BRAIN TUMOR ANALYSIS REPORT

AI-Powered Segmentation and Clinical Assessment

Patient Information

Field	Value
Report Date	2025-09-19T11:35:28.436801
Case ID	case_fe8d688e-30b5-4668-87a1-10fabcd52985

AI-GENERATED CLINICAL REPORT

EXECUTIVE SUMMARY

This case demonstrates a large right-sided central brain tumor with moderate enhancement and significant peritumoral edema. The tumor exhibits minimal necrosis and a heterogeneous composition, consistent with a high-grade glioma. Quantitative analysis indicates a very large tumor burden with substantial surrounding edema, warranting urgent clinical evaluation and multidisciplinary management.

TUMOR MORPHOLOGY AND LOCATION

- Location: Right hemisphere, central brain region
- Size Classification: Very large (>15 cm^3)
- Maximum Diameter: 62.0 mm
- Anatomical Considerations: The central location in the right hemisphere may be associated with potential involvement of critical motor and sensory pathways, necessitating careful functional assessment and surgical planning if indicated.

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 suggests active tumor proliferation with possible blood-brain barrier disruption. The presence of enhancement is consistent with malignant glioma, particularly anaplastic astrocytoma or glioblastoma.

TISSUE COMPOSITION ANALYSIS

| Tissue Component | Presence | Clinical Interpretation |

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

| Necrotic Core | Present | Minimal necrosis (0.5%) is consistent with high-grade glioma; may reflect treatment response or tumor biology. |

| Peritumoral Edema | Present | Extensive edema (79%) reflects significant mass effect and inflammatory response, contributing to neurological symptoms. |

CLINICAL ASSESSMENT

• Tumor Grade Indicators:

- Moderate enhancement

- Extensive edema

- Minimal necrosis

- Large tumor volume

These features are consistent with a high-grade glioma, possibly anaplastic astrocytoma or glioblastoma, though definitive grading requires histopathological correlation.

• Differential Diagnosis:

- High-grade glioma (anaplastic astrocytoma or glioblastoma)

- Malignant meningioma (if enhancing margins are irregular)

- Metastatic lesion (if patient history supports)

• Prognosis Indicators:

- Large tumor volume and extensive edema suggest aggressive behavior.

- Minimal necrosis may indicate active tumor rather than treatment-related change.

- Moderate enhancement is consistent with high-grade malignancy.

RECOMMENDATIONS

1. Immediate Actions:

- Urgent neurosurgical consultation for potential biopsy or resection.

- Neurological evaluation for symptom management and functional assessment.

2. Additional Imaging:

- Contrast-enhanced MRI with diffusion-weighted imaging (DWI) and perfusion imaging to further characterize tumor vascularity and cellularity.

- Consider MRI spectroscopy (MRS) for metabolic characterization.

3. Multidisciplinary Review:

- Involvement of neuro-oncology, radiation oncology, and neuropathology teams for staging and treatment planning.

4. Follow-up Protocol:

- Repeat MRI within 2–4 weeks post-treatment initiation.

- Functional MRI (fMRI) and DTI if surgical resection is planned.

5. Treatment Considerations:

- Consider surgical resection if feasible and safe.

- Initiate radiation therapy and chemotherapy (e.g., temozolomide) in accordance with standard protocols for high-grade gliomas.

- Monitor for signs of increased intracranial pressure due to edema.

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 variability in tumor core definition; histopathological correlation remains essential for definitive diagnosis.

