BRAIN TUMOR ANALYSIS REPORT

AI-Powered Segmentation and Clinical Assessment

Patient Information

Field	Value
Report Date	2025-09-19T11:46:27.593453
Case ID	case_6c0098b6-85fd-457e-b28c-03c0e9573a79

AI-GENERATED CLINICAL REPORT

EXECUTIVE SUMMARY

This case demonstrates a large, enhancing brain tumor with significant peritumoral edema and minimal necrosis, located in the right central cerebral hemisphere. The tumor exhibits moderate enhancement with a predominantly edematous composition, consistent with high-grade glioma. Imaging findings support the need for prompt multidisciplinary evaluation and potential surgical intervention.

TUMOR MORPHOLOGY AND LOCATION

- Location: Right central cerebral hemisphere
- Size Classification: Very large (>15 cm^3)
- Maximum Diameter: 62.0 mm
- Anatomical Considerations: The central location in the right hemisphere may pose risks for motor and sensory function, depending on involvement of adjacent structures such as the internal capsule or motor cortex. Clinical correlation is essential for neurological assessment.

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 520.73, Maximum 1146.00
- Clinical Significance: Moderate enhancement is consistent with active tumor proliferation and blood-brain barrier disruption, commonly seen in high-grade gliomas or recurrent tumors. The absence of significant rim enhancement suggests possible infiltrative growth rather than encapsulated lesion.

TISSUE COMPOSITION ANALYSIS

| Tissue Component | Presence | Clinical Interpretation |

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| Enhancing Tissue | Present | Indicates active tumor proliferation and vascular permeability. |

| Necrotic Core | Present | Minimal necrosis (0.5%) supports a more viable tumor mass with less central ischemia. |

| Peritumoral Edema | Present | Extensive edema (79%) reflects significant inflammatory and vasogenic response to tumor burden. |

CLINICAL ASSESSMENT

• Tumor Grade Indicators:

- Moderate enhancement and extensive edema suggest a high-grade glioma (e.g., glioblastoma or anaplastic astrocytoma).

- Minimal necrosis does not rule out malignancy but may indicate a less aggressive variant or early stage.

• Differential Diagnosis:

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

- Recurrent glioma

- Metastatic lesion (less likely without known primary)

- Inflammatory or infectious process (less supported by imaging features)

• Prognosis Indicators:

- Large tumor volume and significant edema are associated with poor functional outcomes and may impact surgical resection feasibility.

- Moderate enhancement and minimal necrosis suggest a relatively active tumor with potential for rapid progression.

RECOMMENDATIONS

1. Immediate Actions:

- Urgent neurological evaluation and clinical staging.

- Consider neurosurgical consultation for potential biopsy or resection planning.

2. Additional Imaging:

- Functional MRI (fMRI) and DTI to assess involvement of eloquent cortex or white matter tracts.

- Diffusion-weighted imaging (DWI) and MR spectroscopy (MRS) for further characterization.

3. Multidisciplinary Review:

- Involvement of neuro-oncology, neurosurgery, radiation oncology, and neuropathology for comprehensive care planning.

4. Follow-up Protocol:

- MRI with contrast within 1–2 weeks post-intervention, followed by routine surveillance every 3–6 months.

5. Treatment Considerations:

- Surgical resection if feasible and safe.

- Consider concurrent chemoradiation based on histopathological findings.

- Molecular profiling (IDH, MGMT, 1p19q codeletion) recommended for precise tumor classification.

