

*ARRO Contour:*  
**GLIOBLASTOMA**

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**University of Wisconsin**  
**Reference: RTOG 0825**

# CONTOURING STEPS

- Co-registration and fusion of Planning CT with T2/ FLAIR images and T1 contrast-enhanced images of post-operative MRI.
- **GTV1** = T2/ FLAIR abnormality
- Include all enhancement on postoperative MRI and the surgical cavity.
  - TIP: Draw **GTV2** (described below) and create a summation contour which should be labeled back as **GTV1**. This will ensure all enhancement and surgical cavity is part of **GTV1**.
- **GTV2** = T1 Contrast-enhanced abnormality, Include the complete surgical cavity

# CONTOURING STEPS

- $CTV1 = GTV1 + 2 \text{ cm margin}$
- The  $CTV1$  margin may be reduced to 0.5 cm around natural barriers to tumor growth such as the skull, ventricles, falx, etc, and to allow sparing OAR, if necessary.
- $PTV1 = CTV1 + 3 \text{ to } 5 \text{ mm margin}$ , depending upon localization method and reproducibility at each center.
- If no surrounding edema is present, then  $PTV1 = GTV2 + 2.5\text{-cm margin}$ .
- $CTV2 = GTV2 + 2 \text{ cm margin}$  not extending beyond  $CTV1$
- $PTV2 = CTV2 + 3 \text{ to } 5 \text{ mm margin}$

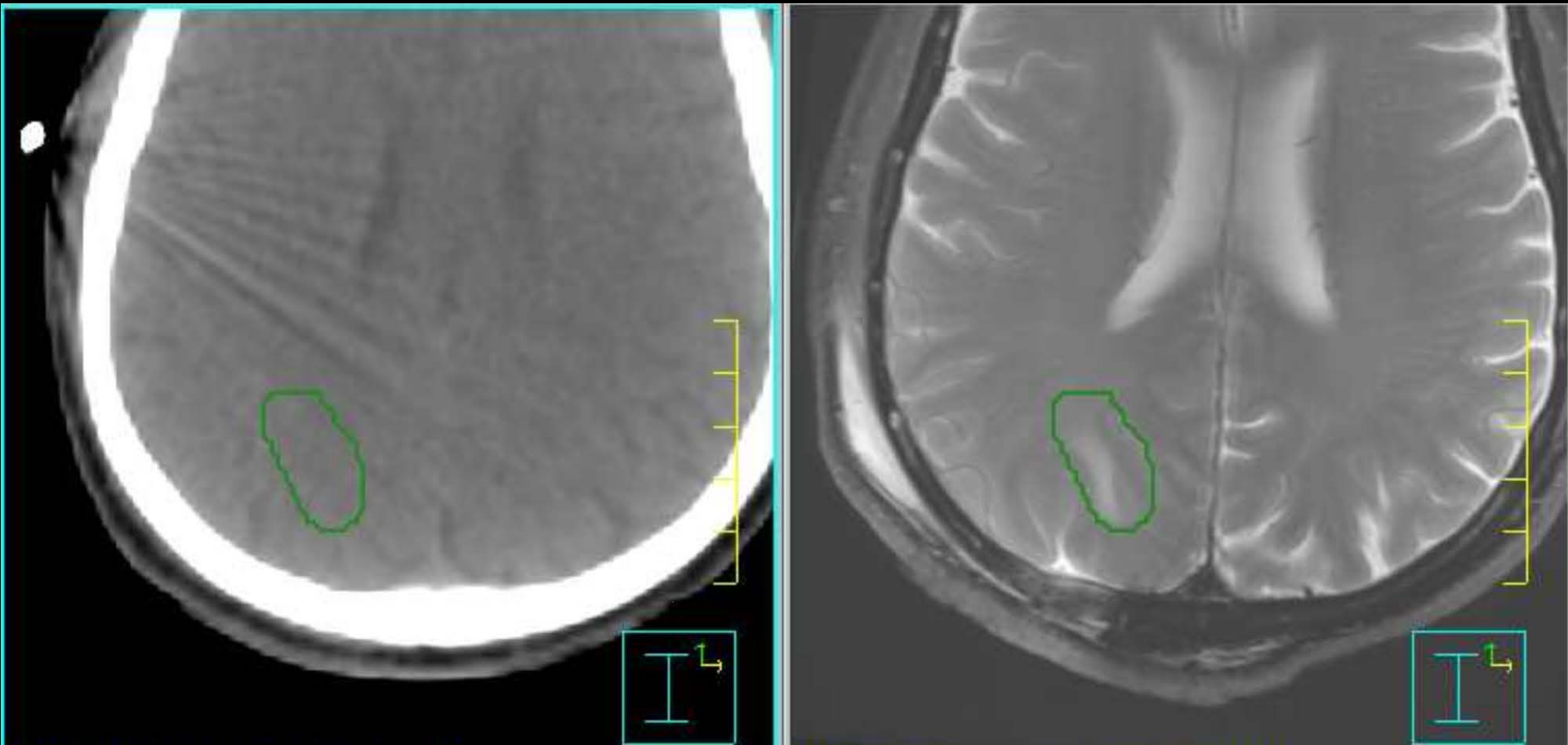
# TARGET DOSE

- **PTV1** to be planned to receive a dose of 46 Gy in 23 fractions.
- **PTV2** to be planned to receive an additional 14 Gy in 7 fractions.
- The inhomogeneity within the target volume shall be kept to  $\pm 10\%$  of the prescribed dose.
- The minimum dose to the target volume should be kept within 10% of the dose at the center of the volume.
- Doses are specified such that at least 95% of the PTV shall receive 100% of the prescribed dose

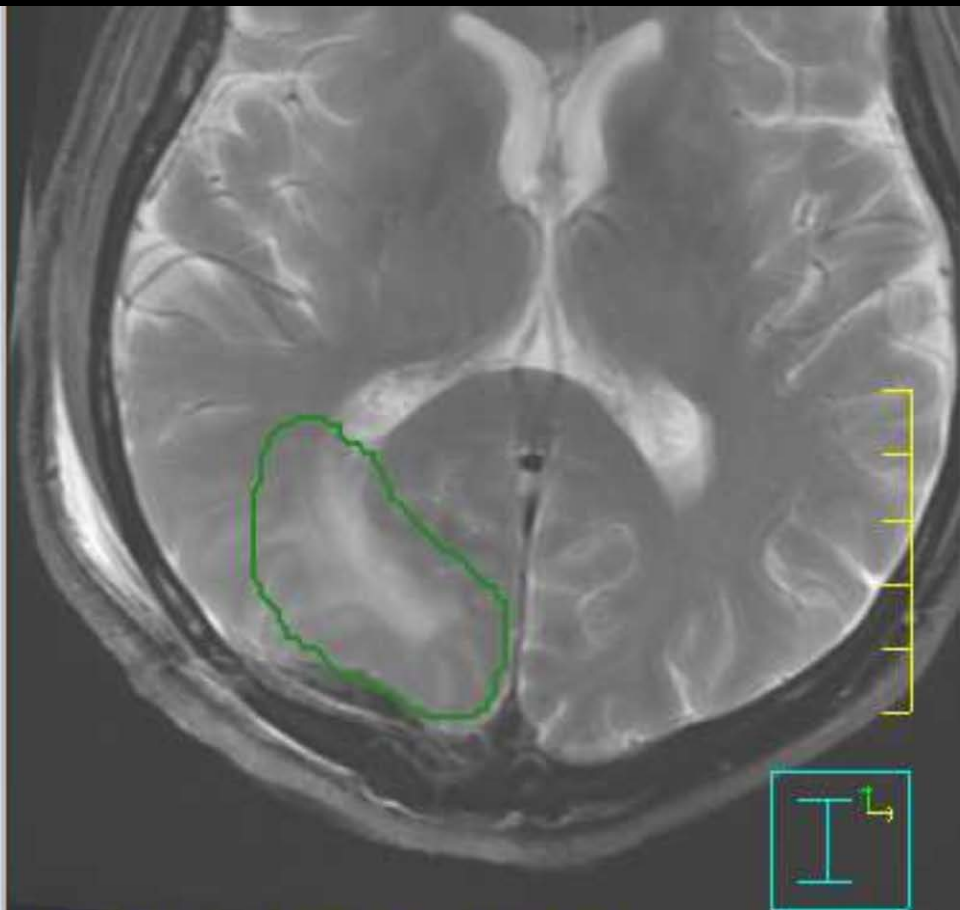
# ORGAN AT RISK (OAR)

- OAR must be defined , along with a planning risk volume (PRV) for each OAR.
- $PRV = OAR + 3 \text{ mm}$ .
- In the event that an OAR is in immediate proximity to a PTV such that dose to the OAR cannot be constrained within protocol limits, a second PTV (PTVoverlap) is generated.
- PTVoverlap = The overlap between the PTV2 and the particular PRV of concern (i.e. the overlap is the intersection between the **PTV1** and the PRV).
- Dose to the PTVoverlap must be as close as permissible to 14 Gy while not exceeding the OAR dose limit.

