BRAIN TUMOR ANALYSIS REPORT

AI-Powered Segmentation and Clinical Assessment

Patient Information

Field	Value
Report Date	2025-09-15T07:09:13.582510
Case ID	case_d30929c7-dcfa-43d6-9d80-d631b8028fa5

AI-GENERATED CLINICAL REPORT

EXECUTIVE SUMMARY

This case demonstrates a large, moderately enhancing brain tumor located in the right central cerebral hemisphere with significant peritumoral edema and minimal necrosis. The imaging findings suggest a high-grade neoplasm with prominent enhancing components, warranting urgent multidisciplinary evaluation and potential biopsy or surgical intervention.

TUMOR MORPHOLOGY AND LOCATION

- Location: Right hemisphere, central cerebral region
- Size Classification: Very large (tumor volume >15 cm^3)
- Maximum Diameter: 62.0 mm
- Anatomical Considerations: The central location in the right hemisphere may impact motor and sensory functions. Given its proximity to critical white matter tracts and eloquent cortex, surgical planning must consider functional preservation and potential neurological deficits.

QUANTITATIVE ANALYSIS

- Total Tumor Volume: 52.92 cm^3
- Tumor Core Volume: 11.12 cm^3
- Enhancing Component: 10.86 cm^3 (20.5%)
- Necrotic Component: 0.26 cm^3 (0.5%)
- Edematous Component: 41.80 cm^3 (79.0%)

ENHANCEMENT CHARACTERISTICS

- Enhancement Pattern: Moderate (10–30%)
- Enhancement Intensity: Mean intensity 520.73, Maximum intensity 1146.00
- Clinical Significance: Moderate enhancement indicates active tumor proliferation with probable blood-brain barrier disruption, consistent with high-grade glioma or metastatic disease; however, it does not definitively confirm histological grade without tissue sampling.

TISSUE COMPOSITION ANALYSIS

| Tissue Type | Presence | Clinical Interpretation |

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| Enhancing Tissue | Present | Indicates active tumor growth and potential cellular proliferation; seen in high-grade gliomas or metastases. |

| Necrotic Core | Present | Minimal necrosis noted (0.5%); low-grade tumors typically show higher degrees of necrosis but can also have focal areas in higher-grade lesions. |

| Peritumoral Edema | Present | Extensive edema (79%) suggests aggressive tumor biology and likely significant surrounding inflammation/invasion. |

CLINICAL ASSESSMENT

• Tumor Grade Indicators:

- Moderate enhancement

- Significant peritumoral edema

- Minimal necrosis

- Large total volume

These findings favor a diagnosis toward a high-grade glioma such as glioblastoma multiforme (GBM), though further histopathological confirmation is essential.

• Differential Diagnosis:

- Glioblastoma multiforme (GBM) – most likely due to high-grade morphology and extent of enhancement and edema

- Anaplastic astrocytoma (WHO Grade III) – possible if patient has a longer tumor history and less intense edema

- Metastasis – if patient history supports prior malignancy, particularly melanoma or lung cancer

• Prognosis Indicators:

- Large tumor volume (>50 cm^3)

- Extensive edema

- Minimal necrosis

These features generally correlate with more aggressive behavior and poorer prognosis, especially in GBM.

RECOMMENDATIONS

1. Immediate Actions: Urgent neurosurgical evaluation and consideration of biopsy or resection depending on lesion accessibility and risk profile.

2. Additional Imaging: Consider perfusion-weighted imaging (PWI) or magnetic resonance spectroscopy (MRS) to assess metabolic activity or differentiate between tumor recurrence and radiation damage post-treatment.

3. Multidisciplinary Review: Involve neuro-oncology, neuroradiology, and neuropathology teams for comprehensive care planning and molecular profiling when feasible.

4. Follow-up Protocol: Scheduled MRI with contrast every 6-12 months post-intervention to monitor progression or response to therapy.

5. Treatment Considerations: Based on imaging findings, initiation of standard multimodal treatment including maximal safe surgical resection followed by radiotherapy and adjuvant chemotherapy should be anticipated.

