

BRAIN TUMOR ANALYSIS REPORT

AI-Powered Segmentation and Clinical Assessment

Patient Information

Field	Value
Report Date	2025-09-17T20:18:10.122859
Case ID	case_44355279-af7a-4d79-8249-6c4fb564b700

AI-GENERATED CLINICAL REPORT

EXECUTIVE SUMMARY

This case demonstrates a large right-sided cerebral tumor with moderate enhancement, minimal necrosis, and significant peritumoral edema. The tumor exhibits characteristics consistent with a high-grade glioma, likely anaplastic astrocytoma or glioblastoma, based on the volumetric and enhancement profile. Clinical correlation and histopathological confirmation are essential for definitive diagnosis and treatment planning.

TUMOR MORPHOLOGY AND LOCATION

- Location: Right hemisphere, central region
- Size Classification: Very large ($>15 \text{ cm}^3$)
- Maximum Diameter: 62.0 mm
- Anatomical Considerations: The central location in the right hemisphere may be associated with functional implications related to motor, sensory, or cognitive functions, depending on the specific anatomical structures involved. Given the extent of edema and tumor size, potential mass effect and midline shift should be evaluated clinically.

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 HU, Maximum 1146.00 HU
- Clinical Significance: Moderate enhancement suggests active tumor proliferation with possible blood-brain barrier disruption. The presence of enhancement without significant necrosis supports a more aggressive tumor biology, consistent with higher-grade gliomas.

TISSUE COMPOSITION ANALYSIS

| Tissue Component | Presence | Clinical Interpretation |

|--|--||

| Enhancing Tissue | Present | Indicates viable tumor tissue with active cellular proliferation and vascularization. |

| Necrotic Core | Present | Minimal necrosis (0.5%) suggests a relatively well-perfused tumor, less typical of glioblastoma. |

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

CLINICAL ASSESSMENT

- Tumor Grade Indicators: Moderate enhancement, minimal necrosis, and extensive edema are suggestive of anaplastic glioma or glioblastoma. The absence of significant hemorrhage or calcification further supports this differential.
- Differential Diagnosis: Likely high-grade glioma (e.g., anaplastic astrocytoma or glioblastoma), with consideration for other infiltrative lesions such as lymphoma or metastatic disease if clinical history suggests.
- Prognosis Indicators: Extensive edema and moderate enhancement are associated with more aggressive tumor behavior. The minimal necrosis may indicate a less differentiated tumor, potentially impacting prognosis.

RECOMMENDATIONS

1. Immediate Actions: Clinical correlation for neurological symptoms and functional deficits; consider urgent neurosurgical evaluation for potential biopsy or resection.
2. Additional Imaging: Consider perfusion MRI or MR spectroscopy to further characterize tumor metabolism and vascularity.
3. Multidisciplinary Review: Refer to neuro-oncology team for staging, treatment planning, and consideration of adjuvant therapy (radiotherapy, chemotherapy).
4. Follow-up Protocol: MRI with contrast at 3–6 months post-treatment; consider surveillance imaging based on treatment response.
5. Treatment Considerations: Based on imaging findings, surgical resection with histopathological confirmation is likely indicated, followed by standard-of-care radiation and chemotherapy if histology confirms glioblastoma or anaplastic astrocytoma.

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 17, 2025 at 08:17 PM

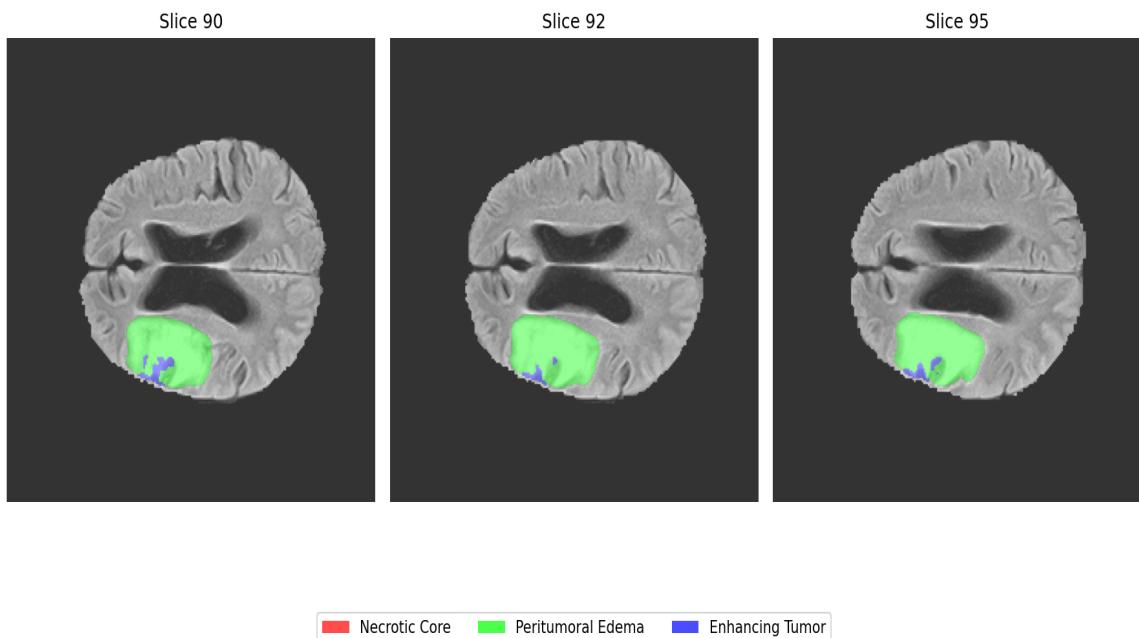
System: AI-Assisted Brain Tumor Analysis Platform

