UNIVERSITÄTS KLINIKUM FREIBURG

CCCF COMPREHENSIVE CANCER CENTER FREIBURG

Hirntumorbildgebung

Federführend Prof. Dr. Horst Urbach

im Namen der Leitlinienkommission:

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Freigabe: interdisziplinärer Qualitätszirkel
Stand 10/2023, gültig bis 10/2024
Version 4

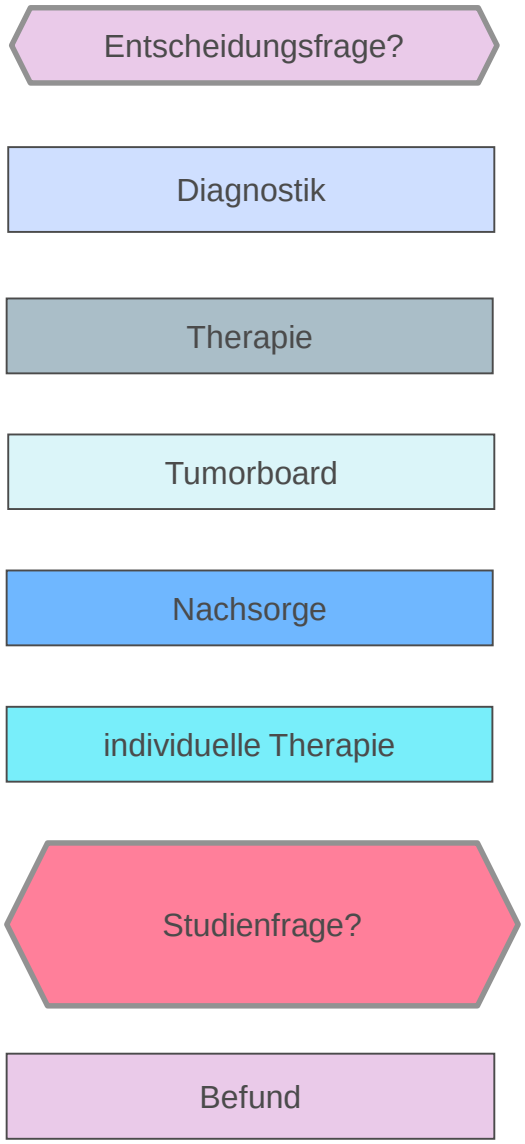
Was ist neu?

- RANO 2.0 fasst RANO-HGG und RANO-LGG zusammen
- Baseline-MRT ist die MRT 4 Wochen (21-35 Tage) nach Beendigung der Radiotherapie, falls nicht erfolgt: Baseline-MRT vor Behandlung. Die früh postoperative MRT ist als Baseline rausgenommen worden.
- Bei IDHwt Glioblastomen sind die FLAIR-Bilder nicht PD-relevant (außer bei antiangionetischer Therapie)
  Bei IDHmt Gliomen mit signifikantem FLAIR-Anteil können die FLAIR-Bilder herangezogen werden
- Ein erneutes MRT zur Unterscheidung Progression/ Pseudoprogression ist nur notwendig, wenn die erste MRT innerhalb von 12 Wochen nach Ende der Radiotherapie angefertigt wurde
- Kriterium der messbaren Läsion für PD bei neuen Läsionen: definiert durch Tumoranteile mit einem Durchmesser von mindestens 10 mm in jeweils 3 orthogonalen Ebenen in 3D oder in 2D (2 Schichten mit interslice Gap einberechnet), falls dies nicht erfüllt ist könnte eine vorgezogene VK erwogen werden (Details s.u.)

