

## MEditorial January 2012

### “The Heat is On”

I am one whose mood responds well to the Santa Ana winds, which bring warmth and a feeling of comfort amidst drearier January days in Southern California. It is postulated that these and other similar winds (e.g. Siroccos in North Africa) create atmospheric ionization, with the positive and negative ions created having different physiologic and psychological effects. Positively charged ions may influence mood, relaxation and energy via melatonin, a hormone produced in the brain.

Another form of “ionizing radiation” is radiation therapy, which has been used to treat localized prostate cancer for many years. Indeed there has been a revolution in this science, even since I finished medical school. Before the 1980’s external radiation, mainly via photons (atomic particles of light energy)/electrons, were aimed at the area of the prostate but could not be precisely focused so as to avoid injury to surrounding tissues, even the skin. Seed implants, if used, had to be placed via an open incision with surgical exposure of the prostate gland [a bit more of which would have allowed removal of the cancerous gland!].

Side effects of radiation limited the dosage, which in turn led to poorer cancer outcomes than with removal of the gland (radical prostatectomy). Significant gastrointestinal/rectal, as well as urinary side effects were not infrequently seen--and are still seen, more so in our older prostate cancer patients treated well over 20 years ago.

Although there are many types of radiation and sometimes non-electron (i.e., proton) particles used, the net thrust can be summed up as: “increase or boost the radiation dose to the prostate and immediately surrounding tissues to kill all cancer cells and reduce the dose to surrounding tissues, especially rectum and bladder”. The need for this goal led 1<sup>st</sup> to “conformal external radiation,” with several beams coming at the prostate from different directions, and within the last 15-20 years, IMRT (intensity-modulated radiation therapy). IMRT, as with other external sources, is administered over about 6 weeks to limit the daily dose,

but uses a sophisticated system to “shape” the radiation beam to the individualistic anatomy of the prostate by opening and closing tiny windows known as collimators (often using tungsten barriers) thus partly interrupting the beam and deforming it away from normal structures. This technology safely allows a higher radiation dose, often 75-80 Gy, pronounced “gray” (a unit of radiation), lethal to most prostate cancer cells.

Modifications to IMRT systems are based on the premise that the prostate may slightly “move” both within a session and from day-to-day treatments based on degree of rectal and bladder fullness. One would not therefore want the radiation beam to omit treating some prostate tissue or to “get” the innocent bystander contiguous structures. Tomotherapy and “Rapid Arc” are examples of the “IGRT” radiotherapy, IG standing for image-guided, integrating active “real-time” imaging into the treatment protocol [initially calculated by a radiation oncologist and physicist].

Brachytherapy, which can be a stand-alone radiation treatment or used in conjunction with above-stated external sources, implies either (1) permanent seeds giving off slow radiation and implanted into the prostate as an outpatient one-time procedure, or (2) temporary needles allowing conduction of electron beam radiation into the prostate via plastic needles removed right after each session. The needles used in either case to enter the prostate are passed under ultrasonic guidance between the scrotal area and rectum under anesthesia. These treatments, used as sole therapy, probably have as high a cure rate for the typical low grade prostate cancers as IMRT or radical prostatectomy --but are limited by their inability to radiate much beyond the outer capsule of the prostate (a not uncommon area of early local cancer cell penetration); as well as more irritation, and more urinary tract side effects, especially with permanent seeds, to the urethra. On the other hand, for the most part, brachytherapy has fewer rectal side effects vs. external sources.

Proton beam therapy has certain characteristics that make it more targeted to the prostate and not giving off much radiation before either entering or exiting the prostate. It is felt to be an effective and safe form of external radiotherapy.

Proton beam facilities are expensive to build and therefore costly to administer; and are geographically limited. There are no clear-cut unbiased “scientifically done” studies to say proton beam is better than IMRT either in terms of cancer outcome or side effects.

Besides avoiding surgery, one benefit to prostate radiation is essentially no urinary leakage--compared to a definite risk with radical (open or robotic) prostatectomy. With surgery, the chance of significant leakage lasting more than 6 months is well under 5%; but anywhere from 10-30% of men experience some, perhaps a minor degree of ongoing incontinence. Urinary side effects, if they do occur during or after radiation, are often graded “more severely bothersome” by men than is incontinence, per se--and can include occasional bleeding, pain, urgency and frequency.

Impotence is common to all treatments for prostate cancer. Preservation of potency is better than ever with both modern radiation therapy and technical refinements in (open and robotic) radical prostatectomy. One should expect a 25% or greater drop-off in erectile rigidity after any of these treatments and possible permanent ED. The worse results are with older men, generally 70+ and/or those with weak erections from the start. Men who choose radiation for their prostate cancer often note good erections initially--with progressive deterioration over 2-3 years; during the same time course after radical prostatectomy, erections may actually improve from at 1<sup>st</sup> a dismal situation. I myself would not suggest choosing radiation over surgery for potency issues alone.

I think radiation therapy is a good prostate cancer therapeutic option, comparable in outcome but different as regards side effect profile vis-à-vis radical prostatectomy. For early, likely curable prostate cancer, the statistics for freedom from PSA recurrence as well as disease-free survival are similar, likely for 10-15 years after therapy. For locally very aggressive prostate cancer (we urologists can identify that smaller fraction of men), radiation therapy with the addition of hormonal therapy (i.e., “anti-testosterone” drugs) MAY provide better local control of the cancer; but these, unfortunately, are the type of patients who have

a higher failure rate with either primary modality of treatment and whose disease may nonetheless progress.

As one urologist with two close blood relatives (one against my advice!) having been treated with external beam radiation therapy, I feel I am open-minded about this approach. All of us who care for men with prostate cancer need to be so and offer choices; while at the same time guiding a patient to the right solution based on his individual situation and needs.

**Dr. Alan Freedman**

**401 Old Newport Blvd., Suite 101**

**Newport Beach, CA 92663**

**Phone: (949) 645-3434**

**FAX: (949) 645-0277**