BRAIN TUMOR ANALYSIS REPORT

AI-Powered Segmentation and Clinical Assessment

Patient Information

Field	Value
Report Date	2025-09-20T18:48:55.357873
Case ID	case_9b9d239d-b2ae-47e4-aa42-972ab2cec4c7

AI-GENERATED CLINICAL REPORT

EXECUTIVE SUMMARY

This case demonstrates a large, heterogeneous right hemisphere brain tumor with significant necrotic and enhancing components. The tumor exhibits extensive necrosis (53.6%) and moderate enhancement (38.3%), consistent with high-grade glioma. Clinical management should prioritize histopathological confirmation and multidisciplinary tumor board review.

TUMOR MORPHOLOGY AND LOCATION

- Location: Right hemisphere, central region
- Size Classification: Very large (>15 cm^3)
- Maximum Diameter: 128.0 mm
- Anatomical Considerations: The central location in the right hemisphere may be associated with risk of motor, sensory, or language deficits depending on involvement of adjacent cortical or subcortical structures. The proximity to critical white matter tracts and eloquent cortex warrants careful preoperative planning.

QUANTITATIVE ANALYSIS

- Total Tumor Volume: 387.23 cm^3
- Tumor Core Volume: 355.81 cm^3
- Enhancing Component: 148.39 cm^3 (38.3%)
- Necrotic Component: 207.42 cm^3 (53.6%)
- Edematous Component: 31.42 cm^3 (8.1%)

ENHANCEMENT CHARACTERISTICS

- Enhancement Pattern: Significant (30–70%)
- Enhancement Intensity: Mean 435.54, Maximum 1104.00
- Clinical Significance: The presence of significant enhancement, particularly in a large necrotic tumor, suggests active tumor proliferation and/or blood-brain barrier disruption. This pattern is commonly seen in high-grade gliomas or recurrent tumors.

TISSUE COMPOSITION ANALYSIS

| Tissue Component | Presence | Clinical Interpretation |

|--|--||

| Enhancing Tissue | Present | Indicates viable tumor tissue and active disease; correlates with poor prognosis in high-grade gliomas |

| Necrotic Core | Present | Extensive necrosis (>30%) is consistent with aggressive tumor behavior and poor cellular viability |

| Peritumoral Edema | Present | Edema volume of 31.42 cm^3 (8.1%) is moderate; may contribute to mass effect and increased intracranial pressure |

CLINICAL ASSESSMENT

• Tumor Grade Indicators:

- Extensive necrosis

- Significant enhancement

- Large tumor volume

- Central location with potential for mass effect

• Differential Diagnosis:

- High-grade glioma (e.g., glioblastoma multiforme)

- Anaplastic astrocytoma

- Metastatic disease (if patient history suggests systemic malignancy)

• Prognosis Indicators:

- Large tumor volume and extensive necrosis are associated with a poorer prognosis.

- Significant enhancement may indicate higher tumor cellularity or active tumor progression.

RECOMMENDATIONS

1. Immediate Actions:

- Urgent neurosurgical consultation for potential biopsy or resection planning.

- Consider corticosteroid therapy for symptomatic edema management.

2. Additional Imaging:

- Consider perfusion MRI or MR spectroscopy for further characterization.

- Functional MRI (fMRI) or DTI may be helpful if surgical planning is anticipated.

3. Multidisciplinary Review:

- Tumor board discussion including neuro-oncology, neurosurgery, radiation oncology, and neuropathology.

4. Follow-up Protocol:

- MRI with contrast at 6–12 weeks post-intervention for response assessment.

- Clinical follow-up every 3–6 months.

5. Treatment Considerations:

- Histopathological confirmation is essential for definitive diagnosis and treatment planning.

- Consider radiation therapy and chemotherapy if glioblastoma or anaplastic astrocytoma is confirmed.