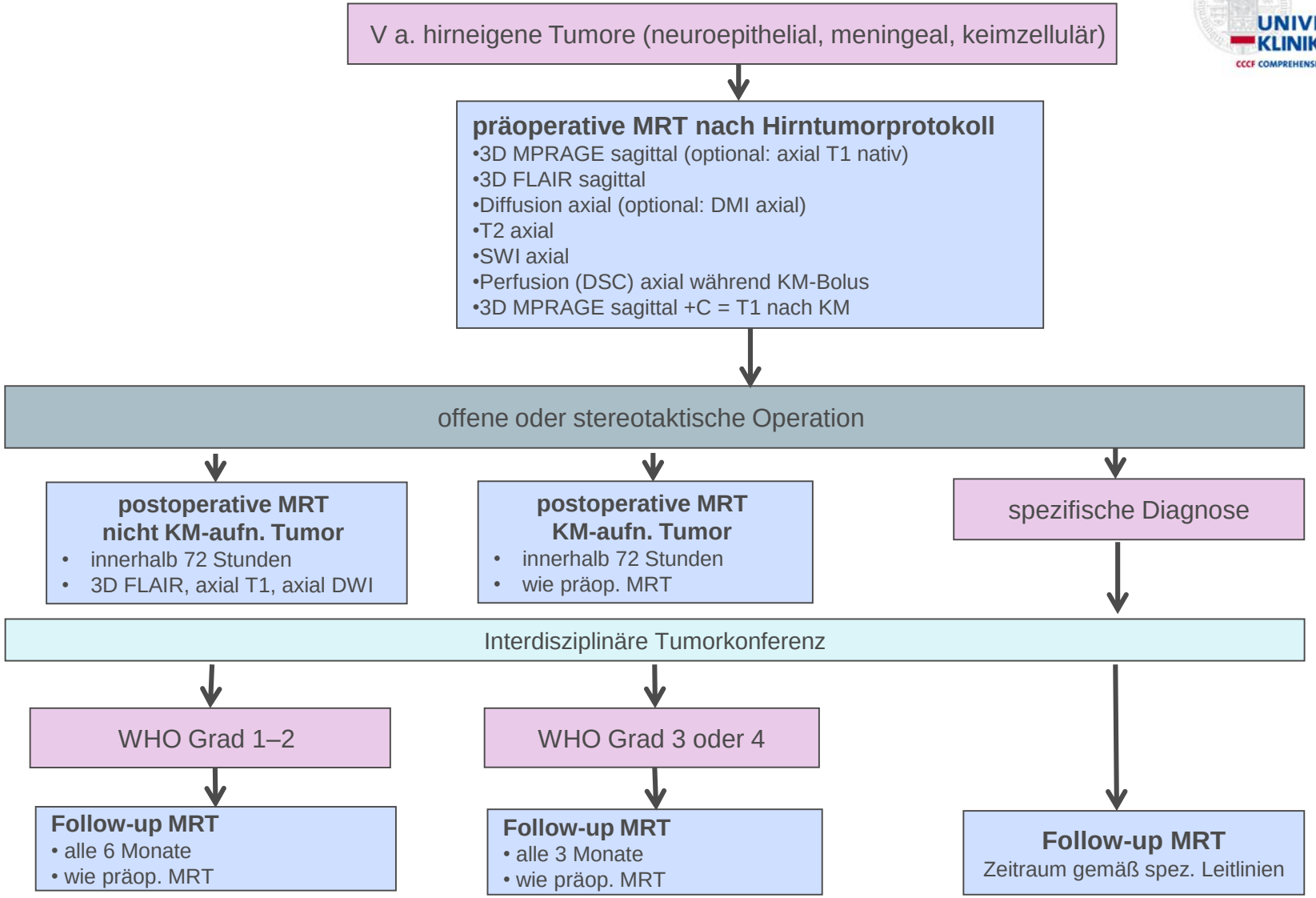
Wen PY et al. RANO 2.0: Update to the Response Assessment in Neuro-Oncology Criteria for High- and Low-Grade Gliomas in Adults. J Clin Oncol DOI https://doi.org/10.1200/JCO.23.01059

Struktur der Clinical Pathways

Zeichenerklärung



MR-Bildgebung



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RANO 2.0

	RANO-HGG	mRANO	iRANO	RANO2.0
Newly diagnosed Settings				
Baseline MRI	Pre-radiation	Post-radiation	Pre-radiation	Post-radiation
T1 postcontrast evaluation	Required	Required	Required	Required
FLAIR evaluation	Required	Omitted	Omitted	Omitted Can be considered with agents that significantly affect vascular permeability
Confirmation scans in the first 12 weeks of completion of radiation*	Optional	Mandatory	Recommended within 6 months from initiation of immunotherapy	Mandatory
Confirmation scan beyond 12 weeks of radiation*	Optional	Mandatory	Recommended within 6 months from initiation of immunotherapy	Optional Mandatory confirmation scans can be considered with therapies associated with high rates of pseudoprogression
Recurrent Settings				
Baseline MRI	Pre-treatment	Pre-treatment	Pre-treatment	Pre-treatment
T1 postcontrast evaluation	Required	Required	Required	Required
FLAIR evaluation	Required	Omitted	Omitted	Omitted Can be considered with agents that significantly affect vascular permeability
Confirmation scans*	Optional	Mandatory	Recommended within 6 months from treatment initiation	Optional Mandatory confirmation scans can be considered with therapies associated with high rates of pseudoprogression

*Confirmation scans should not be considered in case of clinical decline

RANO: Response Assessment in Neuro-Oncology. RANO-HGG: RANO for high-grade glioma. mRANO: modified RANO. iRANO: immunotherapy RANO

FLAIR: fluid attenuation inversion recovery

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RANO 2.0: KM-aufnehmende Tumoren

TABLE 1. Response Criteria for Enhancing Tumors

CR
CR requires all the following criteria compared with the baseline scan:
(1) Complete disappearance of all enhancing measurable, nonmeasurable, and nontarget disease sustained for at least 4 weeks
(2) No new lesions
(3) Patient must be off corticosteroids or on physiologic replacement doses only
(4) Stable or improved clinically
In the absence of a scan confirming durability of response for at least 4 weeks later, this response will be considered only SD. Patients with nonmeasurable disease only at baseline cannot have CR; the best response possible is SD
PR
PR requires all the following criteria compared with the baseline scan:
(1) ≥50% decrease in the sum of products of perpendicular diameters, or ≥65% decrease in total volume, of all measurable enhancing target lesions sustained for at least 4 weeks
(2) No new lesions
(3) No progression of nonmeasurable enhancing disease[a] or nontarget lesions[b] (see legend below)
(4) Patient must be on a corticosteroid dose not greater than the dose at the time of baseline scan
(5) Stable or improved clinically
In the absence of a scan confirming durability of response for at least 4 weeks later, this response will be considered only SD. Patients with nonmeasurable disease only at baseline cannot have PR; the best response possible is SD
SD
SD occurs if the patient does not qualify for CR, PR, or PD (see next section) and requires
(1) Stable area(s) of enhancing target lesions on imaging
(2) No new lesions
(3) No progression of nonmeasurable disease[a] or nontarget lesions[b] (see legend below)
(4) Patients must be on a corticosteroid dose that is not greater than the dose at the time of baseline scan. In the event that the corticosteroid dose was increased for new symptoms and signs without confirmation of disease progression on neuroimaging, and subsequent follow-up imaging shows that this increase in corticosteroids was required because of disease progression, the last scan considered to show SD will be the scan obtained when the corticosteroid dose was equivalent to the baseline dose
(5) Stable or improved clinically

