

BRAIN TUMOR ANALYSIS REPORT

AI-Powered Segmentation and Clinical Assessment

Patient Information

Field	Value
Report Date	2025-09-17T20:06:14.371220
Case ID	case_282417a1-bfa7-47fb-9ccb-0f1bba8b8f7c

AI-GENERATED CLINICAL REPORT

EXECUTIVE SUMMARY

This case demonstrates a large right-sided central brain tumor with heterogeneous characteristics, including a small necrotic component and significant peritumoral edema. The tumor exhibits moderate enhancement and is classified as very large based on volumetric analysis. These findings are consistent with a high-grade glioma, warranting urgent multidisciplinary evaluation and potential intervention.

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 impact motor, sensory, or language function depending on the precise anatomical involvement. Given the proximity to critical white matter tracts and cortical areas, surgical planning must consider functional preservation.

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 relatively low percentage of enhancing tissue may indicate a heterogeneous tumor with areas of necrosis or fibrosis.

TISSUE COMPOSITION ANALYSIS

| Tissue Component | Presence | Clinical Interpretation |

| -- |

| Enhancing Tissue | Present | Indicates viable tumor tissue with active angiogenesis and potential for aggressive behavior. |

| Necrotic Core | Present | Minimal necrosis (0.5%) suggests a low degree of tumor cell death, which may correlate with tumor grade or treatment response. |

| Peritumoral Edema | Present | Extensive edema (79%) indicates significant mass effect and likely ongoing inflammatory or metabolic activity. |

CLINICAL ASSESSMENT

- **Tumor Grade Indicators:** Moderate enhancement, minimal necrosis, and extensive edema are consistent with a high-grade glioma (e.g., glioblastoma or anaplastic astrocytoma). The absence of extensive hemorrhage or cystic changes supports a solid tumor morphology.
- **Differential Diagnosis:** Likely primary glioblastoma multiforme (GBM) or anaplastic astrocytoma, given the size, enhancement pattern, and edema characteristics. Metastatic disease should also be considered, particularly in the context of known primary malignancy.
- **Prognosis Indicators:** The presence of significant edema and moderate enhancement may indicate a more aggressive tumor behavior. However, the minimal necrosis and lack of hemorrhage may suggest a more indolent course compared to classic GBM.

RECOMMENDATIONS

1. **Immediate Actions:** Urgent neurosurgical consultation for potential biopsy or resection; consider neurologic evaluation for functional status assessment.
2. **Additional Imaging:** MRI with contrast-enhanced T1-weighted and FLAIR sequences to further characterize tumor margins and assess for leptomeningeal spread.
3. **Multidisciplinary Review:** Involvement of neuro-oncology, radiation oncology, and neuropathology for staging and treatment planning.
4. **Follow-up Protocol:** Serial MRI monitoring every 3–6 months post-intervention; consider PET imaging if further characterization is needed.
5. **Treatment Considerations:** Consider multimodal therapy including surgery, radiation, and chemotherapy, particularly if glioblastoma is confirmed histologically.

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 tumor components. Histopathological correlation is essential for definitive diagnosis.

