

BRAIN TUMOR ANALYSIS REPORT

AI-Powered Segmentation and Clinical Assessment

Patient Information

Field	Value
Report Date	2025-09-19T07:50:28.664525
Case ID	case_78b9b76c-42e6-4ea3-b894-c05e62df6a46

AI-GENERATED CLINICAL REPORT

EXECUTIVE SUMMARY

This MRI-based brain tumor segmentation analysis reveals a large, heterogeneous right-sided central brain lesion with moderate enhancement, minimal necrosis, and significant peritumoral edema. The tumor demonstrates features consistent with a high-grade glioma, warranting urgent multidisciplinary evaluation and potential biopsy for histopathological confirmation.

TUMOR MORPHOLOGY AND LOCATION

- Location: Right hemisphere, central brain region
- Size Classification: Very large ($>15\text{ cm}^3$)
- Maximum Diameter: 62.0 mm
- Anatomical Considerations: The central location in the right hemisphere may pose risk for involvement of critical motor and sensory pathways, potentially affecting contralateral limb function and speech if adjacent to the dominant hemisphere structures.

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, suggesting viable tumor tissue. The absence of significant rim enhancement or irregular enhancement pattern reduces likelihood of meningioma or low-grade glioma.

TISSUE COMPOSITION ANALYSIS

| Tissue Component | Present/Absent | Clinical Interpretation |

|--|--||

| Enhancing Tissue | Present | Indicates active tumor proliferation and viable neoplastic tissue.

| Necrotic Core | Present | Minimal necrosis (0.5%) supports a more aggressive tumor type with limited ischemia. |

| Peritumoral Edema | Present | Extensive edema (79%) is consistent with high-grade glioma and suggests significant mass effect. |

CLINICAL ASSESSMENT

- Tumor Grade Indicators:

- Large volume (52.92 cm^3)
- Moderate enhancement pattern
- Minimal necrosis
- Extensive peritumoral edema

- Differential Diagnosis:

- High-grade glioma (e.g., glioblastoma multiforme)
- Anaplastic astrocytoma
- Anaplastic oligodendrogloma (less likely without specific histologic markers)

- Prognosis Indicators:

- Extensive edema and large tumor volume suggest aggressive behavior.
- Moderate enhancement and minimal necrosis are not definitive for low-grade tumors but do not exclude high-grade pathology.

RECOMMENDATIONS

1. Immediate Actions:

- Urgent neurosurgical consultation for potential biopsy or resection planning.
- Consider corticosteroid therapy for symptomatic edema control.

2. Additional Imaging:

- Functional MRI (fMRI) and DTI to assess involvement of eloquent cortex and white matter tracts.
- MR spectroscopy (MRS) for metabolic characterization of tumor tissue.

3. Multidisciplinary Review:

- Neuro-oncology team consultation for staging and treatment planning.
- Pathology review of any obtained tissue for histological confirmation.

4. Follow-up Protocol:

- Repeat MRI in 2–4 weeks post-treatment initiation to assess response.
- Consider serial volumetric analysis for monitoring tumor progression or regression.

5. Treatment Considerations:

- Surgical resection with maximal safe extent is indicated.
- Adjuvant radiation and chemotherapy (e.g., temozolomide) should be considered based on histopathology and molecular markers.

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 infiltrative tumor margins and inability to distinguish certain histologic subtypes without biopsy.