Wen PY et al. RANO 2.0: Update to the Response Assessment in Neuro-Oncology Criteria for High- and Low-Grade Gliomas in Adults. J Clin Oncol DOI https://doi.org/10.1200/JCO.23.01059

RANO 2.0: KM-aufnehmende Tumoren

PD
Progression is defined by any of the following compared with baseline or best response after initiation of therapy if there has been a reduction from baseline:
(1) ≥25% increase in sum of the products of perpendicular diameters, or ≥40% increase in total volume of enhancing target lesions, on stable or increasing doses of corticosteroids
If confirmation scans are required (within 12 weeks of completion of radiotherapy and at other time points in studies of agents associated with a high incidence of pseudoprogression), then at least two sequential scans separated by ≥4 weeks both exhibiting ≥25% increase in sum of products of perpendicular diameters or ≥40% increase in total volume of enhancing lesions compared with the most recent previous scan will be required. If the second scan at least 4 weeks later exhibits SD or PR/CR, the previous scan showing preliminary PD is noted as pseudoprogression and the patient should continue on therapy (Data Supplement [Fig S3A]). The original MRI showing preliminary PD or the second scan, depending on which scan has the smallest sum of the products of the perpendicular diameters or volume, will serve as the baseline for future comparison
(2) Appearance of a new lesion. In the case where the baseline or best response demonstrates no measurable enhancing disease (visible or not visible), then any new measurable (≥10 mm × 10 mm) enhancing lesions are considered PD. If there is uncertainty regarding progression, the patient may continue on treatment and remain under close observation (eg, re-evaluated at 4-week intervals). If subsequent evaluations confirm progression, the date of progression should be backdated to the time point at which this concern for progression was first raised
If confirmation scans are required, any new measurable (≥10 mm × 10 mm) enhancing lesions should not be immediately considered PD, but instead should be added to the sum of bidimensional products or total volume representing the entire enhancing tumor burden. The new lesion will be considered PD if confirmed by a subsequent scan ≥4 weeks later exhibiting ≥25% increase in sum of products of perpendicular diameters or ≥40% increase in total volume of enhancing lesions relative to the scan first illustrating new measurable disease. If the second scan at least 4 weeks later exhibits SD, CR, PR, or becomes nonmeasurable, the initial scan is noted as pseudoprogression, and the patient should continue on therapy until a second increase in tumor size is observed
(3) Appearance of definite leptomeningeal disease
(4) Clear progression of nonmeasurable lesions (increase in bidirectional diameters by at least 5 × 5 mm to ≥10 × 10 mm[a]; see legend below)
(5) Unequivocal progression of existing nontarget lesions[b] (see legend below)
(6) Definite clinical deterioration not attributable to decrease in corticosteroid dose or other causes apart from the tumor
(7) Failure to return for evaluation as a result of death or deteriorating condition should also be considered as progression unless caused by documented nonrelated disorders
Increase in corticosteroid dose alone, in the absence of clinical deterioration related to tumor, will not be used as a determinant of progression. Patients with stable imaging studies whose corticosteroid dose was increased for reasons other than clinical deterioration related to tumor do not qualify for SD or PD. They should be observed closely. If their corticosteroid dose can be reduced back to baseline, they will be considered as having SD; if further clinical deterioration related to tumor becomes apparent, they will be considered to have progression. The date of progression should be the first time point at which corticosteroid increase was necessary

Wen PY et al. RANO 2.0: Update to the Response Assessment in Neuro-Oncology Criteria for High- and Low-Grade Gliomas in Adults. J Clin Oncol DOI https://doi.org/10.1200/JCO.23.01059