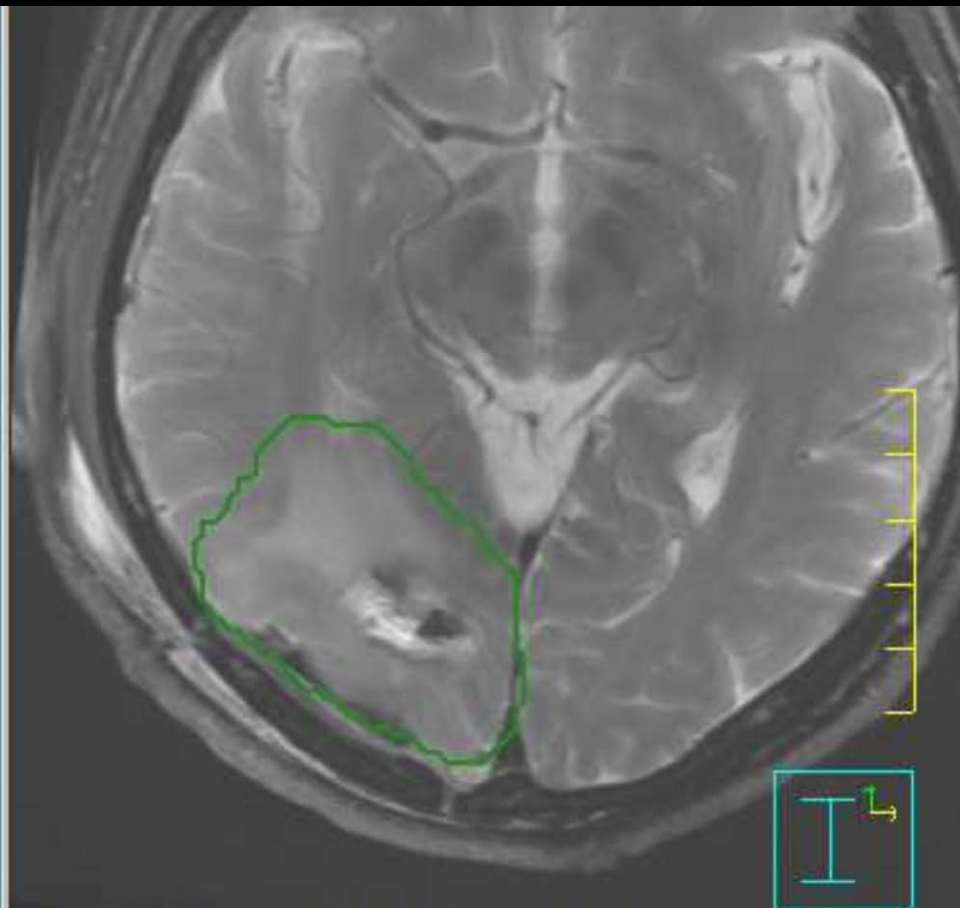
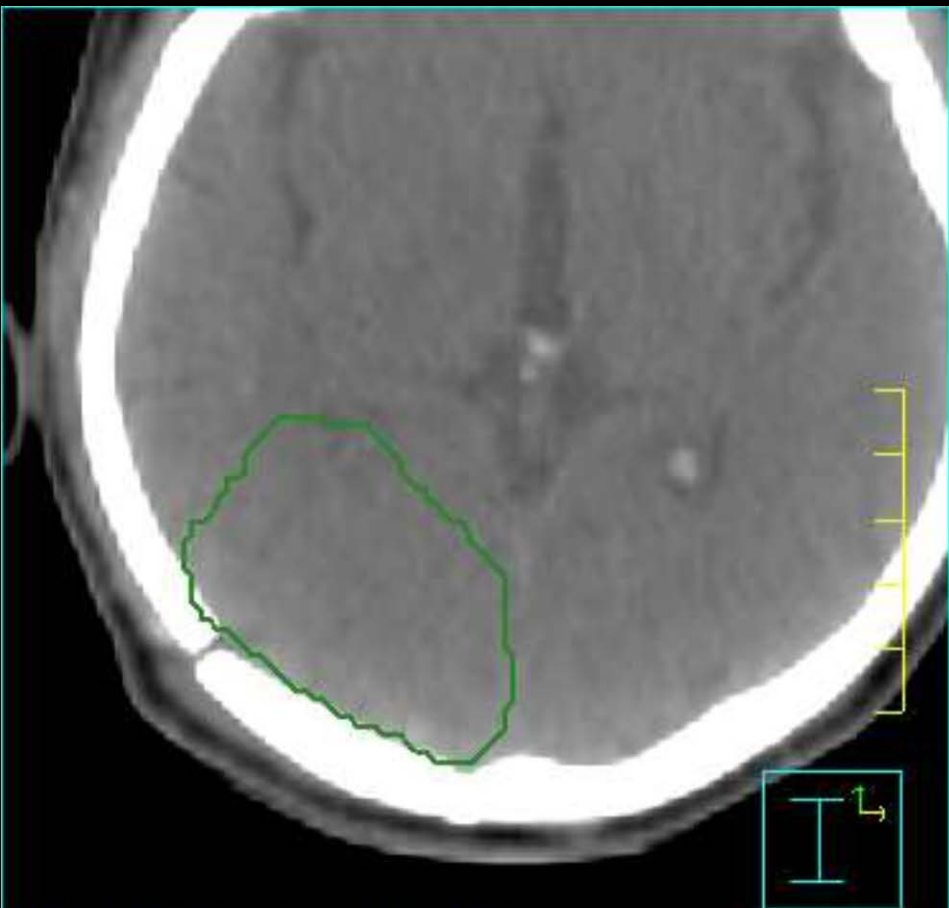
- Co-registration and fusion of Planning CT with T2/ FLAIR images of post-operative MRI.



- *GTV1* = T2/ FLAIR abnormality

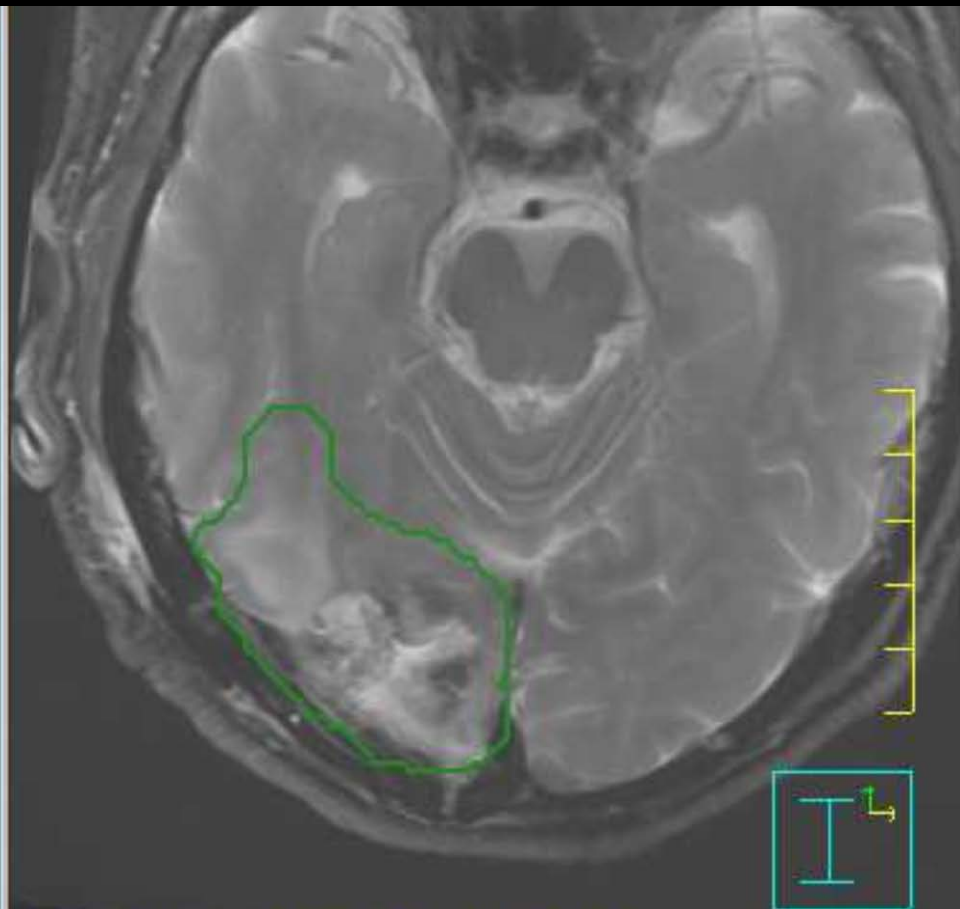
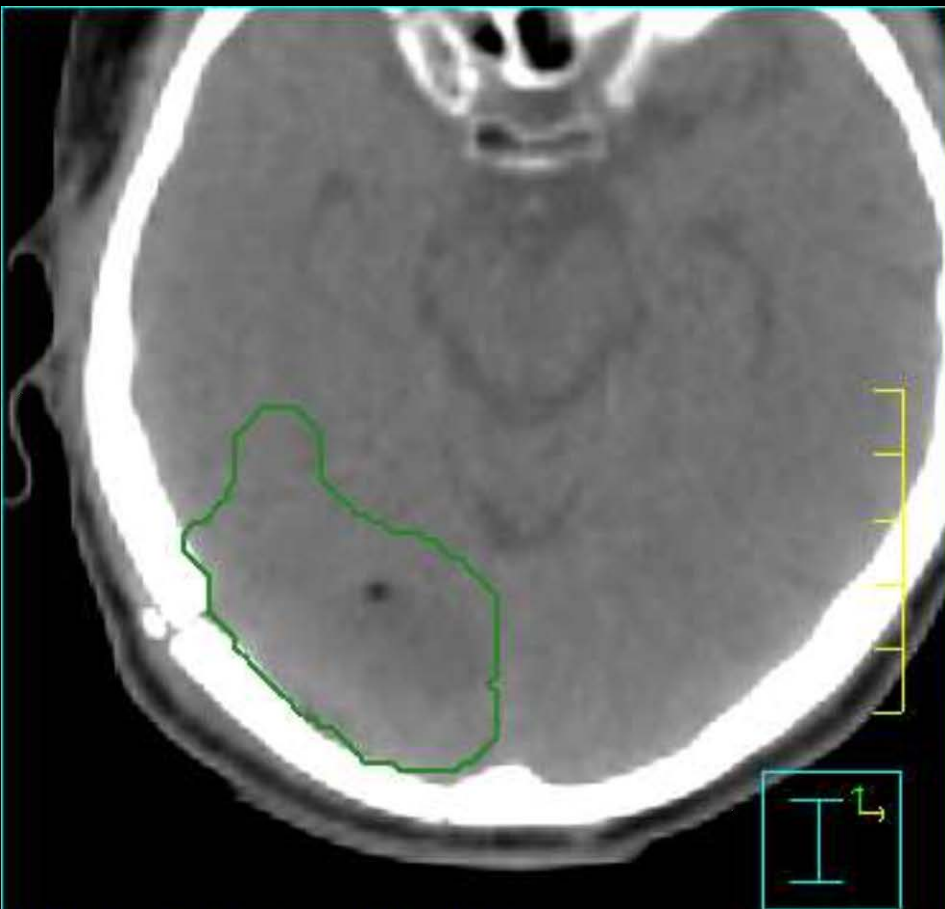