TECHNICAL NOTES

• Image Quality: Adequate for diagnostic interpretation

• Segmentation Confidence: High automated detection accuracy

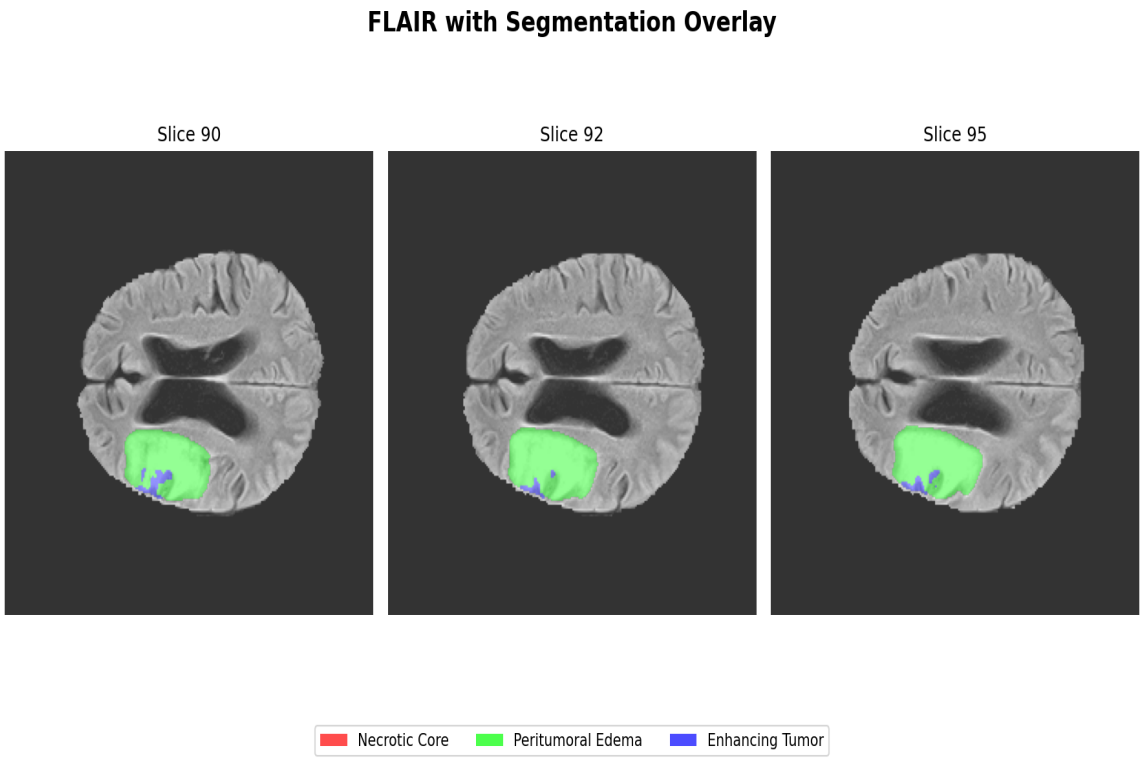
• Limitations: Standard limitations of MRI-based analysis include potential overestimation of edema and underestimation of subtle infiltrative components. Functional and metabolic imaging should complement volumetric data.

