

Somatostatin-receptor positive brain stem glioma visualized by octreoscan

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Submitted: March 3, 2007 *Accepted:* April 2, 2007

Key words: **brainstem glioma; somatostatin receptor; octreoscan**

Neuroendocrinol Lett 2007; **28**(3):250–251

NEL280307L02 © 2007 Neuroendocrinology Letters www.nel.edu

Abstract

In diffuse brainstem gliomas often surgical biopsies cannot be obtained. The diagnosis relies upon imaging criteria, first line being MRI. Gliomas generally express somatostatin receptors (SSTR), which might enable receptor imaging. We present the case of a female adolescent with acute onset of hallucinations, dysphagia and diplopia. MRI detected a suggestive large pontine glioma. This lesion presented with marked In-111-pentetreotide tracer uptake. SSTR-scan provided information about SSTR-expression, tumour viability and extension. Radiopeptide therapy for selected patients might be discussed.

Diffuse brainstem gliomas constitute 10–15% of all intracranial tumours in childhood. Only in a minority of cases surgical biopsies can be obtained. Therefore the diagnosis relies upon imaging criteria. Medulla oblongata and pontine tumours would appear to have the worst outcome of all brain stem gliomas. Radiation as well as chemotherapy obtain very limited therapeutic effect [1].

Meningeomas and gliomas generally express at least one somatostatin (i.e. a neuroendocrine hormone) receptor (SSTR) subtype [2]. Semiquantitative measurement by PCR reveals moderate

expression in differentiated glial tumours, but tissue containing glioblastomas displayed lower expression of SSTR subtypes [3]. It may be speculated that SSTRs may be relevant only in the context of well differentiated cellular programs but lose their significance with progressive dedifferentiation [4].

Somatostatin-receptor-scan might provide information about tumour extension and possibly select individual patients for related therapies as radiopeptide therapy.

A female adolescent (22 years) presented at the Wagner-Jauregg Hospital with a psychotic clinical

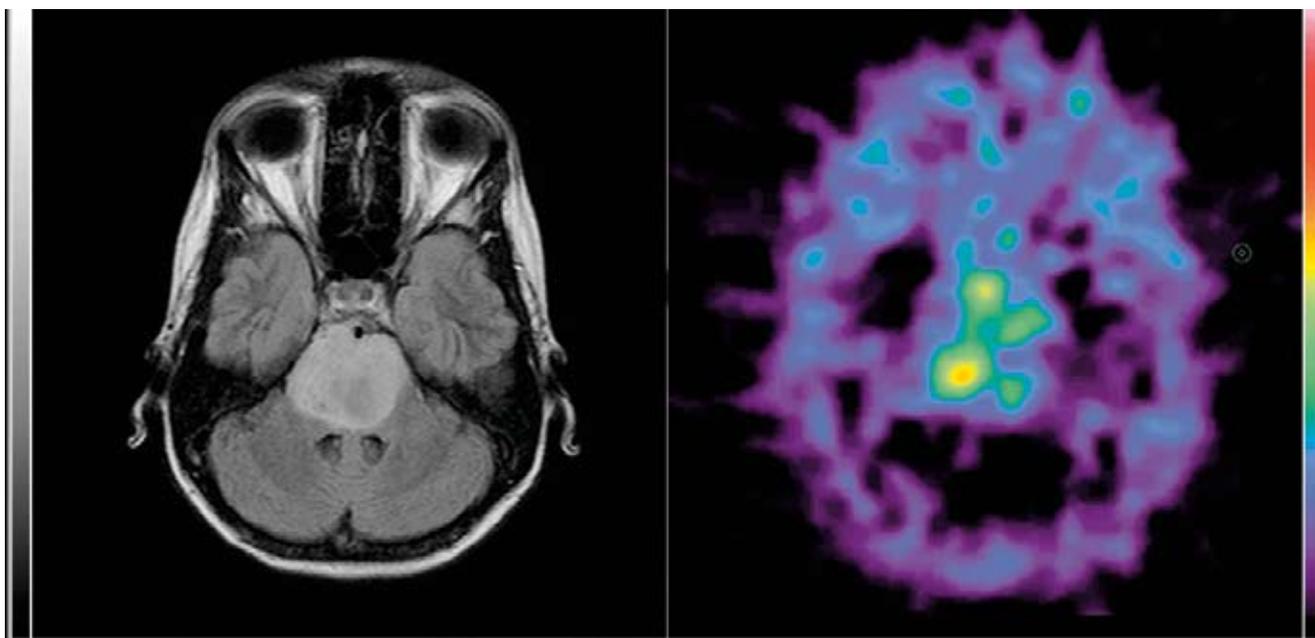


Figure 1. MRI (flair, axial) and 24h-somatostatin-receptor-scan SPECT images of the brain stem glioma: an inhomogeneous marked tracer uptake can be observed in the pontine tumour lesion (more accentuated on the right). The tumour exceeds to the right brachium pontis as observed by MRI.

pattern dominated by anxiety and hallucinations in May 2005. Sporadic cephalgia and dysphagia had developed since half a year. Neurological examination revealed additionally diplopia and paresis of the right abducens nerve. MRI detected a pontine glioma with a maximal diameter of 4cm. Corticoids and chemotherapy accompanied by psycho-pharmaceuticals were initiated without clinical success. In June 2005 the tumour was also investigated by Octreo-Scan (110 MBq In-111-pentetreotide i.v.), brain SPECT images presented a marked tracer uptake in the pontine glioma (see figure1). Scintigraphic pictures were obtained by IRIX three-head-gamma camera. Various alternative individual therapeutic approaches were discussed with the family of the patient. Meanwhile the clinical presentation became worse; she developed a mutistic behaviour and was unwilling to accept further treatment. Considering the fatal prognosis of the disease as well as ethical aspects this decision was respected. She died a few weeks later at a palliative ward.

The role of scintigraphic SSTR imaging in brain tumours is not defined yet. The evidence of predominant expression of SSTR2 in medulloblastomas opens interesting prospects for their diagnosis and therapy [5]. On the other hand, low-grade gliomas such as astrocytomas express SSTR in a high percentage, while glioblastomas are rarely SSTR positive [6]. In brain stem gliomas In-111-pentetreotide scintigraphy may contribute to diagnosis when high SSTR expression is present as in our case. This is of additional importance when biopsy

is not possible and the diagnosis depends upon imaging methods only. All pontine gliomas independent of their grading are considered malignant because of the clinical course of this tumour entity. In individual cases therapeutic options as Y-90 labelled somatostatin analogue radiopeptide therapy (eventually as a palliative approach) might be considered. High SSTR density in the tumour proven by in vivo nuclear medicine methods should be helpful for patient selection.

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