

1p/19q Deletion (FISH) in Oligodendrogliomas

Indications for Ordering

- Diagnose oligodendroglioma brain tumors
 - Indicated in both low-grade and high-grade (anaplastic) oligodendrogliomas
- Predict response to therapy in oligodendrogliomas

Test Description

Fluorescent in situ hybridization (FISH)

Tests to Consider

[1p/19q Deletion by FISH 2008604](#)

- Use when oligodendrogliomas are suspected

[IDH1 R132 by Immunohistochemistry 2005857](#)

- Use when morphology indicates tumor may be a glioma
- Use to differentiate tumor from reactive gliosis

[IDH1 R132H Point Mutation with Interpretation by Immunohistochemistry 2007357](#)

- Includes pathologist interpretation

Disease Overview

Prevalence

- 2nd most common glioma in adults
- Accounts for 2% of central nervous system (CNS) tumors

Diagnostic issues

- Malignant gliomas are the most common type of primary brain tumors (>70% of all CNS tumors)
 - Subtypes – astrocytoma, oligodendroglioma, mixed glioma
- Differentiating astrocytoma from oligodendroglioma is crucial
 - Treatment and prognosis differ between tumors
 - Combined loss of chromosomal arms 1p and 19q is characteristic of oligodendrogliomas
 - Gain of chromosome 19 supports diagnosis of high-grade astrocytoma (glioblastoma multiforme)
 - Loss of 1p may identify treatment-sensitive high grade oligodendroglioma (for both chemotherapy and radiotherapy)
 - Prognostic relevance in low-grade tumors less well characterized

Genetics

Gene – chromosomes 1 and 19 involved

Structure/function

Deletion is short arm of 1p and long arm of 19q

- Results in loss of mediators of resistance to therapy

Variants

- 1p/19q codeletion is mutually exclusive for *TP53* and *EGFR* amplification
- 1p/19q codeletion is frequently associated with *IDH1* or *IDH2* variants

Test Interpretation

Results

- Positive
 - Tumors with 1p/19q ratio <0.80 and ≥25% deleted cells are deemed deleted for 1p
 - Tumors with 19q/19p ratio <0.80 and ≥35% deleted cells are deemed deleted for 19q
 - Both deletions are associated with a better prognosis
 - Codeletion has better prognosis than single deletion
 - Presence of codeletion establishes diagnosis of oligodendroglioma
- Negative
 - Does not exclude diagnosis of oligodendroglioma

Limitations

Test should not be used alone for the diagnosis of malignancy