Report Generated: September 19, 2025 at 11:46 AM

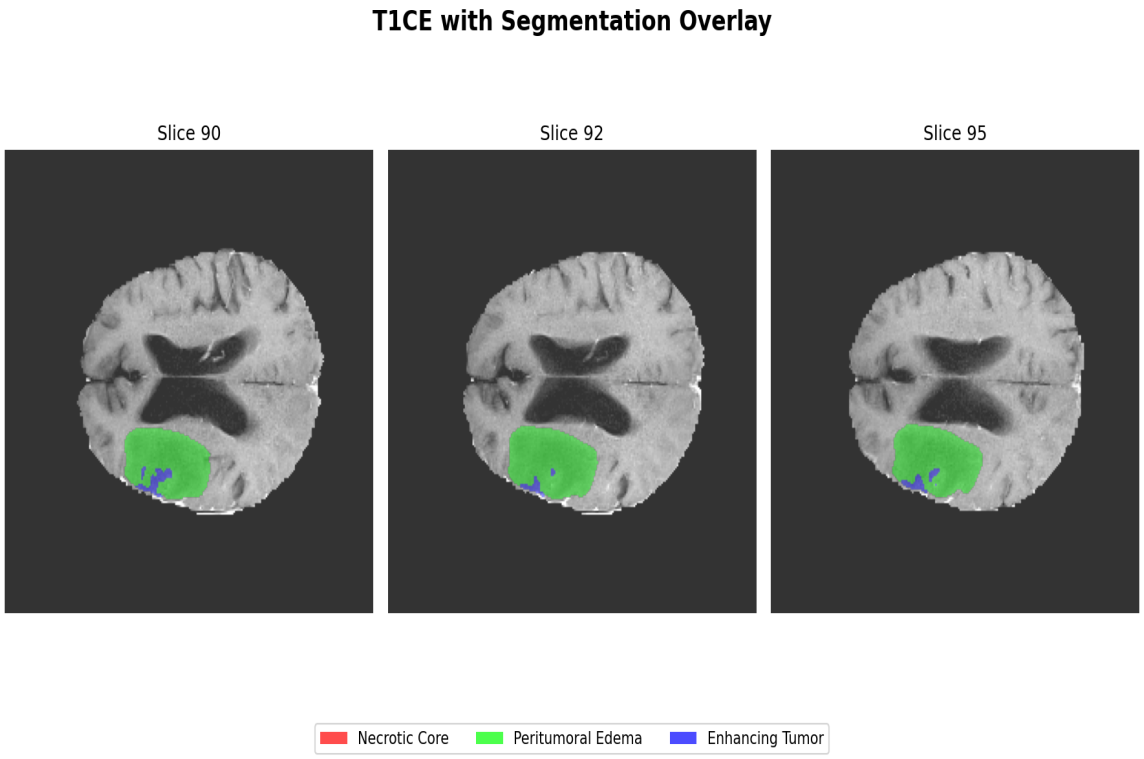
System: AI-Assisted Brain Tumor Analysis Platform