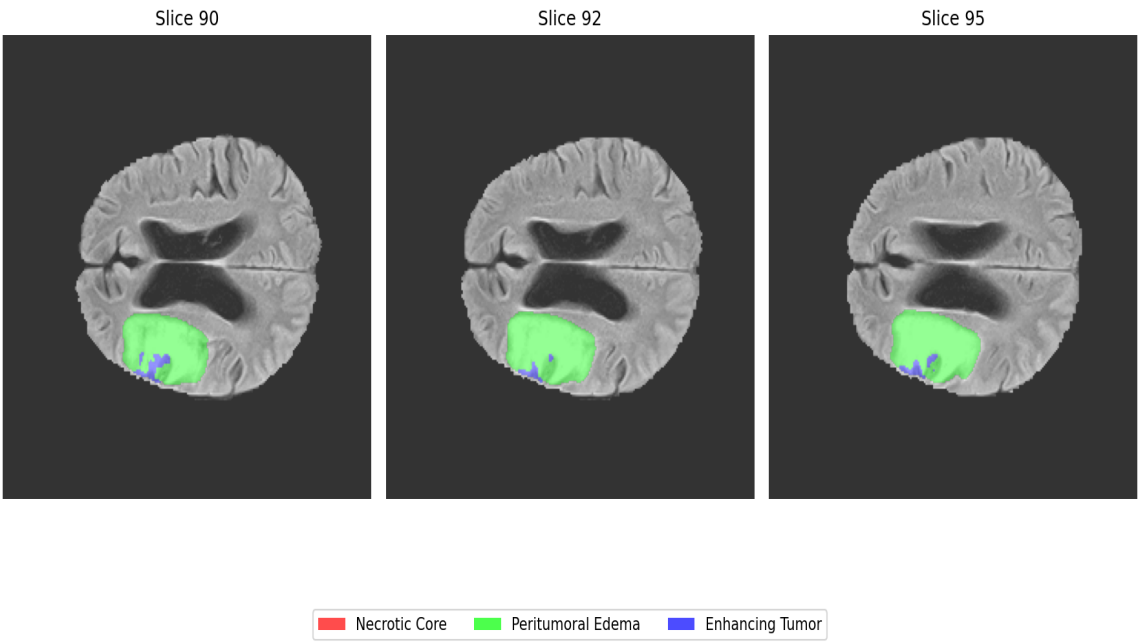
Report Generated: September 17, 2025 at 08:06 PM

