Somatostatin receptor in meningioma

SSTR2A

The expression of somatostatin receptors in meningioma is well established. First, suggestions of a prognostic impact of SSTRs in meningioma have been made. However, the knowledge is based on few investigations in small cohorts.

Fodi et al. analyzed the expression of all five known SSTRs in a large cohort of over 700 meningiomas and demonstrated significant correlations with WHO tumor grade and other clinical characteristics. They therefore expanded the dataset and additionally collected information about radiographic tumor recurrence and progression as well as clinically relevant factors (gender, age, extent of resection, WHO grade, tumor location, adjuvant radiotherapy, neurofibromatosis type 2, primary/recurrent tumor) for a comprehensive prognostic multivariate analysis (n = 666). The immunohistochemical expression scores of SSTR1, 2A, 3, 4, and 5 were scored using an intensity distribution score ranging from 0 to 12. For recurrence-free progression analysis, a cutoff at an intensity distribution score of 6 was used. Univariate analysis demonstrated a higher rate of tumor recurrence for increased expression scores for SSTR2A, SSTR3, and SSTR4 ($p = 0.0312$, $p = 0.0351$, and $p = 0.0390$, respectively), while high expression levels of SSTR1 showed less frequent tumor recurrences ($p = 0.0012$). In the Kaplan-Meier analysis, a higher intensity distribution score showed a favorable prognosis for SSTR1 ($p = 0.0158$) and an unfavorable prognosis for SSTR2A (0.0143). The negative prognostic impact of higher SSTR2A expression remained a significant factor in the multivariate analysis (RR 1.69, $p = 0.0060$). They concluded that the expression of SSTR2A has an independent prognostic value regarding meningioma recurrence [1].

Meningiomas express somatostatin receptor subtype 2 (SST2), which is targeted by the somatostatin analog octreotide. However, to date, using somatostatin analog therapy for the treatment of these tumors in clinical practice has been debated.

This offers an additional positron emission tomography (PET) based imaging for tumor delineation with the somatostatin-receptor ligand 68Ga-DOTA-D-Phe1-Tyr3-octreotide(DOTATOC) [2].

1)
Fodi C, Skardelly M, Hempel JM, Hoffmann E, Castaneda S, Tabatabai G, Honegger J, Tatagiba M, Schittenhelm J, Behling F. The immunohistochemical expression of SSTR2A is an independent prognostic factor in meningioma. Neurosurg Rev. 2021 Oct 2. doi: 10.1007/s10143-021-01651-w. Epub ahead of print. PMID: 34601710.
2)
Dutour A, Kumar U, Panetta R, Ouafik L, Fina F, Sasi R, Patel YC. Expression of somatostatin receptor subtypes in human brain tumors. Int J Cancer. 1998;76(5):620–627. doi: 10.1002/(SICI)1097-0215(19980529)76:5<620::AID-IJC2>3.0.CO;2-S.