- *GTV1* = T2/ FLAIR abnormality

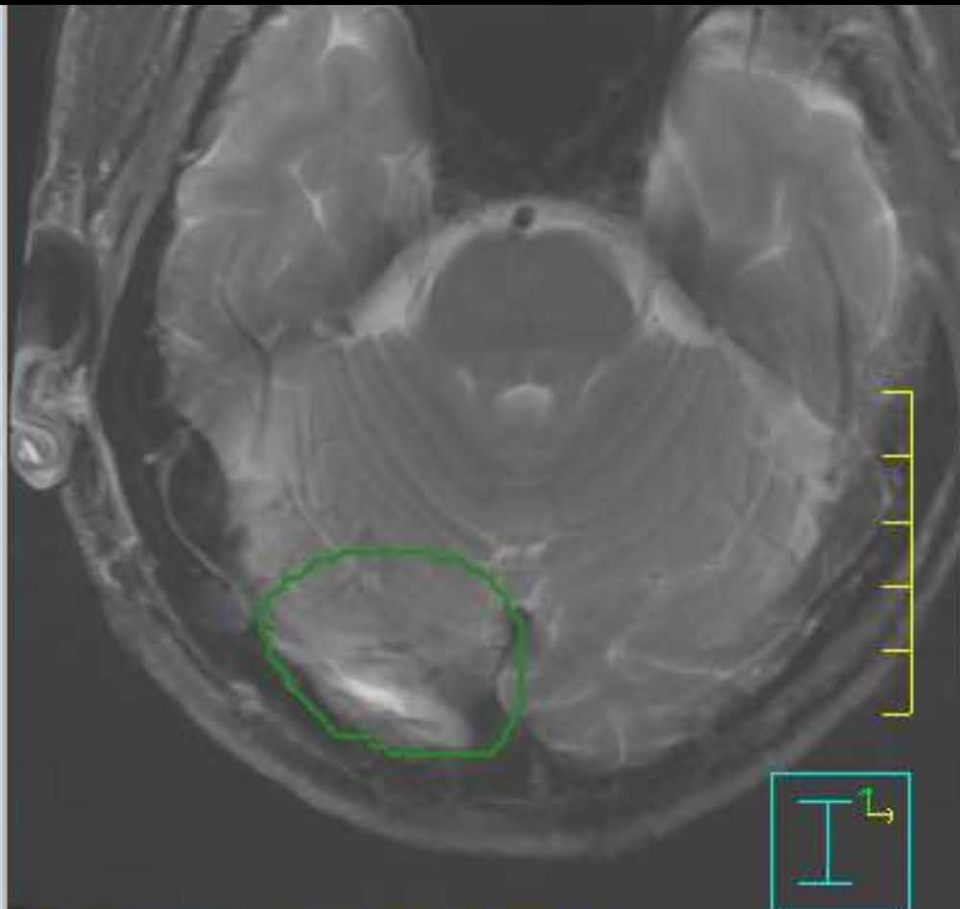
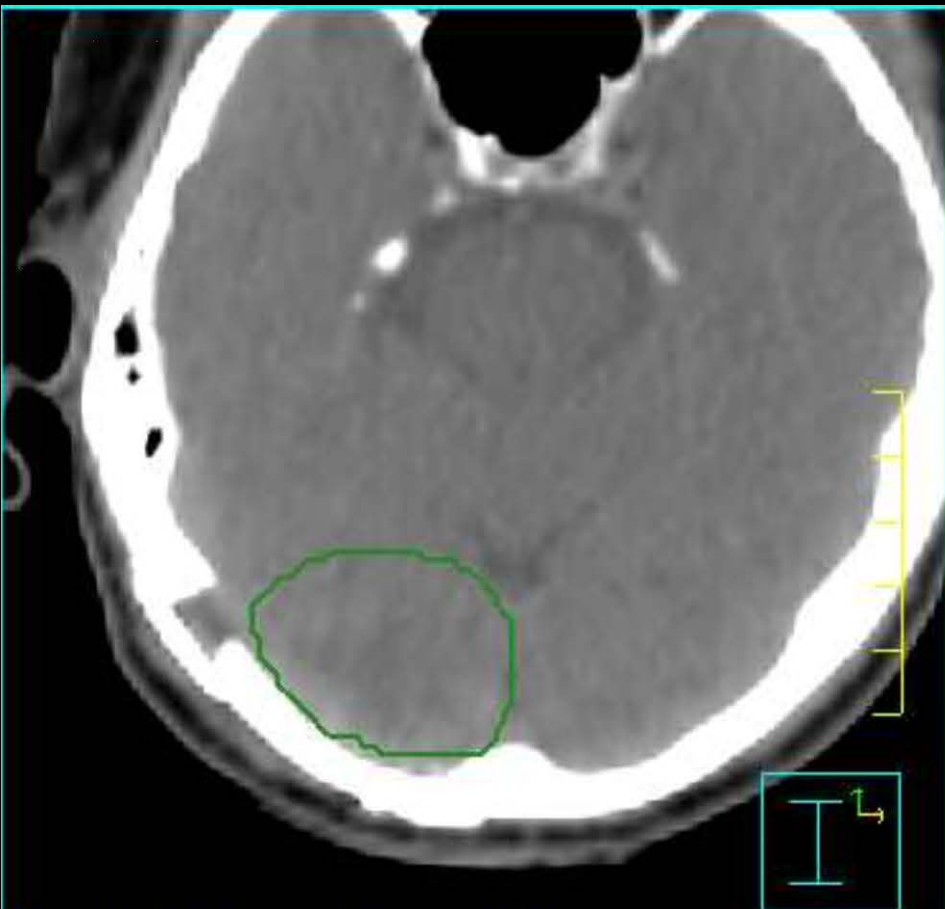


- *GTV1* = T2/ FLAIR abnormality



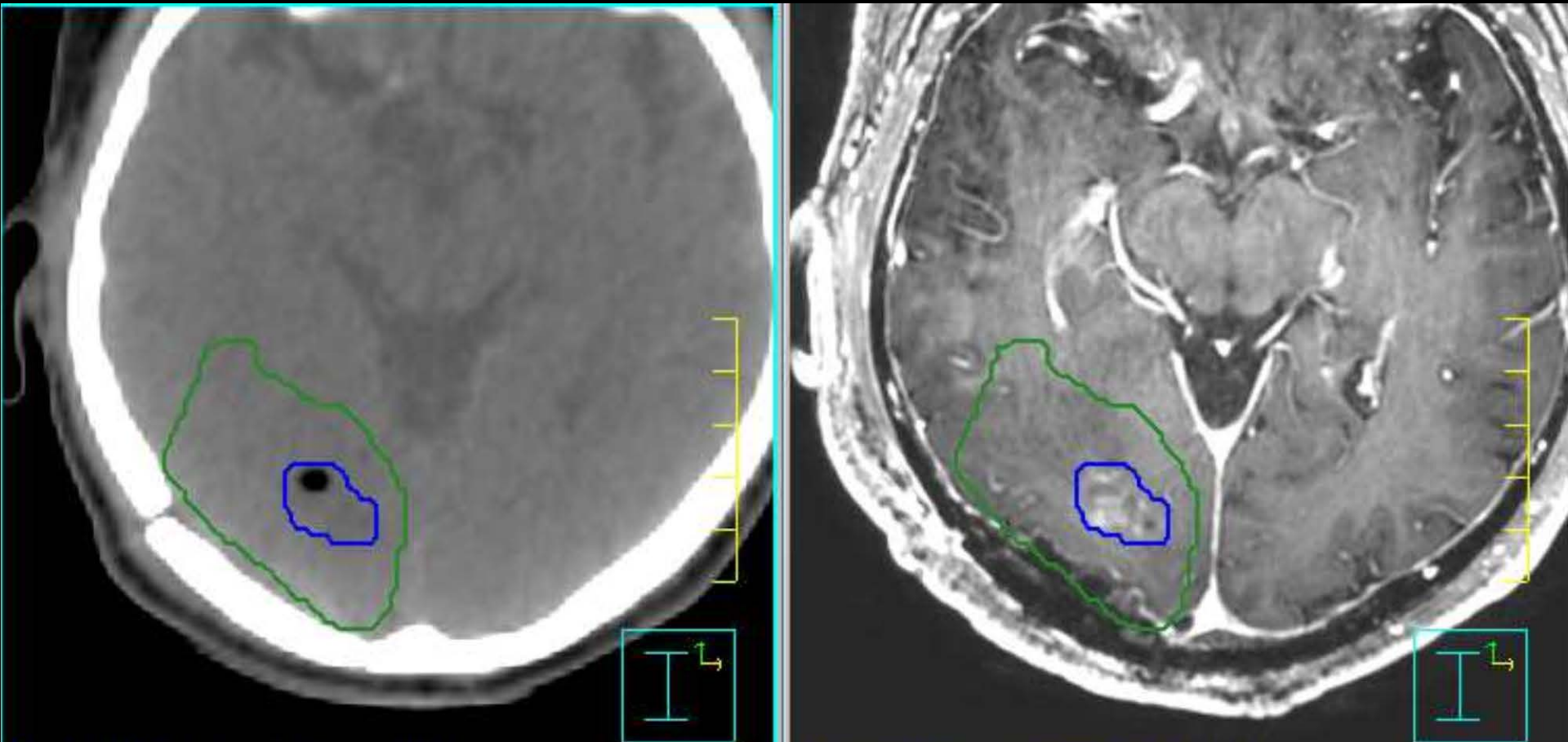


- **GTV1** = Include all enhancement on postoperative MRI and the surgical cavity.



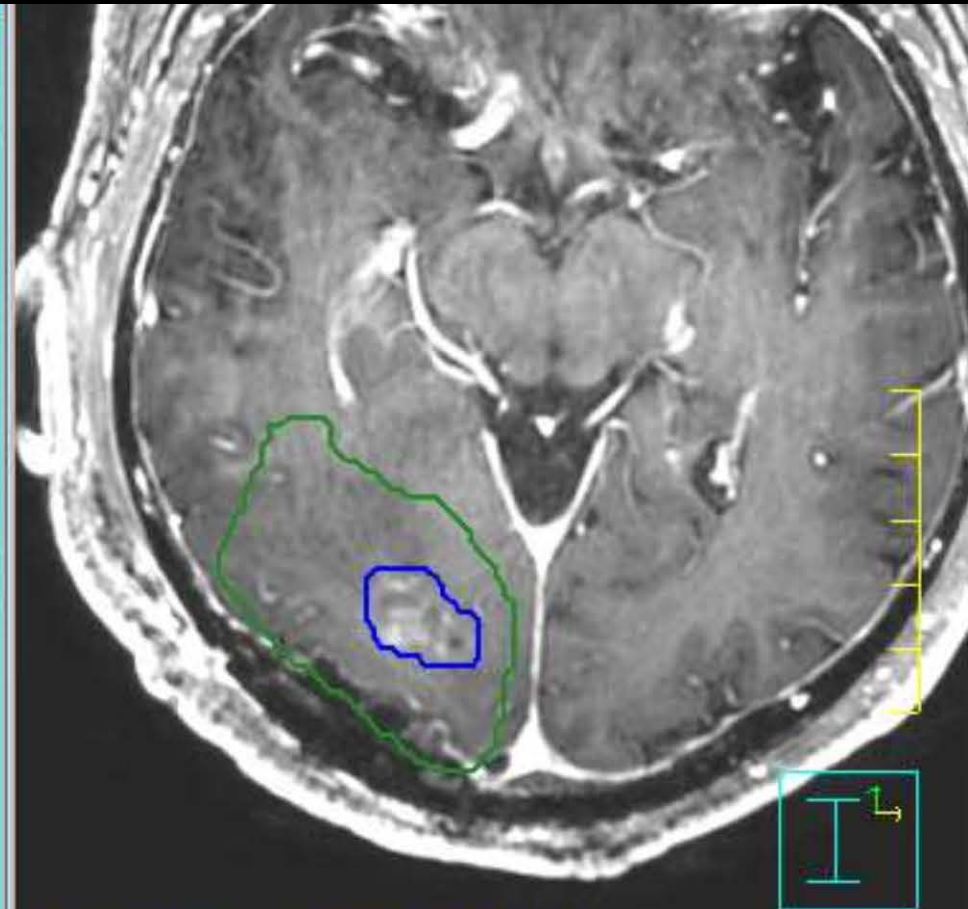
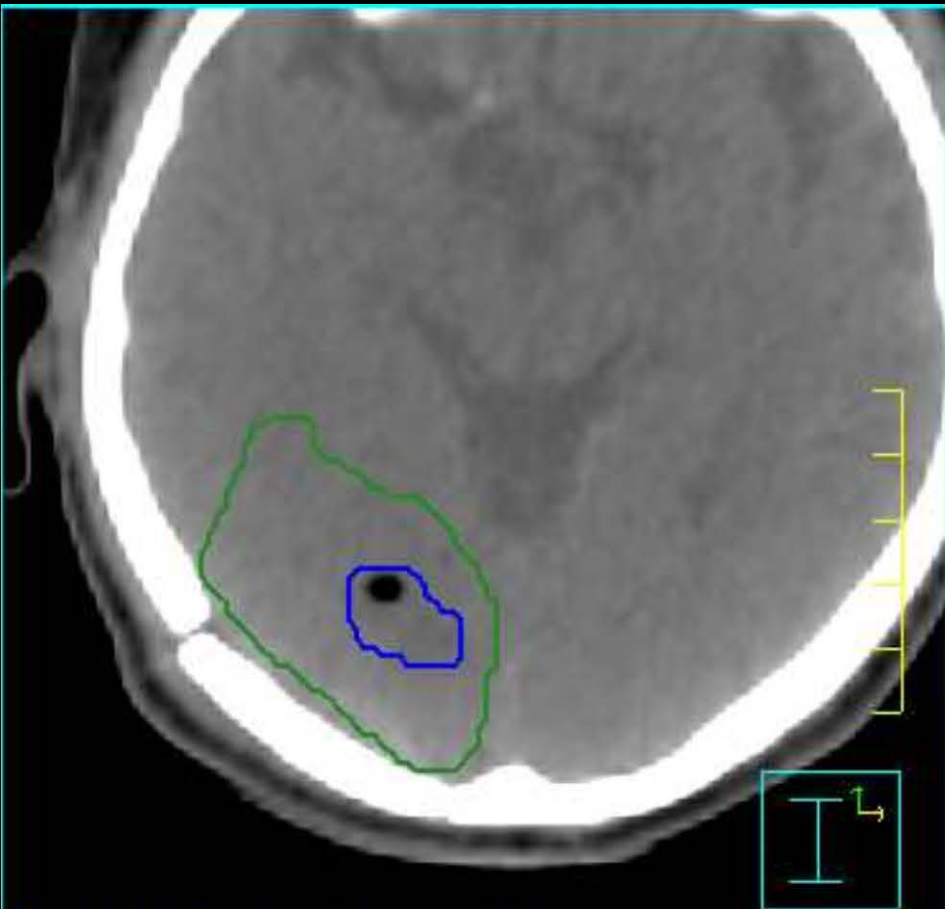
- TIP: Draw **GTV2** (described next) and create a summation contour which should be labeled back as **GTV1**. This will ensure all enhancement and surgical cavity is part of **GTV1**.