RANO 2.0: nicht KM-aufnehmende Tumoren

TABLE 2. Criteria for Nonenhancing Disease

CR
CR requires all the following criteria compared with the baseline scan
(1) Complete disappearance of the target lesion(s) on T2 or FLAIR imaging. If enhancement had been present, it must have resolved completely
(2) No new lesions, no new T2 or FLAIR abnormalities apart from those consistent with radiation effects, and no new or increased enhancement
(3) Disappearance of all nontarget lesions
(4) Patients must be off corticosteroids or only on physiologic replacement doses
(5) Stable or improved clinically
In the absence of a scan confirming durability of response for at least 4 weeks later, this response will be considered only SD. Patients with nonmeasurable nonenhancing disease only at baseline cannot have CR; the best response possible is SD
PR
PR requires all the following criteria compared with the baseline scan
(1) ≥50% decrease in the sum of the products of perpendicular diameters or ≥65% decrease in total volume of the target lesion(s) on T2 or FLAIR imaging, sustained for at least 4 weeks
(2) No new lesions, no new T2 or FLAIR abnormalities apart from those consistent with radiation effects, and no new or increased enhancement
(3) No progression of nonmeasurable disease[a] or nontarget lesions[b] (see legend below)
(4) Patient must be on a corticosteroid dose that is not greater than the dose at the time of baseline scan
(5) Stable or improved clinically.
In the absence of a scan confirming durability of response for at least 4 weeks later, this response will be considered only SD. Patients with nonmeasurable nonenhancing disease only at baseline cannot have PR; the best response possible is SD
MR: applies only to nonenhancing disease
MR requires all the following criteria compared with baseline
(1) Decrease between 25% and 50% in the sum of the products of perpendicular diameters, or between 40% and 65% of the total volume of the nonenhancing target lesion(s) on T2 or FLAIR MRI compared with baseline, sustained for at least 4 weeks
(2) No new lesions, no new T2 or FLAIR abnormalities apart from those consistent with radiation effect, and no new or increased enhancement
(3) No progression of nonmeasurable disease or nontarget lesions[b] (see legend below)
(4) Patients should be on a corticosteroid dose that should not be greater than the dose at the time of baseline scan
(5) Stable or improved clinically
In the absence of a scan confirming durability of response for at least 4 weeks later, this response will be considered only SD. Patients with nonmeasurable
SD
SD occurs if the changes do not qualify for CR, PR, or MR, or PD and requires
(1) Stable area(s) of nonenhancing target lesions on T2 or FLAIR imaging
(2) No new lesions, no new T2 or FLAIR abnormalities apart from those consistent with radiation effect, and no new or increased enhancement
(3) No progression of nonmeasurable disease[a] or nontarget lesions[b] (see legend below)
(4) Patients should be on a corticosteroid dose that is not greater than the dose at the time of baseline scan. In the event that the corticosteroid dose was increased for new symptoms and signs without confirmation of disease progression on neuroimaging, and subsequent follow-up imaging shows that this increase in corticosteroids was required because of disease progression, the last scan considered to show SD will be the scan obtained when the corticosteroid dose was equivalent to the baseline dose
(5) Stable or improved clinically

RANO 2.0: nicht KM-aufnehmende Tumoren

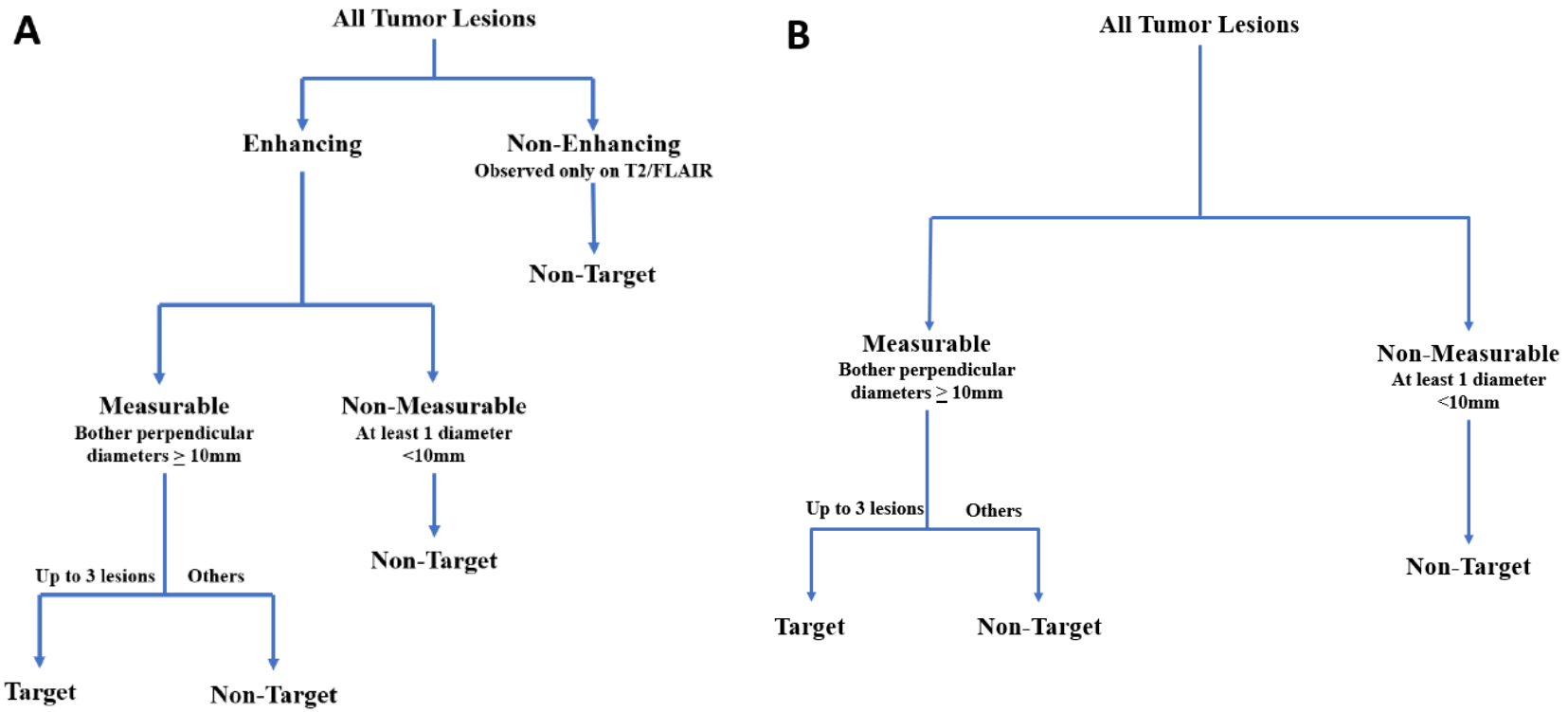
PD
Progression is defined by any of the following compared with baseline or best response after initiation of therapy if there has been a reduction from baseline
(1) ≥25% increase in sum of products of perpendicular diameters, or ≥40% increase in total volume, of the T2 or FLAIR nonenhancing target lesion(s) on stable or increasing doses of corticosteroids not attributable to radiation effect, edema, or comorbid events
(2) Appearance of new lesions or contrast enhancement. In the case where the baseline or best response demonstrates no measurable disease (visible or not visible), then any new measurable (>10 mm × 10 mm) nonenhancing or enhancing lesions are considered PD. If there is uncertainty regarding progression, the patient may continue on treatment and remain under close observation (eg, re-evaluated at 4-week intervals). If subsequent evaluations confirm progression, the date of progression should be backdated to the time point at which this concern for progression was first raised
(3) The appearance of definite leptomeningeal disease
(4) Clear progression of nonmeasurable lesions (increase in bidirectional diameters by at least 5 × 5 mm to ≥10 × 10 mm[a]; see legend below)
(4) Unequivocal progression of existing nontarget lesions[b] (see legend below)
(5) Definite clinical deterioration not attributable to decrease in corticosteroid dose or other causes apart from the tumor
(6) Failure to return for evaluation because of death or deteriorating condition, unless caused by documented nonrelated disorders