Case ID: case_44355279-af7a-4d79-8249-6c4fb564b700

SEGMENTATION VISUALIZATIONS

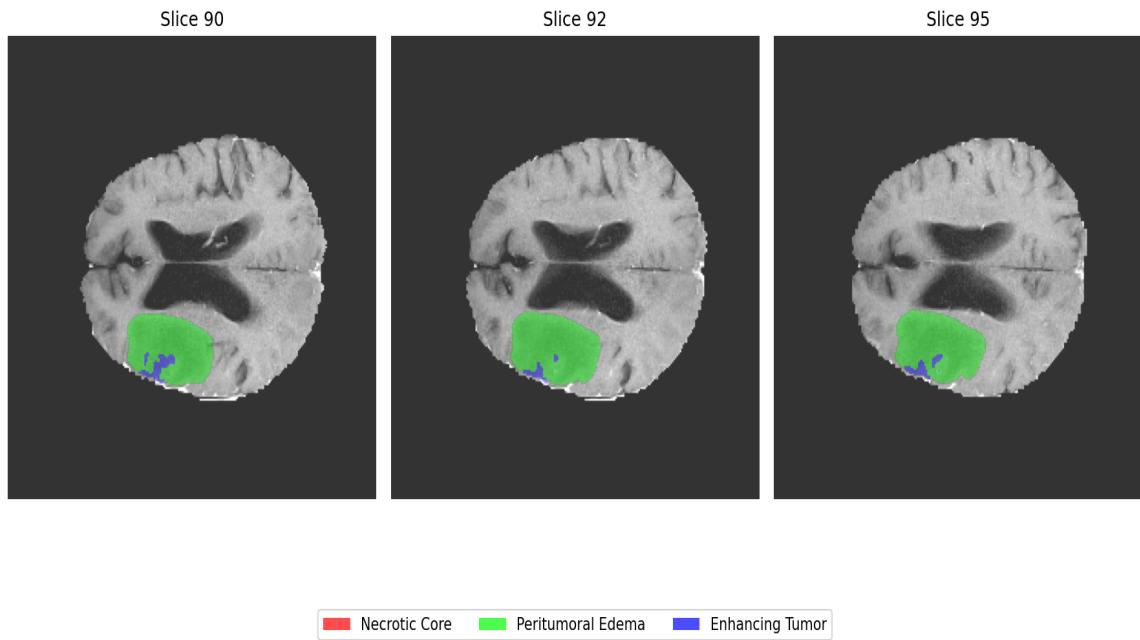
FLAIR Segmentation Overlay

FLAIR with Segmentation Overlay



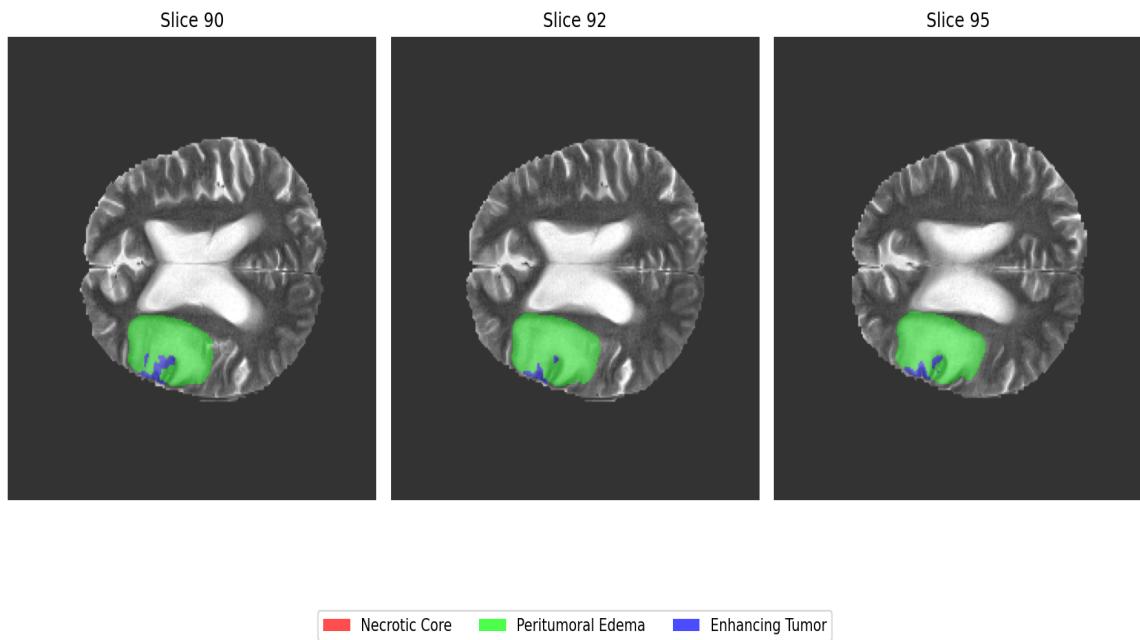
T1CE Segmentation Overlay

T1CE with Segmentation Overlay



