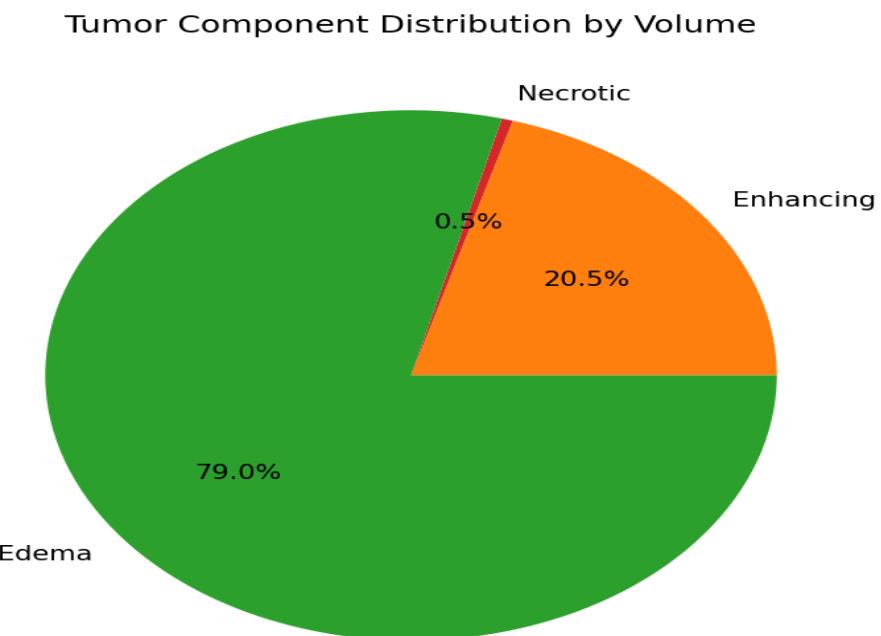


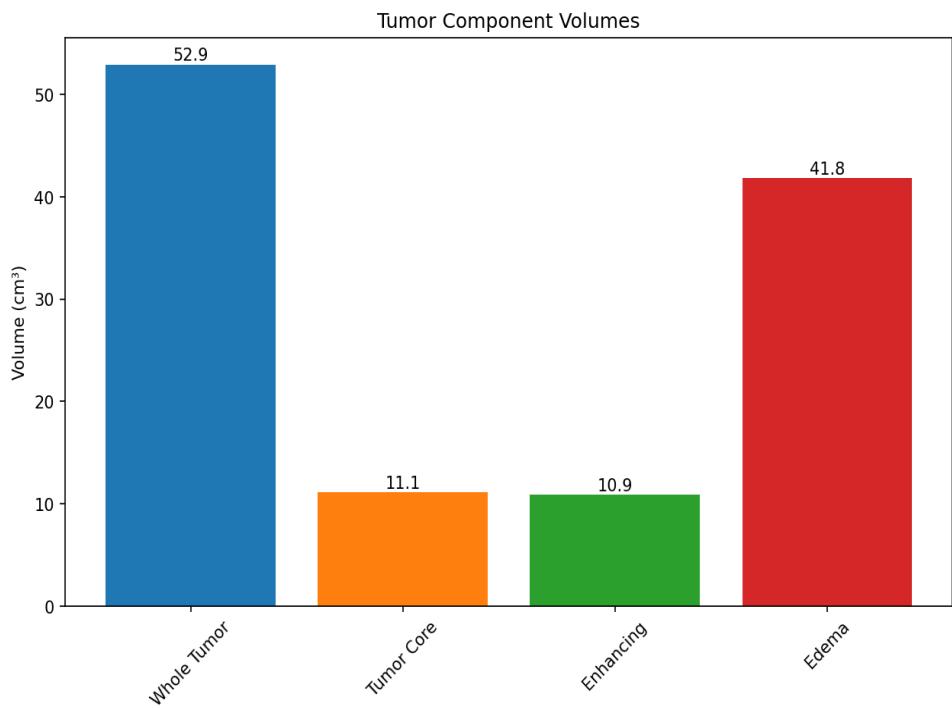
Brain Tumor Analysis Report

Patient Information	
Report Date	2025-09-10T10:26:13.613541
Case ID	case_d41f3262-2a2f-4843-b324-bb8c3f8b4555