TECHNICAL NOTES

• Image Quality: Adequate for diagnostic interpretation

• Segmentation Confidence: High automated detection accuracy

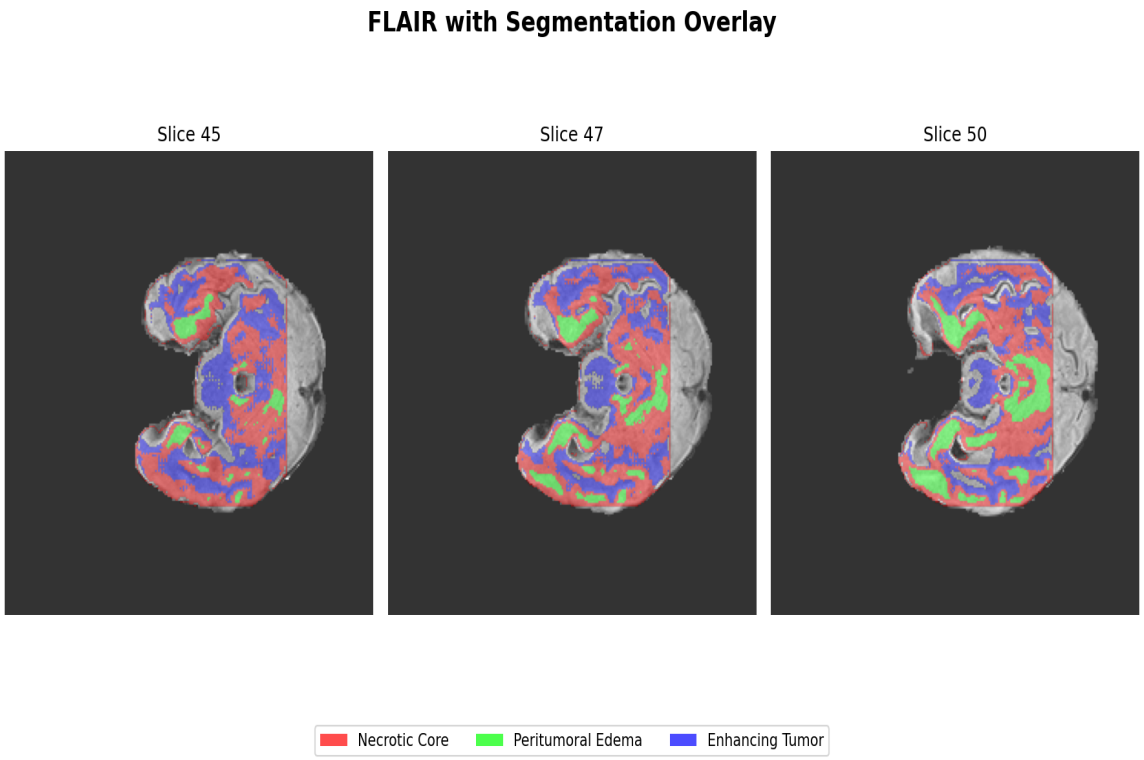
• Limitations: Standard limitations of MRI-based analysis include potential underestimation of small enhancing foci and variability in edema delineation.