T2 Segmentation Overlay

T2 with Segmentation Overlay



3D Volume Analysis

3D Tumor Segmentation Views

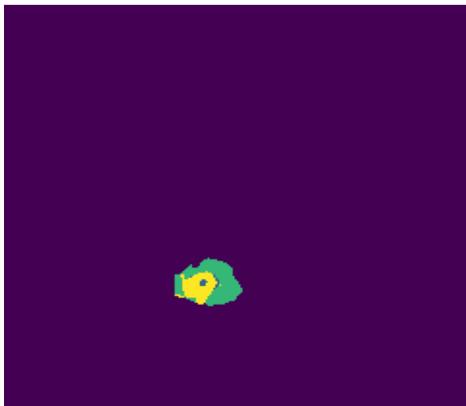
Sagittal View



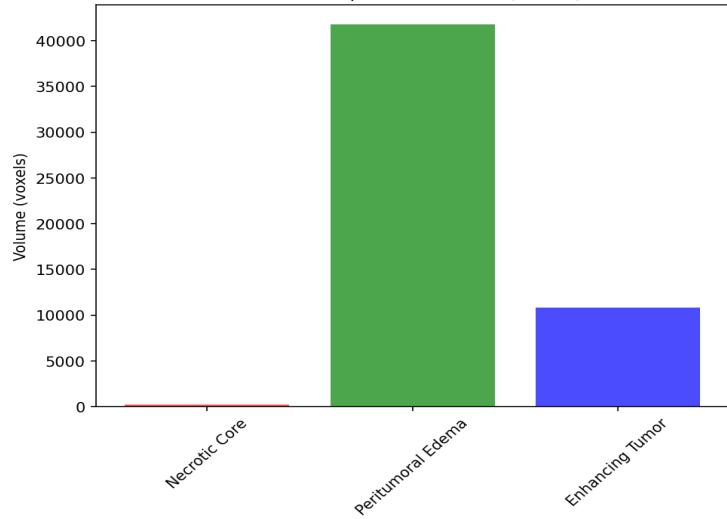
Coronal View



Axial View

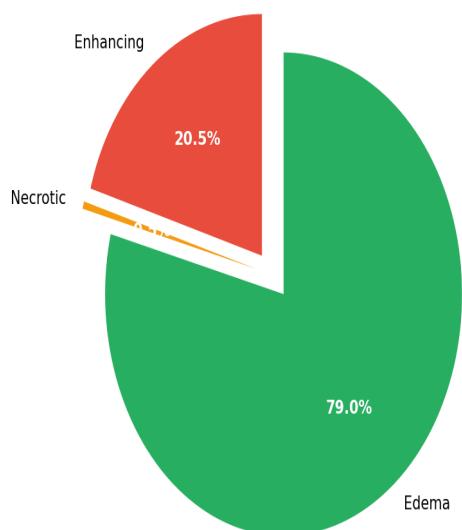


Tumor Component Volumes (voxels)