TECHNICAL NOTES

• Image Quality: Adequate for diagnostic interpretation

• Segmentation Confidence: High confidence from automated methods using 1.0 mm isotropic resolution

• Limitations: MRI-based segmentation cannot fully replace histopathological correlation; some tumor heterogeneity may not capture entirely through volumetric analysis alone.

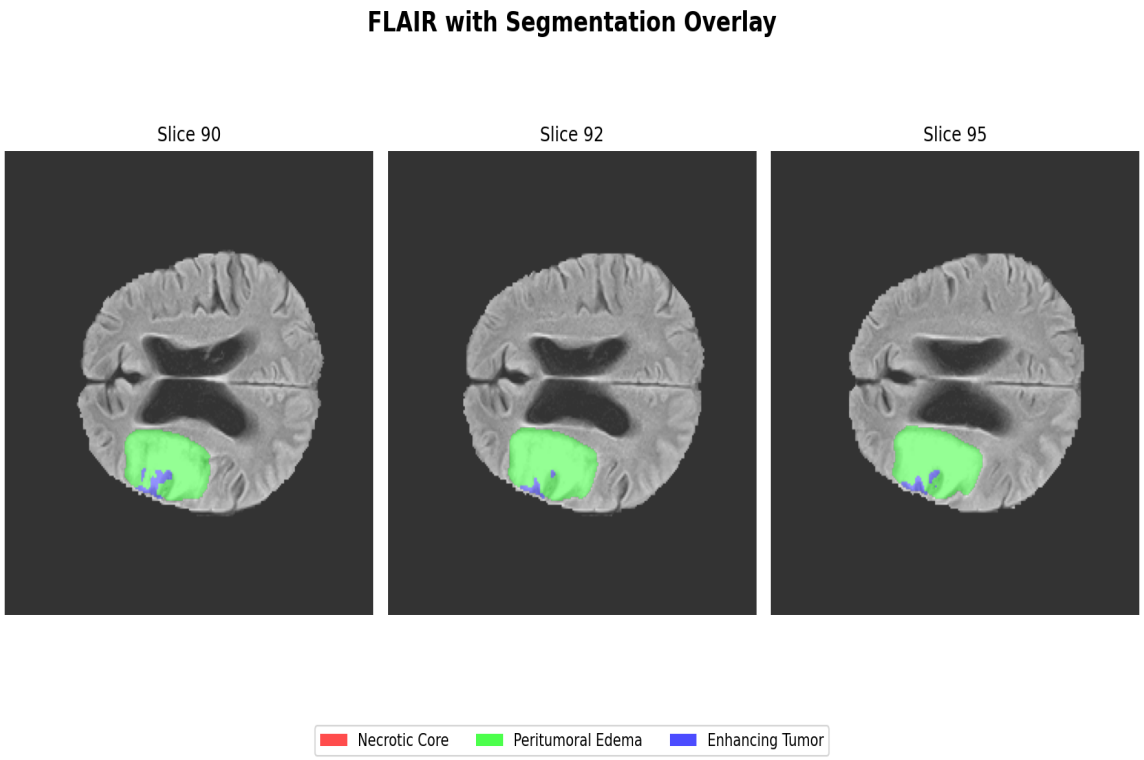
Report Generated: September 15, 2025 at 07:08 AM

