

## **Unintended Consequences of Optimized Computerized Treatment Planning**

With the advent of remote controlled high dose rate (HDR) brachytherapy and computerized optimization, the dwell times can be varied to achieve uniform dose along dose optimization points. Although optimization methods have aided in treatment planning, there is no ideal optimization method. Different Optimization techniques can give rise to similar dose distribution around the specified optimization points but will result in very different doses at points away from the optimization points. This can lead to inadvertent underdosing of the tumor if the tumor is farther from the radioactive sources than the dose optimization points. Conversely, it could result in inadvertent overdosing of critical normal tissues if these are closer to the radioactive sources than the dose optimization points. Clinicians often use computer optimized treatment plans without being fully aware of the resulting dose distribution particularly at adjacent critical normal tissue sites. In this study, different methods of optimizations as well as non-optimized plans are compared and unplanned consequences of optimized treatment planning in HDR brachytherapy are demonstrated. This study concludes that judicial clinical judgement has to be exercised rather than depending blindly on computer optimization.