



THE CHALLENGE OF ACCURATE ASSESSMENT

In oncology, accurate tumor characterization and understanding of metabolic activity are essential for guiding treatment decisions, especially in early interventions that can improve survival rates. In neurodegenerative diseases like Alzheimer's and Parkinson's, as well as neurovascular conditions such as Moyamoya, timely assessment of perfusion and metabolism is crucial for tracking progression and optimizing treatment.

Oncological and neurovascular conditions pose unique diagnostic challenges, as abnormal vascular structures and disease progression impact blood flow and metabolic function. Early detection and precise characterization of these changes are critical in tailoring treatments, improving prognostic accuracy, and tracking response. Advanced imaging offers vital insights to guide appropriate therapeutic interventions and improve patient outcomes.

CERCARE MEDICAL'S PROPRIETARY BIOMARKERS

Deliver advanced, detailed maps that provide critical insights into tumor behavior, brain perfusion characteristics, and the distinction between true progression and pseudoprogression. *



OEF

Model based Oxygen Extraction Fraction
Reflects the efficiency of oxygen utilization by the tissue.



CTH

Capillary Transit time Heterogeneity.
Shows microvascular flow heterogeneity.



COV

Coefficient Of Variance. (COV = CTH/MTT)
Shows the variability of flow heterogeneity in the brain tissue.



CMRO2

Cerebral Metabolic Rate of Oxygen (CMRO2 = OEF x CBF)
Represents the rate at which oxygen is consumed by the brain tissue.



Leakage

Specific to DSC-Perfusion. Shows the extravasation of contrast agent in a particular voxel (i.e. in case of disrupted Blood Brain Barrier).



LOI

Lack Of Information. Quality check map. Shows the lack of information for each voxel. Areas with no vascularization are expected to have high LOI, such as CSF and necrotic tissue.

*Park et al., 2023, ASAN Center, Seoul, South Korea

Prediction of pseudoprogression in post-treatment glioblastoma using dynamic susceptibility contrast-derived oxygenation and microvascular transit time heterogeneity measures - doi.org/10.1007/s00330-023-10324-9

PERFUSION AUTOMATION

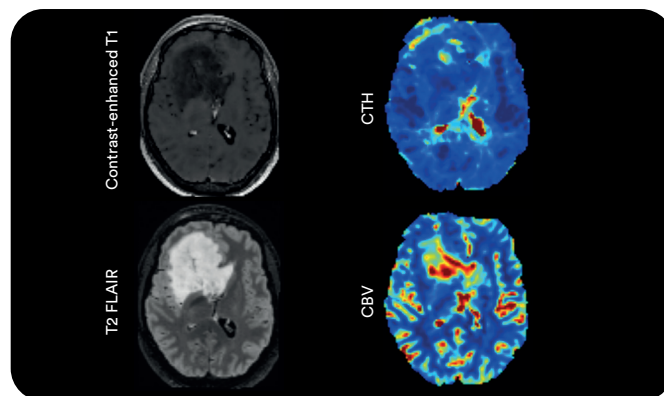
Enhancing diagnostic speed and accuracy

Perfusion imaging plays a key role in diagnosing tumor vascularization, brain hypoperfusion, and perfusion deficits in diseases like Moyamoya. However, achieving reliable, automated quantification of perfusion parameters across these conditions remains a significant challenge.

At Cercare Medical, our advanced solutions automatically generate precise perfusion maps, streamlining the diagnostic workflow and enhancing consistency. This fully automated process minimizes manual errors and variability, empowering clinicians to make informed decisions with confidence.

KEY FEATURES OF PERFUSION AUTOMATION

- **Streamlined Workflow:** Automated processing reduces the time from image acquisition to analysis, which is particularly valuable in time-sensitive conditions.
- **Enhanced Precision:** Automatically generated maps provide reliable, standardized results, essential for managing complex cases in oncology and neurovascular diseases.



Example of enhanced precision, as CTH assists in selecting the best location for biopsy, which is not as clear on CBV.



