Purpose:

Vaginal packing for gynecological brachytherapy is used to immobilize the applicator and reduce doses to the bladder and rectum by increasing the separation from the applicator. With the introduction of the Radiadyne Alatus™ balloon packing system, we evaluate further reductions in dose to these structures by increasing the concentration of contrast in the balloon, increasing its attenuation. This evaluation has been performed using the Acuros™ dose calculation algorithm.

Methods:

A patient with cervical cancer was treated with HDR Ir-192 by insertion of a tandem and ovoid applicator, with the Alatus™ balloon system used for vaginal packing instead of wet gauze. The balloons were filled with distilled water containing 10% Omnipaque contrast. Retrospectively, the balloons were contoured in the BrachyVision™ planning system, and the CT number of the structure set was adjusted to determine the effect of the concentration of the contrast in the balloons on bladder and rectal doses after heterogeneity correction using the Acuros™ algorithm.

Results:

Use of 10% Omnipaque solution reduced the bladder and rectal point doses by 6% and 9.5%, respectively, with similar reductions in the D2cc and D1cc for each structure. Overriding the density of the balloon showed that a 50% solution would reduce the doses by 8% and 30%, respectively, due to the positions of the balloons with respect to the applicator dwell positions.

Conclusions:

Use of the Alatus™ balloon packing system allows reduction of the bladder and rectal doses both by increasing the distance between the bladder and rectum and the applicators and by increased attenuation of the dose by the use of contrast solution. Optimal dilution of the contrast should take into account both the positive protective effect of the solution as well as any negative artifact that the solution causes in the CT scan, which might obscure the patient's anatomy patient.