

BRAIN TUMOR ANALYSIS REPORT

AI-Powered Segmentation and Clinical Assessment

Patient Information

Field	Value
Report Date	2025-09-20T00:11:14.287113
Case ID	case_4781830f-8cae-4efc-aad2-0d2ca1fd9667

AI-GENERATED CLINICAL REPORT

EXECUTIVE SUMMARY

This case demonstrates a large right-sided brain tumor with extensive necrotic and edematous components but no demonstrable enhancing tissue. The tumor is classified as very large based on volumetric measurements and is located in the central region of the right hemisphere. The absence of enhancement and presence of moderate necrosis suggest a high-grade lesion, likely requiring urgent multidisciplinary evaluation and intervention.

TUMOR MORPHOLOGY AND LOCATION

- Location: Right hemisphere, central region
- Size Classification: Very large ($>15 \text{ cm}^3$)
- Maximum Diameter: 122.0 mm
- Anatomical Considerations: The central location in the right hemisphere may impact motor and sensory functions, depending on the specific anatomical structures involved. The presence of significant peritumoral edema increases the risk of mass effect and potential neurological compromise.

QUANTITATIVE ANALYSIS

- Total Tumor Volume: 251.55 cm^3
- Tumor Core Volume: 45.01 cm^3
- Enhancing Component: 0.00 cm^3 (0.0%)
- Necrotic Component: 45.01 cm^3 (17.9%)
- Edematous Component: 206.55 cm^3 (82.1%)

ENHANCEMENT CHARACTERISTICS

- Enhancement Pattern: None
- Enhancement Intensity: Mean 0.00, Maximum 0.00
- Clinical Significance: Lack of enhancement suggests either a non-enhancing tumor type or extensive necrosis within the tumor core, which is consistent with high-grade gliomas or other aggressive neoplasms with significant central necrosis.

TISSUE COMPOSITION ANALYSIS

| Tissue Component | Presence | Clinical Interpretation |

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| Enhancing Tissue | Absent | Indicates no active tumor growth or vascular permeability; may suggest advanced necrosis or low-grade histology. |

| Necrotic Core | Present | Moderate necrosis (10–30%) is commonly associated with high-grade gliomas or treatment-related changes. |

| Peritumoral Edema | Present | Extensive edema (82.1% of total tumor volume) is a marker of significant mass effect and inflammation. |

CLINICAL ASSESSMENT

- Tumor Grade Indicators: Absence of enhancement, high necrotic burden, and large size are consistent with high-grade glioma (e.g., glioblastoma).
- Differential Diagnosis: Likely high-grade glioma (e.g., glioblastoma multiforme), metastatic disease with central necrosis, or radiation-induced necrosis in a previously treated patient.
- Prognosis Indicators: Extensive necrosis and edema, combined with lack of enhancement, are associated with a poor prognosis, particularly in high-grade gliomas.

RECOMMENDATIONS

1. Immediate Actions: Urgent neurosurgical consultation for potential biopsy or resection; neurological evaluation to assess mass effect and functional deficits.
2. Additional Imaging: Consider contrast-enhanced MRI with diffusion-weighted imaging (DWI) and MR spectroscopy to further characterize the lesion.
3. Multidisciplinary Review: Involvement of neuro-oncology, radiation oncology, and neuropathology for staging and treatment planning.
4. Follow-up Protocol: Serial MRI imaging at 6–12 weeks to monitor for changes in tumor volume or enhancement.
5. Treatment Considerations: Likely indication for surgical resection, followed by radiation therapy and/or chemotherapy based on histopathological findings.

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 components and inability to differentiate histological subtypes without biopsy.