- Co-registration and fusion of Planning CT with T1 Contrast-enhanced images of post-operative MRI.



- **GTV2** = T1 Contrast-enhanced abnormality

- GTV1
- GTV2

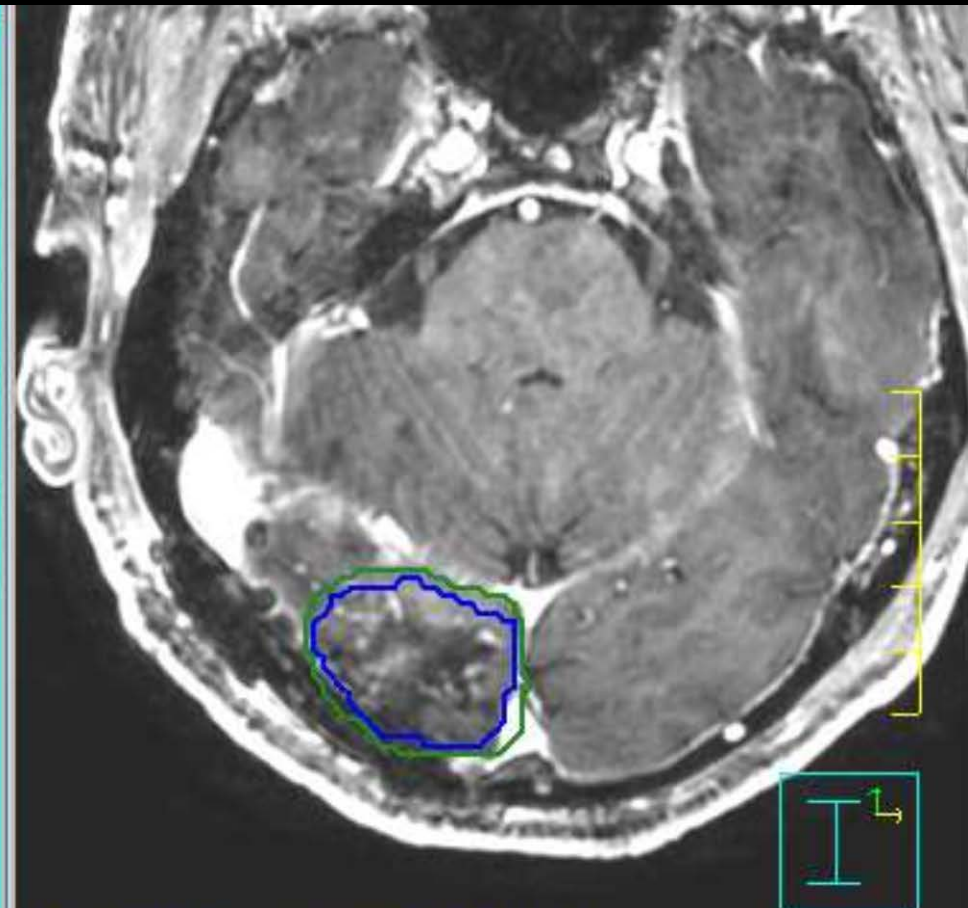
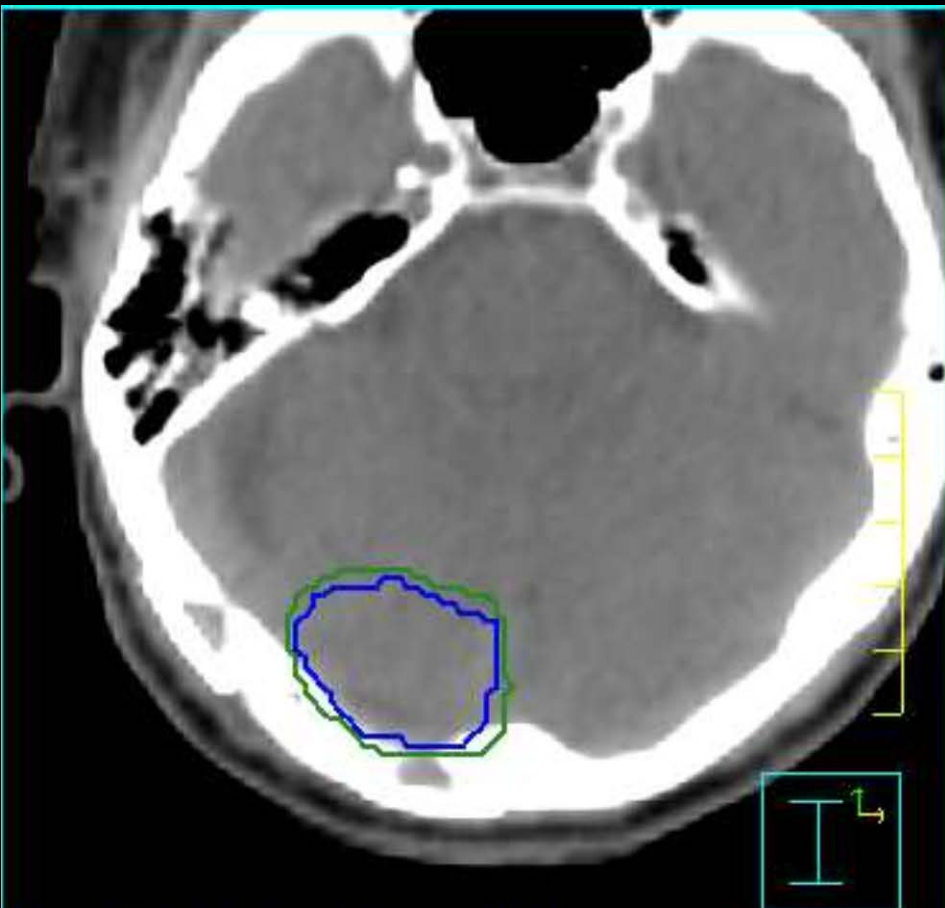