Wen PY et al. RANO 2.0: Update to the Response Assessment in Neuro-Oncology Criteria for High- and Low-Grade Gliomas in Adults. J Clin Oncol DOI https://doi.org/10.1200/JCO.23.01059

Definition: Target lesions

KM-aufnehmende Läsionen

nicht KM-aufnehmende Läsionen



Wen PY et al. RANO 2.0: Update to the Response Assessment in Neuro-Oncology Criteria for High- and Low-Grade Gliomas in Adults. J Clin Oncol DOI https://doi.org/10.1200/JCO.23.01059

RANO-Kriterien für Metastasen

- Messbare Läsionen müssen einen längsten Durchmesser von 10 mm haben.
- Bei mehreren target lesions werden die Durchmesser addiert.

	Complete response	Partial response	Stable disease	Progressive disease
Target lesions	None	≥30% decrease in sum longest distance relative to baseline	<30% decrease relative to baseline but <20% increase in sum longest distance relative to nadir	≥20% increase in sum longest distance relative to nadir*
Non-target lesions	None	Stable or improved	Stable or improved	Unequivocal progressive disease*
New lesion(s)†	None	None	None	Present*
Corticosteroids	None	Stable or decreased	Stable or decreased	Not applicable‡
Clinical status	Stable or improved	Stable or improved	Stable or improved	Worse*
Requirement for response	All	All	All	Any‡

*Progression occurs when this criterion is met. †A new lesion is one that not present on prior scans and is visible in minimum two projections. If a new lesion is equivocal, for example because of its small size, continued therapy can be considered, and follow-up assessment will clarify if the new lesion is new disease. If repeat scans confirm there is definitely a new lesion, progression should be declared using the date of the initial scan showing the new lesion. For immunotherapy-based approaches, new lesions alone to do not define progression. ‡Increase in corticosteroids alone will not be taken into account in determining progression in the absence of persistent clinical deterioration.

Table 2: **Summary of the response criteria for CNS metastases proposed by RANO-BM**

Lin NU, et al. Response Assessment in Neuro-Oncology (RANO) group. Response assessment criteria for brain metastases: proposal from the RANO group.
Lancet Oncol. 2015 Jun;16(6):e270-8. doi: 10.1016/S1470-2045(15)70057-4. Epub 2015 May 27.

RANO Kriterien für Immuntherapie

	Malignant glioma[16]	Low-grade glioma[17]	Brain metastases[18]
Complete response	Disappearance of all enhancing disease for ≥4 weeks; no new lesions; stable or improved T2/FLAIR; no more than physiological steroids; clinically stable or improved	Disappearance of all enhancing and T2/FLAIR disease for ≥4 weeks; no new lesions; no more than physiological steroids; clinically stable or improved	Disappearance of all enhancing target and non-target lesions for ≥4 weeks; no new lesions; no steroids; clinically stable or improved
Partial response	≥50% decrease in the sum of biperpendicular diameters of enhancing disease for ≥4 weeks; no new lesions; stable or improved T2/FLAIR; stable or decreased steroid dose; clinically stable or improved	≥50% decrease in the sum of biperpendicular diameter of T2/FLAIR disease for ≥4 weeks; no new lesions; stable or decreased steroid dose; clinically stable or improved	≥30% decrease in sum of longest diameters of target lesions for ≥4 weeks; no new lesions; stable or decreased steroid dose; clinically stable or improved
Minor response	NA	25–49% decrease in the sum of biperpendicular diameters of T2/FLAIR disease for ≥4 weeks; no new lesions; clinically stable or improved	NA
Stable disease	Does not qualify for complete response, partial response, or progressive disease; no new lesions; stable or improved T2/FLAIR; stable or decreased steroid dose; clinically stable or improved	Does not qualify for complete response, partial response, or progressive disease; no new lesions; stable or improved T2/FLAIR; stable or decreased steroid dose; clinically stable or improved	Does not qualify for complete response, partial response, or progressive disease
Progressive disease	≥25% decrease in the sum of biperpendicular diameters of enhancing disease; or new lesions; or substantial worsened T2/FLAIR; or substantial clinical decline	≥25% decrease in the sum of biperpendicular diameters of T2/FLAIR disease; or new lesions; or substantial clinical decline	≥20% decrease in the sum of longest diameters of target lesions; or unequivocal progression of enhancing non-target lesions; or new lesions; or substantial clinical decline