TUMOR GRADING

Precision in Oncology diagnosis

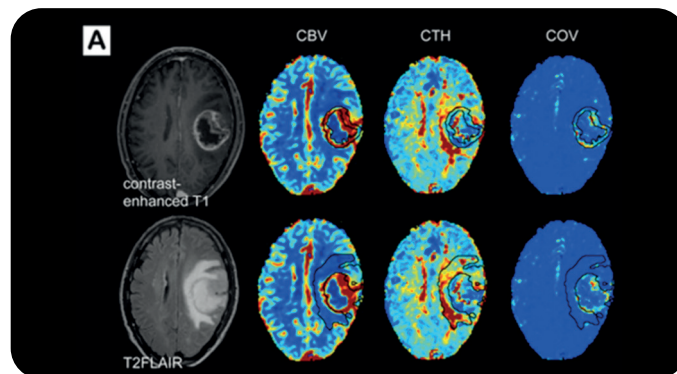
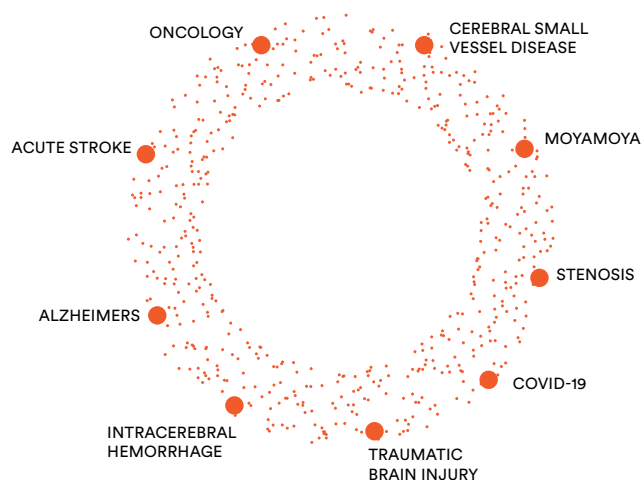
In oncology, accurate tumor grading is critical for determining cancer aggressiveness, guiding treatment decisions, and predicting outcomes. Traditional imaging methods often fail to provide detailed insights into tumor vascularization and metabolic activity—key factors in understanding tumor behavior.

Cercare Medical's proprietary biomarkers, integrated into perfusion imaging, offer advanced tools for evaluating:

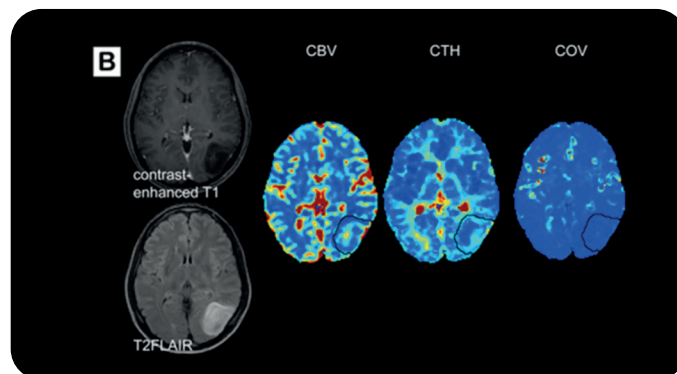
- **Tumor Vascularization:** Mapping the blood supply to the tumor, essential for understanding its aggressiveness.
- **Metabolic Activity:** Quantifying oxygen consumption and metabolic demand, supporting clinicians to grade and assess.

These biomarkers provide more advanced, detailed maps of tumors, offering a clearer picture of their biological behavior, which is crucial for accurate grading and treatment planning.

The Disease Wheel: Cercare Medical's Focus Areas



Glioblastoma (high CTH, high COV)



Astrocytoma Grade 2 (low CTH, low COV)

UNLOCKING NEW INSIGHTS

Grading and predicting time to progression of glioma patients using both CBV and CTH outperformed the use of CBV alone.*

*Tietze et al. 2015 - PLOS ONE

Perfusion MRI Derived Indices of Microvascular Shunting and Flow Control Correlate with Tumor Grade and Outcome in Patients with Cerebral Glioma