System: AI-Assisted Brain Tumor Analysis Platform

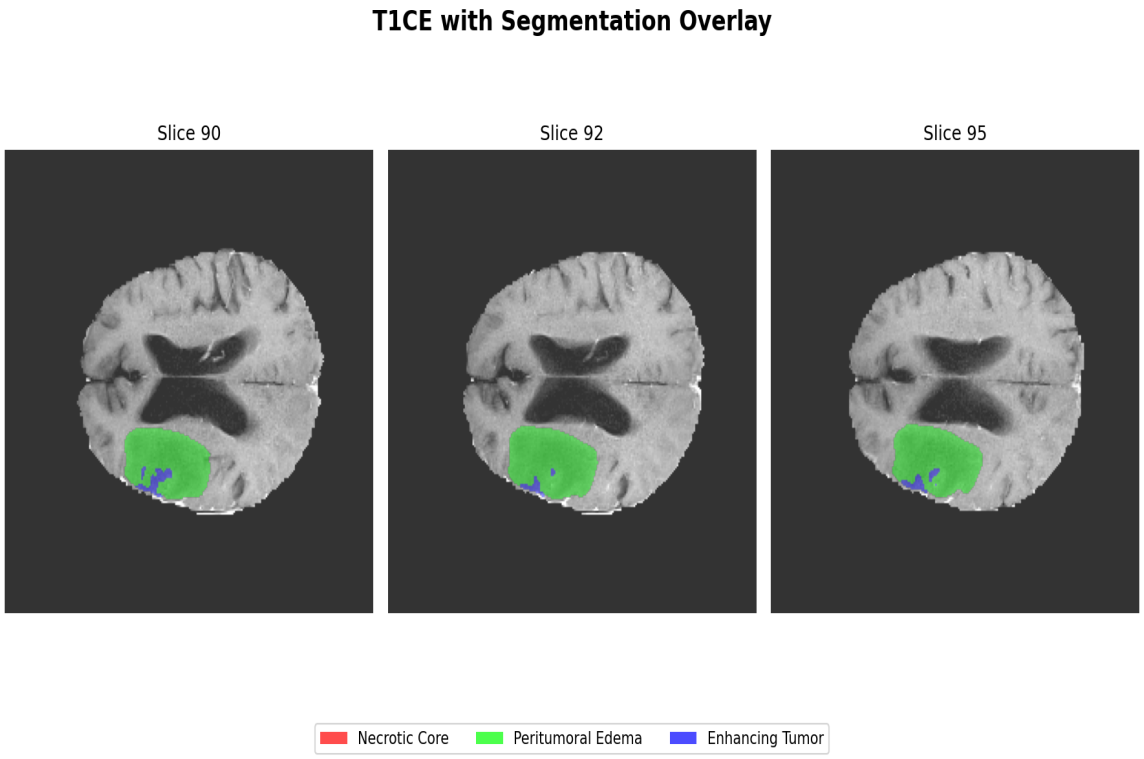
Case ID: case_d30929c7-dcfa-43d6-9d80-d631b8028fa5