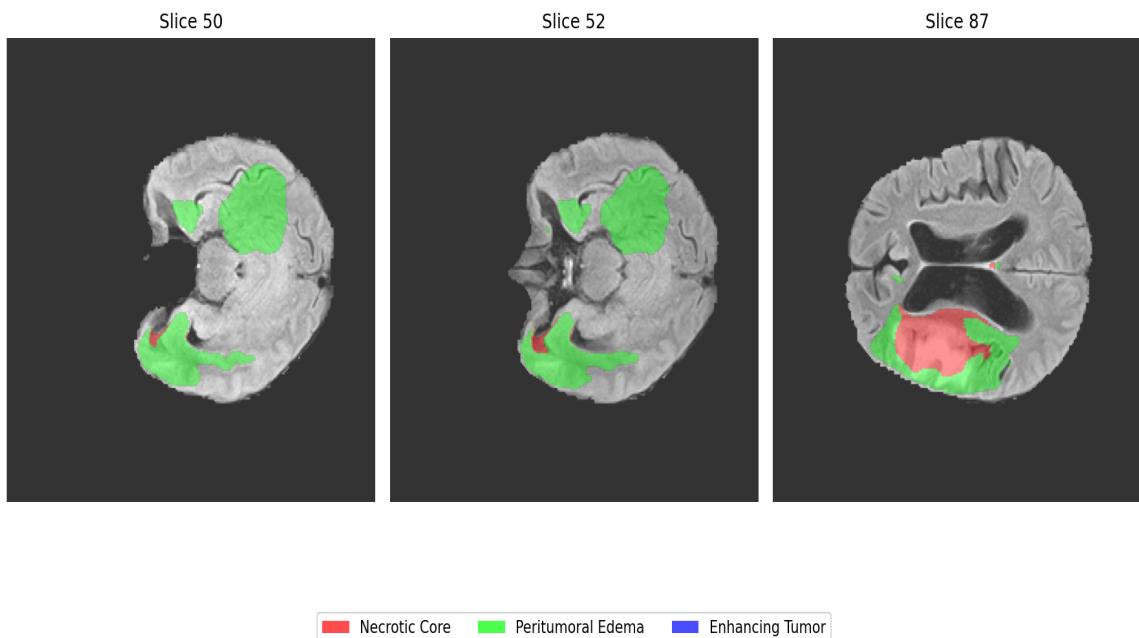
Report Generated: September 20, 2025 at 12:11 AM