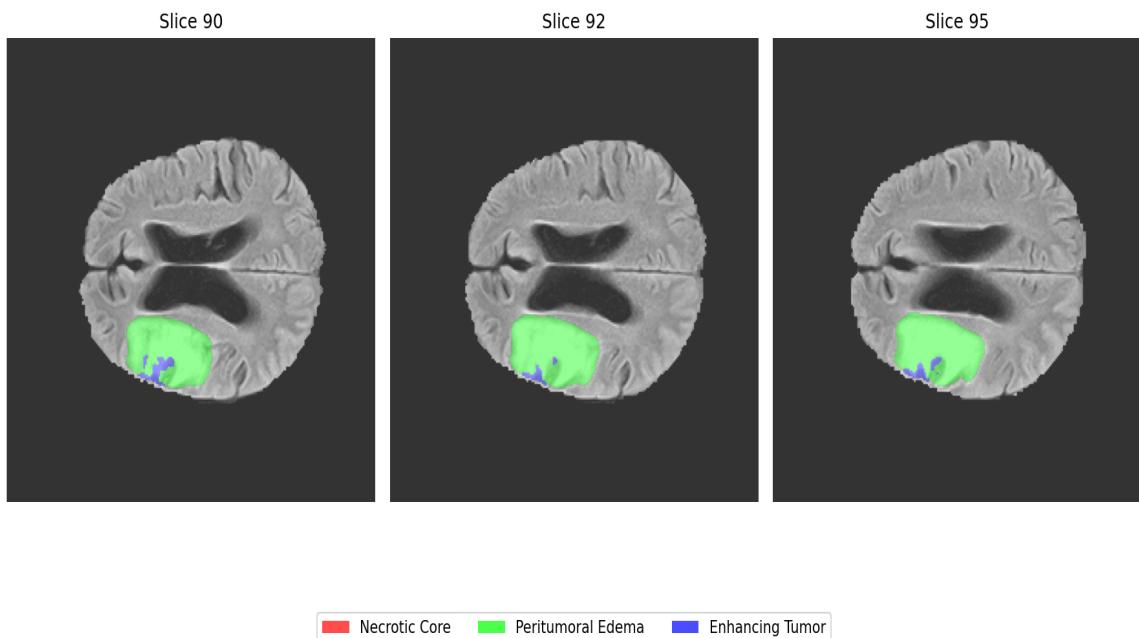
Report Generated: September 19, 2025 at 07:50 AM

