT without EBI was feasible and its toxicity was acceptable. Short-term tumor control was promising, although more patient accrual and longer follow-up are needed to confirm the efficacy of this novel approach.

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Difference in rectal dosimetry between pre-plan and post-implant analysis in transperineal interstitial brachytherapy for prostate cancer

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Purpose: To investigate differences in rectal dosimetry between pre-plan ultrasonography (US) and post-implant computed tomography (CT).
Materials and methods: Subjects comprised 49 patients who underwent prostate brachytherapy using ^{125}I seed implants. Prescribed dose was 145 Gy to the periphery of the prostate. Differences in rectal dosimetry between pre-plan US and post-implant CT analysis were evaluated. In addition, patients were divided into 2 groups according to timing of pre-planning (pre-plan group, n = 28; intraoperative pre-plan group, n = 21), and differences in rectal dosimetry between groups were assessed.
Results: Volume differences between pre-plan and post-implant analysis (pre-plan minus post-implant analysis) for all patients were follows; $-0.08\,cm^3$ in V60 (the volume of the rectal wall receiving 60% of prescribed dose), $-0.05\,cm^3$ in V70, $-0.16\,cm^3$ in V80, $-0.38\,cm^3$ in V90, $-0.40\,cm^3$ in V100, $-0.32\,cm^3$ in V110, $-0.22\,cm^3$ in V120, $-0.15\,cm^3$ in V130, $-0.10\,cm^3$ in V140, $-0.07\,cm^3$ in V150, and $-0.05\,cm^3$ in V160. Large differences in rectal dosimetry were noted between pre-plan US and post-implant CT, and differences varied widely in both groups, considering the steep curve of tolerable volume and dose. No advantage was identified for the intraoperative pre-plan group. Safe volume to avoid proctitis tended to be smaller on ultrasonography than on CT at one month.
Conclusion: The present work shows that direct comparison of CT analysis and pre-plan US is unfavorable due to large differences in the two modalities and overestimation of tolerable volume. However, by comprehending the degree of difference, comparison of data from CT analysis with a US pre-plan may be feasible and useful for providing feedback between the two modalities.