

# BT-RADS Implementation

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V 1.02

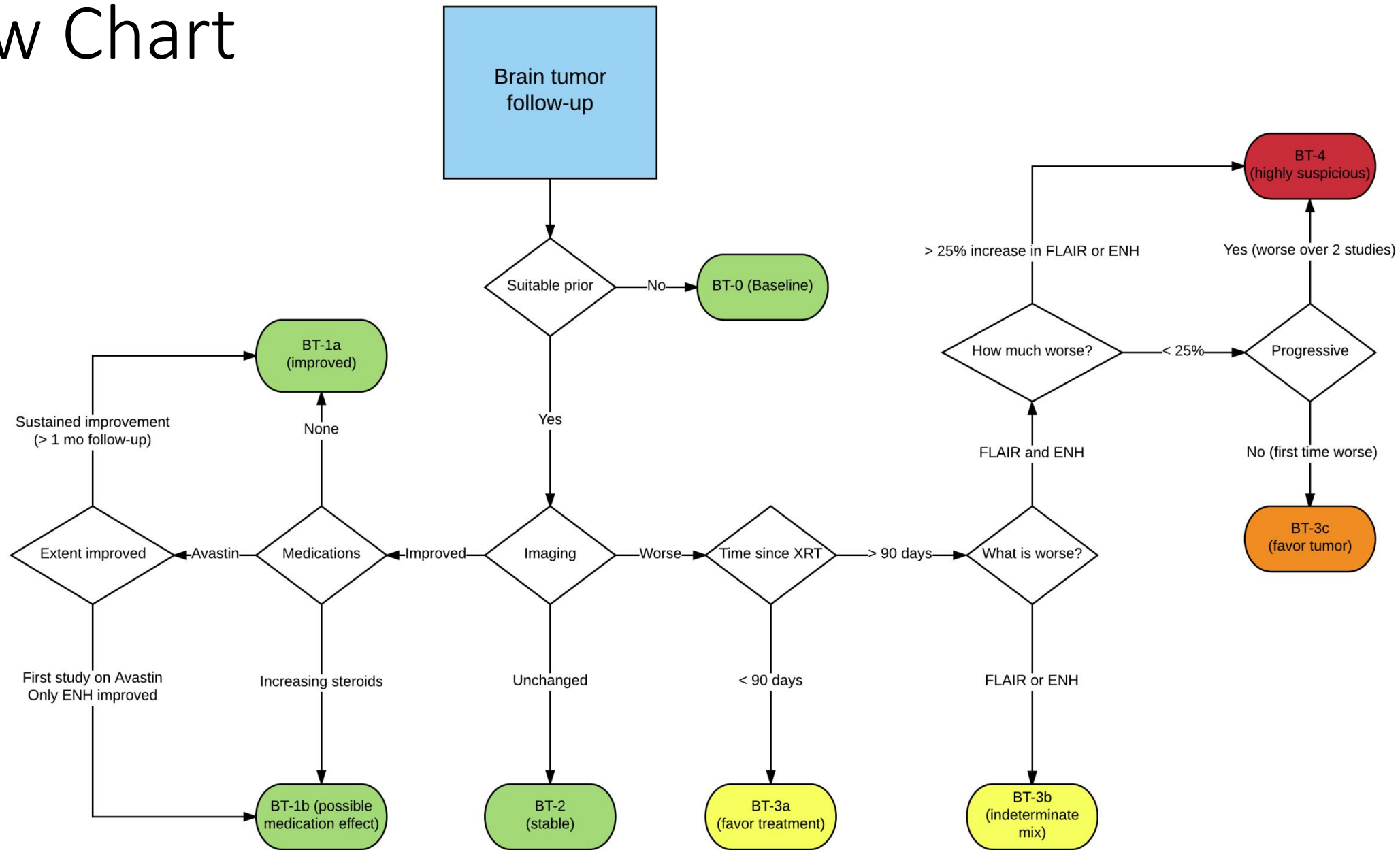
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# Standardized Brain Tumor MR Reporting