System: AI-Assisted Brain Tumor Analysis Platform

SEGMENTATION VISUALIZATIONS

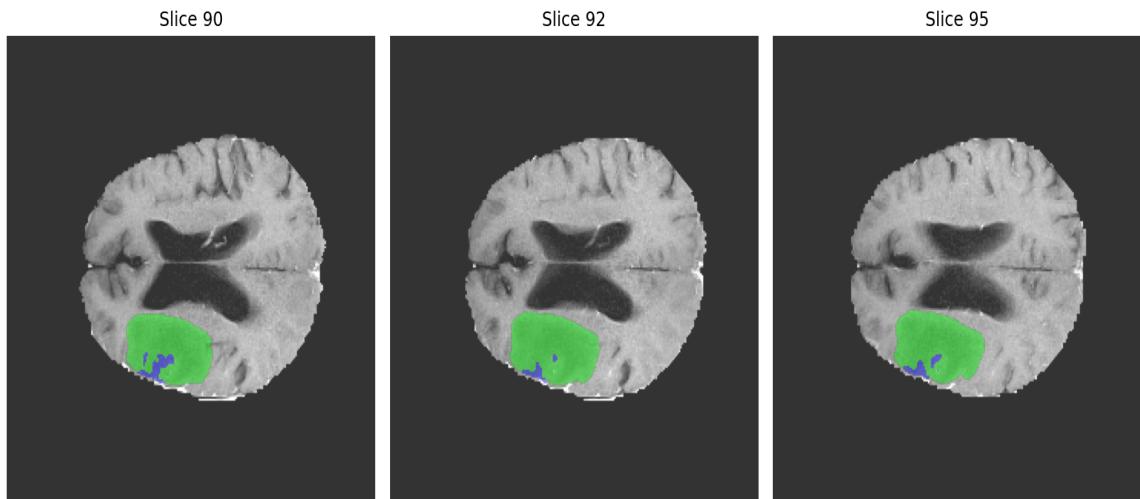
FLAIR Segmentation Overlay

FLAIR with Segmentation Overlay



T1CE Segmentation Overlay

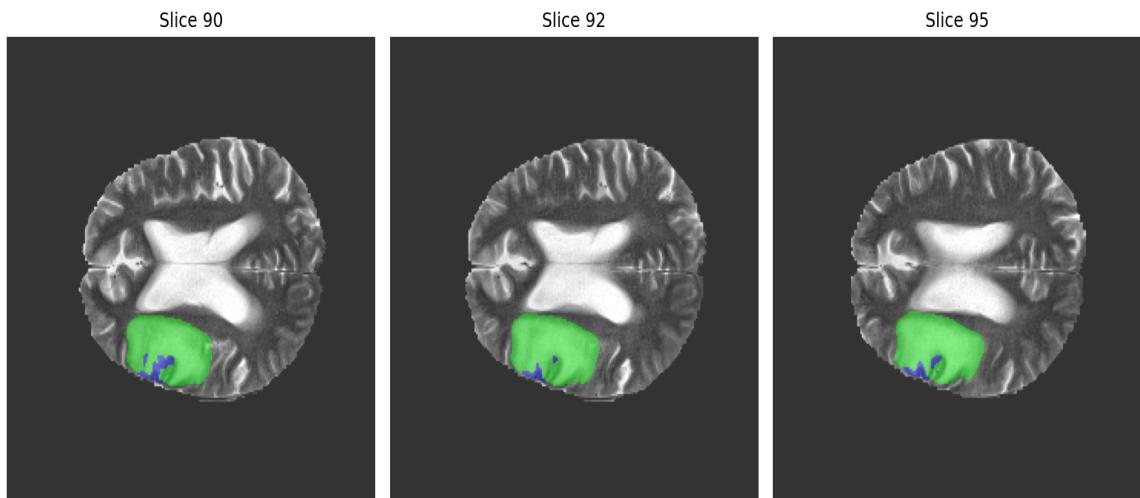
T1CE with Segmentation Overlay



■ 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

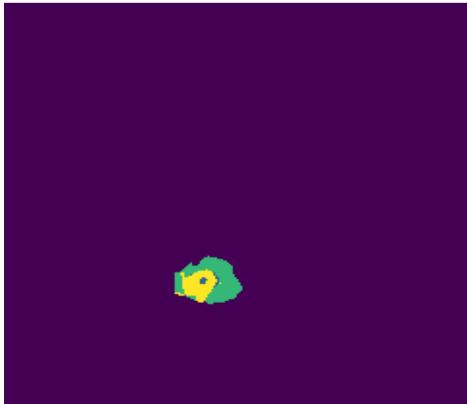
Sagittal View



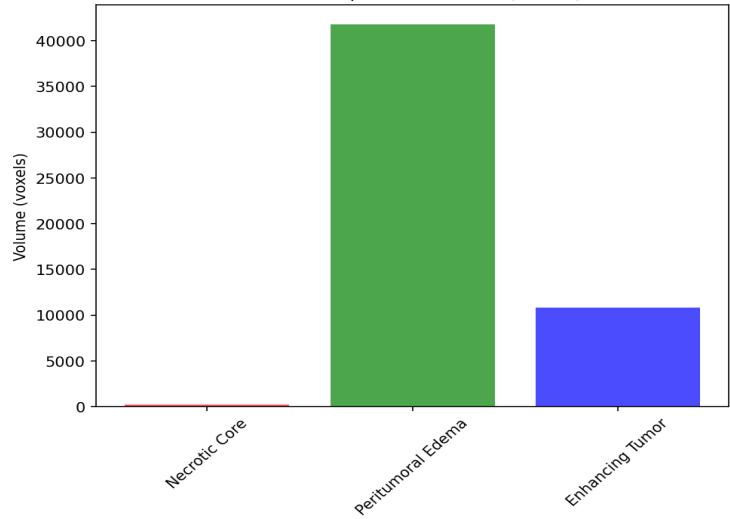
Coronal View



Axial View

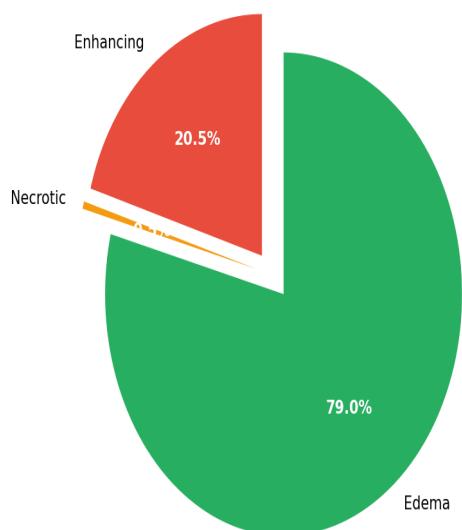


Tumor Component Volumes (voxels)