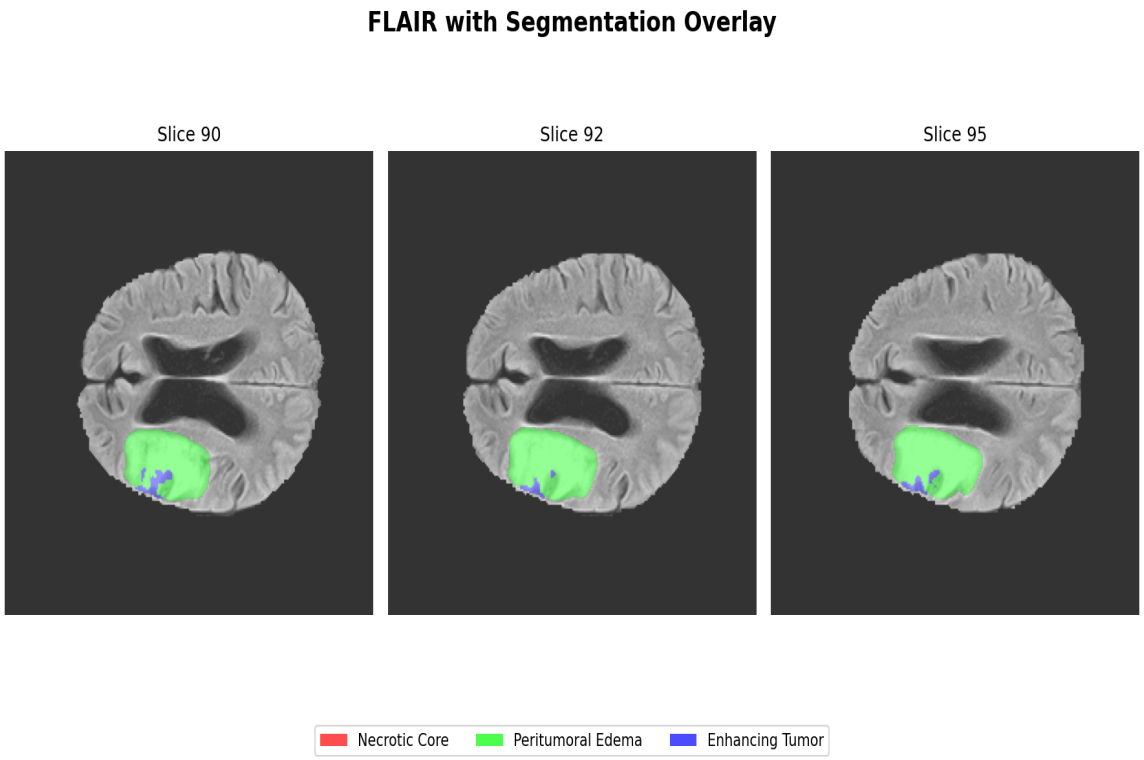
Report Generated: September 19, 2025 at 11:35 AM

System: AI-Assisted Brain Tumor Analysis Platform

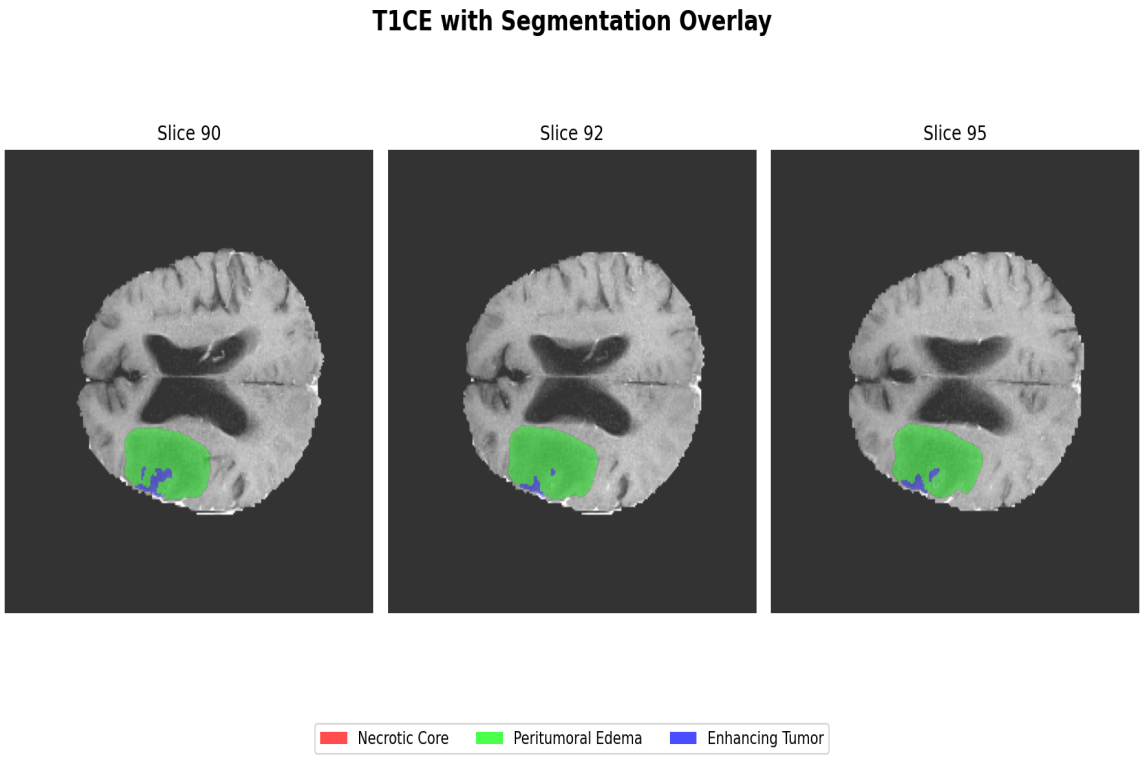
Case ID: case_fe8d688e-30b5-4668-87a1-10fabcd52985