- GTV2 = T1 Contrast-enhanced abnormality



- GTV1

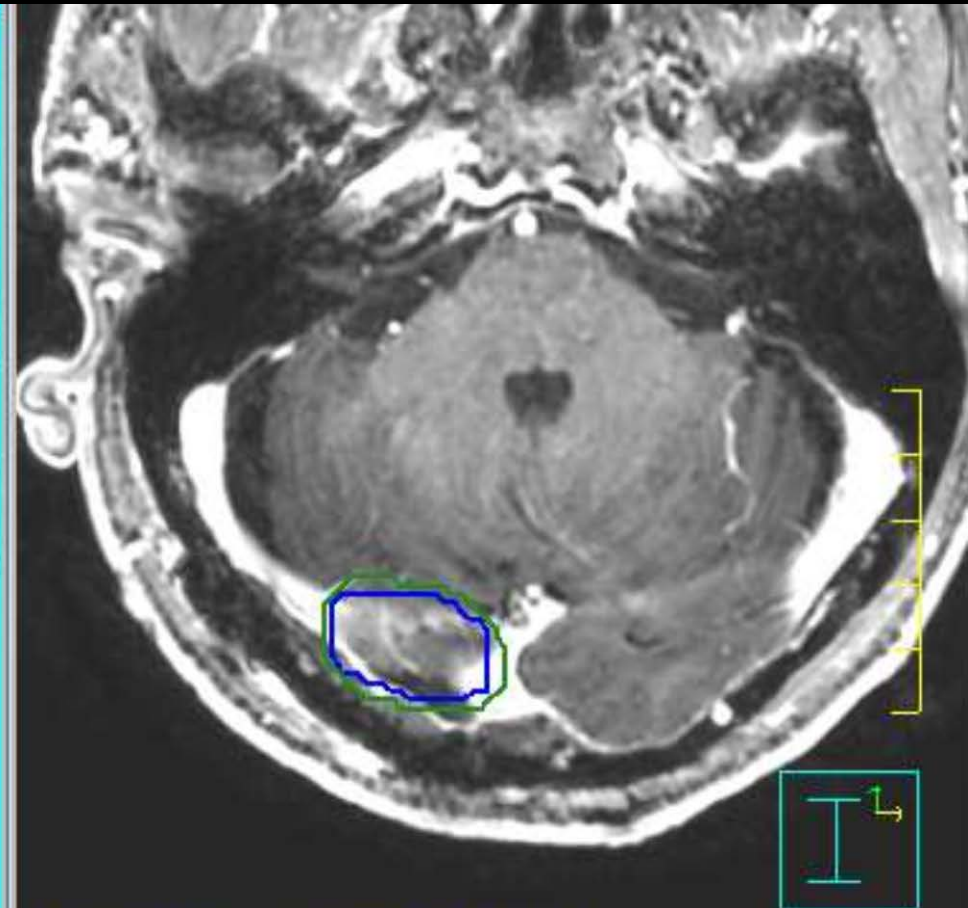
- GTV2



- GTV2 = Include the complete surgical cavity

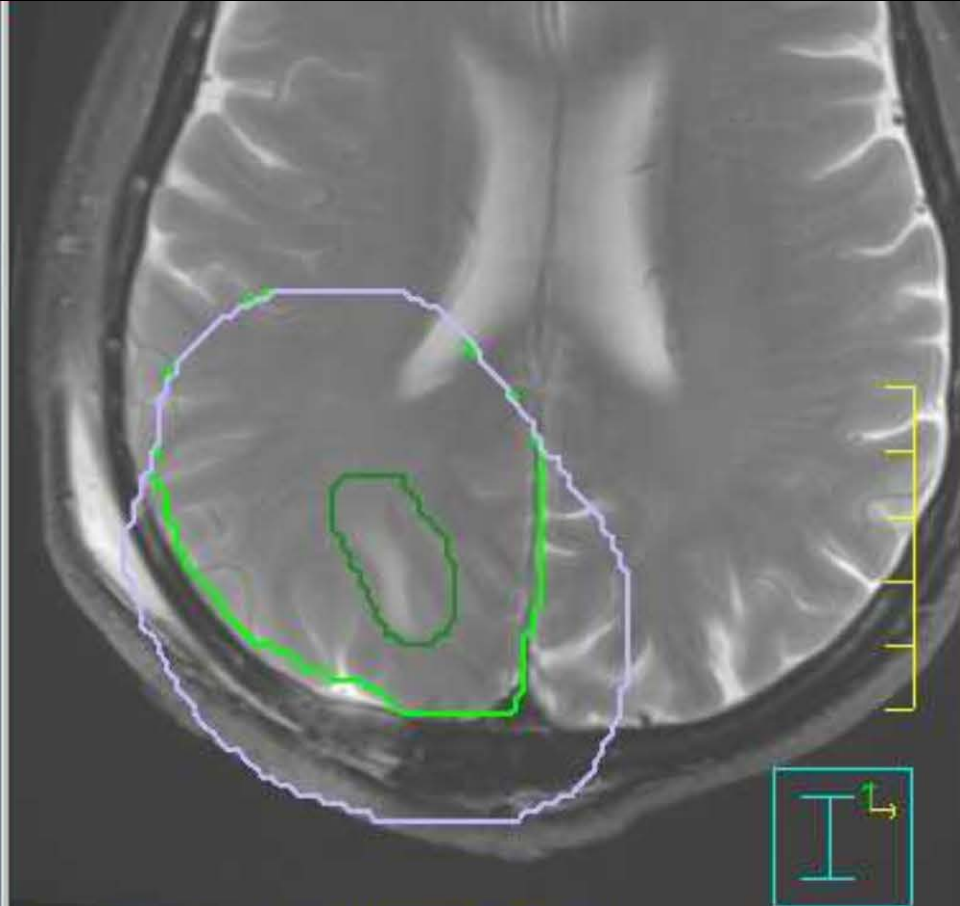
- GTV1

- GTV2



- GTV2 = Include the complete surgical cavity

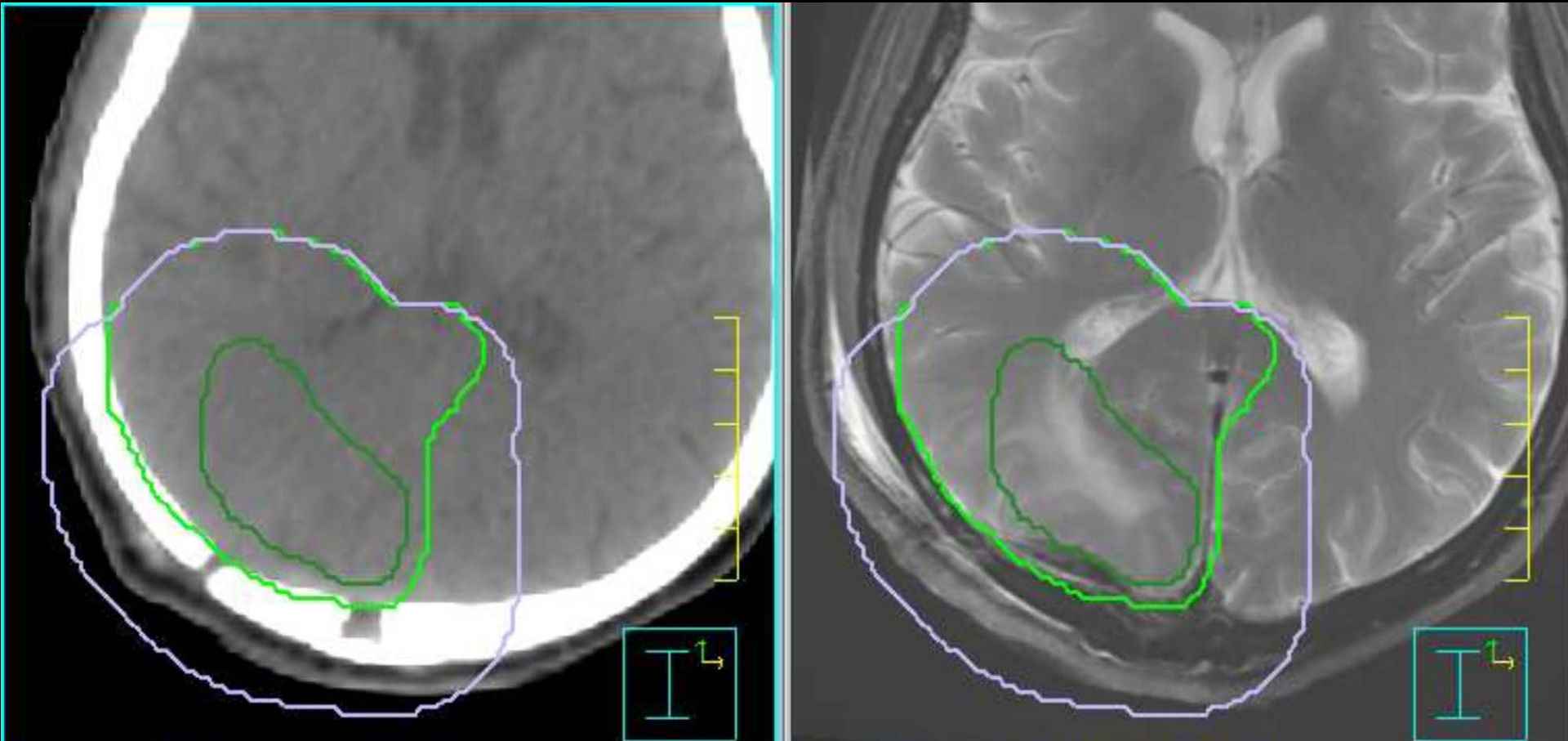
- CTV1
- GTV1
- Reference 2cm expansion



- $CTV1 = GTV1 + 2 \text{ cm margin}$
- Reference 2cm expansion reduced to 0.5 cm around natural barriers to tumor growth such as the skull, ventricles, falx, etc to create CTV1



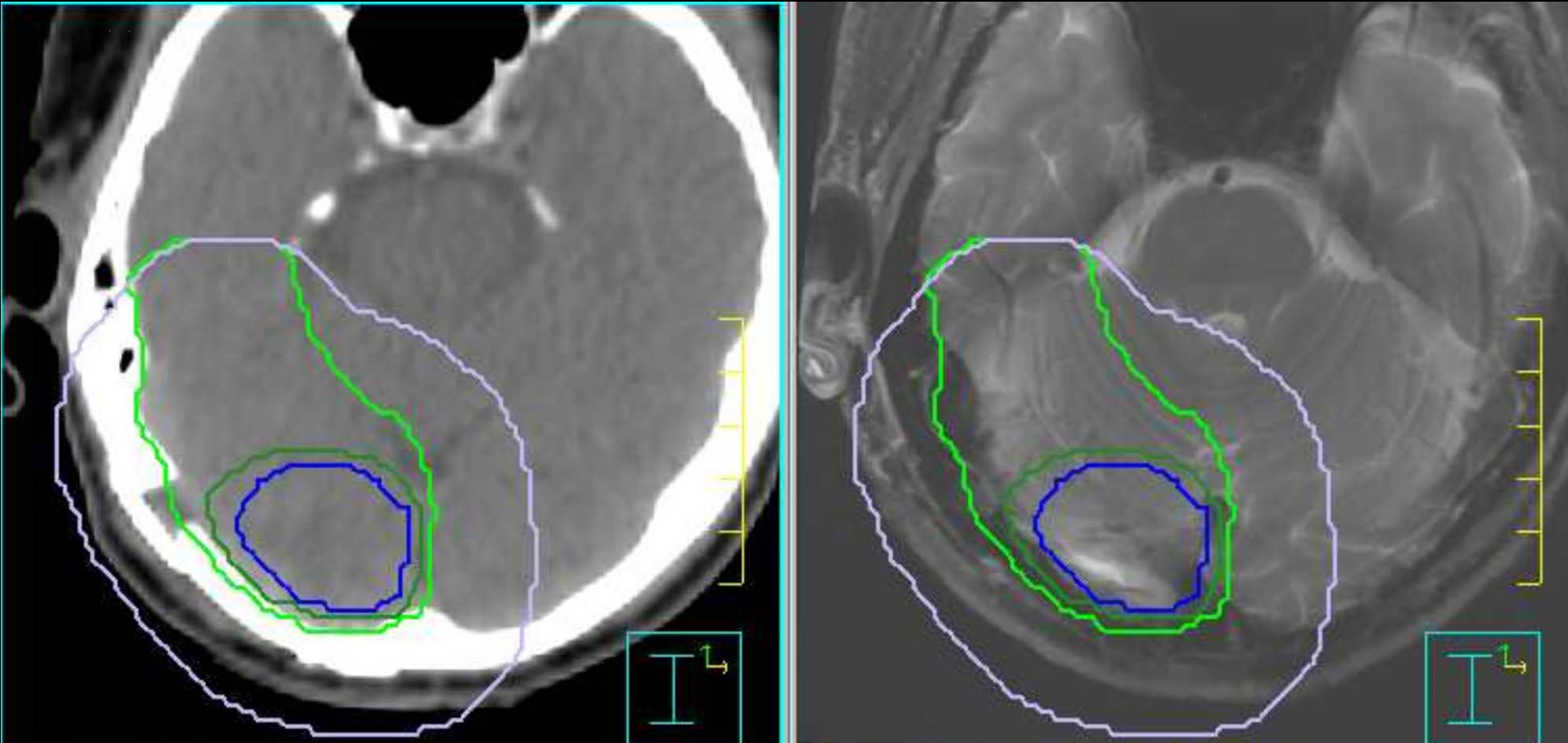
- CTV1
- GTV1
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- Reference 2cm expansion reduced to 0.5 cm around natural barriers to tumor growth such as the skull, ventricles, falx, etc to create CTV1



