

Stereotactic Interstitial Iodine-125 Brachytherapy for Treatment of Brain Tumors

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Management, treatment, and survival of patients with some of brain tumors as glioblastoma multiforme (GBM) and brain metastasis have been remained the greatest clinical challenges despite recent advances in neurosurgery, radiation, and chemotherapy. Stereotactic interstitial brachytherapy (IBT) using iodine-125 seeds (I-125) can deliver high doses of radiation to a tumor with only low doses irradiating surrounding tissues. It has a rich history in the treatment of central nervous system tumors since the first treatment being carried out by Hirsch et al. in 1912, and iodine-125 was first used for stereotactic iodine-125 brachytherapy, in 1984 by Gutin and colleagues¹. This iodine seed can be used to treat several types of cancer including prostate, lung, ocular and brain. Recently, iodine-125 seed was made in Iran by Atomic Energy Organization of Iran under supervision of International Atomic Energy Agency. Hence, this letter aims to highlight the merits of iodine-125 brachytherapy in treatment of brain tumors.

A literature review by Schwarz et al., indicated that, survival rates with relatively low complication rates and a good quality of life were observed after IBT using I-125, for highly selected patients with newly diagnosed or recurrent primary or metastatic brain tumors². Recently, Barbarite et al. showed that patient outcomes and overall survival improved with more aggressive radiotherapy parallel with increased risk of radiation-related complications. They reported that IBT using I-125 for GBM can be used alone or in combination with other therapies such as surgery, external beam radiotherapy and chemotherapy³.

Raleigh et al., reported that IBT using I-125 was an effective strategy for achieving local control of brain metastasis⁴. They indicated that with careful patient

selection, this treatment regimen was associated with minimal toxicity and could result in long-term survival for some patients. In addition, Romagna et al. reported iodine-125 brachytherapy as upfront and salvage treatment for brain metastases⁵. Majdoub et al., indicated that IBT using I-125 achieved local control rates comparable to surgery and radio-/chemotherapy treatment for patients with oligodendroglial brain tumors⁶. Magill et al., recommended adjuvant brachytherapy as an option for patients with recurrent high-grade meningiomas⁷. In addition, Shahzadi et al., reported that long-term results for patients with circumscribed and relatively small size tumors appeared to be a safe, feasible, and minimally-invasive treatment. They also prepared a guideline for patients' selection to perform this modality¹.

However, Iodine-125 brain brachytherapy in Iran is facing a number of challenges issues including lack of dedicated operating room, anesthetists, equipment, radiation oncologists, medical physicists, radiotherapy technologists and stereotactic radiosurgery experts. Furthermore, cost effectiveness in addition to efficacy and risk is uncertain. Therefore, getting a personalized and individualized care such as brain brachytherapy has some limitations and the brain brachytherapy treatments has not received first priority for reimbursement. The achievement of self sufficiency in the field of brachytherapy depends on production of iodine-125 seed for brain brachytherapy. Consequently, the development of a remote controlled HDR machine in the country and the development of the treatment planning software are recommended.

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