SEGMENTATION VISUALIZATIONS

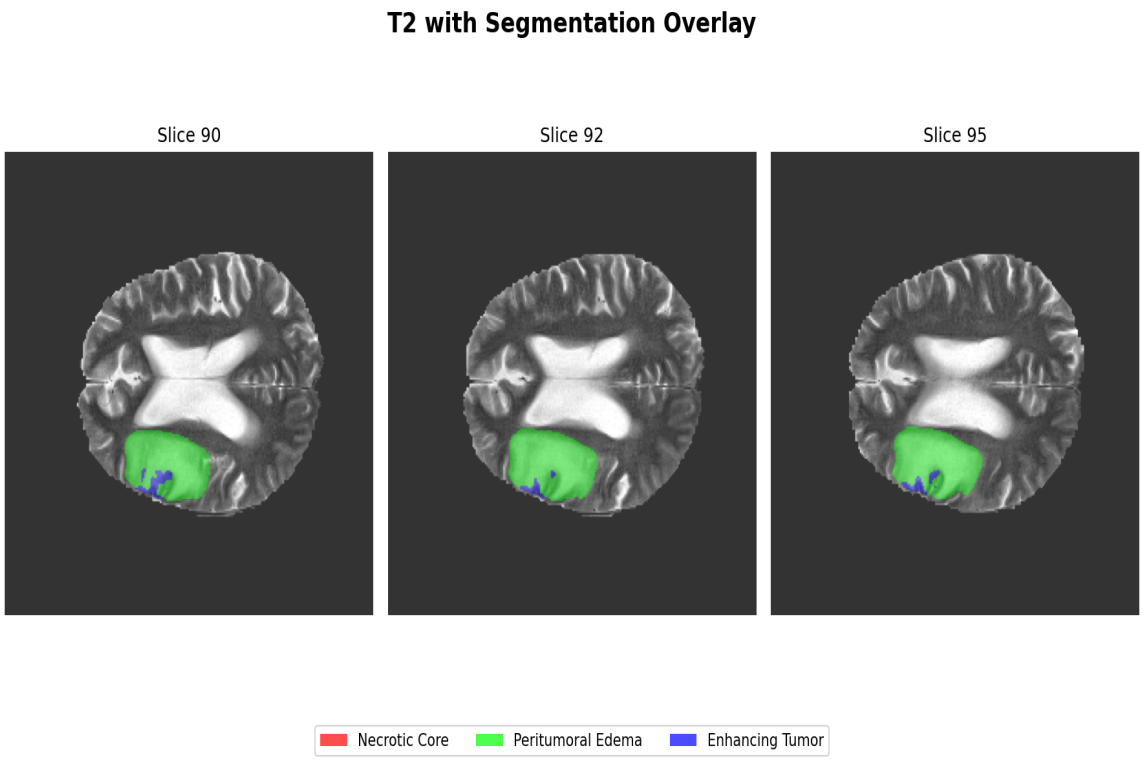
FLAIR Segmentation Overlay



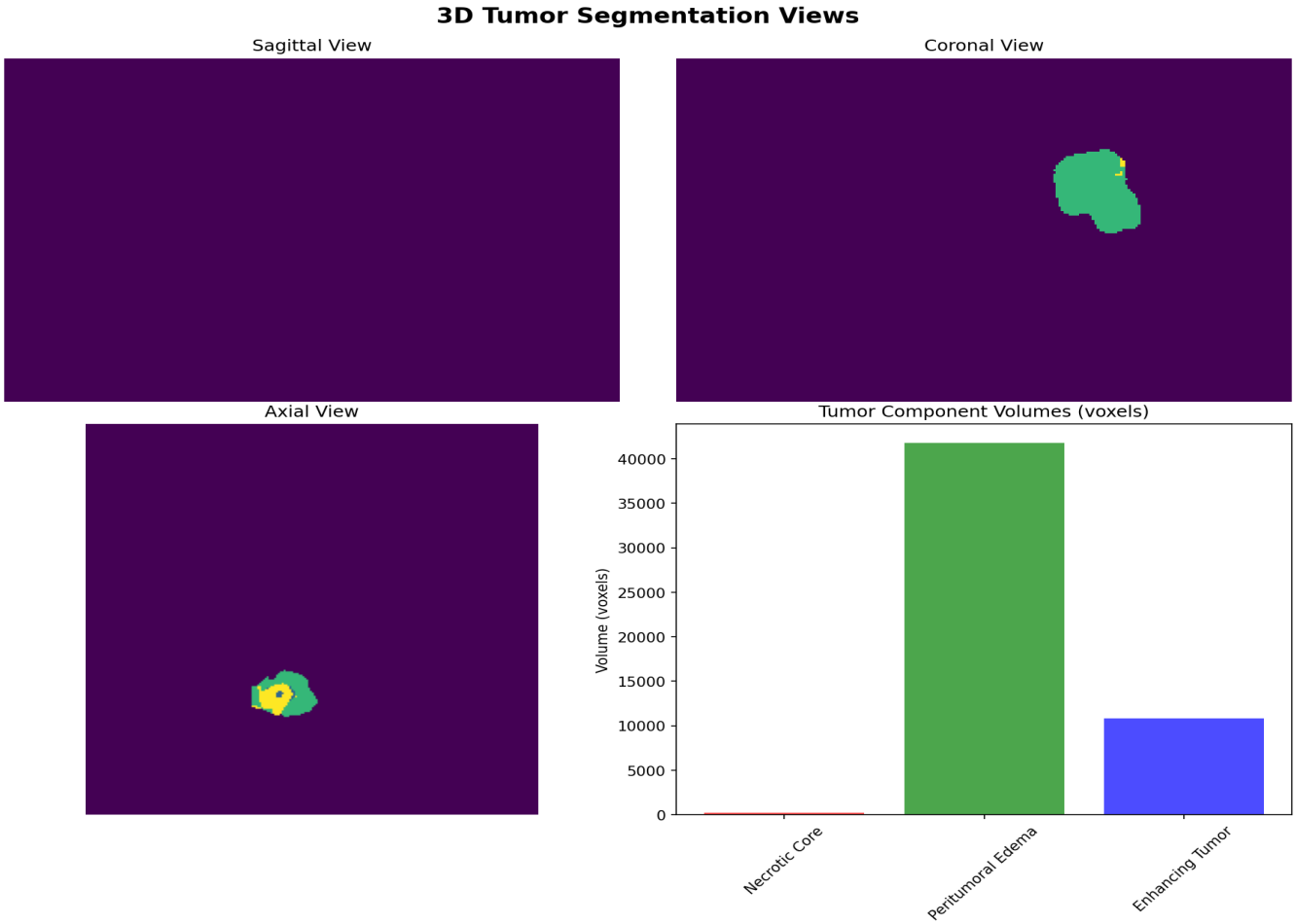
T1CE Segmentation Overlay



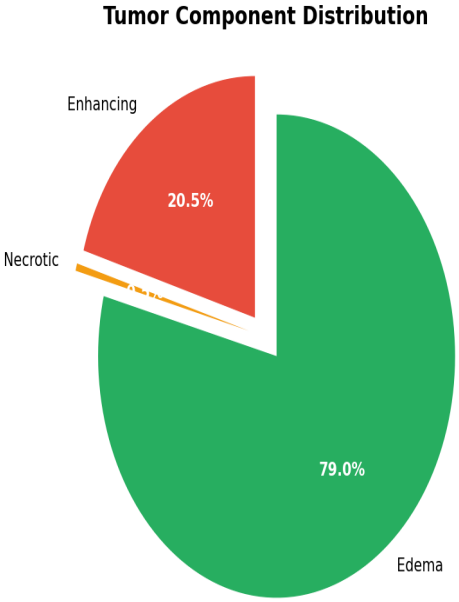
T2 Segmentation Overlay

