

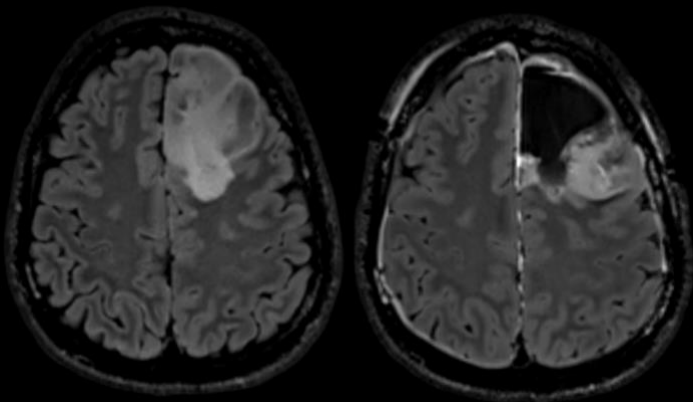
Advocating increased extent of neurosurgical resection in IDH-mutated glioma

**Is relapse-free survival associated with
residual tumour or initial tumour volume?**

A/Prof Michael Back

Sydney Australia

NSA-COGNO Aug2026



No disclosures to report

A/Prof Michael Back

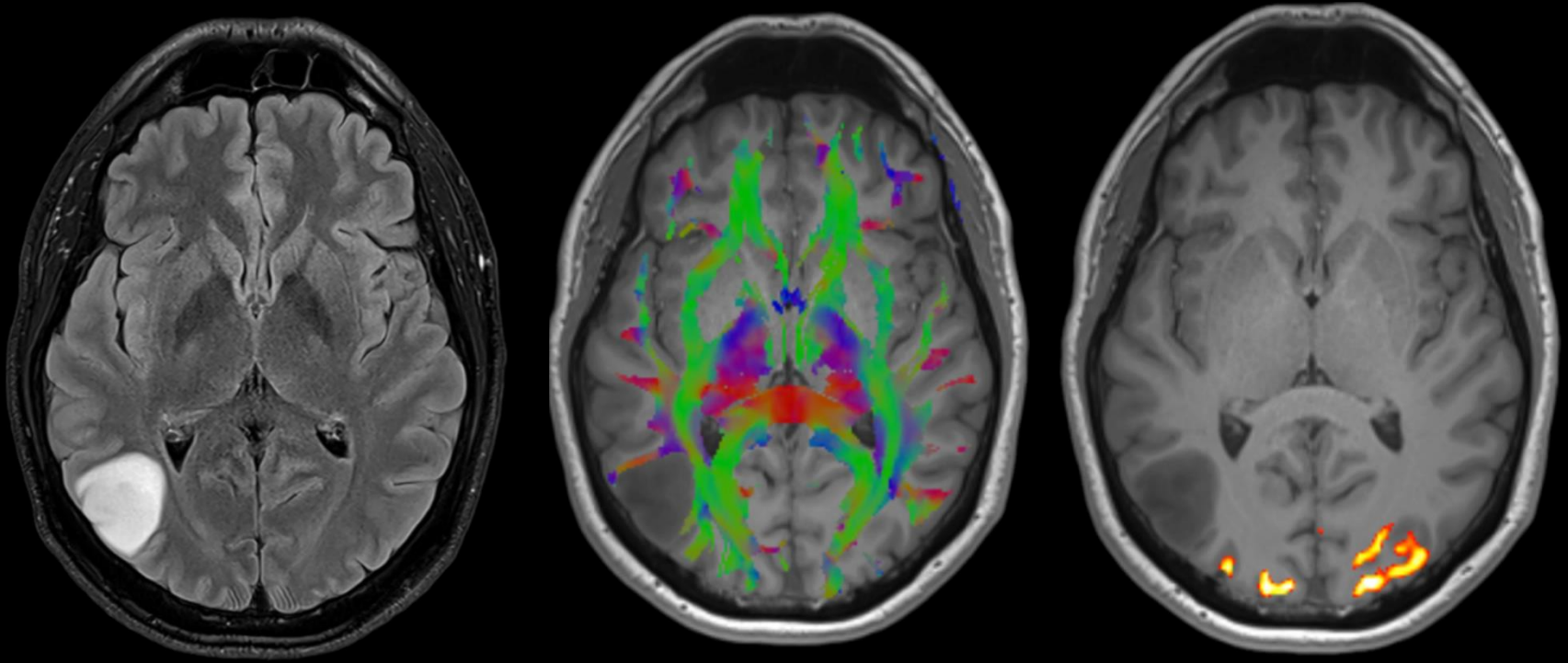
Sydney Australia

NSA-COGNO Aug2026



IDH-mutated glioma

? optimal management at initial diagnosis



IDH-mutated glioma

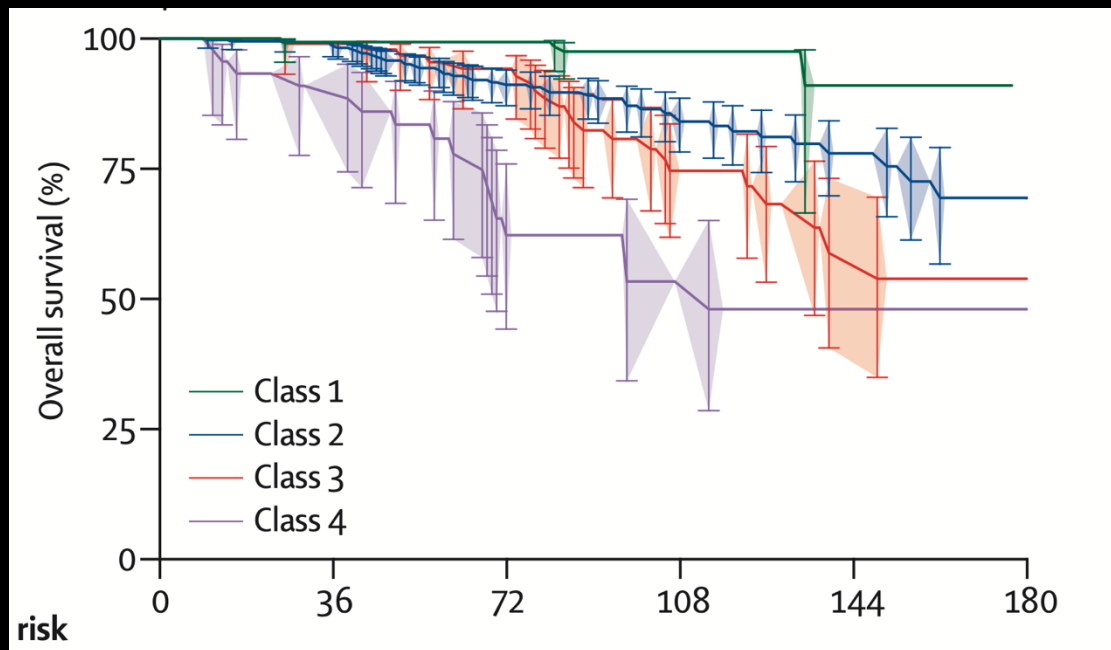
RANO Resect Group

A prognostic classification system for extent of resection in *IDH*-mutant grade 2 glioma: an international, multicentre, retrospective cohort study with external validation by the RANO resect group

***Lancet Oncol* 2025; 26: 1638–50**

IDH-mutated glioma

RANO Resect Group



Lancet Oncol 2025; 26: 1638–50

IDH-mutated glioma

RANO classification for extent of resection in *IDH*-mutant glioma of WHO grade 2

Class 1:
supramaximal T2-FLAIR resection

0 cm³ T2-FLAIR tumour + resection
of non-affected structures

Class 2:
maximal T2-FLAIR resection

0–5 cm³ T2-FLAIR tumour"