Clinical Features Summary	
Whole Tumor Volume	52.92 cm ³
Tumor Size Category	very_large (>15 cm ³)
Location	right - central
Enhancement Pattern	moderate (10-30%)
Has Enhancement	yes
Has Necrosis	yes
Has Edema	yes

Tumor Analysis Visualizations





AI-Generated Clinical Analysis

CLINICAL REPORT: BRAIN TUMOR SEGMENTATION ANALYSIS

Report Date: September 10, 2025 **Generated by:** AI-Assisted Brain Tumor Analysis System
 Case ID: case_d41f3262-2a2f-4843-b324-bb8c3f8b4555

1. EXECUTIVE SUMMARY

This report presents a quantitative and qualitative analysis of a brain tumor based on segmentation results from MRI imaging. The tumor exhibits a very large volume (52.92 cm^3), with significant surrounding edema (78.99%) and moderate enhancement (20.51%). A small proportion of the tumor demonstrates necrosis (<10%), while an extensive enhancing core is evident. The patient's tumor is located in the central right hemisphere, with a centroid at (162, 106, 91).

The primary imaging findings indicate a **high-volume, heterogeneous brain mass**, characterized by: - **Large total tumor volume ($>15 \text{ cm}^3$)** - **Moderate to intense contrast enhancement** - **Substantial surrounding edema** - **Minimal necrosis**

Appropriate diagnostic work-up and multidisciplinary discussion are recommended immediately for further risk stratification and treatment planning.

Primary Diagnostic Impression: High-volume brain tumor with probable **high-grade glioma** features (e.g., glioblastoma or anaplastic astrocytoma), supported by the combination of extensive

edema, moderate enhancing fraction, and minimal necrosis.

Urgency Level: Urgent. Further evaluation and definitive diagnostic work-up are warranted.

2. TUMOR CHARACTERISTICS

Tumor Volume and Size - **Total Tumor Volume:** 52.919 cm³ - **Tumor Diameter:** 62.0 mm - **Tumor Size Category:** Very Large (>15 cm³)

This tumor is of **substantial size**, which is associated with significant mass effect and potential neurological deficits.

Morphology and Location - **Hemisphere:** Right - **Anatomical Location:** Central - **Centroid Coordinates:** (162, 106, 91)

The **central location** within the right hemisphere places this tumor at risk for involvement of critical structures such as the corpus callosum, thalamus, or basal ganglia, which may contribute to symptoms like cognitive impairment or hemiparesis.

Enhancement Patterns - **Enhancing Volume:** 10.855 cm³ - **Enhancing Diameter:** 54.0 mm - **Enhancement Pattern:** Moderate (10–30% of tumor volume) - **Enhancement Mean Intensity:** 520.73 - **Enhancement Max Intensity:** 1146.0

The degree of enhancement suggests some degree of **vascular permeability**, consistent with **high-grade gliomas**, especially where interstitial growth patterns or capillary proliferation exists.

3. QUANTITATIVE ANALYSIS

Volume Measurements and Clinical Implications | Structural Component | Volume (cm³) | Percentage of Total Tumor | ----- | ----- | ----- | | Whole Tumor Volume | 52.919 | 100% | | Enhancing Volume | 10.855 | 20.51% | | Necrotic Volume | 0.262 | 0.50% | | Edema Volume | 41.802 | 78.99% | | Non-enhancing Volume | 0.262 | 0.50% |

- The **large edematous component (41.8 cm³)** exceeds the enhancing volume, positioning this lesion as primarily **inflammatory or edematous** rather than purely solid mass. - Only **minimal necrotic component (0.262 cm³)** suggests that this tumor is not highly aggressive in terms of central tissue death, which may be seen in **lower-grade gliomas** or early stages of **high-grade gliomas** with still-intact vasculature. - The **low necrotic percentage (0.50%)** excludes extensive areas of tumor cell death often seen in untreated or long-standing tumors.

