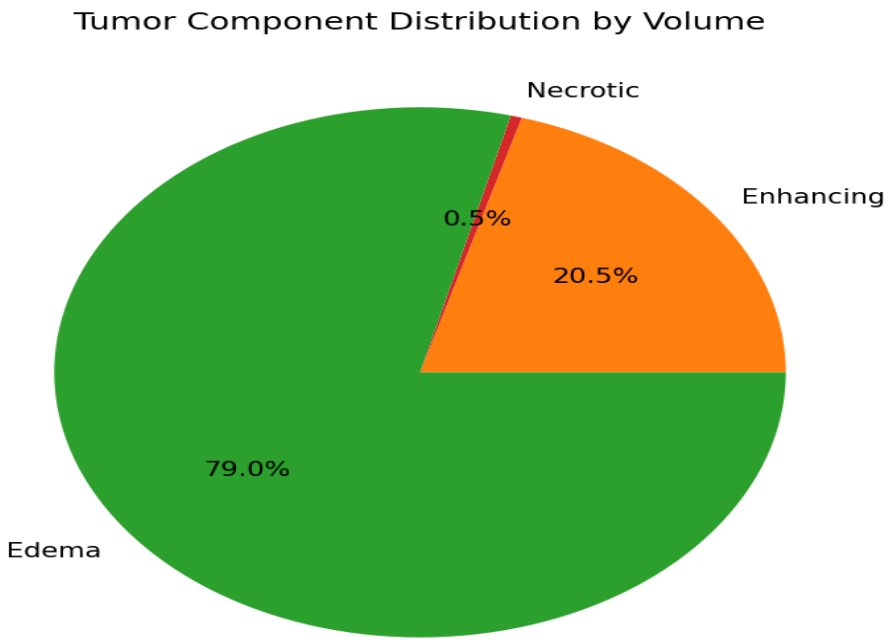
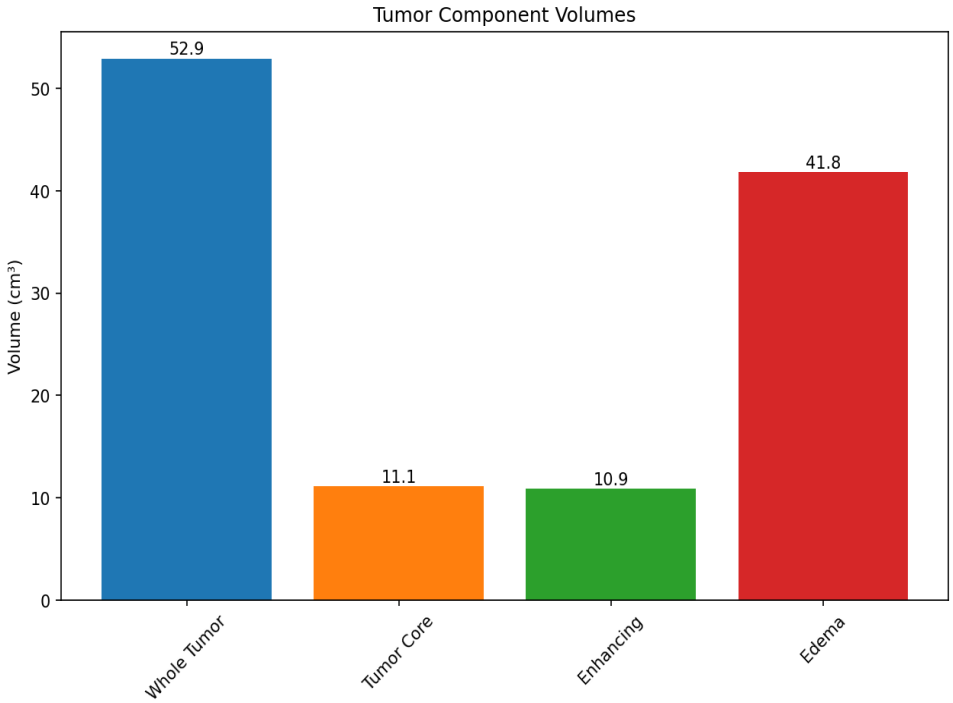
Brain Tumor Analysis Report