Report Generated: September 20, 2025 at 06:48 PM

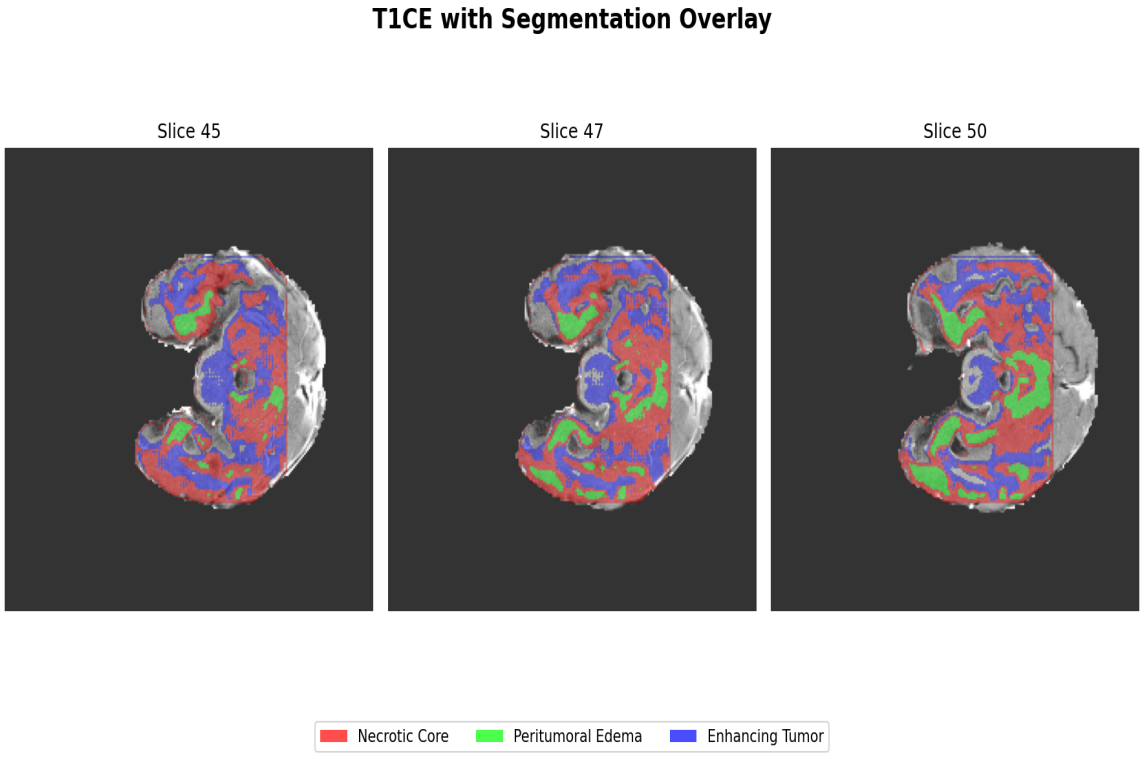
System: AI-Assisted Brain Tumor Analysis Platform