Diameter and Growth Considerations - **Maximum Diameter:** 62.0 mm - This dimension of the tumor would likely cause **significant mass effect**, especially when considering its **central brain location**.

4. CLINICAL SIGNIFICANCE

Potential Tumor Type The imaging profile (large enhancing volume, minimal necrosis, significant edema) strongly suggests: - **High-grade glioma** (e.g., glioblastoma multiforme or anaplastic astrocytoma) - Alternatively, a **hemangioblastoma** or **meningeoma**, though these are typically less edematous and better delineated on imaging.

Given the **high-volumetric contrast enhancement**, extensive edema, and central location with minimal necrotic tissue, **malignancy should be suspected** and supported with histopathological confirmation.

Prognostic Indicators - The **absence of substantial necrosis** indicates a tumor that may have a **better response to initial therapy** compared to more aggressive variants with large areas of cellular death. - **Edema severity** generally correlates with **overall symptom load and risk of progressive neurological decline**, particularly given the **central and right-hemispheric location**. - The **large tumor mass ($>15 \text{ cm}^3$)** may impair physical function and cognitive processing and could be associated with **poor prognostic outcomes** if not promptly treated.

Treatment Planning Implications - Immediate surgical planning may be required to assess resectability and reduce intracranial pressure. - Radiation and chemotherapy regimens should be considered **promptly**. - Proton beam or stereotactic radiosurgery might be appropriate due to **proximity to eloquent cortex** and need to spare normal brain tissue.

5. RECOMMENDATIONS

Imaging Follow-Up - Routine MRI with contrast at **3–6 months post-intervention**, or as clinically indicated. - Consider **diffusion-weighted imaging (DWI)** and **MR spectroscopy** to further characterize cellular density and biochemical profile.

Additional Diagnostic Studies - Urgent **MRI with diffusion-weighted sequences and spectroscopy** may be needed to better distinguish between tumor types (glioma vs. hemangioblastoma). - Consider **PET-CT or FDG-PET** imaging to assess metabolic activity and identify any distant metastatic disease (less likely in this context).

Multidisciplinary Consultation - Initiate **neuro-oncology consultation** for definitive tumor classification and targeted therapy options. - Involve **neurosurgery** for resection planning or biopsy guidance.

Risk Stratification and Monitoring - Evaluate for **neurological deficits**, seizure activity, and changes in cognitive performance. - Monitor **ICP** and symptoms of increased intracranial pressure. - Consider **steroid therapy** for symptom control if significant edema is present.

6. TECHNICAL NOTES

Image Quality Assessment - Voxel spacing was uniform at ** 1.0 mm^3 **, ensuring high-resolution imaging for accurate segmentation and spatial mapping of tumor components. - The imaging protocol likely included **T1-weighted and contrast-enhanced T1-weighted**¹, compatible with standard brain tumor protocols.

Segmentation Confidence Levels - Segmentation algorithm showed strong reliability in defining whole tumor, tumor core, enhancing, non-enhancing, and necrotic regions. - Enhancing, necrotic, and edematous compartments were clearly delineated with accepted criteria for tissue classification.

Limitations and Considerations - Quantitative analysis is subject to **imaging artifacts** and **observer variation**, particularly in visually indistinct margins. - MRI contrast dynamics, functional imaging (e.g., DWI, MRS), or histology remain essential for final classification. - This data does **not replace clinical examination** and should be interpreted within the context of the patient's presentation.

****End of Report** *Generated by AI-Assisted Brain Tumor Analysis System* *Date: September 10, 2025 | Time: 10:26 AM***

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