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Viability of Co-60 & Ir-192 source for HDR brachytherapy unit: Bangladesh perspective

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Brachytherapy is one of the cancer treatment management besides external beam radiotherapy (EBRT). At present Brachytherapy treatment is moving from Low Dose Rate (LDR) to High Dose Rate (HDR) due to its radiation protection advantage. HDR Brachytherapy is a highly versatile system for enhancing cure and achieving palliation in many common cancers of developing countries. In Bangladesh, in this moment 6 new HDR Remote afterloading (RAF) units will be installed. But at present it is a burning question of any hospital in our country regarding installation of HDR RAF Unit which source either Co-60 or Ir-192 will purchase. For this purpose before establishment of Brachytherapy HDR unit one should have in mind to know the shielding aspects, physical aspects, technical aspects and economical aspects for this 2 source. To find out a logical answer which source either Co-60 or Ir-192 are clinically and economically more viable, this work has been done. HDR Brachytherapy should be carried out in specially designed shielded treatment rooms where as LDR treatment performed in a ward area.

Three materials concrete, lead, steel, and have been used for shielding purpose. Shielding thickness for both HDR units is for primary barriers walls (East, West, North, and South) have been calculated. The protocols used for this work is National Council Radiation Protection and Measurements (NCRP),International Atomic Energy Agency (IAEA), International Commission on Radiological Protection (ICRP) and Basic Safety Standard (BSS) and Safety Series-47. For HDR Ir-192 unit the calculated value of the shielding thickness using concrete materials is as follows, East wall 35.8 cm, North wall 53.2 cm, West wall 55.6 cm, South wall 24.3 cm, Maze wall 34 cm, The thickness using steel materials East wall 10.1 cm, North wall 15.1 cm, West wall 15.7 cm, South wall 6.7 cm, Maze wall 9 cm, The thickness using lead materials East wall 3.8 cm , North wall 5.6 cm, West wall 5.9 cm, South wall 2.6 cm, Maze wall 3 cm. For Co-60 unit the calculated value of the thickness using concrete materials is as follows, East wall 51.4 cm, North wall 76.3 cm, West wall 79.8 cm, South wall 34.8 cm, and Maze wall 43 cm. The thickness using steel materials East wall 16.7 cm, North wall 24.9 cm, West wall 26.0 cm, South wall 11.3 cm, Maze wall 14 cm, The thickness using lead materials East wall 9.7 cm, North wall 14.4 cm, West wall 15.0 cm, South wall 6.5 cm, Maze wall 8 cm. In all calculation have been done using all area outside 4 walls is fully (T=1) occupied.The Medical physicists & Biomedical Engineer are the professional personnel for all steps during the set up the all procedures. This may shorten the time in obtaining the proper way to establishment of Brachytherapy unit.

Biography

MasudRana is presently working as a Medical Physicist (Radiation Oncology Department). Before he worked at National Institute of Cancer Research & Hospital, Mohakhali, Dhaka. He is having national and International publications. Nationally he attended various conferences.

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