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Dosimetric optimization of BATD-3D interstitial prostate treatments with ^{60}Co and Multi-image technique

Wednesday, June 21, 2017 10:55 AM (5 minutes)

INTRODUCTION:

It is presented an efficient and quick method to dosimetric optimization using multi-imaging technique for interstitial prostate cancer HDR brachytherapy (BATD-3D) with ^{60}Co Source- BEBIG.

MATERIALS AND METHODS:

Establish an optimization process for interstitial needle placement, target volume contour, Organs at risk contour, and treatment planning with the use of different image techniques (MRI, CT and US) that optimize application time, planning time, and treatment total time. Also it is done dosimetric planification evaluation using different index such as COIN, Paddick Index (PI), conformity/gradient Index (CGI).

RESULTS:

In table 1 it is seen that dosimetrical values obtained for each organ at risk, achieving constraints for each case. In Table 2 it is also shown quality index to CTV coverage, observing a $\text{COIN}_{\text{prom}}=0.738$ and establish the use of the Paddick $\text{PI}_{\text{prom}}=0.757$ and accordance/gradient Index $\text{ICG}_{\text{prom}}=78.7\%$. This way we could see to parameters to quality control for a correct treatment placement.

CONCLUSIONS:

The correct use of Multi -Imaging optimize the different procedures in the application of interstitial HDR Prostate Brachytherapy (Fig. 1), as well using quality index such as (COIN, PI and ICG) in order to assure a correct treatment dosimetry.

Organs at risk dosimetry needs to be in a narrow relation with CTV quality index, achieving the constraints for prostate volumetric treatments in our centre:

- Rectum: $\text{D0.1cc} \leq 80\%$, $\text{D1cc} \leq 70\%$ y $\text{D0.1cc} \leq 60\%$
- Bladder: $\text{D0.1cc} < 90\%$, $\text{D1cc} \leq 60\%$ y $\text{D0.1cc} \leq 50\%$
- Urethra: $\text{D0.1cc} \leq 120\%$, $\text{D1cc} \leq 70\%$ y $\text{D0.1cc} \leq 10\%$

Country

PERÚ

Institution

ONCOSALUD- AUNA

Primary author: PAREDES VARGAS, Anthony (ONCOSALUD - RED AUNA)

Co-authors: GARCIA, Bertha (RED AUNA - CLINICA DELGADO); MARTINEZ PEREZ, David Antonio (ONCOSALUD); SARRIA BARDALES, Gustavo (ONCOSALUD - RED AUNA); PINILLOS ASHTON, Luis (ONCOSALUD - RED AUNA)

Presenter: SARRIA BARDALES, Gustavo (ONCOSALUD - RED AUNA)

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