System: AI-Assisted Brain Tumor Analysis Platform

SEGMENTATION VISUALIZATIONS

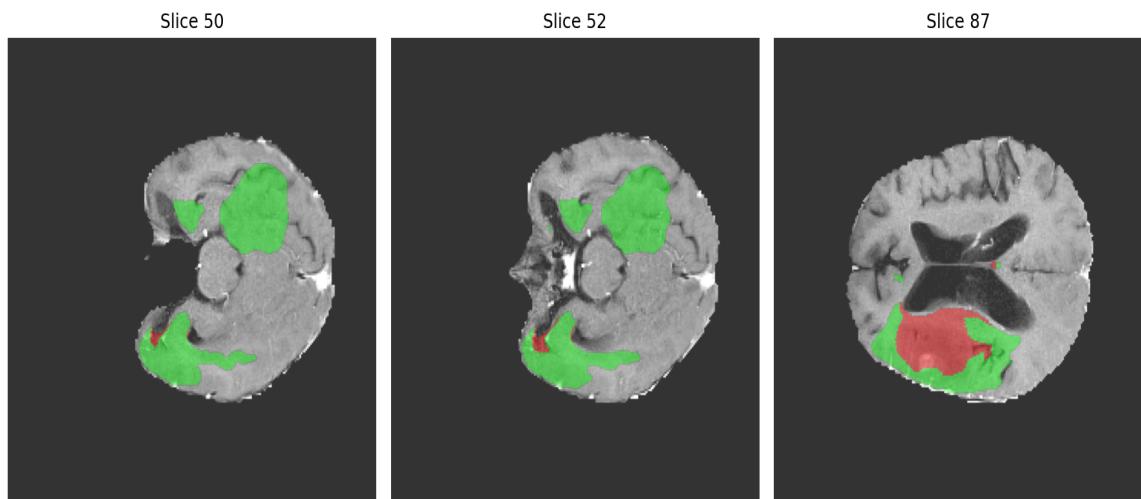
FLAIR Segmentation Overlay

FLAIR with Segmentation Overlay



T1CE Segmentation Overlay

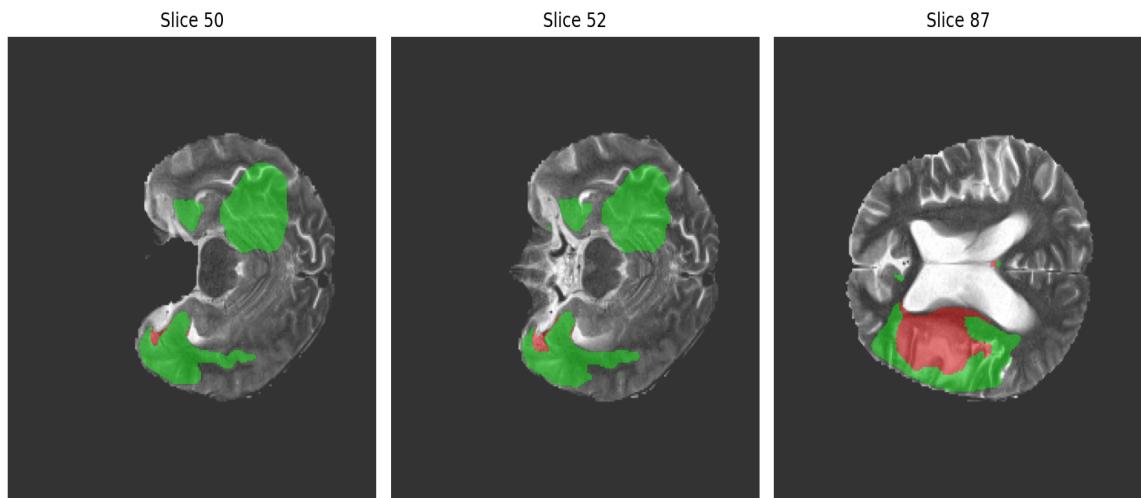
T1CE with Segmentation Overlay



