

## AbstractID: 1325 Title: Needle Displacement Effect on Dose Distribution in HDR Brachytherapy of Prostate Cancer

When using HDR brachytherapy in the treatment of prostate cancer, interfractional needle displacement is a problem caused by patient motion and prostate edema. The goal of this study was to determine how much the needle displacement affects the given dose distribution. In order to minimize needle motion, a set of post-operation x-ray plain films were taken as the reference needle position. The needles were repositioned to match the post-operation film before each treatment. Another set of films, 1<sup>st</sup> pre-treatment and 2<sup>nd</sup> pre-treatment, were taken after the repositioning of the needles. However, even with this repositioning, there is still some displacement between the actual treatment position and the needle position on the treatment plan. In order to see how this affects the dose distribution, the treatment plan was recalculated to include the needle displacement measured by overlaying pre-treatment films with post-operation films. Eight patients were analyzed for a total of twenty-eight plan comparisons (one comparison for each fraction). The range of needle displacement distance was less than 1mm to 10 mm with an average displacement of 1.58mm. The resulting dose distributions and DVH were compared to the original plan. It was found that as long as needles were carefully repositioned, the change in the dose distribution was minimal based on the treatment planning methods used at this facility.