

Dose Verification of the Brachytherapy System via MCNP

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Figure 1: Brachytherapy as an effective and safe way to treat prostate cancer.

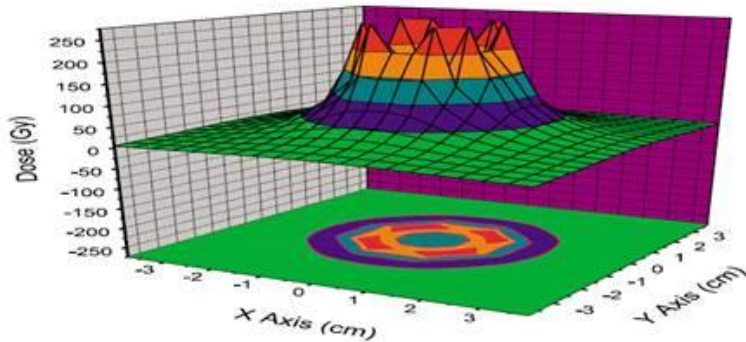


Figure 2. An example of an MCNP calculation taken from a related literature.

Background of the Study : Prostate cancer is one of the leading causes of death among men, usually men with age fifty and above. Of course, there are many other factors to consider like genetics, diet, medication, obesity, and sexually transmitted diseases or STDs. The symptoms of prostate cancer are frequent urination, difficulty in urinating, pain in urinating, presence of blood in the urine, pain when ejaculating, and difficulty in achieving erection. Internal radiation therapy, or more commonly known as brachytherapy, is a safe and effective way to treat prostate cancer. Low – energy photon emitting sealed sources, or generally known as seeds, are injected to the prostate that will eradicate the tumour. Iodine – 125 and, recently, Palladium – 103 are the usual seeds used in brachytherapy. Iodine – 125 has a half – life of 60.1 days and it emits gamma rays. It has a recommendation dose of 144 Gy with 80% of that dose being delivered in 140 days. Monte Carlo N – Particle calculation, or generally known as MCNP, is usually used to make simulations for a better treatment planning. MCNP can help in pinpointing where the seeds must be placed in the prostate for best results. Usually, seeds that emit higher doses are placed in the centre of the tumour while seeds that emit lower doses are placed in the outer part of the tumour to preserve the healthy tissues around the prostate.



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