SEGMENTATION VISUALIZATIONS

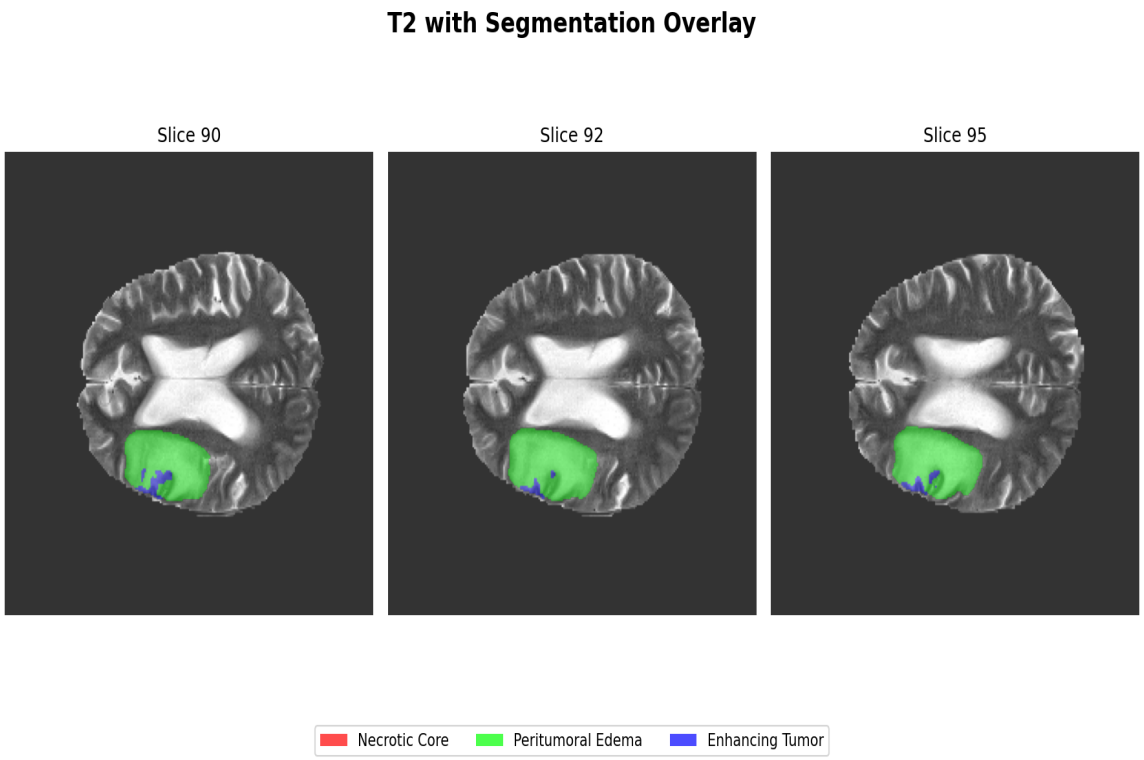
FLAIR Segmentation Overlay



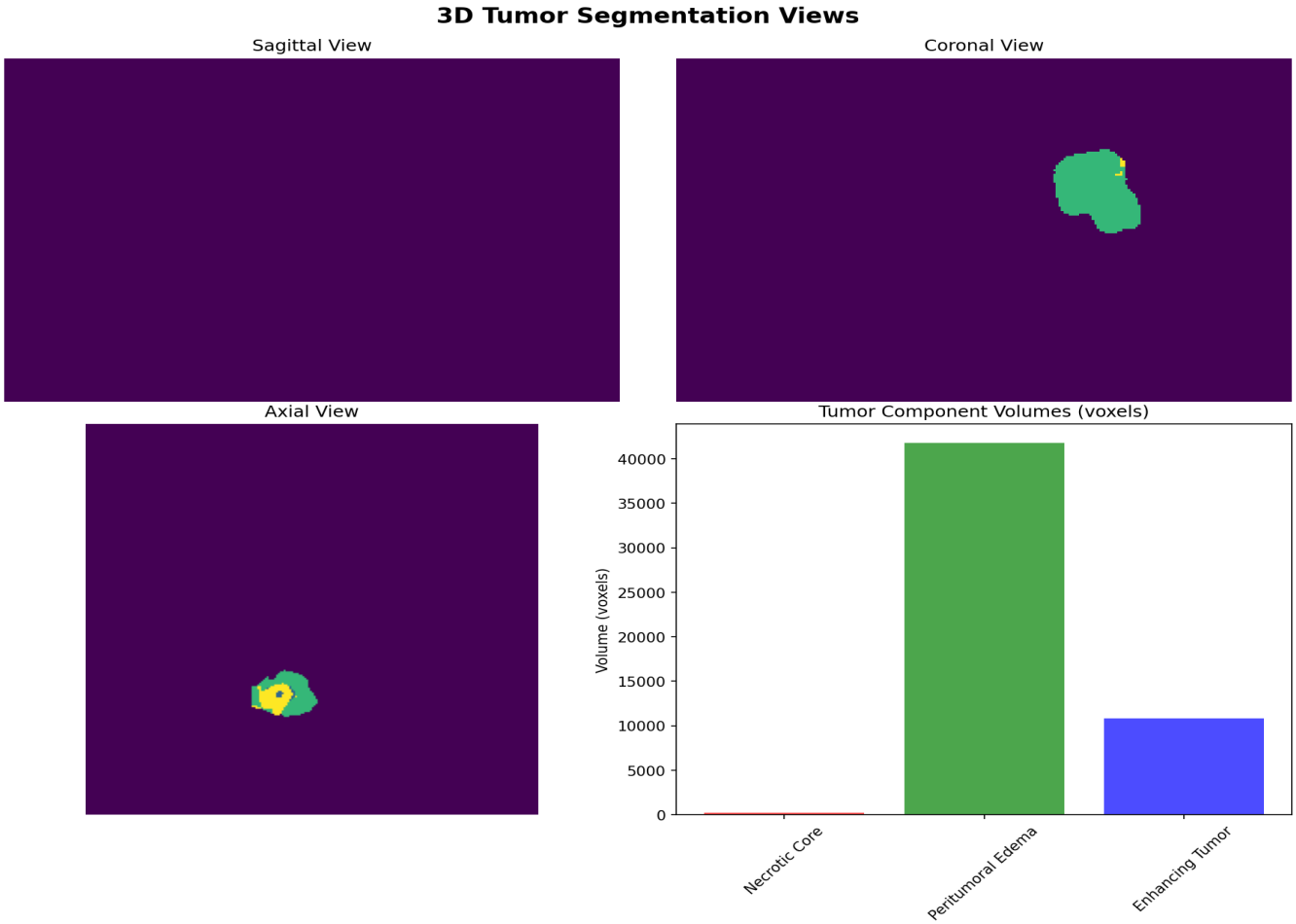
T1CE Segmentation Overlay



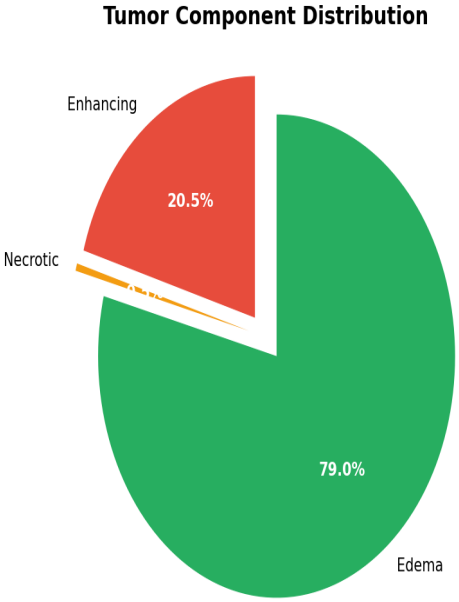
T2 Segmentation Overlay

