

## The use of a transperineal polyethylene glycol hydrogel spacer to curtail rectal radiation dose after permanent iodine-125 prostate brachytherapy, "Beyond the Abstract," by Nadine Beydoun

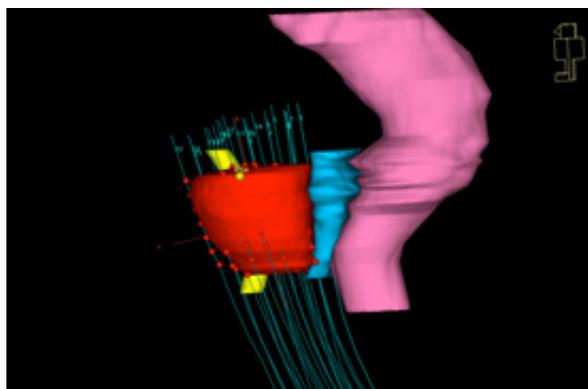
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BERKELEY, CA (UroToday.com) - Since the publication of our initial experience with a polyethylene glycol (PEG) hydrogel spacer use in 5 patients undergoing prostate seed implantation, the hydrogel has now been successfully used in 43 patients, including 10 seed brachytherapy patients, 10 high-dose rate brachytherapy (HDR) patients, 15 external beam radiotherapy patients, and 8 post-seed implant patients who were found to have suboptimal rectal dose (rectal volume receiving prescribed dose exceeds 1.3 cubic centimetres) at the time of their day 30 post-implant dosimetric assessment.

Preliminary analysis of our study population supports our earlier findings of rectal dose reduction in all patients undergoing spacer insertion. Further follow-up is awaited to determine how this rectal dose reduction will impact on late rectal toxicity. The greatest benefit in terms of rectal dose reduction was seen in external beam radiotherapy patients. Brachytherapy techniques allow greater dose conformity around the prostate, thereby differentially sparing the anterior rectal wall to a greater degree than 3-dimensional conformal radiotherapy or intensity modulated radiotherapy (IMRT) techniques. One particular advantage to using the spacer in brachytherapy patients, that was not anticipated, was for those with small-volume prostates or posteriorly-situated urethras, in whom optimisation of dose to the peripheral zone of the prostate normally involves a trade-off between either increased urethral or rectal dose. In these patients, insertion of the hydrogel provided additional separation between the urethra and rectum, thereby allowing seeds (or dwell positions in HDR patients) to be situated more posteriorly and away from the urethra.

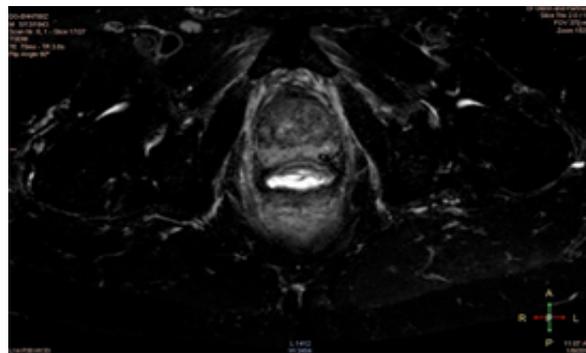
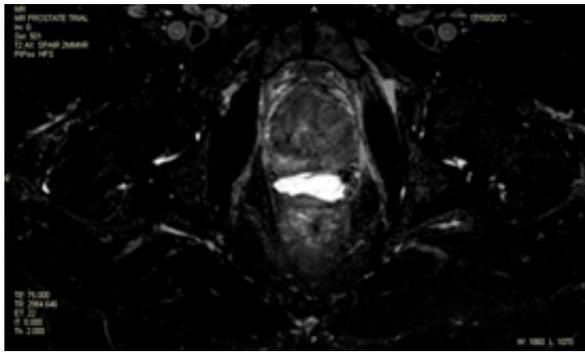
A technical difficulty that has been encountered with insertion of the hydrogel in brachytherapy patients is that the needle template (and HDR brachytherapy applicators) restrict angulation of the spacer needle, making it more difficult to achieve the desired position at mid prostate within the anterior perirectal fat. Insertion of the PEG hydrogel at the end of the brachytherapy implant is mandated by the fact that transrectal ultrasound image quality deteriorates after spacer insertion. To overcome this problem, it is advisable that the needle template is removed prior to insertion of the hydrogel, or hydrogel insertion is carried out as a separate procedure. Furthermore, if PEG hydrogel needle or HDR applicator penetration of the rectal wall occurs, antibiotics should be given to minimise infectious complications following the procedure.

Finally, whilst it is expected that the hydrogel will maintain separation for 3 months before beginning to undergo hydrolysis, post-spacer magnetic resonance imaging (MRI) in our study cohort has yielded variable results in terms of the rate of breakdown of the spacer beyond 3 months.



**Figure 1:** Three-dimensional representation of high dose rate brachytherapy implant. Red = prostate; yellow = urethra;

Blue = spacer; Pink = rectum.



A

B

**Figure 2:** Axial Magnetic Resonance Imaging (MRI) showing (A) spacer (hyper-intense on T2-weighted images) immediately following insertion, and (B) early hydrolysis (decreased intensity on T2) 3 months after insertion.

**Written by:**

Nadine Beydoun as part of *Beyond the Abstract* on UroToday.com. This initiative offers a method of publishing for the professional urology community. Authors are given an opportunity to expand on the circumstances, limitations etc... of their research by referencing the published abstract.

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**First report of transperineal polyethylene glycol hydrogel spacer use to curtail rectal radiation dose after permanent iodine-125 prostate brachytherapy - Abstract**



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Tags: **Beyond the Abstract**    **high-dose rate (HDR) brachytherapy**    **intensity modulated radiotherapy (IMRT)**

**Magnetic resonance imaging (MRI)**    **polyethylene glycol (PEG) hydrogel spacer**