System: AI-Assisted Brain Tumor Analysis Platform

SEGMENTATION VISUALIZATIONS

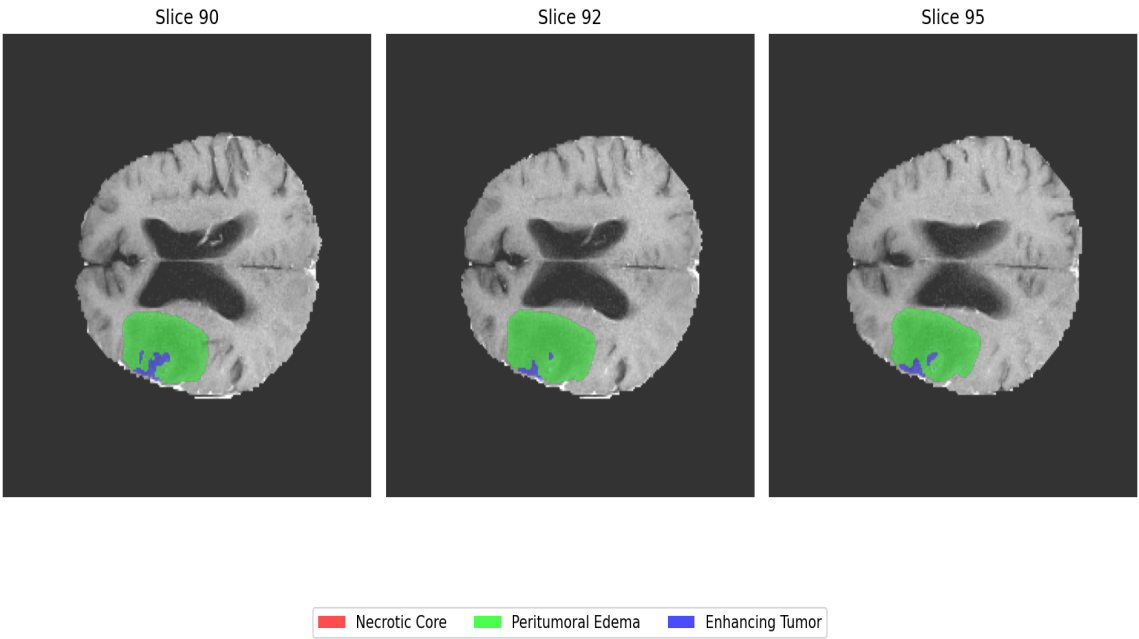
FLAIR Segmentation Overlay

FLAIR with Segmentation Overlay



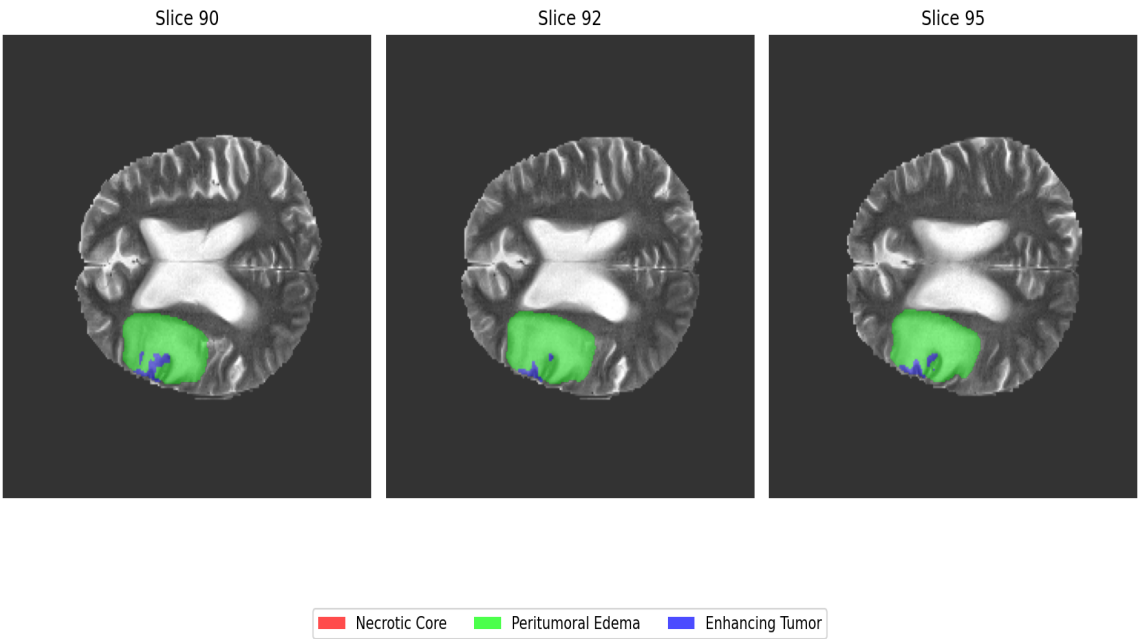