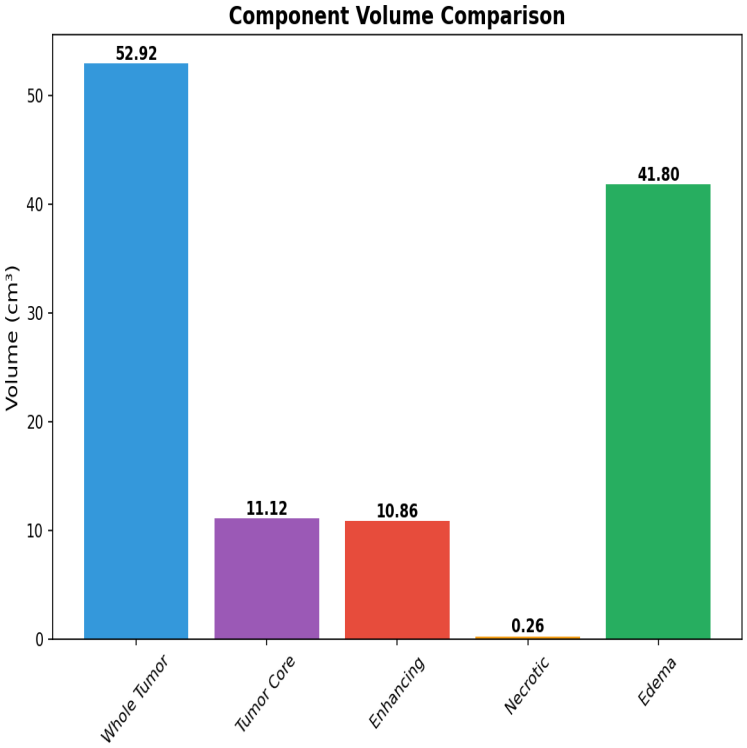


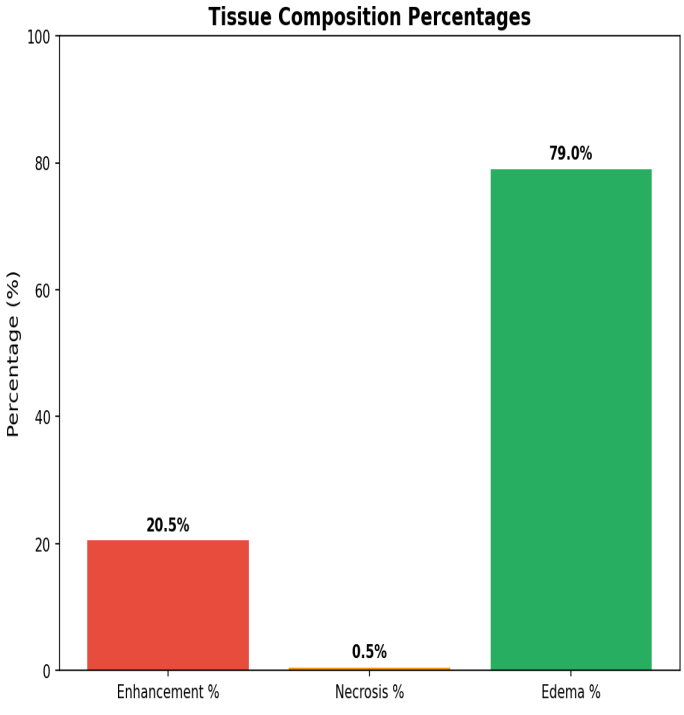
3D Volume Analysis

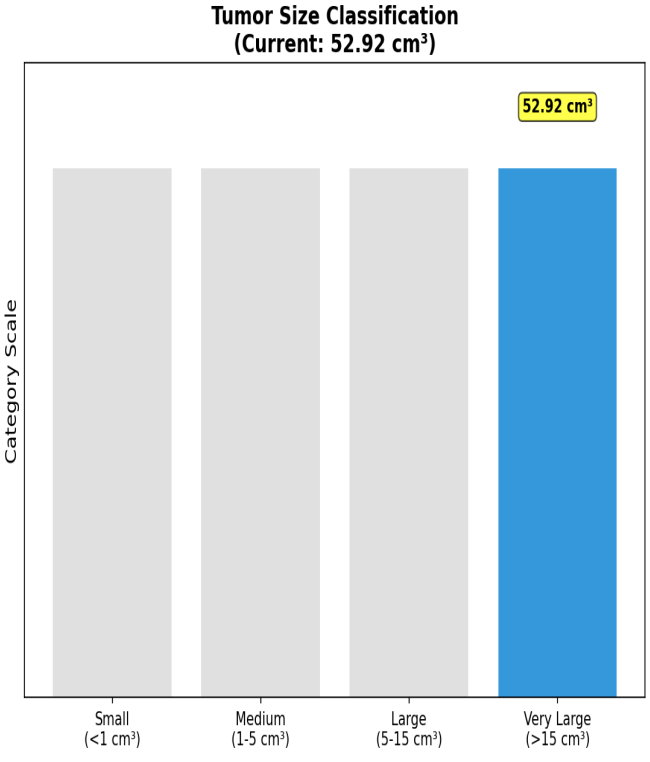

3D Tumor Segmentation Views
Sagittal View
Coronal View
Axial View
Tumor Component Volumes (voxels)
Volume (voxels)
0
5000
10000
15000
20000
25000
30000
35000
40000
Necrotic Core
Peritumoral Edema
Enhancing Tumor

QUANTITATIVE ANALYSIS









Necrosis	0.5%	minimal (<10%)
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 15, 2025 at 07:09 AM using microsoft/DialoGPT-medium.