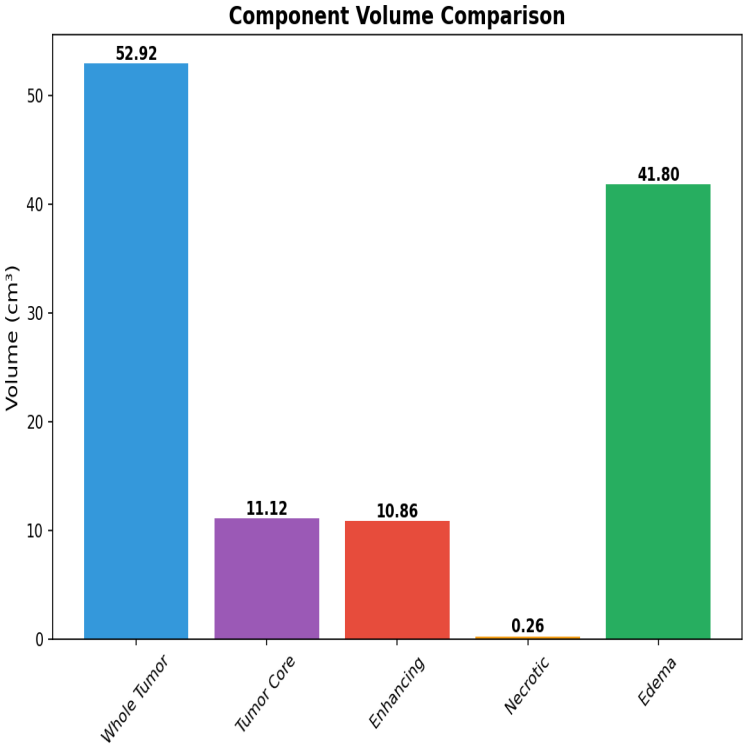


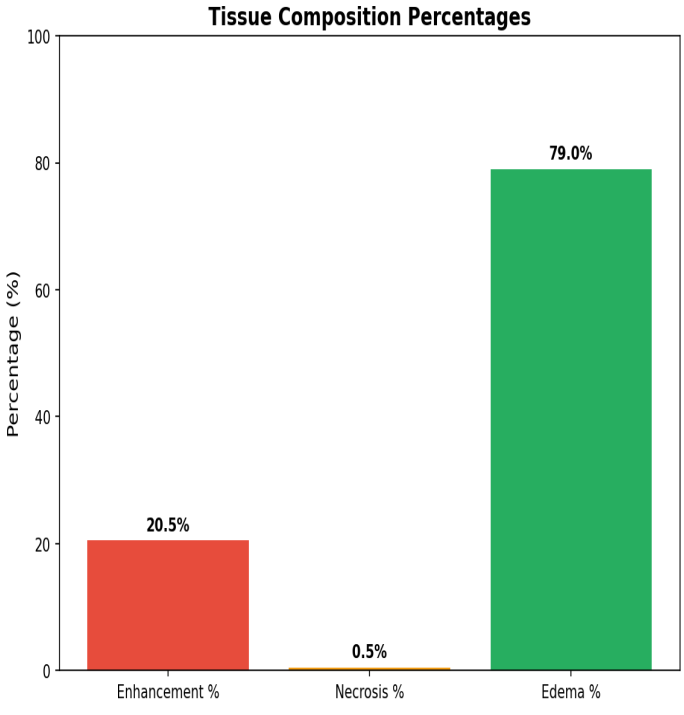
3D Volume Analysis

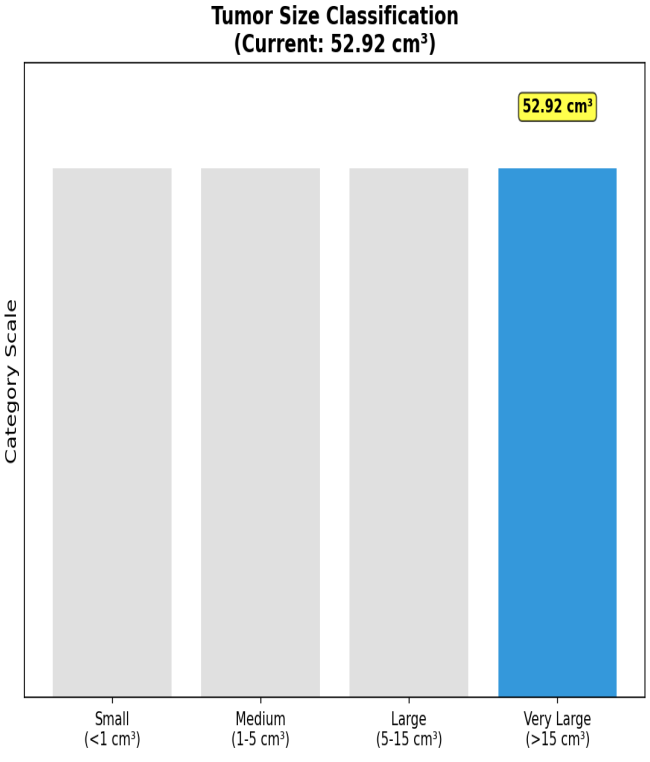

3D Tumor Segmentation Views
Sagittal View
Coronal View
Axial View
Tumor Component Volumes (voxels)
Volume (voxels)
0
5000
10000
15000
20000
25000
30000
35000
40000
Necrotic Core
Peritumoral Edema
Enhancing Tumor

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 11:35 AM using Qwen/Qwen3-Coder-30B-A3B-Instruct.