- Problem:
  - Variability in reporting MRIs in brain tumor patients limits usefulness to
    - Referring clinicians
    - Patients
- Proposed solution
  - Standardized report for brain tumor reports
  - Impression categories tied to expected management decisions
- Goals:
  - Simple system which can easily be implemented
  - Maximize consistency across section
  - Minimize ambiguity of report outcomes
  - Easily understandable reports
  - Legend at end to assist the reader

| Score | Title               | Subscore                     | Description   | Associated management recommendation                                   |
|-------|---------------------|------------------------------|---|--|
| 0     | Not scored          |                              | <i>New baseline, incomplete study, or otherwise unable to categorize</i>  | Continued follow-up, no change   |
| 1     | Imaging improvement | 1a - Improvement             | Improvement in imaging findings suspected to reflect <i>decreasing tumor burden and/or improving treatment effect</i>               | Continued follow-up, no change   |
|       |                     | 1b – Medication effect       | Improvement in imaging findings potentially due to <i>effect from medications</i> such as increasing steroids or initiating avastin | Continued follow-up, no change   |
| 2     | No change           |                              | <i>No appreciable change</i> from the prior   | Continued follow-up, no change   |
| 3     | Imaging worsening   | 3a – Favor treatment effect  | Worsening imaging findings favored to represent <i>treatment effects</i> , including radiation therapy and medications              | Decreased time interval of follow-up                                   |
|       |                     | 3b – Indeterminate           | Worsening imaging findings favored to represent <i>an indeterminate mix of treatment effect and tumor worsening</i>                 | Decreased time interval of follow-up                                   |
|       |                     | 3c – Favor tumor progression | Worsening imaging findings favored to represent <i>increasing burden of tumor</i>   | Consider change in management vs. Decreased time interval of follow-up |
| 4     | Imaging worsening   |                              | Worsening of imaging findings <i>highly suspicious for tumor progression</i>  | Consider change in management  |

# Flow Chart



# Detailed categorization criteria

# 0: Not Scored

- Baseline study (initial diagnostic MRI or most recent post-op MRI)
- Non-tumor findings obscure diagnosis (e.g. infection)
- Non-diagnostic study or otherwise unable to classify

\*Designated if any of the above 3 criteria are met

# 1a: Improvement

- Decreased enhancing component
- Unchanged or decreased FLAIR component
- No new enhancing or FLAIR lesions
- Unchanged or decreased mass effect
- Clinically stable or improved

-OR-

- All of the above
- On Avastin with response confirmed by 4-week follow up

\*All criteria for one scenario should be met

# 1b: Medication Effect

- Decreased enhancing component
- Unchanged or decreased FLAIR component
- No new enhancing or FLAIR lesions
- Unchanged or decreased mass effect
- Clinically stable or improved
- On increasing doses of steroids or first post-Avastin imaging with decreased enhancement only

\*All criteria should be met



## 2: No Change

- Unchanged enhancing component
- Unchanged FLAIR component
- No new enhancing or FLAIR lesions
- Unchanged mass effect
- Clinically stable

\*All criteria should be met

# 3a: Favor Treatment Effect

- Imaging worsening within 12 weeks of completing most recent CRT
- One or both of the following:
  - Increased enhancing component
  - Increased FLAIR component
- No new enhancing or FLAIR lesions outside of XRT treatment zone
- Increased mass effect
- Clinically stable

\*All criteria should be met

## 3b: Indeterminate

- Imaging worsening outside 12 weeks of completing CRT
- One of the following:
  - Increased enhancing component
  - Increased FLAIR component and increasing mass effect
- No new enhancing or FLAIR lesions outside of XRT treatment zone
- Clinically stable

\*All criteria should be met

## 3c: Favor Tumor Progression

- Increased enhancing component less than 25%
- Increased FLAIR component less than 25%
- No new enhancing or FLAIR lesions outside XRT treatment zone
- Increased mass effect
- Clinically worse

-OR-

- New indeterminate lesion outside of XRT treatment zone (e.g. FLAIR lesion without enhancement)

\*All criteria for one scenario should be met

# 4: Progression

- Progressive increase in enhancing or FLAIR component over multiple studies over time
- Progressive increase in mass effect over multiple studies over time
- Progressive clinical deterioration