The iRANO criteria integrate into the existing RANO criteria for malignant glioma, low-grade glioma, and brain metastases by providing recommendations for the interpretation of progressive imaging changes. Specifically, iRANO recommends confirmation of disease progression on follow-up imaging 3 months after initial radiographic progression if there is no new or substantially worsened neurological deficits that are not due to comorbid events or concurrent medication, and it is 6 months or less from starting immunotherapy. If follow-up imaging confirms disease progression, the date of actual progression should be back-dated to the date of initial radiographic progression. The appearance of new lesions 6 months or less from the initiatiation of immunotherapy alone does not define progressive disease. FLAIR=fluid-attenuated inversion recovery. iRANO=immunotherapy Response Assessment in Neuro-Oncology. N/A=not applicable.

Table 1: **RANO and iRANO criteria**

	RANO[16]	Immune-related response criteria[22]	iRANO (if ≤6 months after start of immunotherapy)	iRANO (if >6 months after start of immunotherapy)
Is a repeat scan needed to confirm radiographic progressive disease for patients without significant clinical decline?	No	Yes	Yes	No
Minimum time interval for confirmation of disease progression for patients without significant clinical decline	N/A	≥4 weeks	≥3 months	N/A
Is further immunotherapy treatment allowed after initial radiographic progressive disease (if clinically stable) pending disease progression confirmation?	N/A	Yes	Yes	N/A
Does a new lesion define progressive disease?	Yes	No	No	Yes

iRANO=immunotherapy Response Assessment in Neuro-Oncology. N/A=not applicable.

Table 2: **Key considerations for RANO criteria, immune-related response criteria, and iRANO criteria**

Okada H et al. Immunotherapy response assessment in neuro-oncology: a report of the RANO working group. Lancet Oncol. 2015 Nov;16(15):e534-42. doi: 10.1016/S1470-2045(15)00088-1.

Indikationen für Aminosäure (AA)-PET

Primärdiagnostik [1,4]
→Zur Unterscheidung zwischen Gliomen und nicht-neoplastischen Läsionen in unklaren Fällen.

Grading [1-4,6]
→Die dynamische FET-PET kann zum nicht-invasiven Grading beitragen (z.B. bei V.a. Entdifferenzierung bzw. V.a. high-grade Tumoranteile in nicht-KM-affinen Gliomen).
→Die Aussagekraft der statischen AA-PET zum Grading zerebraler Gliome ist gering.

Biopsieplanung [1,3,4,6]
→Empfohlen und hilfreich zur Planung einer (stereotaktischen) Biopsie.

Strahlentherapieplanung [1-6]
→Bei Gliomen (WHO Grad 2-4) kann die AA-PET wertvolle Zusatzinformationen zur Tumorausdehnung und damit Zielvolumendefinition über CT und MRT hinaus bieten, insbes. bei nicht-KM-affinen Gliomen.

OP-Planung [1-4,6]
→Die AA-PET verbessert die Abgrenzung und Festlegung von Resektionsgrenzen insbes. von low-grade/nicht-KM-affinen Gliomen und in Kombination mit CT/MRT die OP-Planung (z.B. eloquente Gliome).

Rezidivdiagnostik und Verlaufskontrolle [1,3-6]
→Deutlich höhere Spezifität in der Rezidivdiagnostik im Vergleich zur CT oder MRT, insbesondere bei Abgrenzung zu therapieinduzierten Veränderungen.
→Die AA-PET kann Hinweise auf eine sekundäre Malignisierung im Verlauf liefern.

Therapiekontrolle [1,3-6]
→Die AA-PET kann zur Diagnose der Pseudoprogression und der Pseudoresponse beitragen.
→Die AA-PET kann zur Beurteilung von Therapieansprechen herangezogen werden.

Prognostik [1,4-6]
→Bei Gliomen korreliert das Volumen und die Intensität der AA-Aufnahme (bei FET auch die Kinetik) mit der Prognose.