PROGRESSION VS. PSEUDOPROGRESSION

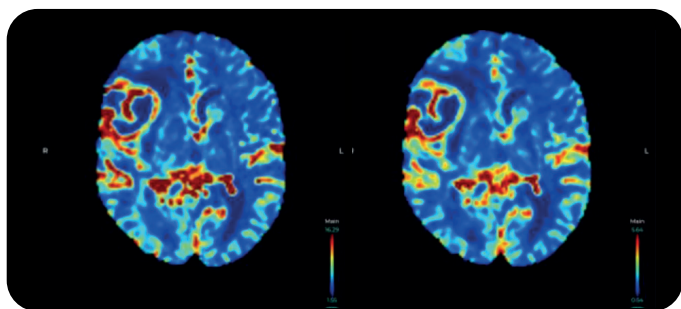
Monitoring treatment response

A key challenge in cancer treatment is distinguishing between true tumor progression and pseudoprogression—a temporary increase in tumor size caused by treatment-related changes rather than actual growth. This distinction is critical, especially in patients undergoing radiation therapy and immunotherapy, where treatment response can be difficult to gauge through traditional imaging alone.

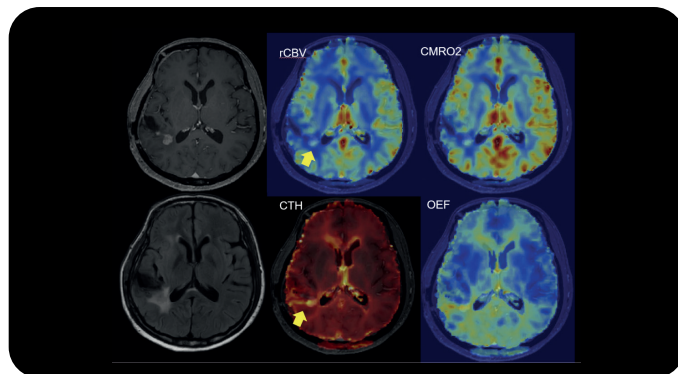
Cercare Medical's solutions provide information that can support the clinician in differentiating between progression and pseudoprogression using advanced perfusion and metabolic imaging, offering clinicians critical insights into treatment effectiveness. This is achieved through:

- > **Perfusion biomarkers:** Providing real-time insights into vascular changes in the tumor.
- > **Metabolic biomarkers:** Evaluating tumor oxygenation and metabolism to support in determining whether the tumor is growing or responding positively to treatment.

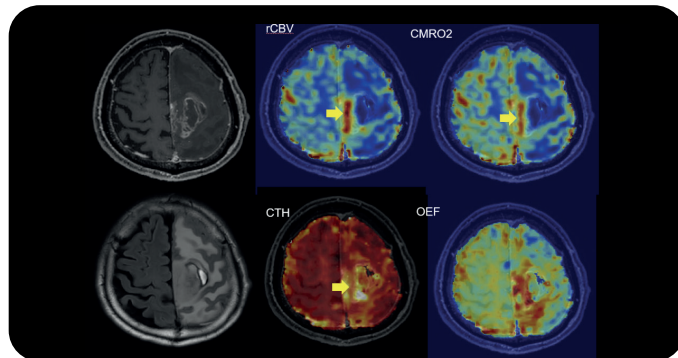
By accurately distinguishing between progression and pseudo-progression, clinicians can optimize treatment decisions, preventing both over- and under-treatment of patients.



SVD-based CBV and **vascular model-based CBV** offer different approaches to perfusion measurement. The vascular model-based CBV includes leakage correction, essential for assessing tumor patients, as blood-brain barrier disruptions often cause abnormal contrast leakage. This correction enhances accuracy in perfusion measurements, improving tumor grading reliability and treatment planning.



Pseudoprogression



Progression

UNLOCKING NEW INSIGHTS

One study showed that using CBV together with CTH and OEF improves distinction between pseudoprogression and tumor progressing compared to using CBV alone (sensitivity and specificity improved from 55% and 65% to 88% and 69% respectively)

***Park et al., 2023, European Radiology**

Prediction of pseudoprogression in post-treatment glioblastoma using dynamic susceptibility contrast-derived oxygenation and microvascular transit time heterogeneity measures.

CERCARE MR NEURO ADVANCED

The solution for oncology, neurodegenerative diseases and Moyamoya

Cercare MR Neuro Advanced is a fully automated, vendor-agnostic perfusion processing application designed to generate high-quality perfusion maps based on MR DSC Perfusion.

This solution includes standard SVD markers and advanced Vascular Model perfusion markers, offering unprecedented clarity for managing oncology, neurodegenerative diseases, and neurovascular conditions like Moyamoya.



