

Short note on stereotactic radiosurgery

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DESCRIPTION

Stereotactic radiosurgery (SRS) is an approach of providing radiation to brain tumors, which can be done instead of surgery. It uses 3D imaging to target high amounts of radiation to the damaged area with minimal effect on the surrounding healthy tissue. It is used to treat tumors that begin in the brain as well as brain metastases. SRS is a definite form of therapeutic radiation that can be used to treat deformities in the brain and spine, as well as cancer, epilepsy, trigeminal neuralgia and arteriovenous malformations. It doesn't require any incision or aperture; it focuses beams of X-rays at impaired tissues through the skin from numerous directions.

Similar to other forms radiation, stereotactic radiosurgery functions by damaging the DNA of the specified cells. The affected cells then lose the capability to replicate, which affects tumors to diminish.

Stereotactic radiosurgery of the brain and spine is usually done in a single session. SRS was at first progressed to treat small, deep brain tumors. At present, it may be used for an extensive range of problems in the brain and other parts of the body. Doctors practice this method to treat areas that are hard to reach or adjacent to vital organs, or they utilize it to treat tumors that have developed inside the body. A few cases of problems that doctor can mark with SRS include:

- deep brain tumors
- residual tumor cells after surgery
- pituitary tumors
- eye cancers
- arteriovenous malformations, which are coiled blood vessels that leak and disrupt your normal flow
- neurological problems, such as trigeminal neuralgia
- Parkinson's disease
- Epilepsy

SRS is used to treat:

- Several types of brain tumors includes:
- benign and malignant
- primary and metastatic
- single and multiple
- residual tumor cells following surgery
- intracranial, orbital and base-of-skull tumors

An arteriovenous malformation (AVMs), a coil of expanded blood vessels that retards normal blood flow in the brain and at intervals bleeds.

Other neurological conditions such as trigeminal neuralgia (nerve impairment in the face), tremor, etc.

There are three techniques that are used to deliver radiation in stereotactic radiosurgery in the brain as well as in other parts of the body:

1. Linear accelerator machines utilize X-rays to treat cancerous and noncancerous distortion in the brain and other parts of the body. These machines can be performed on stereotactic radiosurgery (SRS) in a single session or over three to five sessions for huge tumors, which is called fractionated stereotactic radiotherapy.
2. Gamma Knife machines utilize 192 or 201 small beams of gamma rays to target and treat cancerous and noncancerous brain distortion. Gamma Knife machines are not as much as common than LINAC machines and are used predominantly for small to medium tumors and lesions in the brain related with a variety of conditions.
3. Proton beam therapy (charged particle radiosurgery) is the advanced type of stereotactic radiosurgery and is convenient in only a few research centres in the U.S, although the number of centres offering proton beam therapy has considerably increased in the last few years. Proton beam therapy can treat brain cancers in a single session using stereotactic radiosurgery, or it can use fractionated stereotactic radiotherapy to treat body tumors over several sessions.

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