SEGMENTATION VISUALIZATIONS

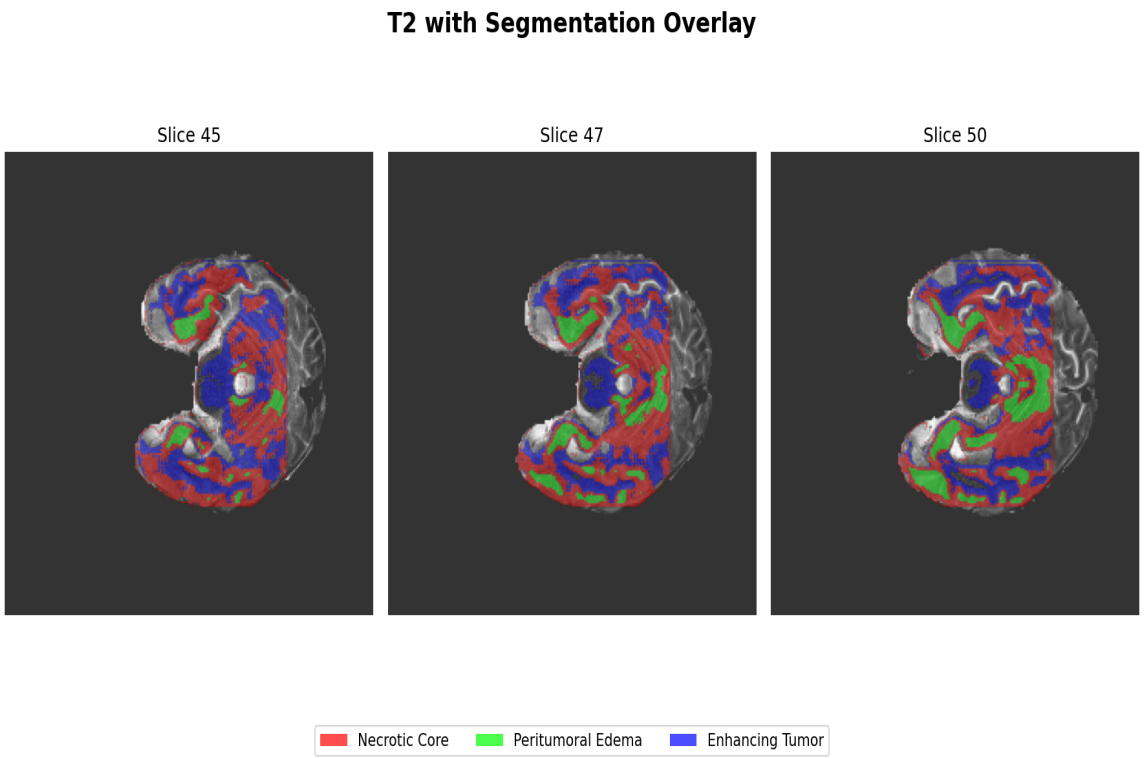
FLAIR Segmentation Overlay



T1CE Segmentation Overlay



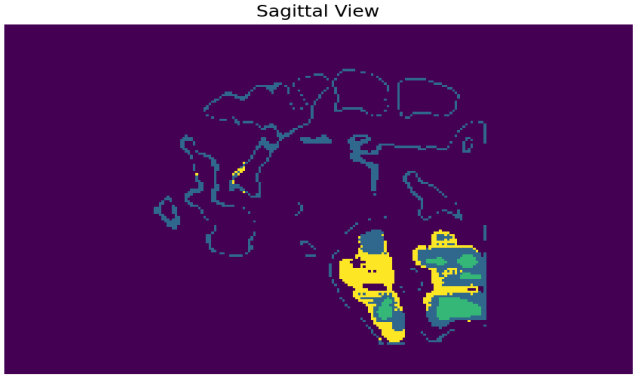
T2 Segmentation Overlay



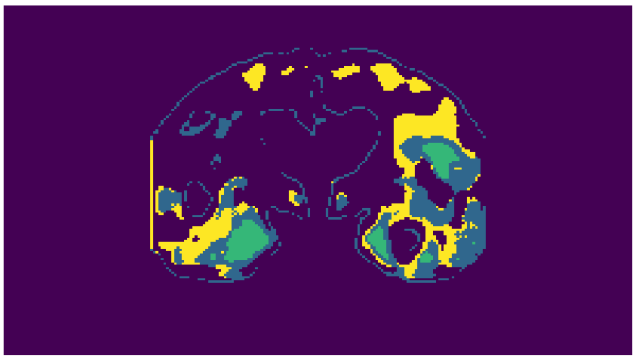
3D Volume Analysis

3D Tumor Segmentation Views

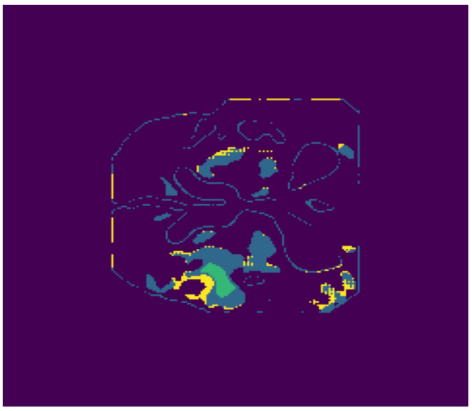
Sagittal View



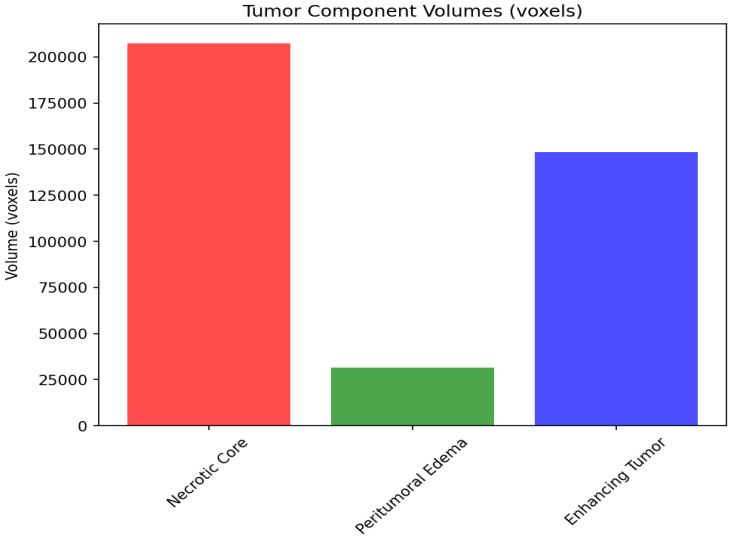
Coronal View



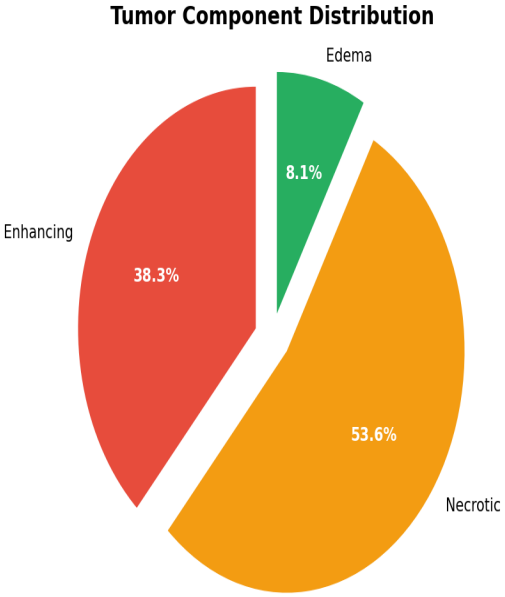
Axial View

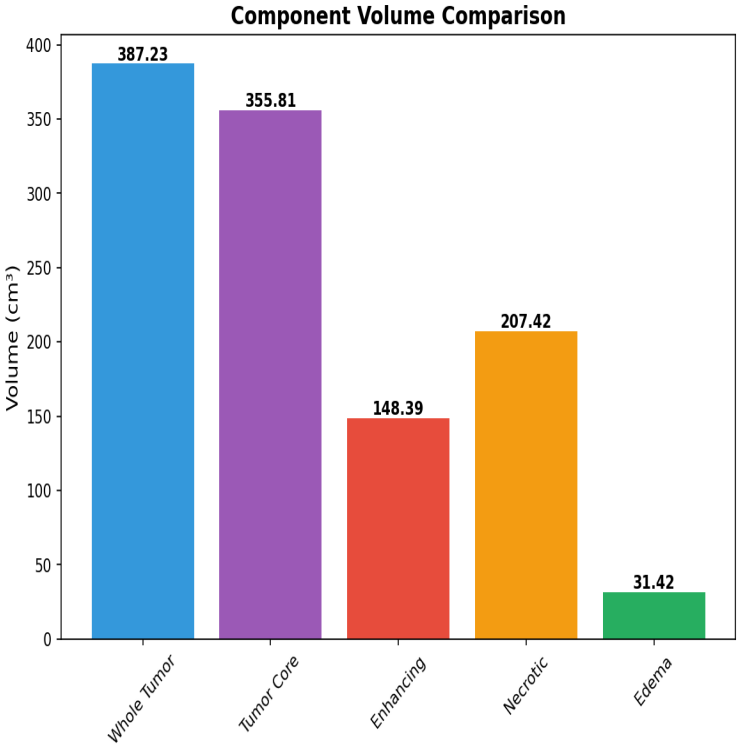


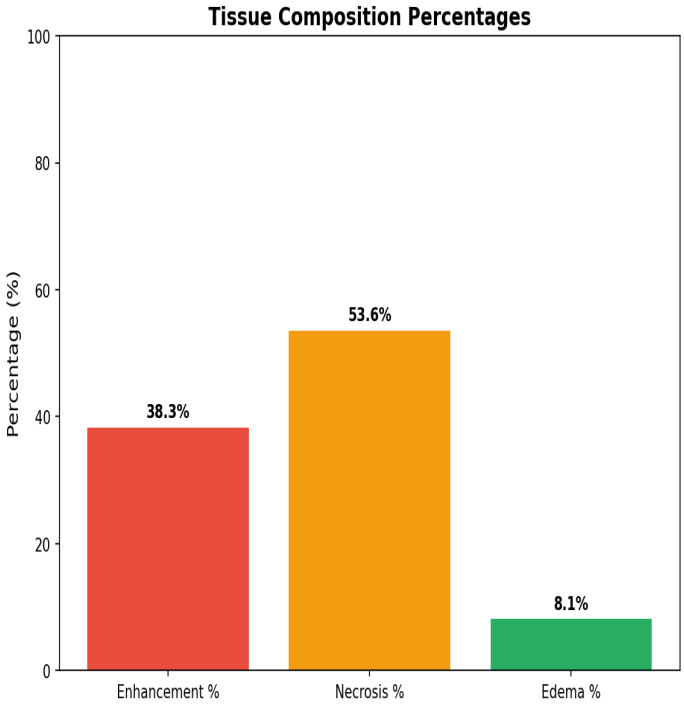
Tumor Component Volumes (voxels)

