

Conformal radiation therapy

Conformal [radiation therapy](#) is a type of [external beam radiation therapy](#). For this procedure, the same type of machine used for regular radiotherapy treatment is combined with a specialized device called a multi-leaf collimator.

The multi-leaf collimator is made up of metal bars fixed to the radiotherapy machine. The bars block the radiation beams to change the shape of the area being treated. Each bar can be adjusted so that the radiation beams conform to the shape and size of the tumour.

Conformal radiation may also aim the radiation beams from several directions to better target the tumour and spare more of the nearby structures than conventional radiation therapy.

Uses

Conformal radiation therapy allows higher doses of radiation to be given to the tumour. The surrounding normal tissue receives less radiation, which lessens the chances of side effects. Conformal radiation is used to treat many cancers. It is especially useful if the tumour is close to important organs or body structures because high doses of radiation can be given with little risk to healthy tissue.

Hypofractionated conformal radiotherapy (hfCRT) is used for larger brain metastases or metastases near critical structures.

5×6Gy hfCRT provides acceptable local control (LC) at 1 year for limited brain metastases. For large lesions not grossly resected, more aggressive strategies can be considered to improve LC ¹⁾.

Procedure

Computed tomography (CT) scans or magnetic resonance imaging (MRI) are used to create a precise 3-dimensional (3-D) image of the tumour. The exact shape of the tumour is programmed into a computer and used to plan radiation treatment. The computer model of the tumour is used to set the multi-leaf collimators so the radiation beams match the shape of the tumour.

Types

There are 2 main types of conformal radiation therapy: 3-dimensional conformal radiation therapy (3-D CRT) 3-D CRT delivers shaped radiation beams aimed from several different directions at the tumour. The radiation beams are all the same strength. intensity-modulated radiation therapy (IMRT) IMRT is a way of giving conformal radiation therapy in a targeted way. The beam strength varies across the treatment area. The tumour receives radiation from a series of small beams of different strengths. A multi-leaf collimator is used to shape and deliver these small beams. The bars of the multi-leaf collimator are moved while the radiation is given. A crossfire technique (beams come from 2 or more directions at the same time) creates a constant dose and spares the surrounding tissues. IMRT shapes the treatment beams very precisely and allows the dose of radiation to be adjusted for different parts of the treatment area. IMRT uses specialized equipment, so it might not be available at

all cancer treatment centres in Canada.

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Lockney NA, Wang DG, Gutin PH, Brennan C, Tabar V, Ballangrud A, Pei X, Chan TA, Yamada Y, Yang TJ, Beal K. Clinical outcomes of patients with limited brain metastases treated with hypofractionated (5×6Gy) conformal radiotherapy. *Radiother Oncol*. 2017 May;123(2):203-208. doi: 10.1016/j.radonc.2017.03.018. Epub 2017 Apr 5. PubMed PMID: 28390657.

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