



Patient Positioning for HDR Brachytherapy

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ABSTRACT

Sharp dose gradients are characteristic of brachytherapy dose distributions. Position of applicators must be stable or dose delivery will shift. This is especially true for prostate HDR brachytherapy. Insertion depth of brachytherapy catheters must be maintained, extending to the base level of the prostate. This work addresses catheter depth stability.

A special patient positioning board has been designed. It is cushioned and moderately elevates the legs. The intent of the board is to prevent needle-catheter displacement due to patient transfers between stretcher and imaging couch. In addition, patient comfort, image guidance, access to the perineum and ambulance transport were all achieved. The patient remains on the board in recovery, during CT imaging and until the first HDR fraction has been delivered. It facilitates visualization and access to the template, assuring correct channel connections for treatment. The board has also proven beneficial for image guided GYN HDR brachytherapy. For accelerated partial breast irradiation (APBI) it can be used to limit applicator rotation following pre-treatment imaging. Commercialization of the board allows for wide availability.

BACKGROUND

Patient position stability for HDR brachytherapy has not been widely addressed. However, it can play a key role for maintaining applicator position. This is especially true for prostate HDR brachytherapy with interstitial catheters inserted through the perineum and up to the prostate base without violating the bladder wall. A patient positioning board (the Slessinger Board) has been developed to promote applicator stability and has been used successfully in the clinic for 10 years.

MATERIALS and METHODS

Collaboration on design of the Slessinger Board (SLB) involved a Seattle based brachytherapy accessory vendor, Radiation Therapy Products (RTP).

Design features included the following:

1. A means to maintain leg elevation to ensure access to and visibility of the perineum
2. CT and MR compatible for assessing applicator depth and image based planning
3. Lightweight, padded and conducive for ambulance transport
4. Easy transfers between stretcher and imaging couch

RTP was the original manufacturer and vendor of the SLB, but discontinued that product following their takeover by North American Scientific (NASI). Resumption of SLB commercial availability was realized in 2010.

The author of this poster is the CEO of Slessinger Enterprises, LLC, manufacturer of the SLB. Radiation Products Design, Inc is the vendor. Further information is available online via a Google search (Slessinger Board).

RESULTS

An image based prostate HDR clinical service was developed and published (1) based on a template sutured to the perineum and plastic closed end needle/catheters inserted under transrectal ultrasound guidance. A generic catheter distribution uses 1cm peripheral spacing and 2 to 4 interior catheters (midway between urethra and periphery) as viewed at the largest axial cross section. Catheter depth adjustments are made under CT guidance and a full CT study is acquired for planning.

A special patient positioning board was developed to promote catheter depth stability (see photo). The patient remains on the positioning board until treatment is completed. For multiple HDR fractions, repeat verification imaging is required since the patient may change position, or rest in bed, overnight.

DISCUSSION

Image guided HDR brachytherapy has become the standard. Delineation of the target and critical structures is possible and DVH results are relied upon to optimize the plan. The precision of treatment plan implementation relies on applicator positional stability. This is not only true for prostate technique, but gynecological sites as well. Whether packing is used or a stabilizing device, limiting patient motion by using the SLB will promote precision. Partial breast brachytherapy has also benefited from SLB positioning. The APBI patient may remain on the SLB from the time of pre-treatment imaging until treatment is completed, reducing the possibility of device rotation

CONCLUSIONS

A padded sliding board is now commercially available, offering a means for improved precision of HDR brachytherapy.

It is convenient for staff, providing easy access to and visualization of the applicators and ease of patient transfers.

CT and MR compatibility allow the patient to remain in a stable position during imaging for planning until treatment has been delivered.

The author has been directly involved in the recent commercialization of the Slessinger Board. It offers improved brachytherapy treatment precision and facilitates the process.

REFERENCE

Slessinger, E. D.: Practical considerations for prostate HDR brachytherapy, Brachytherapy. 2010. 9 (3): 282-287