- CTV1
- GTV1
- Reference 2cm expansion



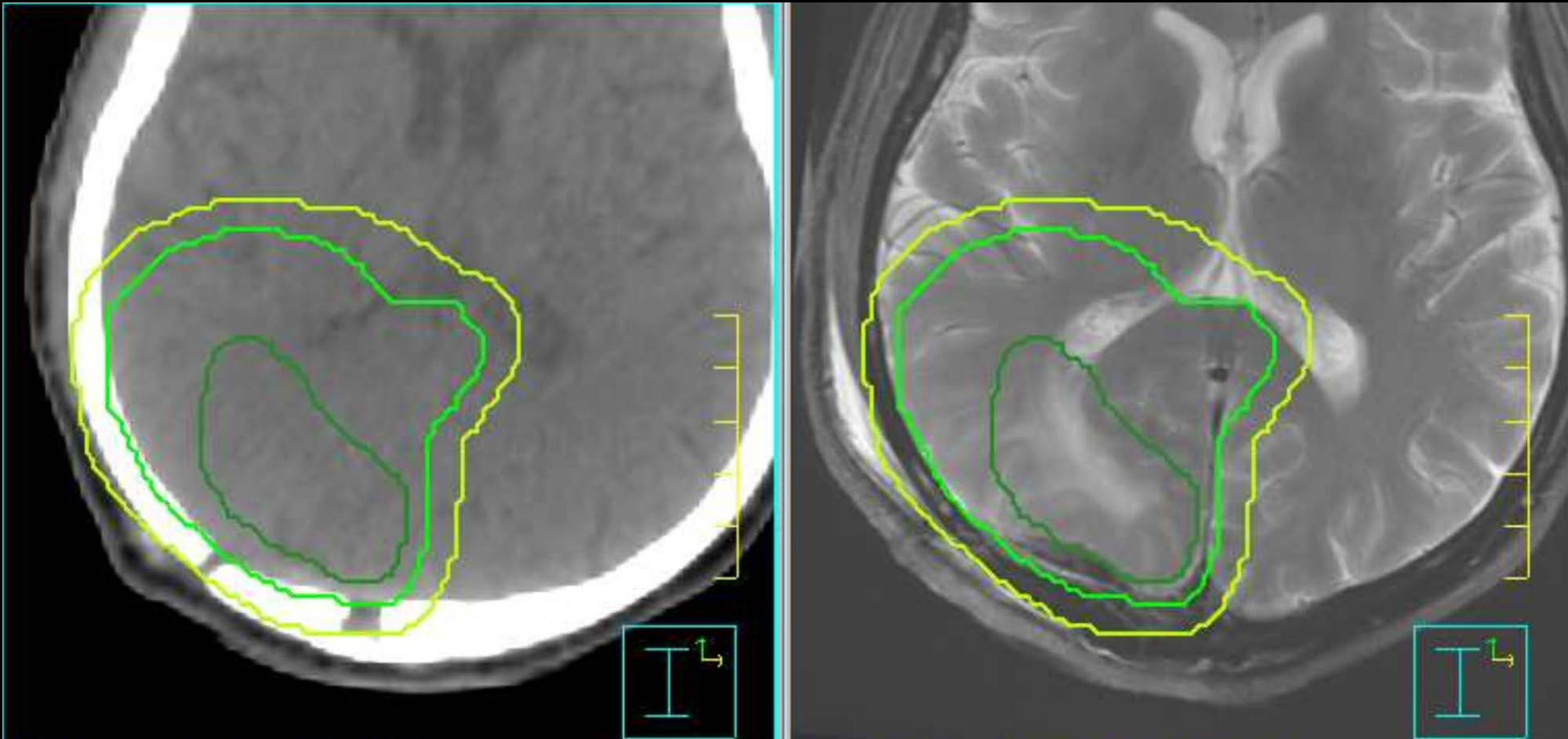
- CTV1 margin may be reduced to allow sparing of optic nerve/ chiasm, brain stem if necessary.

- GTV1
- CTV1
- PTV1



- $PTV1 = CTV1 + 3-5 \text{ mm}$  based on institutional localization method and reproducibility at each center.

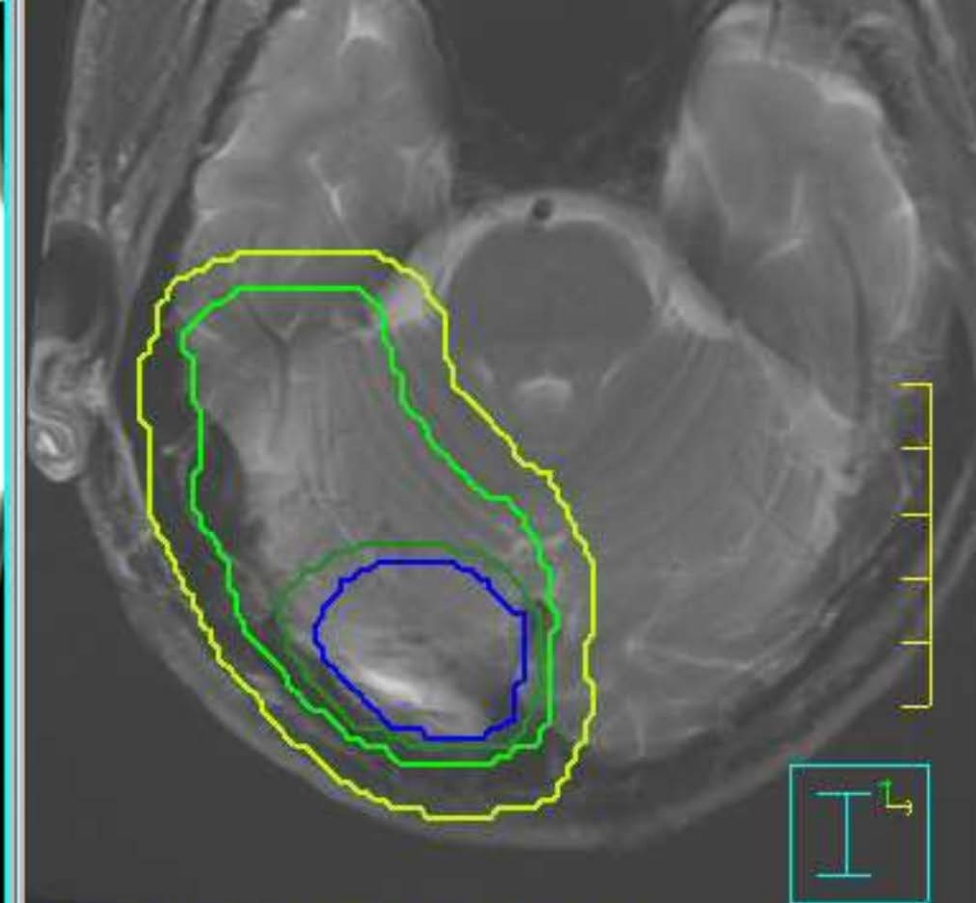
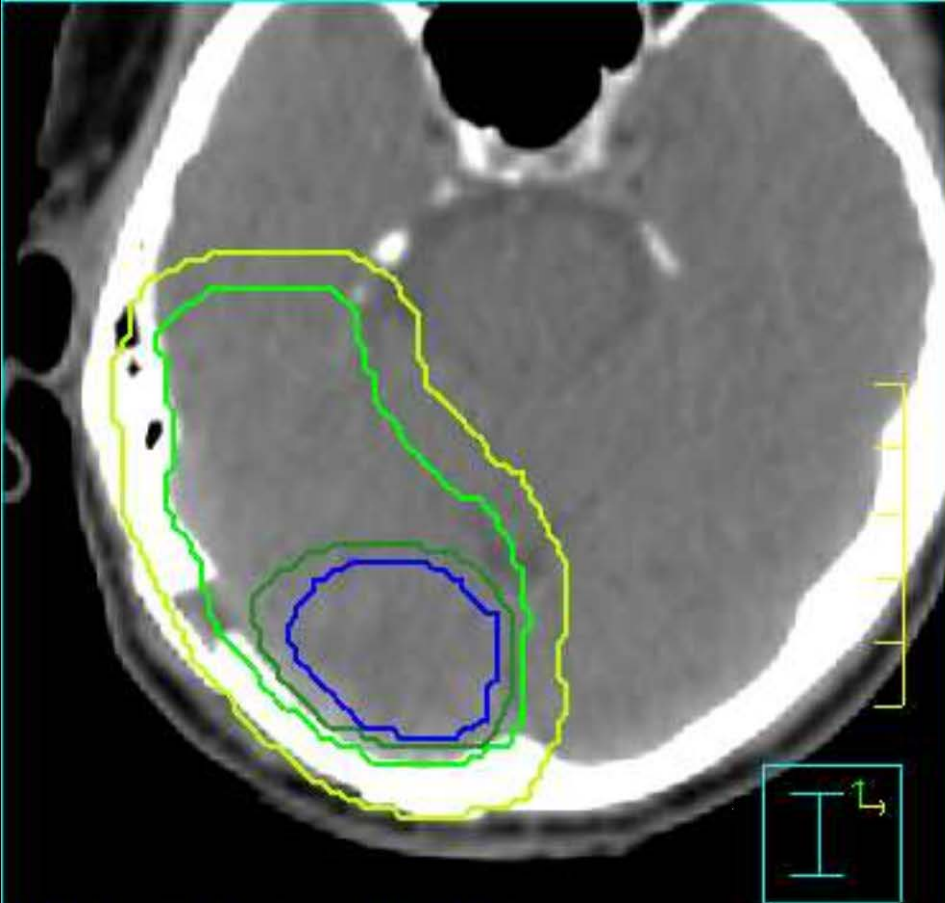
- GTV1
- CTV1
- PTV1



- If no surrounding edema is present, then **PTV1** = contrast-enhancing lesion/ surgical cavity plus 2.5 cm margin.