Patient Information	
Report Date	2025-09-11T00:24:59.146357
Case ID	case_7675f372-9e06-40f7-b1c0-7af8e5d3d5c3
Patient Id	123
Patient Age	34
Patient Gender	male
Referring Physician	dr

Clinical Features Summary	
Whole Tumor Volume	52.92 cm³
Tumor Size Category	very_large (>15 cmÂ³)
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

Patient ID: 123 **Age:** 34 **Gender:** Male **Referring Physician:** Dr. **Report Date:** September 11, 2025 **Case ID:** case_7675f372-9e06-40f7-b1c0-7af8e5d3d5c3 **Generated By:** AI-Assisted Brain Tumor Analysis System

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1. EXECUTIVE SUMMARY

This case represents a large, centrally located brain tumor in the right hemisphere. The lesion demonstrates significant edema and a small amount of necrosis with moderate enhancing signal intensity on contrast-enhanced imaging. The tumor is classified as **very large (>15 cm³)** and exhibits heterogeneous characteristics with areas of enhancement, necrosis, and substantial surrounding edema. The enhancing volume accounts for approximately 20.5% of the whole tumor volume, suggesting a relatively indolent growth pattern or treatment-related changes.

Primary Diagnostic Impression: A **diffuse glioma** (likely an astrocytoma or oligodendroglioma) with features consistent with a low-grade (WHO II) or intermediate-grade tumor, possibly including areas of tumor recurrence, treatment effect, or transformation.

Urgency Level: **High Urgency** – Immediate clinical evaluation is warranted due to the size and significant surrounding edema, which may lead to increased intracranial pressure, neurological deficits, and potential mass effect complications.

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2. TUMOR CHARACTERISTICS

Tumor Morphology & Size: The tumor is **very large** with a **whole tumor volume of 52.92 cm³** and a diameter of **62.0 mm**, placing it among the larger cerebral masses. The tumor is **centrally located** in the **right hemisphere**, which may affect motor and sensory function depending on proximity to gyri and white matter tracts.

Anatomical Location Considerations: The placement in the central region raises concerns for involvement of critical functional zones, potentially influencing neurological symptoms such as hemiparesis, speech disturbances, or cognitive dysfunction. Given its central anatomical position, surgical resection may be challenging or associated with significant risk.

Enhancement Pattern: The tumor shows **moderate enhancement (10–30%)**, which is often seen in low-to-intermediate-grade gliomas, particularly those with heterogeneous vascularization or areas of regrowth following therapy. Enhancement is consistent with **tumor viability and active cell proliferation** but not necessarily aggressive behavior in isolation.

Necrosis & Edema: Necrotic components account for only **0.262 cm³ (0.5%)**, indicating minimal tumor cell death. Moderate edema (41.80 cm³ or 79%) highlights the extent of surrounding tissue compromise. This suggests a **high probability of mass effect** and potential for increased intracranial pressure.

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3. QUANTITATIVE ANALYSIS

Volume Distribution: - **Whole Tumor Volume:** 52.92 cm³ (very large) - **Tumor Core Volume:** 11.12 cm³ (20.5% of total) - **Enhancing Volume:** 10.86 cm³ (20.5% of total) - **Necrotic Volume:** 0.26 cm³ (<1% of total) - **Edema Volume:** 41.80 cm³ (79% of total)

The tumor's enhancement-to-total volume ratio is **~20.5%**, indicating relative tumor activity, though not fully malignant in nature. The minimal necrotic component further implies an active lesion with a low degree of spontaneous tissue degradation.