SEGMENTATION VISUALIZATIONS

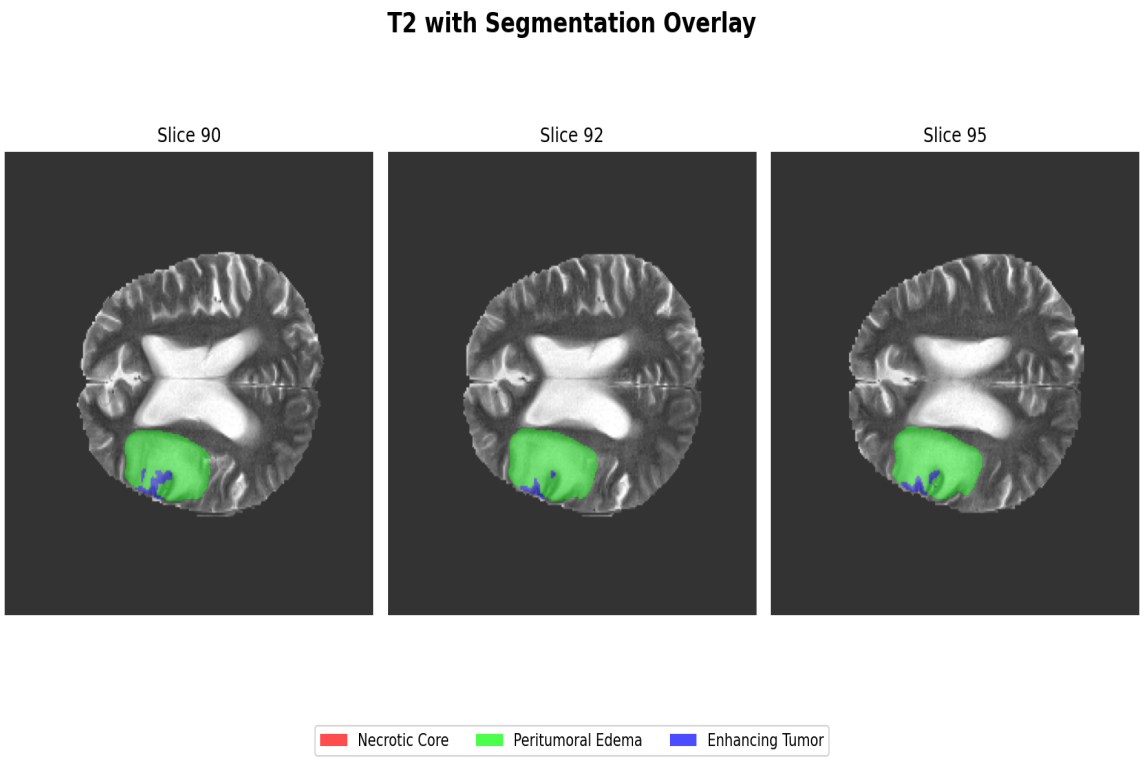
FLAIR Segmentation Overlay



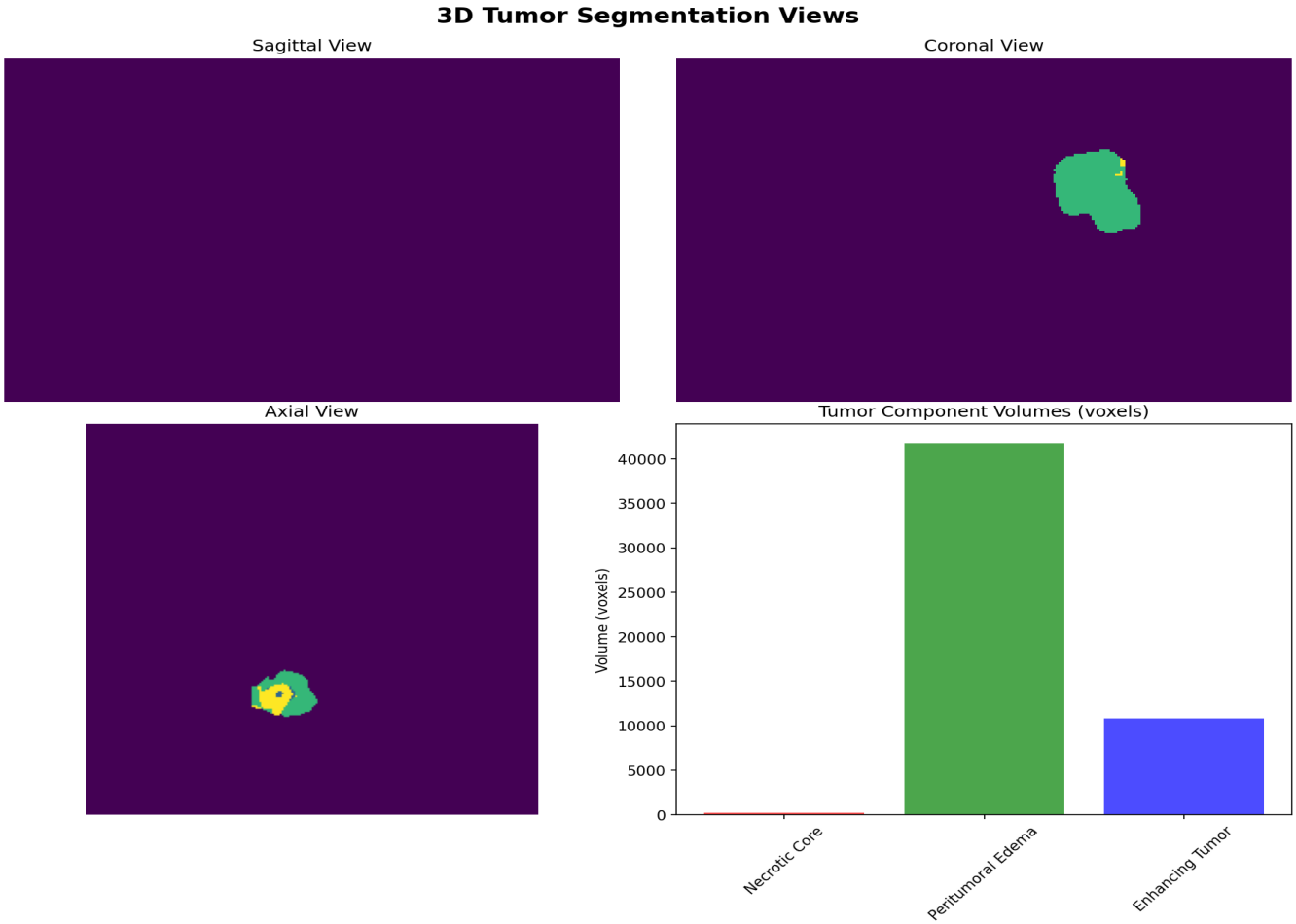
T1CE Segmentation Overlay



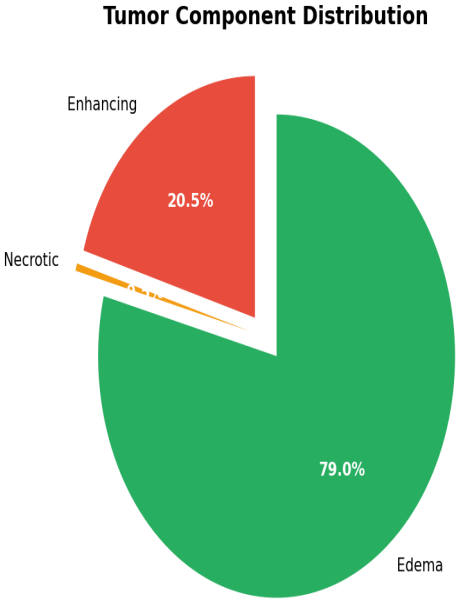
T2 Segmentation Overlay

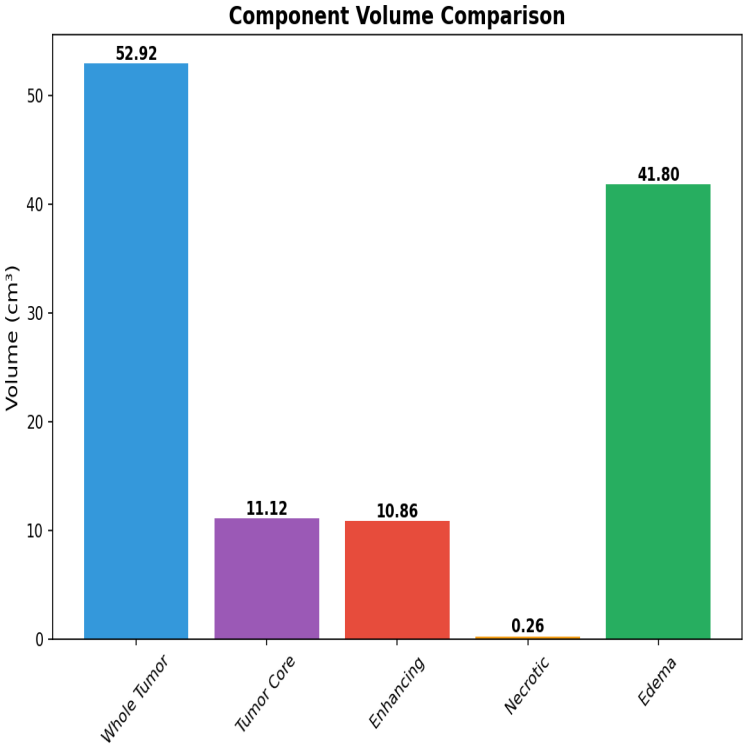


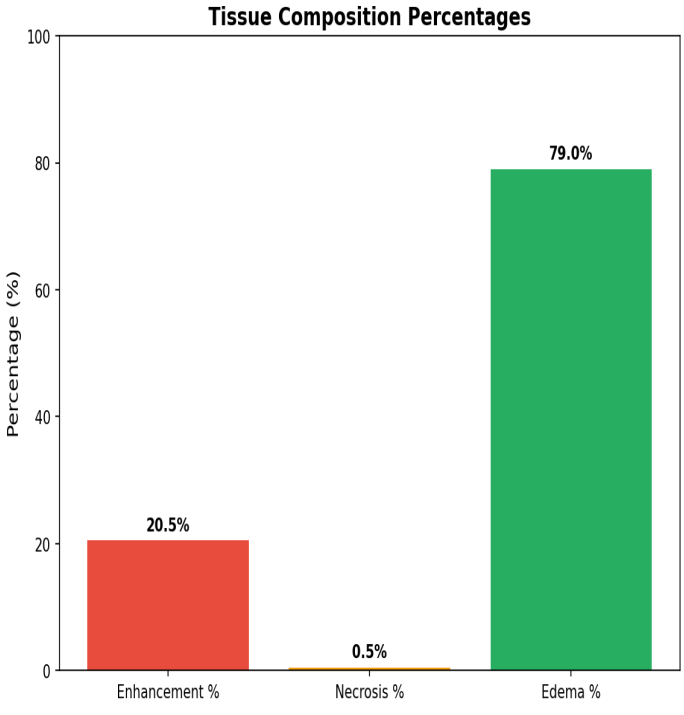
