DOSE COMPARISON OF ORGANS AT RISK IN CERVICAL CANCER INTRACAVITARY BRACHYTHERAPY: ORGAN WALL VERSUS WHOLE ORGAN CONTOUR

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Introduction
Migration from two-dimensional to three-dimensional intracavitary brachytherapy (ICB) in treatment of inoperable cervical cancer, caused the use of dose volume histograms (DVH) in order to observe volume distribution of doses in target volume and/or organs at risk (OAR). However, question remained whether the calculated dose distribution in OAR was the one that corresponded to the one present in real-life conditions, thus emerging the dilemma – what is more real to contour – whole organ or organ wall only?

Material and methods
In this study 15 patients were included with diagnosed inoperable cervical cancer. Prior to brachytherapy all patients received external beam radiotherapy (EBRT) with dose received in 28 daily fractions with total dose of 50.4Gy. ICB consisted of 3 applications (once per week), applied dose of 7Gy in point A, total of 21Gy for whole ICB treatment. ICB used CT simulator, scans were contoured and plans were calculated using the BrachyVision treatment planning software. OAR contours consisted of 5mm outer wall margin contour and contour that encompassed the whole organ. DVH were used for plan evaluation of absorbed doses in 2 ccm organ volume for the whole brachytherapy treatment. OAR dose restrains were 22.32Gy (average of 7.44Gy per brachytherapy fraction) for bladder and 11.91Gy (average of 3.97Gy per brachytherapy fraction) for rectum.

Results
Average values of absorbed doses in bladder for the whole brachytherapy treatment were 4.71Gy for whole organ contour and 4.24Gy for 5mm outer wall contour. Average values of absorbed doses in rectum were 3.47Gy for whole organ contour and 3.28Gy for 5mm outer wall contour. Average dose difference was 0.47Gy for bladder and 0.19Gy for rectum, respectively.

Conclusion
Observed average absorbed doses were lower in OAR contoured as an organ wall (for both bladder and rectum) compared to absorbed doses in OAR contoured as a whole organ. Organ wall contours gave more realistic picture of absorbed OAR doses in ICB treatment.

Key words
Intracavitary brachytherapy, cervical cancer, organ wall