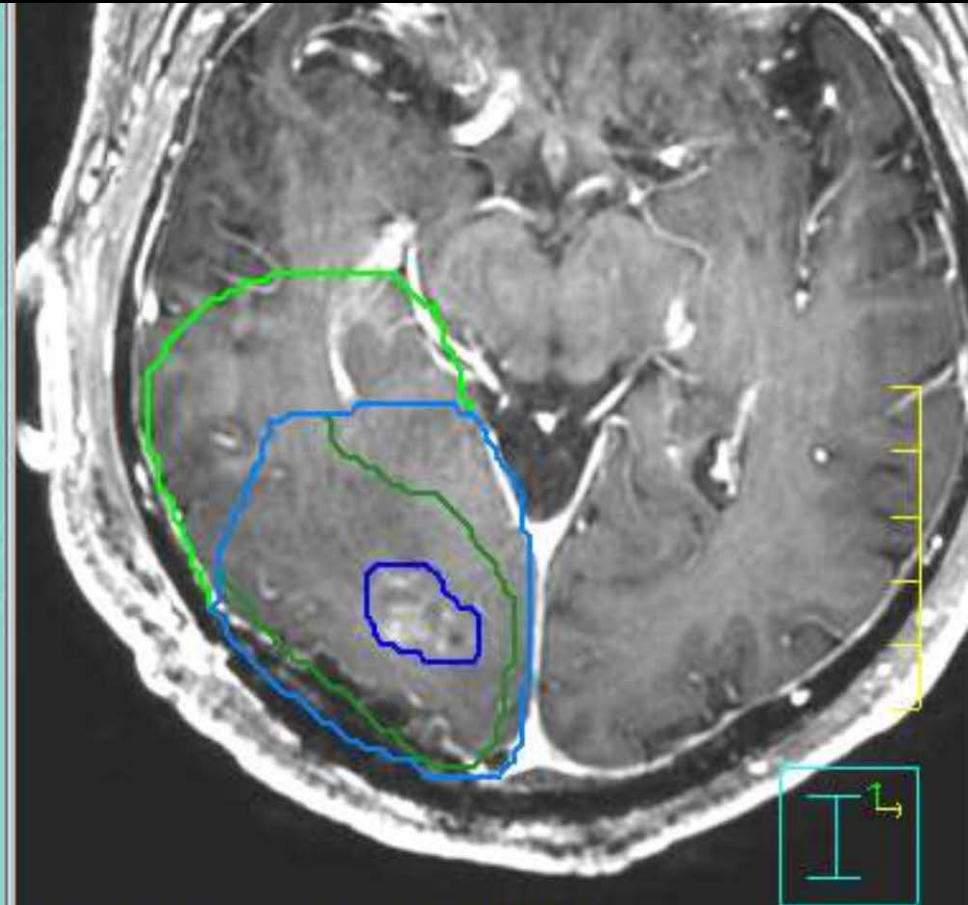


- GTV1
- CTV1
- GTV2
- PTV1



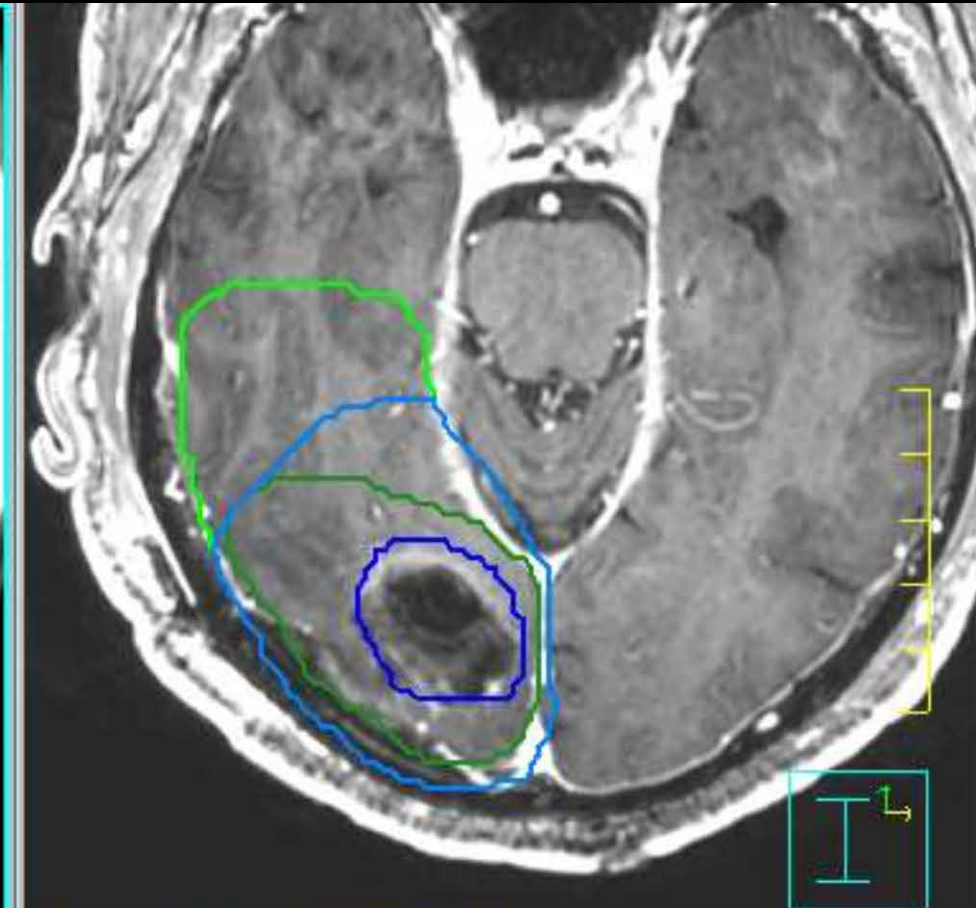
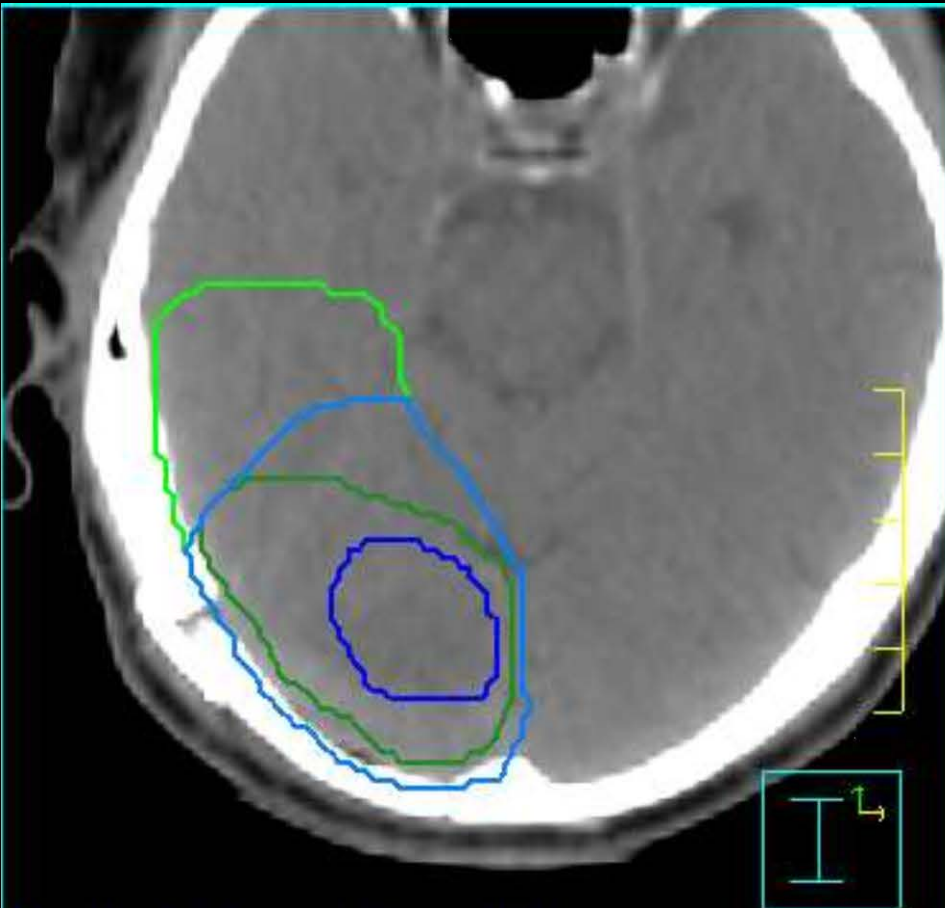
- PTV1 margins alterations to reduce organ at risk dose is not permissible

- GTV1
- CTV1
- GTV2
- CTV2



- $CTV2 = GTV2 + 2\text{cm margin not extending beyond } CTV1$

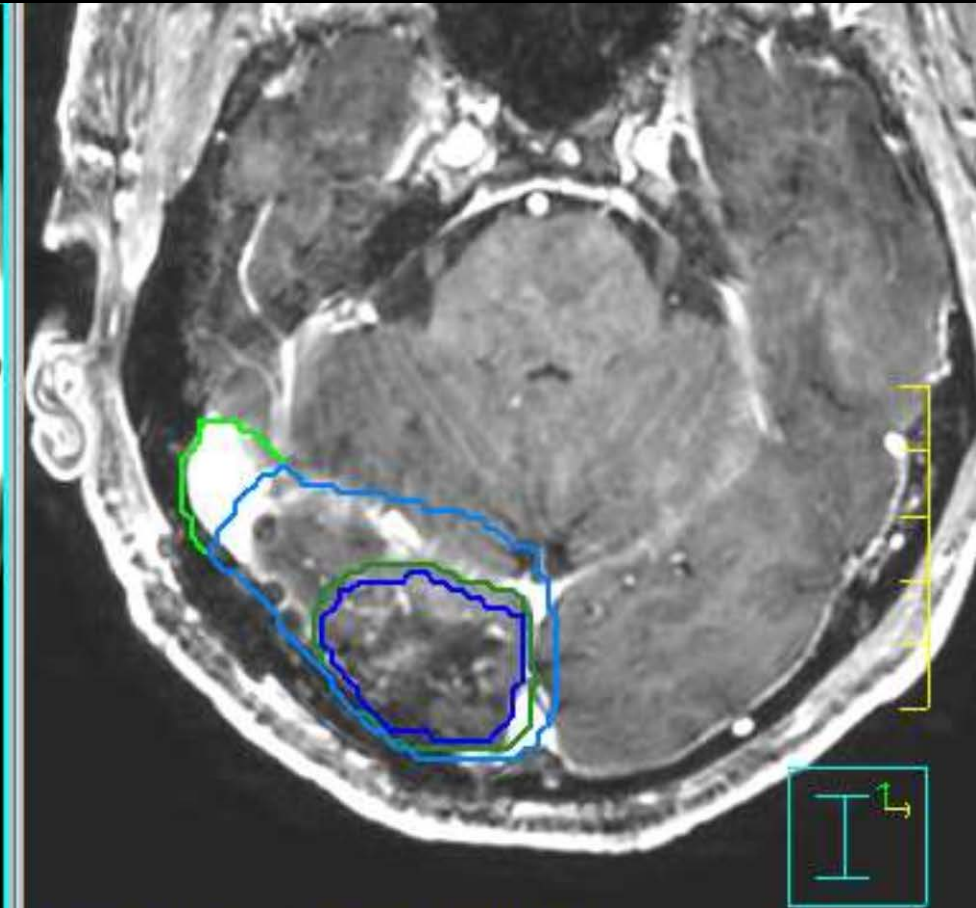
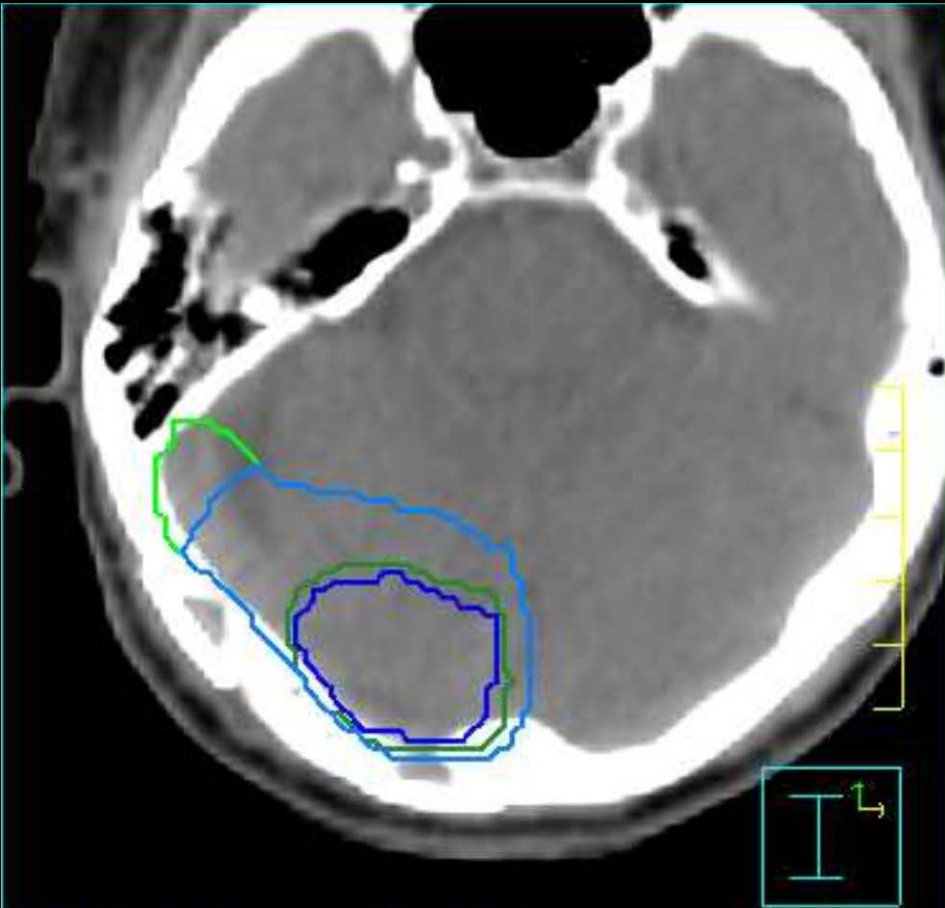
- GTV1
- CTV1
- GTV2
- CTV2



- CTV2 margin may be reduced to 0.5 cm around natural barriers to tumor growth such as the skull, ventricles, falx, etc.



