

September 14, 2010

Cremation following Prostate Brachytherapy

The BC Cancer Agency has been performing prostate brachytherapy using seeds of radioactive Iodine-125 since July 1998 at its Vancouver Centre. Patients have been issued with wallet cards indicating that they have received the implant and requesting that the BCCA Radiation Safety Officer be contacted for information should the patient require surgery or expire within a two year period post-implant. During their pre-implant consultation, these patients are advised that cremation will not be permitted should they die within two years. The two year period was adopted after discussions with the Registrar, Cemetery and Funeral Services, Ministry of the Attorney General, based on an analysis¹ of four possible scenarios which could result from cremation of an implanted patient.

In a recent article, William Que² concludes that the body of a prostate implant patient may be safely cremated at any time, based on the assumption that the seeds rupture at the temperatures encountered in cremation and the radioactive Iodine is released through the stack of the crematorium into the atmosphere. The article cites two currently unavailable reports to the U.S. Nuclear Regulatory Commission (USNRC) and the analysis and conclusions appear to be based on USNRC regulations rather than those of the Canadian Nuclear Safety Commission.

A recent case in the lower mainland indicates that the assumption that the seeds rupture during cremation is not necessarily valid. In early December, a deceased prostate implant patient was cremated nineteen (19) months post-implant. The crematorium operator detected radioactive material among the remains using a hand-held geiger counter and contacted the BC Cancer Agency for assistance. Ultimately, 99 apparently intact seeds, 2 visibly damaged seeds, and 6 radioactive fragments of seeds were recovered from cremated remains of the patient and the next body cremated and the cremation chamber itself. The original implant had consisted of 108 seeds. Subsequent assay of the apparently intact seeds demonstrated that the activity was mostly confined to the interior of the seeds with very minimal surface contamination.

The presence of apparently intact seeds in the cremated remains effectively changes the issue from one of public health (exposure to radioiodine released through the crematorium stack) to one of occupational health (potential exposure of crematorium staff to free radioiodine if the remains are processed in the normal manner). A typical implant would require a period of twenty (20) months to decay to the point where the total activity remaining in the implant was equal to the Annual Limit of Intake (ALI) of Iodine-125 by inhalation for workers. At this time, the BC Cancer Agency considers it prudent to maintain our recommendation that cremation not be permitted for two years post-implant. This provides an additional two half-lives and results in

¹ Kennelly, G.M., "Prostate Brachytherapy and Cremation: An Estimate of Hazards", presented at the Annual Meeting of the Canadian Radiation Protection Association, Montreal, June 2000.

² Que, W., "Radiation safety issues regarding the cremation of the body of an I-125 prostate implant patient", *Journal of Applied Clinical Medical Physics*, Vol. 2, No. 3, Summer 2001, pp.174-177.

a typical implant containing one-quarter of an ALI. The actual fraction of the activity in the remains which is likely to be inhaled by a worker is unknown at this time. A further recommendation to the funeral service providers will be that only major bone fragments - which are unlikely to contain any seeds - be processed.

While the wallet cards carried by patients have resulted in physicians contacting the BC Cancer Agency for information if future surgery is contemplated, they have - at least in the case above - failed to provide the desired level of information to funeral service providers. Although the therapy completion letter currently sent to the referring physicians by the BCCA radiation oncologists contains a request that the presence of the implant be noted on the "Medical Certificate of Death", this has not always been the case.

The BC Cancer Agency would greatly appreciate the assistance of the physicians and members of the Coroner's Service in the province in ensuring that the funeral service providers receive notification regarding the presence of a radioactive implant via the "Medical Certificate of Death". Rather than worry about post-implant time frames, physicians and coroners should simply note the presence of any implants known to them. This notification will alert funeral service providers to contact the BC Cancer Agency for information regarding the implant and any recommended procedures to follow based on the actual activity remaining at the time.

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