THE VASCULAR MODEL

Enhancing diagnostic clarity

The Vascular Model (VM) is central to Cercare Medical’s imaging solutions, offering:

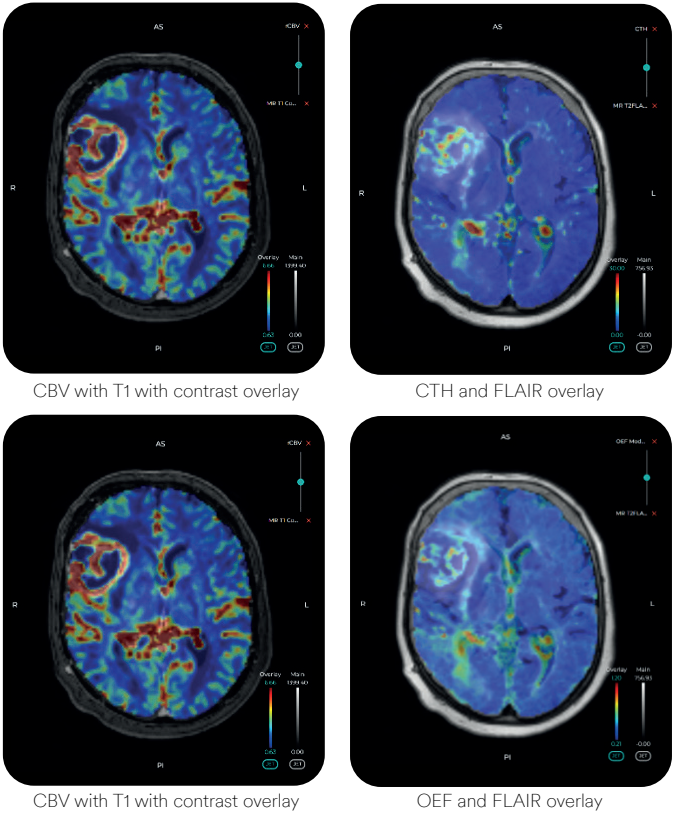
- > **Enhanced Visualization of Tumor Vascularization and Brain Hypoperfusion:** The VM provides clearer insights into tumor perfusion and hypoperfused brain regions, enabling clinicians to make more informed treatment decisions.
- > **Improved Diagnostic Alignment:** Research shows that lesions and abnormalities identified with the VM align more closely with true disease progression, improving diagnostic reliability.*

The imaging markers enable a unique assessment of perfusion capacity in brain tissue and allow for the evaluation of potential capillary dysfunction.

Vascular Model produces perfusion maps with improved SNR and less sensitive to artifacts and less bias (e.g. from macrovascular effects) compared to standard methodologies such as Singular Value Decomposition (SVD).*

*Mouridsen et al. 2006 - J NeuroImage
Bayesian estimation of cerebral perfusion using a physiological model of microvasculature

GLIOBLASTOMA CASE



PRODUCT OVERVIEW - CERCARE MR NEURO ADVANCED IS A PART OF CERCARE MEDICAL NEUROSUITE

NEURO
MR

CERCARE
MR NEURO ADVANCED

Fully automated and vendor neutral perfusion processing application calculating high quality perfusion maps based on MR DSC Perfusion including the standard SVD markers (CBV, CBF, MTT, TTP, Tmax) + Vascular Model perfusion markers including advanced markers (Delay, CTH, OEF, CMRO2, COV, Leakage).

CE
C

FDA
C

✓

✓

✓

✓

✓

■

DIFFUSION

Mean DWI, B0, ADC

SVD BASED DSC PERFUSION MAPS

CBF, CBV, MTT, Tmax, MinIP, TTP

VASCULAR MODEL BASED DSC PERFUSION MAPS

CBF, CBV, MTT, Delay, CTH, COV, OEF, CMRO2, Leakage, LOI

DCE PERFUSION MAPS

Ktrans, Ve, Vp, Kep, Delay, CBF, MaxIP, TTP

RESEARCH - NO CE/FDA Clearance

AI based brain tumor segmentation

Cercare Medical

www.cercare-medical.com
info@cercare-medical.com

Inge Lehmanns Gade 10
8000 Aarhus C, Denmark

Oncology/Insert_FINAL_Nov2024