■ Necrotic Core ■ Peritumoral Edema ■ Enhancing Tumor

T2 Segmentation Overlay

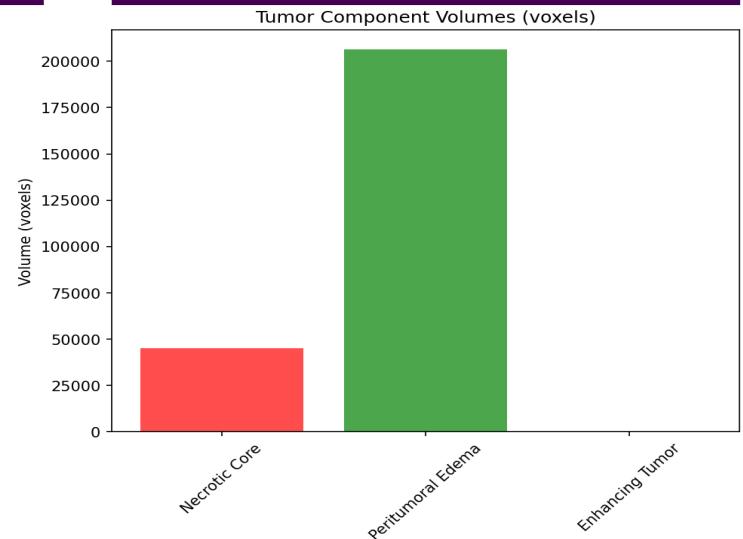
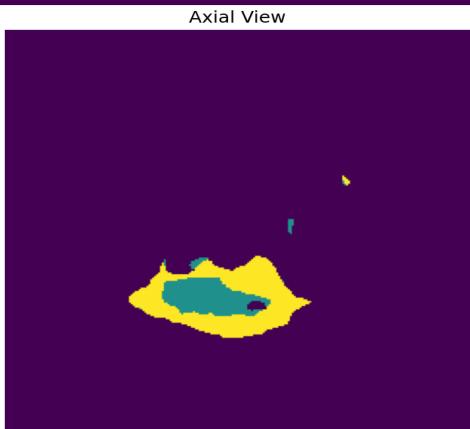
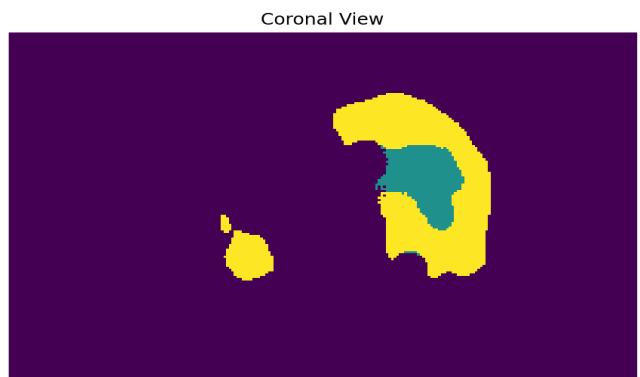
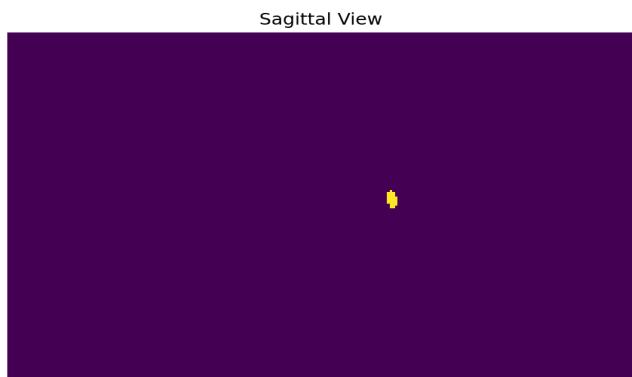
T2 with Segmentation Overlay