T1CE Segmentation Overlay

T1CE with Segmentation Overlay



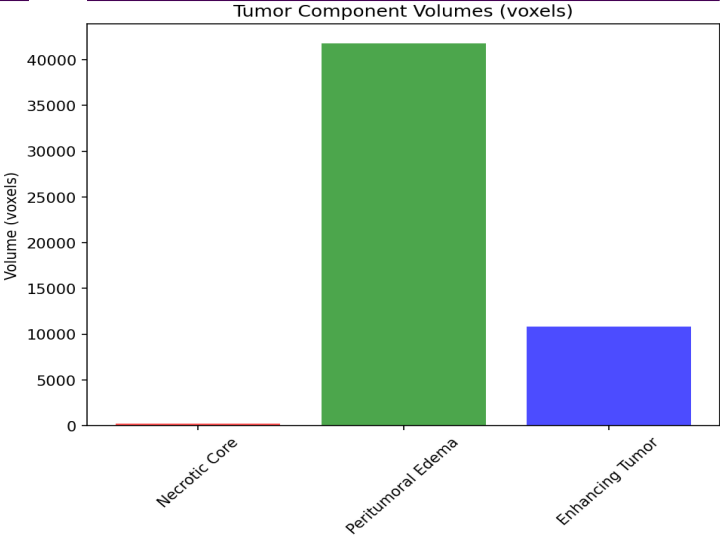
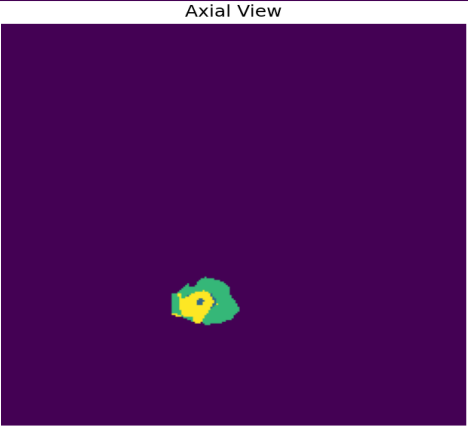
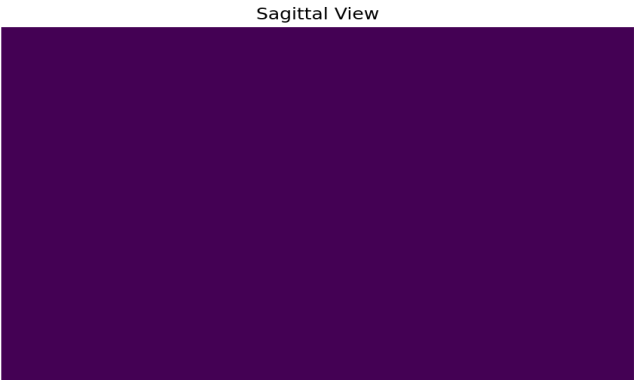
T2 Segmentation Overlay