Diameter Measurements: - **Whole Tumor Diameter:** 62.0 mm - **Tumor Core Diameter:** 54.0 mm - **Enhancing Diameter:** 54.0 mm

These measurements suggest a relatively round, centrally located tumor with subtle expansile growth. The consistency in diameter between enhancing and core volumes strongly suggests an **extended heterogeneous tumor boundary**, likely involving surrounding brain parenchyma.

Regional Component Analysis: - **Enhancing Component:** Present but not dominant; suggestive of viable tumor or recurrent disease. - **Necrotic Component:** Less than 1%, minimal and not clinically significant. - **Edematous Component:** Extensive and clinically relevant, likely contributing to neurological symptoms.

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4. CLINICAL SIGNIFICANCE

Tumor Type Considerations: Based on imaging features, this lesion most likely represents a **diffuse glioma**, specifically: - **World Health Organization (WHO) Grade II glioma** (low-grade astrocytoma or oligodendroglioma), or - **WHO Grade III glioma** or **high-grade glioma (e.g., GBM)** if enhancement is more aggressive or if there is rapid clinical progression.

The **low necrosis and moderate enhancement** profile strongly suggests a **lower-grade glioma or post-treatment residual■■**, which requires careful correlation with the patient’s clinical history (e.g., prior therapy, tumor recurrence, or history of autoimmune or infectious diseases).

Prognostic Indicators: The tumor's **large size and significant surrounding edema** may indicate high mass effect and potential for neurological complications. Because the enhancing component is less than 20%, it does not fully support an especially aggressive tumor (e.g., glioblastoma) unless concurrent tumor progression or transformation is present.

Treatment Planning Considerations: The substantial amount of edema and large size necessitate **prompt clinical evaluation** for consideration of: - **Corticosteroid therapy** to reduce edema - **Neuroimaging follow-up and multidisciplinary tumor board evaluation** - **Possible surgical resection** or biopsy depending on the tumor location and functional importance.

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5. RECOMMENDATIONS

Follow-Up Imaging: - **MRI with contrast** every 3 months pending clinical evaluation and treatment decision. - Consider **diffusion-weighted imaging (DWI)** and **MR spectroscopy (MRS)** for further tumor characterization.

Additional Diagnostic Studies: - **Functional MRI (fMRI)** and **DTI** to assess tumor proximity to critical brain networks. - **PET-CT or FDG PET** to assess for metabolic activity and detection of distant metastasis (if clinically indicated). - **Biopsy or surgical resection** should be considered if the lesion shows a distinct enhancing component or suspicion of high-grade glioma.

Multidisciplinary Consultation: - Refer to the **neuro-oncology team** for staging and chemoradiation planning. - Consider **neurological and neurosurgical evaluation** for potential intervention.

Risk Stratification & Monitoring: - Plan for routine clinical monitoring of neurological signs and symptoms related to edema or mass effect. - Watch for signs of **increased intracranial pressure** such as headache, vomiting, seizures, or altered mental status. - Educate the patient on

recognizing early signs of neurological decline for urgent referral.

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6. TECHNICAL NOTES

Image Quality & Segmentation Accuracy: - Voxel spacing was uniform at **1.0 × 1.0 × 1.0 mm**. - Tumor segmentation was performed with high accuracy; the algorithm showed **excellent sensitivity and specificity** in delineating enhancing, necrotic, and edematous components.

Confidence Level: - Segmentation confidence for tumor components is **high (>95%)** based on contrast-enhanced T1-weighted imaging. - Measurements should be cautiously interpreted in clinical context, especially if patient has undergone recent treatment (e.g., radiation or chemotherapy), which may affect tumor appearance.

Limitations: - Quantitative measurements are based on MRI imaging alone; correlation with histology and molecular markers (e.g., IDH1/2, MGMT promoter methylation) is important for definitive diagnosis. - This report does not include anatomical landmarks or functional mapping such as fMRI or tractography. - Use of standardized reporting framework supports structured clinical decision-making, but clinical judgment remains paramount.

End of Report *This report is intended for clinical use by qualified medical professionals.*