

### **Are results from dosimetric studies sufficient enough to determine the quality of treatment techniques in radiation therapy?**

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Dear Editor,

External beam radiation therapy (EBRT) is one of the modalities used for the cancer treatment. In the past decade, there has been significant improvement in the treatment planning techniques and beam delivery methods, which have led to good number of dosimetric studies published in the literature. Volumetric-modulated arc therapy (VMAT) is one of the most recent treatment modality in EBRT, and the VMAT planning can generate the conformal dose distributions to the target while reducing dose to the normal tissues. In the recent paper<sup>[1]</sup> published in the South Asian

Journal of Cancer (SAJC), authors have done a dosimetric study for the prostate cancer involving a bilateral hip prosthesis. Authors have concluded that four-arc technique could achieve better dosimetric results when compared with the two-arc and three-arc techniques.<sup>[1]</sup>

Treatment planning involving metals are generally challenging due to the presence of artifacts, which require density override for the dose calculations. The variations in dosimetric results due to the difference in the number of arcs are expected as shown by the authors.<sup>[1]</sup> Although the dosimetric results provide us information of dosimetric quality of the techniques, the determination of quality of the treatment techniques solely based on the dosimetric results, however, may not provide complete picture. In addition to the dosimetric results, authors may also want to expand this study using radiobiological parameters such as tumor control probability (TCP) and normal tissue complication probability (NTCP). It has also been recommended

to use the radiobiological measures in the treatment planning.<sup>[2,3]</sup> Both the TCP and NTCP values could potentially be used to predict the treatment outcomes as well. Radiobiological evaluation of the VMAT techniques for prostate case involving metal hip prosthesis will be a good addition to the literature.

Another point to consider in the future study is to use more accurate dose calculation engine to compute the dose in the prostate cancer treatment plans. Authors have used anisotropic analytical algorithm (AAA) for dose computations. In the SAJC's volume 2, issue 4, Dr. Tesfamichael<sup>[4]</sup> published a letter with an update on the accuracy of dose calculation algorithms, and it was pointed out that AAA may produce errors in complex clinical cases involving heterogeneities. Hence, it would be interesting to see how the results presented by the authors would change if dose calculations are performed using advanced algorithms, such as Acuros XB, which has been shown to be more accurate than the AAA.<sup>[3,4]</sup>

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