-OR-

- Increased enhancing component greater than 25%
- Increased FLAIR component greater than 25%
- Increased mass effect
- Clinically worse

-OR-

- New definitive lesion outside of XRT treatment zone (e.g. Enhancing lesion)

\*All criteria for one scenario should be met

# Initial Reporting Template

MRI OF THE BRAIN WITHOUT AND WITH IV CONTRAST

Structured report code: 17.NR2

CLINICAL INDICATION: []

TECHNIQUE:

[1.5 or 3.0]-Tesla system. Pre-contrast sagittal and axial T1-w, and axial T2-FLAIR, GRE, and diffusion-w sequences of the brain with ADC maps. [Perfusion:Perfusion YES/Perfusion NO]Post-contrast axial fat-saturated T2-w and T1-w, and sagittal volumetric T1-w images of the brain with axial and coronal reformations. Intravenous contrast material was administered for the examination.

COMPARISON: [<None.>]

FINDINGS:

TUMOR:

Location:

[]

FLAIR:

[]

Enhancement:

[<No appreciable contrast enhancement.>]

Perfusion:

[<Perfusion imaging was not performed.>]

Diffusion:

[<No diffusion abnormality to suggest hypercellular tumor.>]

OTHER:

No acute infarction.

No significant hemorrhage.

No hydrocephalus.

No herniation.

No unexpected fluid collection.

IMPRESSION:

Intraparenchymal mass in the [], with imaging findings most consistent with [neoplasm type:high grade glioma/low grade glioma/metastasis].

# Follow-Up Reporting Template

## MRI OF THE BRAIN WITHOUT AND WITH IV CONTRAST

Structured report code: 17.NR2

CLINICAL INDICATION: brain tumor

Tumor Type & Mutations: [tumor type]  
Surgical History: [last surgery date]  
Radiation History: [radiation completion date]  
Relevant Medications: [medications (avastin or steroids)]

### TECHNIQUE:

[1.5 or 3.0]-Tesla system. Pre-contrast sagittal and axial T1-w, and axial T2-FLAIR, GRE, and diffusion-w sequences of the brain with ADC maps. [Perfusion:Perfusion YES/Perfusion NO]Post-contrast axial fat-saturated T2-w and T1-w, and sagittal volumetric T1-w images of the brain with axial and coronal reformations. Intravenous contrast material was administered for the examination.

COMPARISON: [None.]

### FINDINGS:

#### TUMOR:

Location:  
[]

#### FLAIR:

[<No change in extent of ~~nonenhancing~~ FLAIR abnormality.>]  
[<No new sites of FLAIR abnormality.>]

#### Enhancement:

[<No change in extent of enhancing component at primary site.>]  
[<No new sites of enhancement.>]

#### Perfusion:

[<No evidence of abnormal ~~hyperperfusion (CBV).~~>]

#### Diffusion:

[<No diffusion abnormality to suggest hypercellular tumor.>]

#### Posttreatment changes:

[<Expected post treatment changes are noted. No evidence of new or worsening fluid collection or hemorrhage.>]

#### OTHER:

No acute infarction.  
No significant hemorrhage.  
No hydrocephalus.  
No herniation.

No unexpected fluid collection.

### IMPRESSION:

- [Glioblastoma/astrocytoma/oligodendroglioma] status post treatment. [No appreciable change in tumor compared to the prior study (Category: GR-2).>]
- [Otherwise expected post-treatment findings.>]

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### LEGEND:

0 - New baseline, incomplete study, or otherwise unable to categorize

1a - Improvement in imaging findings suspected to reflect decreasing tumor burden and/or treatment effect

1b - Improvement in imaging findings potentially due to effect from medications such as steroids or initiating ~~avastin~~.

2 - No appreciable change from the prior

3a - Worsening imaging findings favored to represent treatment effects, including radiation therapy and medications

3b - Worsening imaging findings favored to represent an indeterminate mix of treatment effect and tumor worsening

3c - Worsening imaging findings favored to represent increasing burden of tumor

4 - Worsening of imaging findings highly suspicious for tumor progression