- GTV1
- CTV1
- GTV2
- CTV2



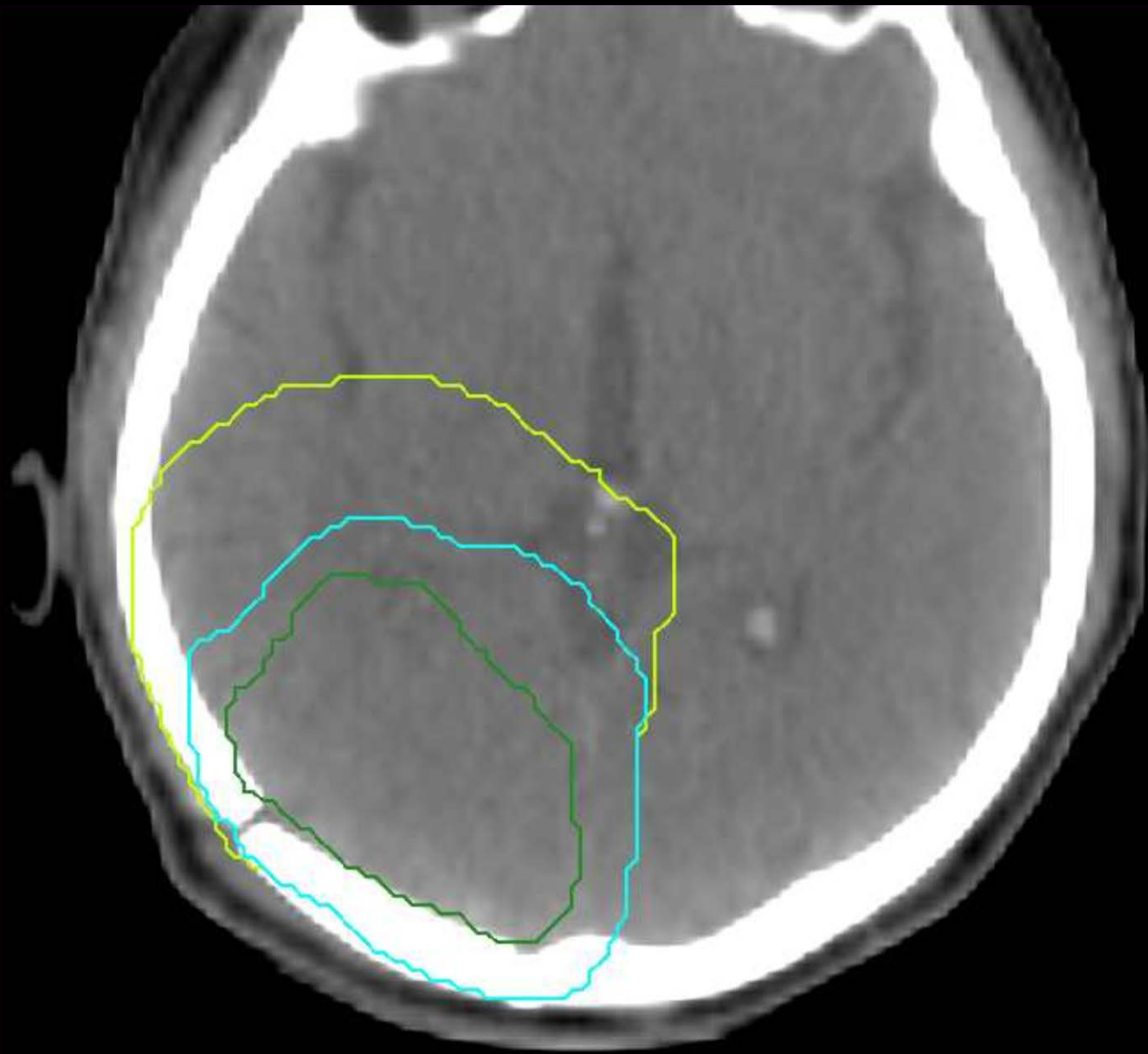
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- GTV1
- PTV2
- PTV1

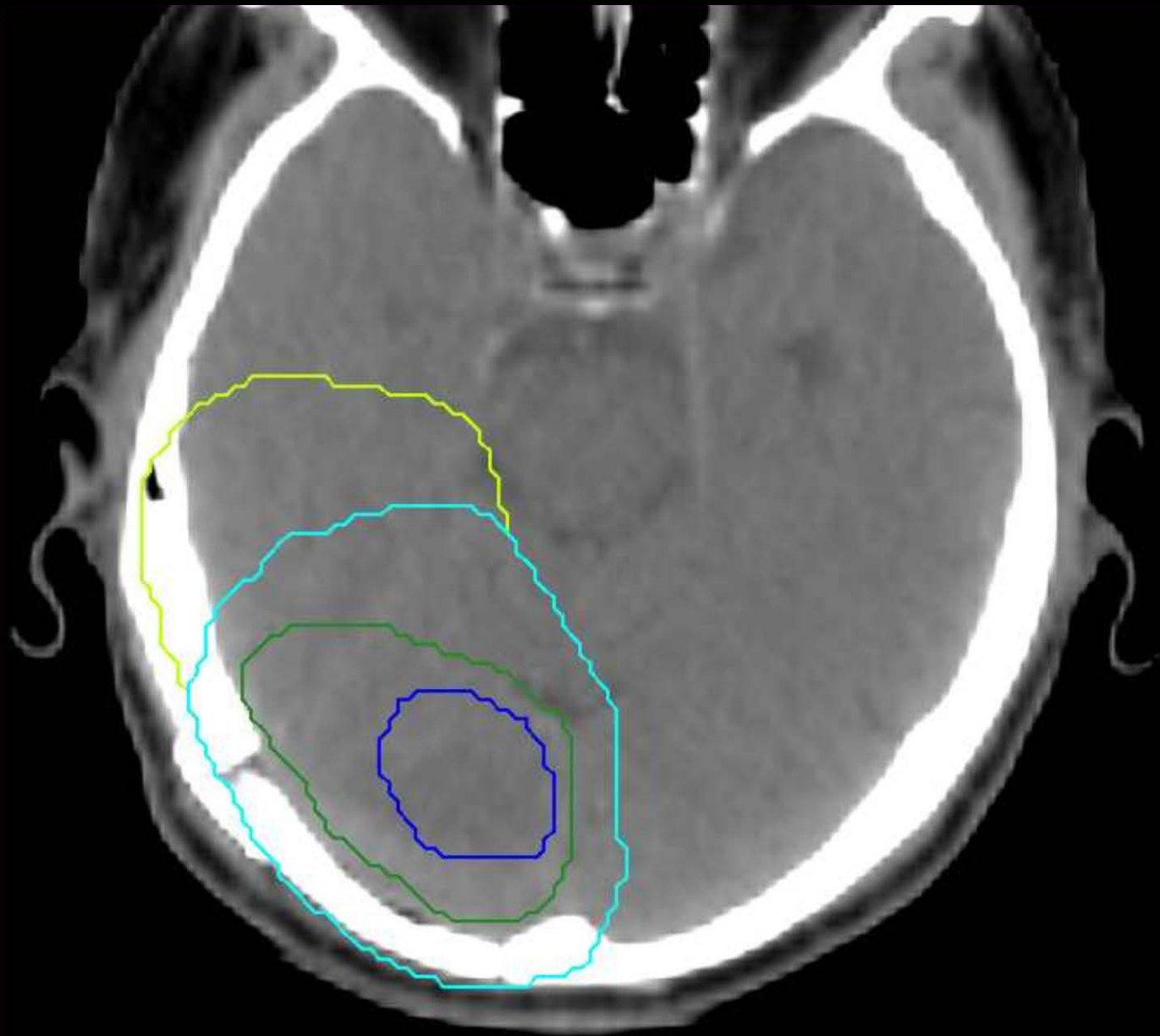
■  $PTV2 = CTV2 + 3-5$  mm based on institutional localization method and reproducibility at each center.



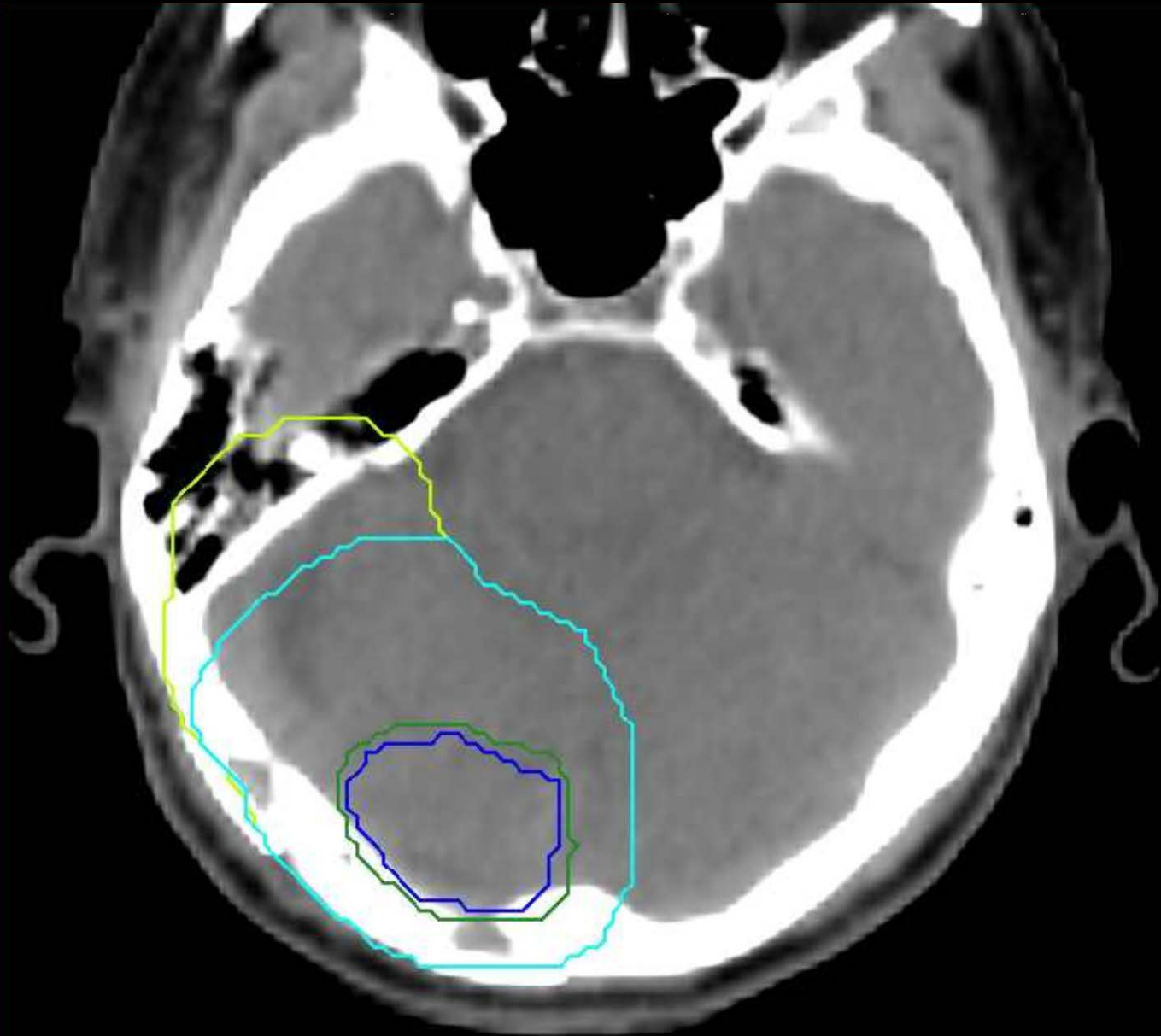


- GTV1
- PTV2
- PTV1





- GTV2
- GTV1
- PTV2
- PTV1



- *GTV2*
- *GTV1*
- *PTV2*
- *PTV1*