■ Necrotic Core ■ Peritumoral Edema ■ Enhancing Tumor

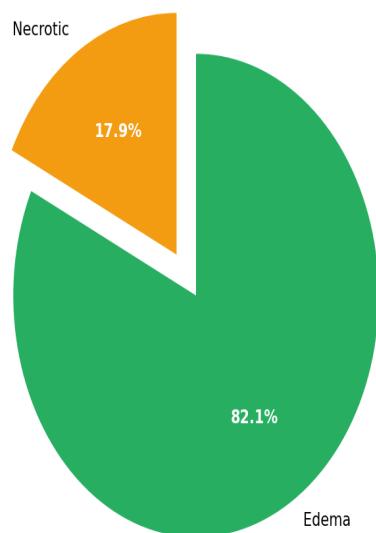
3D Volume Analysis

3D Tumor Segmentation Views

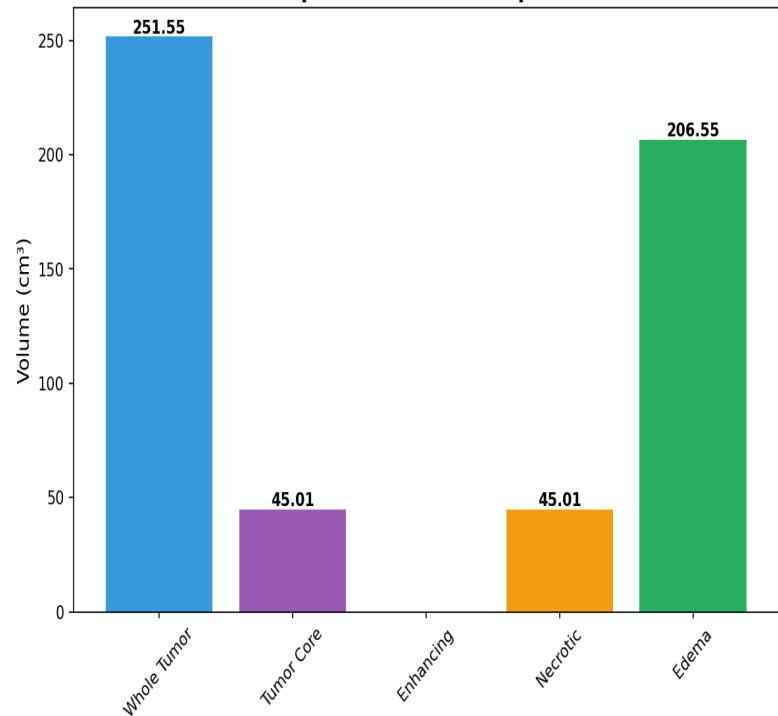


QUANTITATIVE ANALYSIS

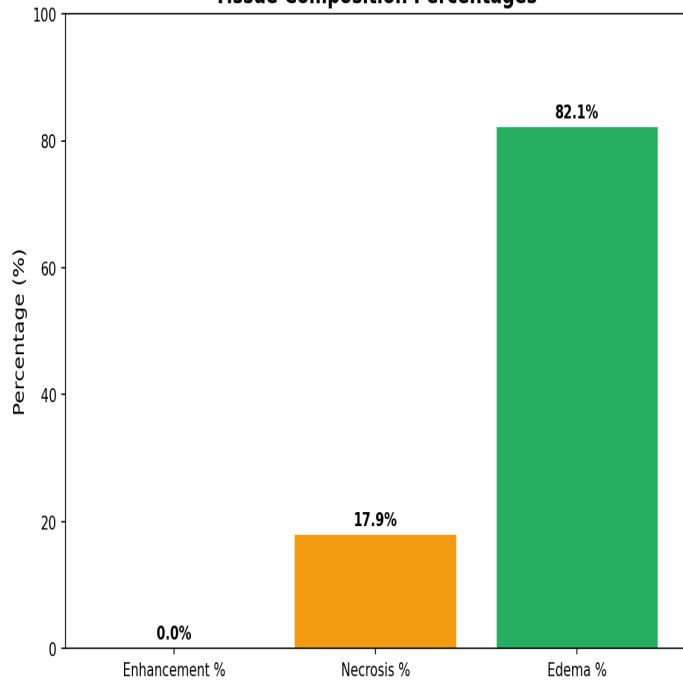
Tumor Component Distribution



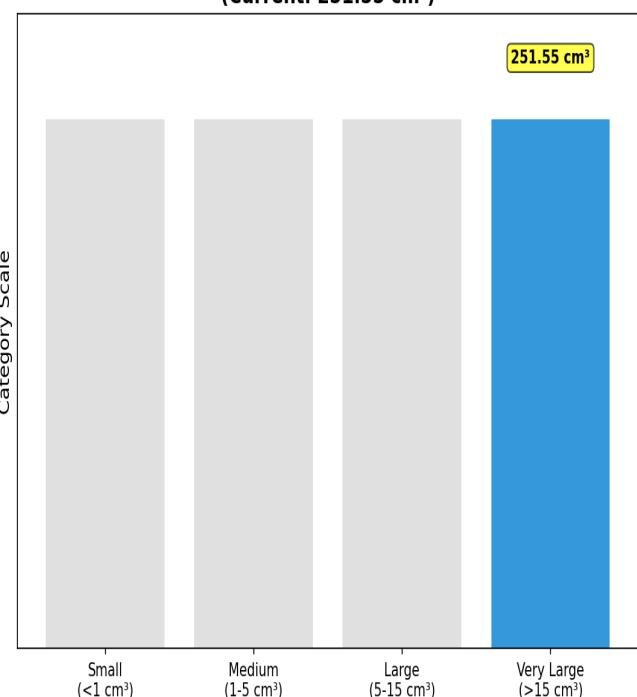
Component Volume Comparison



Tissue Composition Percentages



Tumor Size Classification
(Current: 251.55 cm³)



Clinical Summary Table

Parameter	Value	Clinical Significance
Total Volume	251.55 cm ³	very_large (>15 cm ³)
Maximum Diameter	122.0 mm	Surgical planning reference
Enhancement	0.0%	none
Necrosis	17.9%	moderate (10-30%)
Location	right central	Functional considerations
Enhancement Present	no	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.
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