Pituitary Radiosurgery for Management of Intractable Pain Syndromes: Overview of Reported Results

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Abstract

Introduction: Surgical hypophysectomy for management of intractable pain caused by metastatic cancer was introduced in 1953 by Luft and Olivecrona. Subsequently, less-invasive modifications of this technique were developed. Clinical applications of such treatment have reportedly resulted in pain relief in 40–100% of patients, but were frequently accompanied by major complications. Alternatively, pituitary radiosurgery (PR) targeting the junction of the pituitary stalk and gland attains comparable pain relief with minimal morbidity. [1-3]

Method: The objective of the present review was analysis of the reported results of PR for management of intractable pain syndromes. From 1972 until 2022, 7 uncontrolled series involving small numbers of patients (from 7 to 27) and 3 case reports on clinical applications of such treatment were published.

Result: Irradiation doses varied in different series from 140 to 200 Gy. No significant morphological changes of the pituitary stalk and gland were observed on MRI within 6 months after treatment. According to available publications, at least temporary pain relief after PR was noted in 68 of the 77 evaluated patients (88%), and was usually observed within few days after irradiation. The analgesic effects were most frequent and durable in the presence of metastatic bone disease, but were not limited to that pathological condition or to cases of hormone-dependent cancers. On the long-term follow-up after PR, hormonal changes were noted in 14-33% of patients, but panhypopituitarism was never reported. Diabetes insipidus was marked in 6-14% of patients. Reported neurological complications were limited to aggravation of numbness after thalamic stroke (accompanied by significant reduction of pain), and temporary abducent nerve palsy (one case each). There was one report on late osteonecrosis of the sellar turcica with rhinorrhea and meningitis at 9 years after PR. Treatment-related visual disturbances were never reported.

Discussion: PR has demonstrated highly promising results in management of intractable pain syndromes caused by disseminated cancer (in particular, metastatic bone disease) and thalamic stroke. According to the available data, the analgesic effects of this procedure are comparable with those of both surgical and chemical hypophysectomy, but only a few associated side effects and complications are observed. The physiological mechanism beyond the analgetic effects of PR remains elusive. Moreover, the low-quality studies reported to date provide only level IV evidence of the efficacy of such treatment and do not support any meaningful clinical recommendations. Currently, at least 4 prospective clinical trials of such treatment are undergoing (in USA, France, and China), and their results are highly anticipated.

Conclusions:Further clinical and basic investigations will bolster further developments in PR for management of intractable pain syndromes and expand its clinical role.

References

1. Larkin MB, Karas PJ, McGinnis JP, McCutcheon IE, Viswanathan A. Stereotactic radiosurgery hypophysectomy for palliative treatment of refractory cancer pain: a historical review and update. Front Oncol. 2020;10:572557.
2. Chernov MF, Hayashi M. Pituitary radiosurgery for management of intractable pain: Tokyo Women's Medical University experience and literature review. Acta Neurochir Suppl. 2021;128:133-44.
3. Hu Y, Zhang W, Chen Z, Wu X, Xue S, Mao Y, Yi P, Wei J, Qian D, Wang X, Zhang P, Long H. Hypophysectomy, pituitary neuroadenolysis and pituitary radiosurgery for the treatment of refractory cancer pain: a historical review and mechanism investigation. Front Neurol. 2025;15:1529944.