Neuro-Oncology

Neuro-Oncology 18(9), 1199–1208, 2016
doi:10.1093/neuonc/now058
Advance Access date 21 April 2016

Response Assessment in Neuro-Oncology working group and European Association for Neuro-Oncology recommendations for the clinical use of PET imaging in gliomas

Nathalie L. Albert, Michael Weller, Bogdana Suchorska, Norbert Galldiks, Riccardo Soffietti, Michelle M. Kim, Christian la Fougère, Whitney Pope, Ian Law, Javier Arbizu, Marc C. Chamberlain, Michael Vogelbaum, Ben M. Ellingson, and Joerg C. Tonn

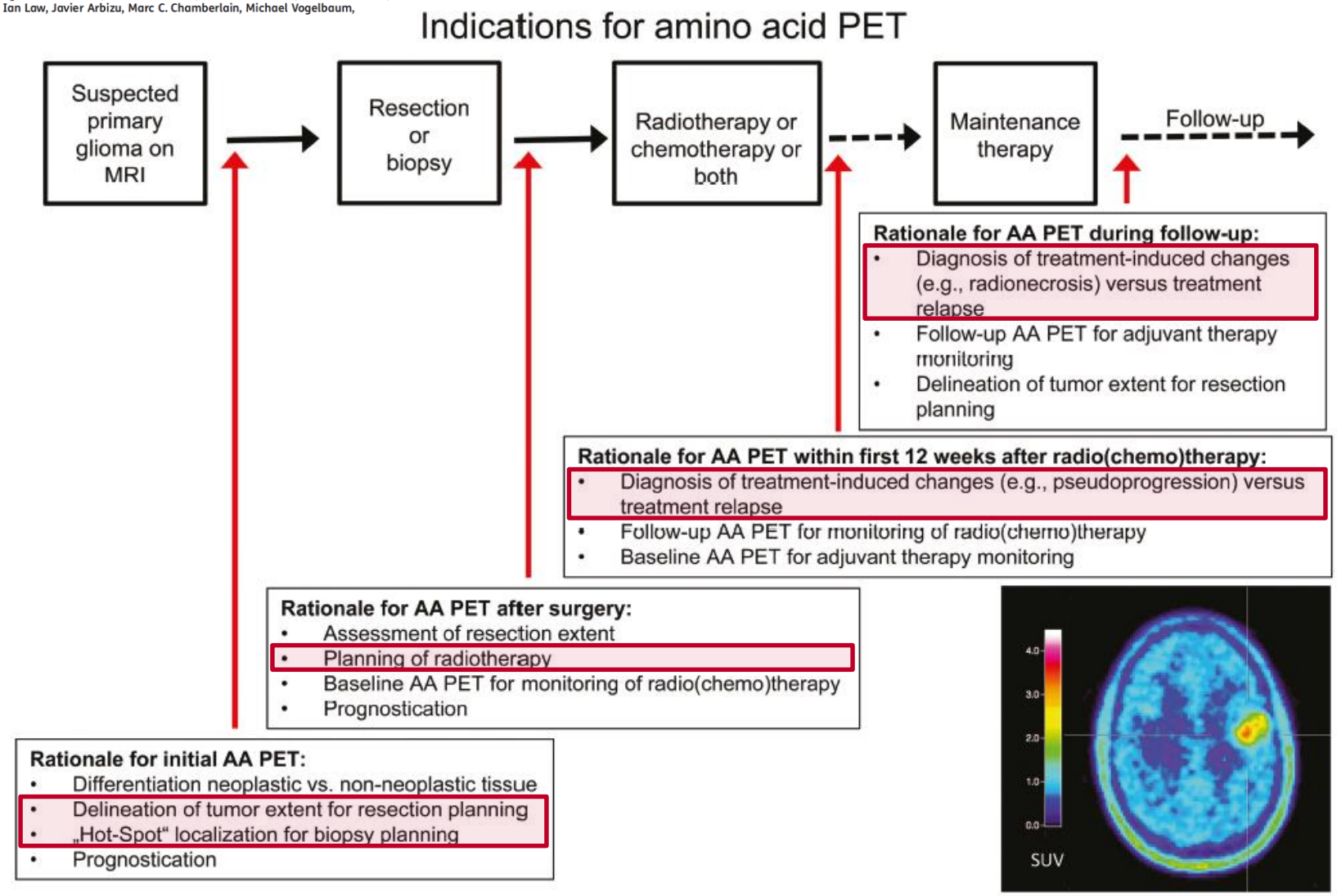


Fig. 1. Overview of indications for amino acid PET.

Federführend: Prof. Dr. Horst Urbach im Namen der Leitlinienkommission.
Freigabe: interdisziplinärer Qualitätszirkel, Stand: 10/23 gültig bis: 10/24, Version 4

Indikationen für Fluordesoxyglucose (FDG)-PET

Primärdiagnostik [1,3]

→Diagnostik von ZNS-Lymphomen (stets zusammen mit Ganzkörper PET/CT), insbes. Differenzierung von tumorösen Läsionen von atypischen Infektionen bei immunsupprimierten Patienten.

Tumorsuche / Staging [2]

→Bei ZNS-Lymphomen Ganzkörper FDG-PET/CT zum Staging.

→Bei ZNS-Metastasen ohne Hinweis auf Primarius Ganzkörper FDG-PET/CT zur Tumorsuche.

Grading [1-4,6]

→Die FDG-PET eignet sich zum nicht-invasiven Grading von Gliomen, die dynamische FET-PET ist vorzuziehen.

Biopsieplanung [3,4]

→Die FDG-PET kann zur Festlegung des Biopsieortes verwendet werden, die AA-PET ist vorzuziehen.

Strahlentherapieplanung [1,3-5]

→Der Nutzen der FDG-PET zu Strahlentherapieplanung ist nicht belegt, die AA-PET ist vorzuziehen.

OP-Planung [1,4]

→Die FDG-PET ist der AA-PET unterlegen.

Rezidivdiagnostik [1-6]

→Die FDG-PET kann zur Rezidivdiagnostik verwendet werden, ist der AA-PET unterlegen.