T2 with Segmentation Overlay



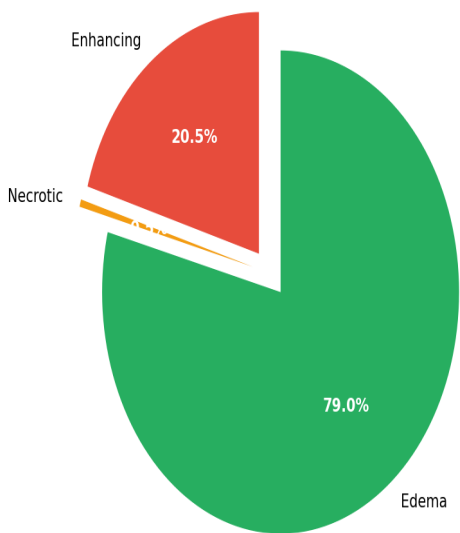
3D Volume Analysis

3D Tumor Segmentation Views

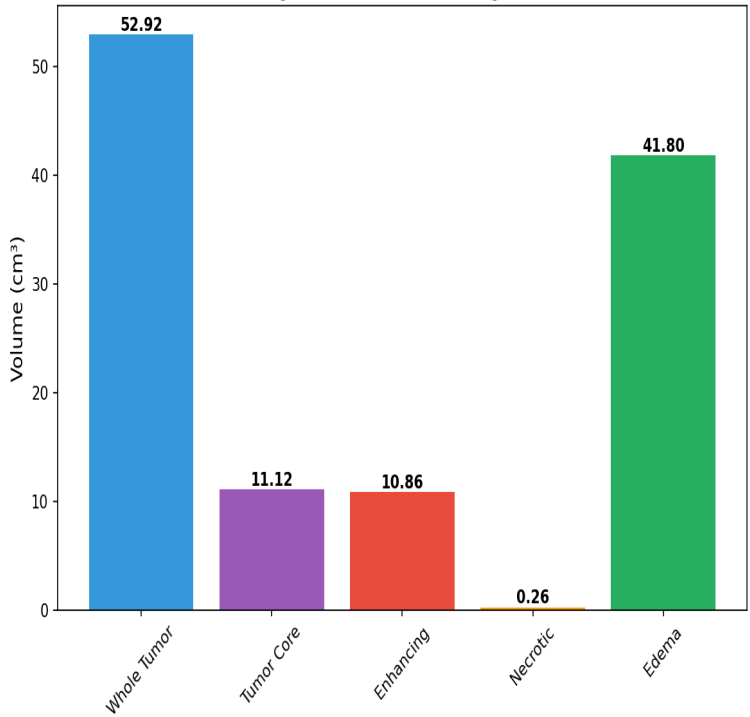


QUANTITATIVE ANALYSIS

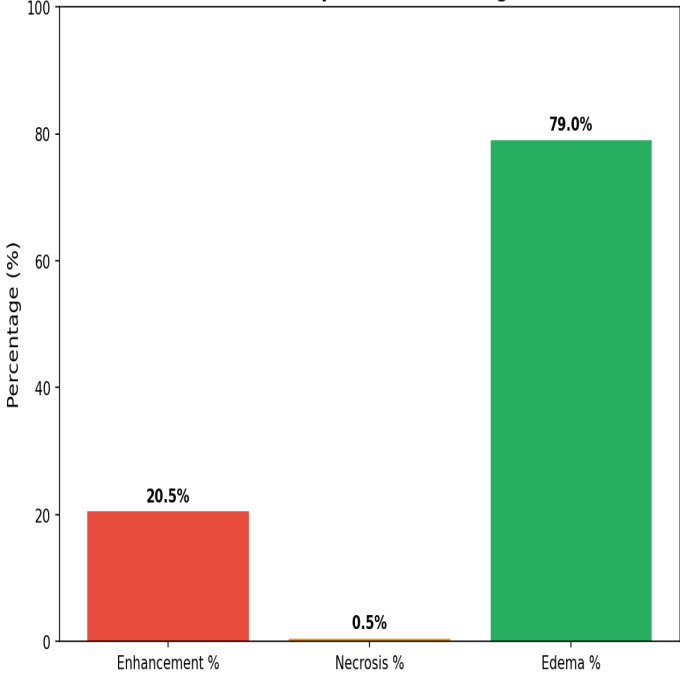
Tumor Component Distribution



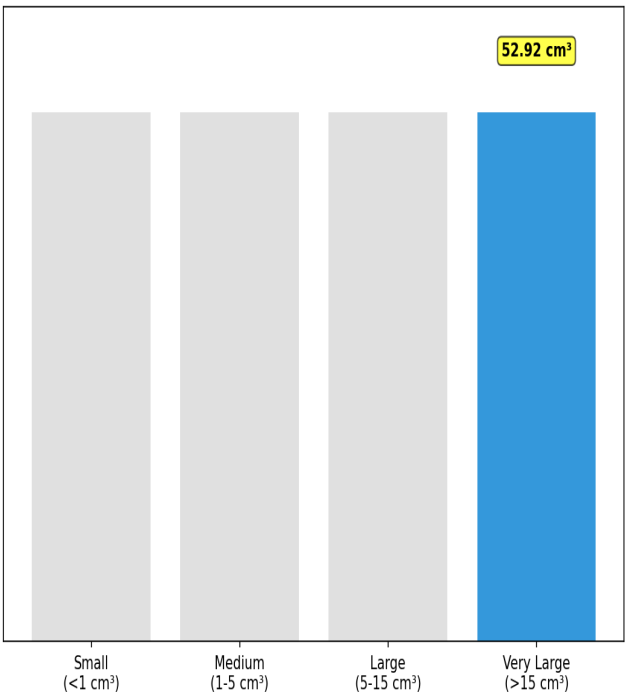
Component Volume Comparison



Tissue Composition Percentages



Tumor Size Classification
(Current: 52.92 cm³)



Clinical Summary Table

Parameter	Value	Clinical Significance
Total Volume	52.92 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.
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