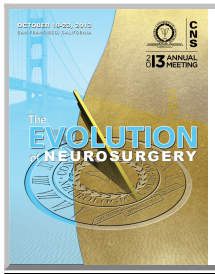

Long-Term Follow-Up Result of Hydroxyurea Chemotherapy for Recurrent Meningiomas

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Introduction

Meningiomas represent 18-20% of all intracranial tumors and have a 20-50% 10-year recurrence rate, despite aggressive surgery and irradiation. Hydroxyurea, an inhibitor of ribonucleotide reductase, is known to inhibit meningioma cells by induction of apoptosis. We report the long-term follow-up result of hydroxyurea therapy in the patients with recurrent meningiomas.

Methods

Thirteen patients with recurrent WHO grade I or II meningioma were treated with hydroxyurea (1000 mg/m2/day orally divided twice per day) from June 1998 to February 2012. Nine female and 4 male, ranging in age from 32 to 83 years (median age 61.7 years), were included. Follow-up assessment included physical examination, computed tomography, and magnetic resonance imaging (MRI). Standard neuro-oncological response criteria (Macdonald criteria) were used to evaluate the follow-up MRI scans. The treatment was continued until there was objective disease progression or onset of unmanageable toxicity.

Table1

Table 1. Demographic data of meningioma patient cohort receiving hydroxyurea chemotherapy

Patient	Age	Sex	Location	Pathology (WHO grade I/II)	RT	Surgeries
1	52	F	Tuberculum sellae	I	Y	1
2	50	F	Cerebellopontine angle	I	N	1
3	54	M	Planum sphenoidale	I	N	1
4	49	M	Sphenoid ridge	I	N	2
5	49	F	Frontoparietal convexity	I	N	1
6	72	F	Frontoparietal parasagittal	I	N	1
7	68	F	Cerebellopontine angle	I	N	1
8	32	M	Petrous apex	I	N	2
9	79	F	Frontal parasagittal	II	N	1
10	66	F	Parietal parasagittal	II	N	1
11	83	M	Frontal parasagittal	II	N	1
12	75	F	Parietoccipital convexity	II	N	1
13	73	F	Parietalconvexity	II	N	1

RT : radiation therapy, F : female, M : male, Surgeries : numbers of surgery

Results

Ten of the 13 patients (76.9%) showed stable disease after treatment, with time to progression ranging from 8 to 128 months (median 72.4 months; 6 patients still accruing time). However, there was no complete response or partial response in any patients. Three patients had progressive disease after 88, 89, 36 months, respectively. There was no severe (Grade III-IV) blood systemic disorders and no episodes of non-hematological side effects.

Table2

Table 2. Response and toxicity date of meningioma patient cohort receiving hydroxyurea chemotherapy

Patient	TTP (months)	Response	Dosage reduced	Hematologic toxicity
1	128+	SD+	No	No
2	84	SD	No	No
3	63+	SD+	No	No
4	85+	SD+	No	No
5	66+	SD+	No	No
6	88	SD→PD	No	No
7	115	SD	No	No
8	89	SD→PD	No	No
9	77+	SD+	No	No
10	92+	SD+	No	No
11	36	SD→PD	No	No
12	8	SD	No	No
13	10	SD	No	No

TTP : time to tumor progression, SD : stable disease, PD : progressive disease , + : following up at present

Conclusions

This study showed that hydroxyurea is a modestly active agent against recurrent meningiomas and can induce long-term stabilization of disease in some patients. We think that hydroxyurea treatment is well tolerated and convenient, and could be considered as an alternative treatment option in patients with recurrent meningiomas prior to reoperation or radiotherapy.

Figure1

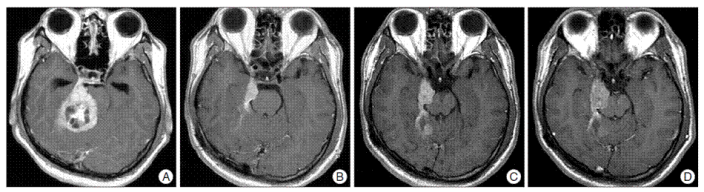

Fig. 1. Axial T1-weighted gadolinium-enhanced magnetic resonance (MR) images of patient 8 in Table 1, 2. A : Preoperative MR image demonstrating an enhancing mass lesion at the petrous apex with brainstem compression. B : Postoperative MR image demonstrating a remained mass lesion at petrous apex. C : MR image at 42 months after the operation demonstrating increased the mass. Hydroxyurea was started. After then, the tumor had been a stable disease. D : MR image at 89 months after initiation of hydroxyurea treatment demonstrating more increase the tumor and midbrain was compressed by tumor mass.

Learning Objectives

Hydroxyurea treatment is well tolerated and convenient, and could be considered as an alternative treatment option in patients with recurrent meningiomas