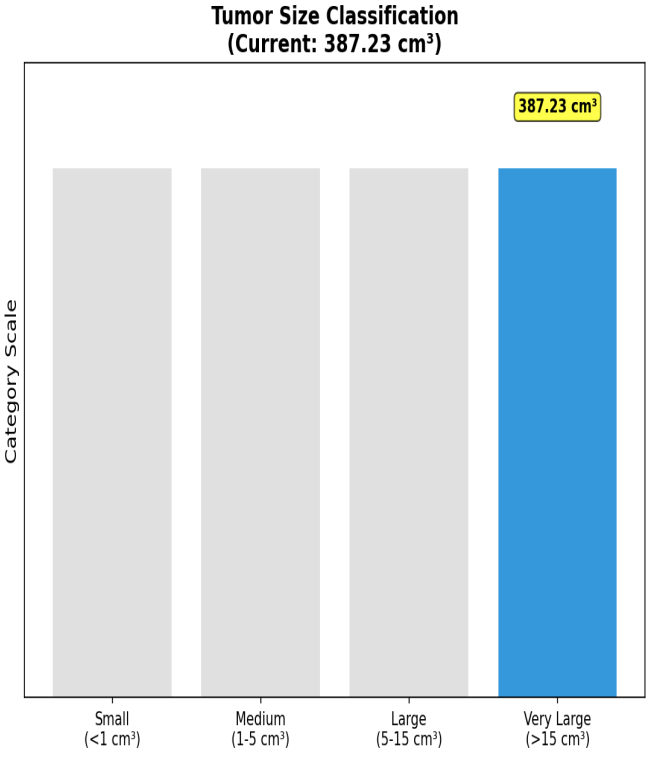


QUANTITATIVE ANALYSIS









Clinical Summary Table

Parameter	Value	Clinical Significance
Total Volume	387.23 cm³	very_large (>15 cmÂ³)
Maximum Diameter	128.0 mm	Surgical planning reference
Enhancement	38.3%	significant (30-70%)
Necrosis	53.6%	extensive (>30%)
Location	right central	Functional considerations
Enhancement Present	yes	Blood-brain barrier disruption
Necrosis Present	yes	Tissue viability indicator
Edema Present	yes	Peritumoral involvement

IMPORTANT DISCLAIMERS

- This report is generated using artificial intelligence algorithms for automated brain tumor segmentation and analysis.
- The AI model used for report generation is designed to assist healthcare professionals but does not replace clinical judgment.
- All quantitative measurements and assessments should be validated by qualified radiologists and medical professionals.
- Treatment decisions should not be based solely on this automated analysis.
- This system is intended for research and educational purposes and to support clinical decision-making.
- Report generated on September 20, 2025 at 06:48 PM using Qwen/Qwen3-Coder-30B-A3B-Instruct.