Gamma Knife Pituitary Radiosurgery for Intractable Pain: Trial Experience and Preliminary Results

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[Rationale] Before two or three decades, cancer pain had been treated by surgical/chemical hypophysectomy. And there was a report that central pain (thalamic pain syndrome) was also tried to be controlled with chemical hypophysectomy. As the clinical results, hypophysectomy provided most of the patients to release from severe pain. However, severe adverse effects (panhypopituitarysm, diabetus insipidus, and visual dysfunction) had been accompanied in almost patients. These historical evidences prompt us to perform gamma knife surgery (GKS) for control of this kind of intractable severe pain with highly irradiation dose to the pituitary stalk/ gland as an alternative hypophysectomy. This method has provided majority of the patients to release from severe pain, and surprisingly without any complication mentioned above.
[Material and Method] An indication of this treatment for our proposal indication: 1) No any other effective treatment prior to GKS, 2) General condition is kept to be good (KPS>40%), 3) Morphine is effective for pain control (for cancer pain), 4) No previous treatment with radiation (GKS/conventional radiotherapy) for brain metastasis. We have treated 10 patients who were suffered from severe cancer pain due to bone metastasis with GKS, and 19 patients who were suffered from post-stroke thalamic pain syndrome. The target was the just border in between the pituitary stalk and gland. Maximum dose was 160-180 Gy for cancer pain and 140-180Gy for central pain. We could follow up all patients (>1 months) with cancer pain and 10 patients (> 6 months) with thalamic pain syndrome.
[Results] All patients (10/10) with cancer pain experienced significant pain reduction, and 70%(7/10) of the cases with thalamic pain syndrome experienced significant pain reduction initially. Some of patients felt pain reduction within several hours later. Pain reduction was appeared within 7 days (median 2 days). No recurrence was observed in the patients with cancer pain, on the other hand, real recurrence was seen in 71.4% (5/7) of the cases with thalamic pain syndrome over 6 months follow-up. No any other complication was observed in all cases up to now.
[Conclusions] Our clinical study protocol is not mandatory and still insufficient. Particularly, much more investigation for clinical results of GKS in the patients with thalamic pain syndrome is needed to optimize this treatment protocol. However, the efficacy and safety have been shown in all our cases. We believe this treatment has a potential to control well for severe pain, and GKS will play a much important role in the field of the management of intractable pain.