3D Volume Analysis

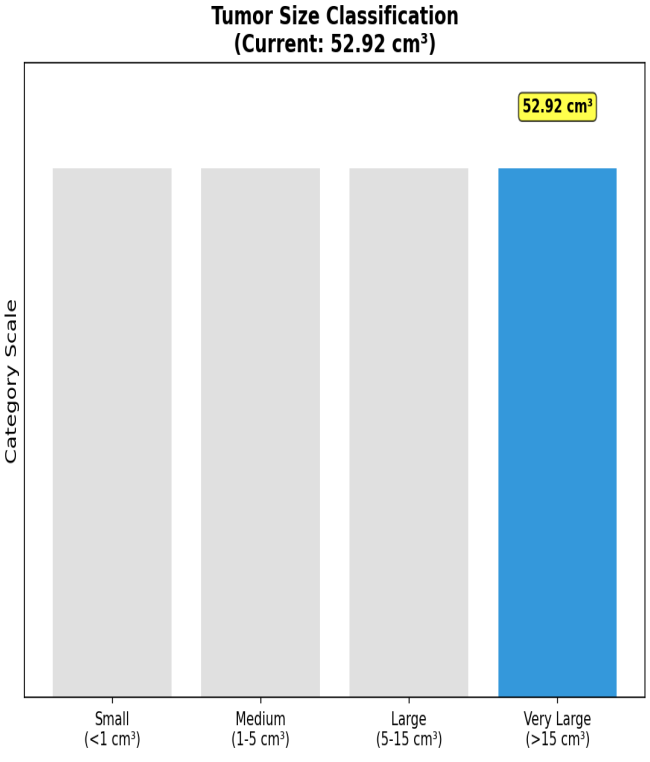

3D Tumor Segmentation Views
Sagittal View
Coronal View
Axial View
Tumor Component Volumes (voxels)
Volume (voxels)
0
5000
10000
15000
20000
25000
30000
35000
40000
Necrotic Core
Peritumoral Edema
Enhancing Tumor

QUANTITATIVE ANALYSIS









Clinical Summary Table

Parameter	Value	Clinical Significance
Total Volume	52.92 cm³	very_large (>15 cmÂ³)
Maximum Diameter	62.0 mm	Surgical planning reference
Enhancement	20.5%	moderate (10-30%)
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 19, 2025 at 11:46 AM using Qwen/Qwen3-Coder-30B-A3B-Instruct.