Therapiekontrolle [1-6]

→Der Nutzen der FDG-PET zur Therapiekontrolle ist nicht belegt, die AA-PET ist vorzuziehen.

Prognostik [5,6]

→Das Ausmaß der FDG-Aufnahme korreliert mit der Prognose bei Patienten mit Gliomen.

Quellenverzeichnis:

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Federführend: Prof. Dr. Horst Urbach im Namen der Leitlinienkommission.
Freigabe: interdisziplinärer Qualitätszirkel, Stand: 10/23 gültig bis: 10/24, Version 4

RANO für Metastasen

Kriterien (unidirectional) bis zu n=5 Läsionen (längsten Durchmesser addieren)	CR (ü. 4 Wo.)	PR (ü. 4 Wo.)	SD (ü. 4 Wo.)	PD
Target Lesion	keine	≥ 30% ↓	>30% ↓ aber < 20% ↑	≥ 20% ↑
Non-target Lesion	keine	stabil oder besser	stabil oder besser	eindeutiger Progress
New Lesion	keine	keine	keine	vorhanden
Kortikosteroide	keine	stabil oder ↓	stabil oder ↓	schlechter
klinischer Status	stabil oder besser	stabil oder besser	stabil oder besser	Schlechter
erforderliche Kriterien	alle	alle	alle	mindestens ein Kriterium

RANO-Zeitfenster (bis 12 Wochen nach Ende der Radiatio) beachten!

Lin NU et al. Reponse assessment criteria for brain metastases: proposal from the RANO group Lancet Oncology 2015; 16:e270-278

RANO für Immunotherapie – Vorschlag für Vereinheitlichung

Kriterien	CR	PR (ü. 4 Wo.)	Minor Response	SD	PD
Malignes Gliom	Alle KM+ Läsionen verschwunden für ≥ 4 Wo.; keine neuen Läsionen; unv. o. verb. FLAIR.	≥ 50% ↓ Summe biperpendikuläre Diameter der KM+ L. für ≥ 4 Wo.; keine neuen Läsionen, FLAIR stabil	entfällt	≤ 50% Abnahme und ≤ 25% Zunahme der KM+ L. für ≥ 4 Wo.; FLAIR stabil.	≥ 25% ↑ der Summe biperpendikuläre Diameter der KM+ L. für ≥ 4 Wo.; neue Läsion; FLAIR ↑;
Low-grade Gliom	Alle KM+ Läsionen verschwunden für ≥ 4 Wo.; keine neue Läsion; unv. o. verb. FLAIR.	≥ 50% ↓ Summe biperpendikuläre Diameter der FLAIR -L. für ≥ 4 Wo.; keine neue Läsion.	25 – 49%↓ Summe biperpendikuläre Diameter der FLAIR -L. für ≥ 4 Wo.; keine neue Läsion.	≤ 25% Abnahme und ≤ 25 % Zunahme der FLAIR L. für ≥ 4 Wo.; keine neuen Läsion.	≥ 25% ↑ der Summe biperpendikuläre Diameter der FLAIR L. für ≥ 4 Wo.; neue Läsion.
Metastasen	Alle KM+ Target und Non-target Läsionen verschwunden für ≥ 4 Wo.; keine neue Läsion.	≥ 30% ↓ Summe biperpendikuläre Diameter der KM+ Target L. für ≥ 4 Wo.; keine neue Läsion.	entfällt	≤ 30 % Abnahme und ≤ 20 % Zunahme der KM+ Target L.; keine neue Läsion.	≥ 20% ↑ der Summe biperpendikuläre Diameter der KM+ Target L.; neue Läsion.

Von einer Progression kann erst die Rede nach 6 Monaten nach Initiation der Immunotherapie die Rede sein. Das iRANO - Intervall ist 6 Monate!
iRANO verlangt die Bestätigung einer Progression 3 Monate nach der initialen Progression.

Okada H. et al., Immunotherapy response assessment in neuro-oncology: a report of the RANO working group. Lancet Oncology 2015; 16:e534-42

Gültigkeit	Datum der Aktualisierung	Version	Änderung	Verantwortliche
November 2016 – November 2018	19.12.2016	1	Ersterstellung	Prof. Dr. Mader, Prof. Dr. Urbach, Prof. Dr. Grosu, Prof. Dr. Zentner
Januar 2019 – Januar 2021	20.02.2019	2	Anpassung der Verantwortlichen, inhaltliche Aktualisierung der Folien, Folien 7 bis 12 hinzugefügt	Prof. Dr. Horst Urbach, Prof. Dr. Meyer, Prof. Dr. Beck, Prof. Dr. Grosu, PD Dr. Dr. Nicolay, Dr. Würtemberger, Dr. Heiland
Juni 2021 - Juni 2022	14.06.2021	3	Anpassung der Verantwortlichen, inhaltliche Aktualisierung der Folien	Prof. Dr. H. Urbach (federführend) im Namen der Leitlinienkommission
Juni 2022 - Juni 2023	05.07.2022	3	Gültigkeitsprüfung: Verlängerung	Prof. Dr. H. Urbach (federführend) im Namen der Leitlinienkommission
Oktober 2023 - Oktober 2024	16.10.2023	4	Anpassung Tumorprotokoll und Nomenklatur, RANO 2.0	Prof. Dr. H. Urbach (federführend) im Namen der Leitlinienkommission