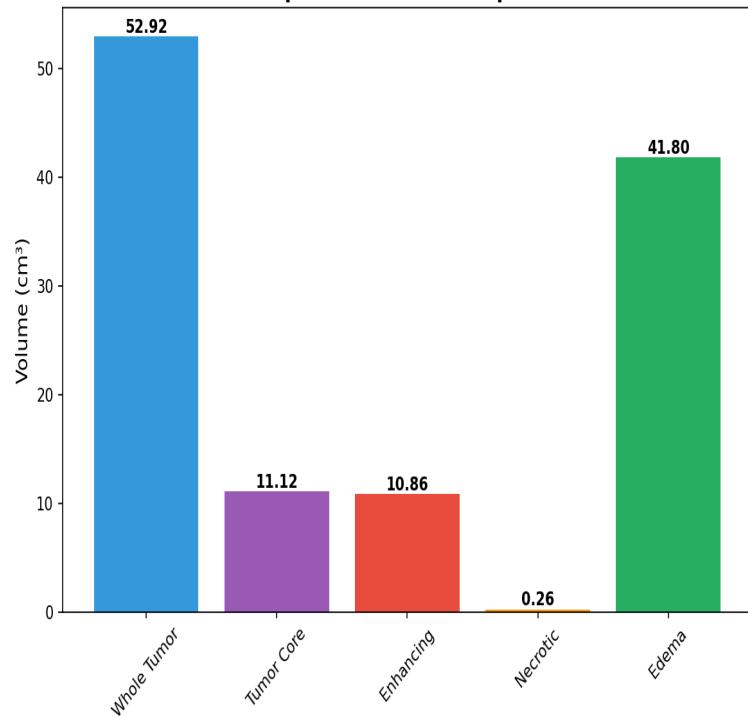


QUANTITATIVE ANALYSIS

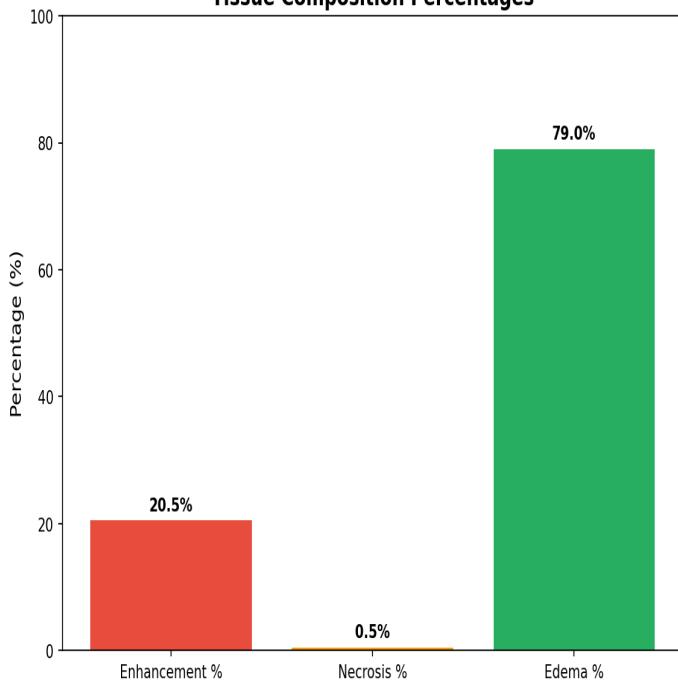
Tumor Component Distribution



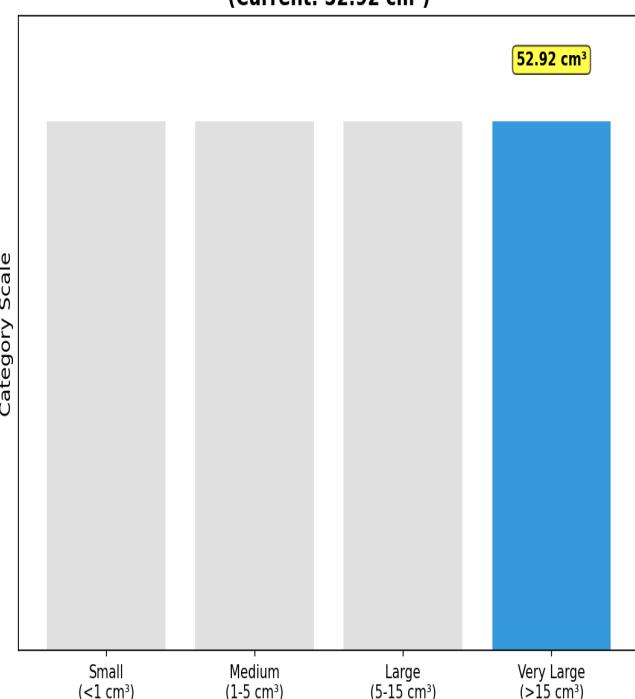
Component Volume Comparison



Tissue Composition Percentages



Tumor Size Classification
(Current: 52.92 cm³)



Clinical Summary Table

Parameter	Value	Clinical Significance
Total Volume	52.92 cm ³	very_large (>15 cm ³)
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 07:50 AM using Qwen/Qwen3-Coder-30B-A3B-Instruct.