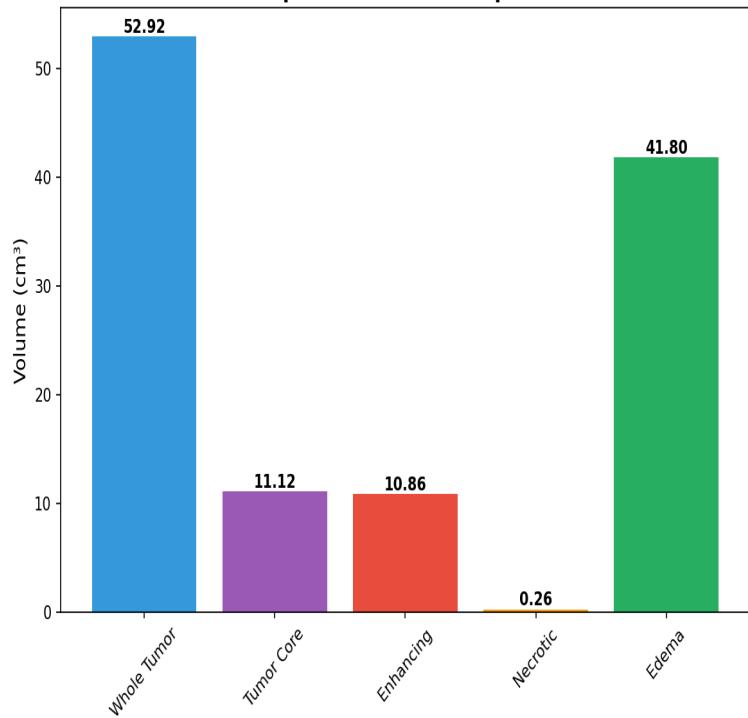


QUANTITATIVE ANALYSIS

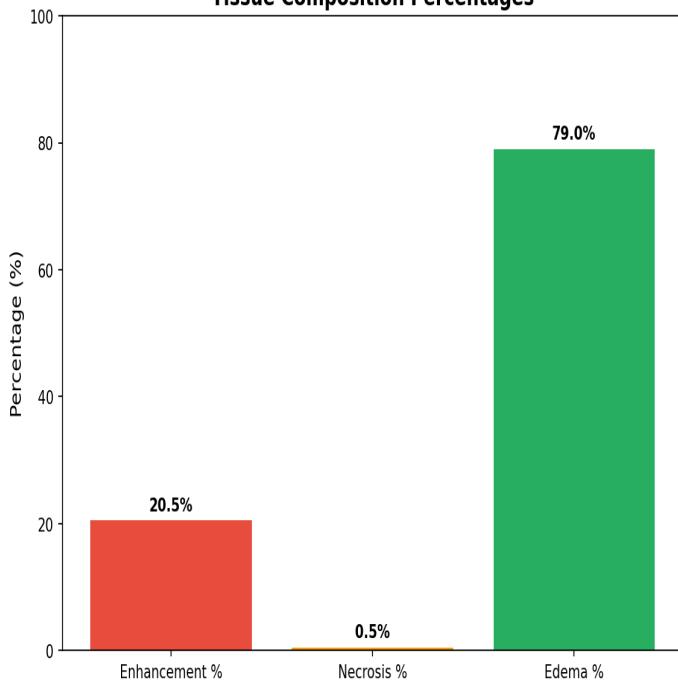
Tumor Component Distribution



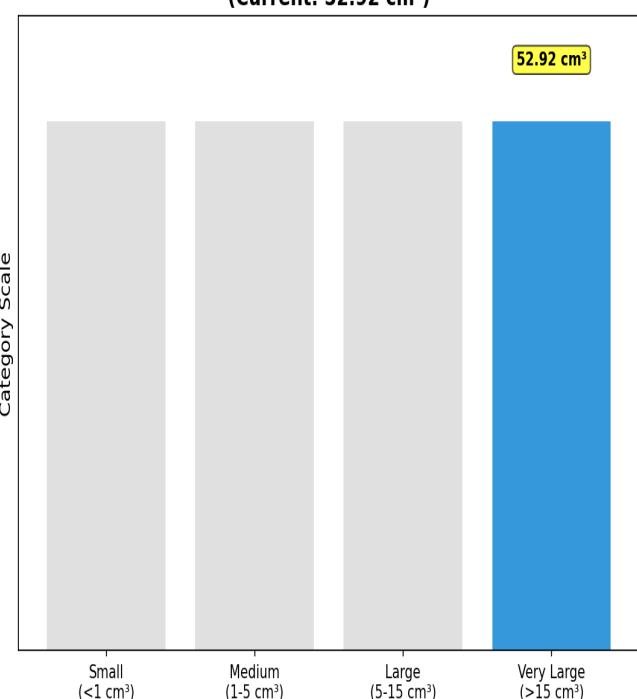
Component Volume Comparison



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.
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