Class 3:
submaximal T2-FLAIR resection

>5–25 cm³ T2-FLAIR tumour

Class 4:
minimal T2-FLAIR resection

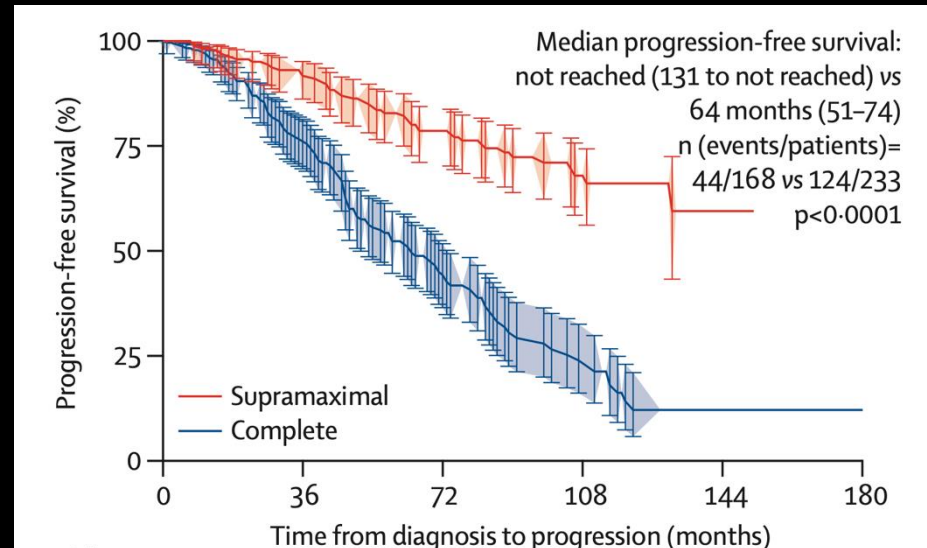
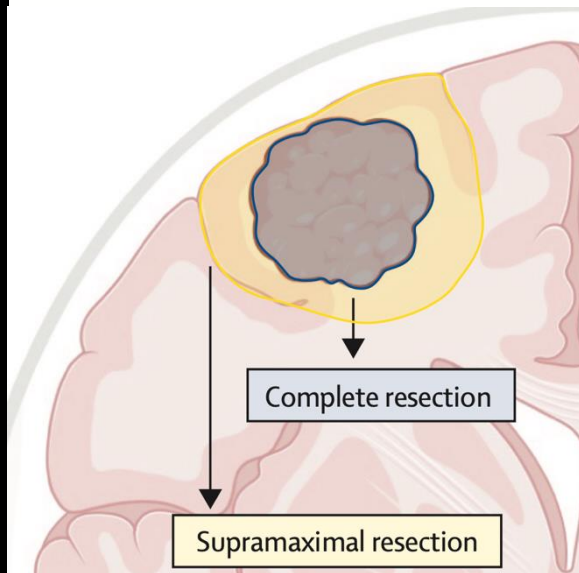
T2-FLAIR tumour and/or
>0 cm³ contrast-enhancing tumour

Lancet Oncol 2025; 26: 1638–50

IDH-mutated glioma

Class 1:
supramaximal T2-FLAIR resection

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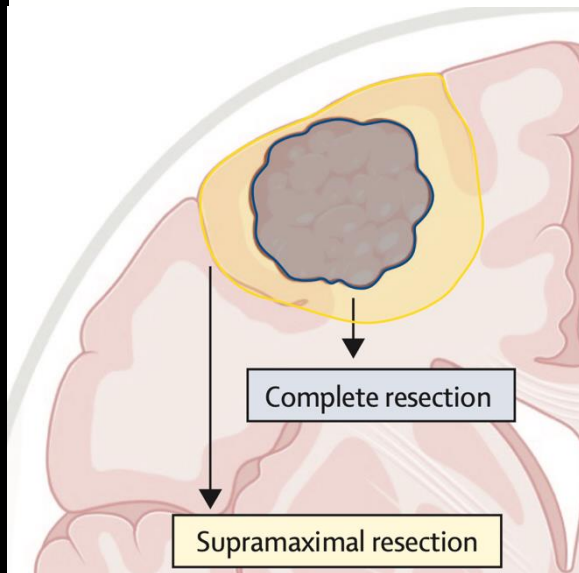


Lancet Oncol 2025; 26: 1638–50

IDH-mutated glioma

Class 1:
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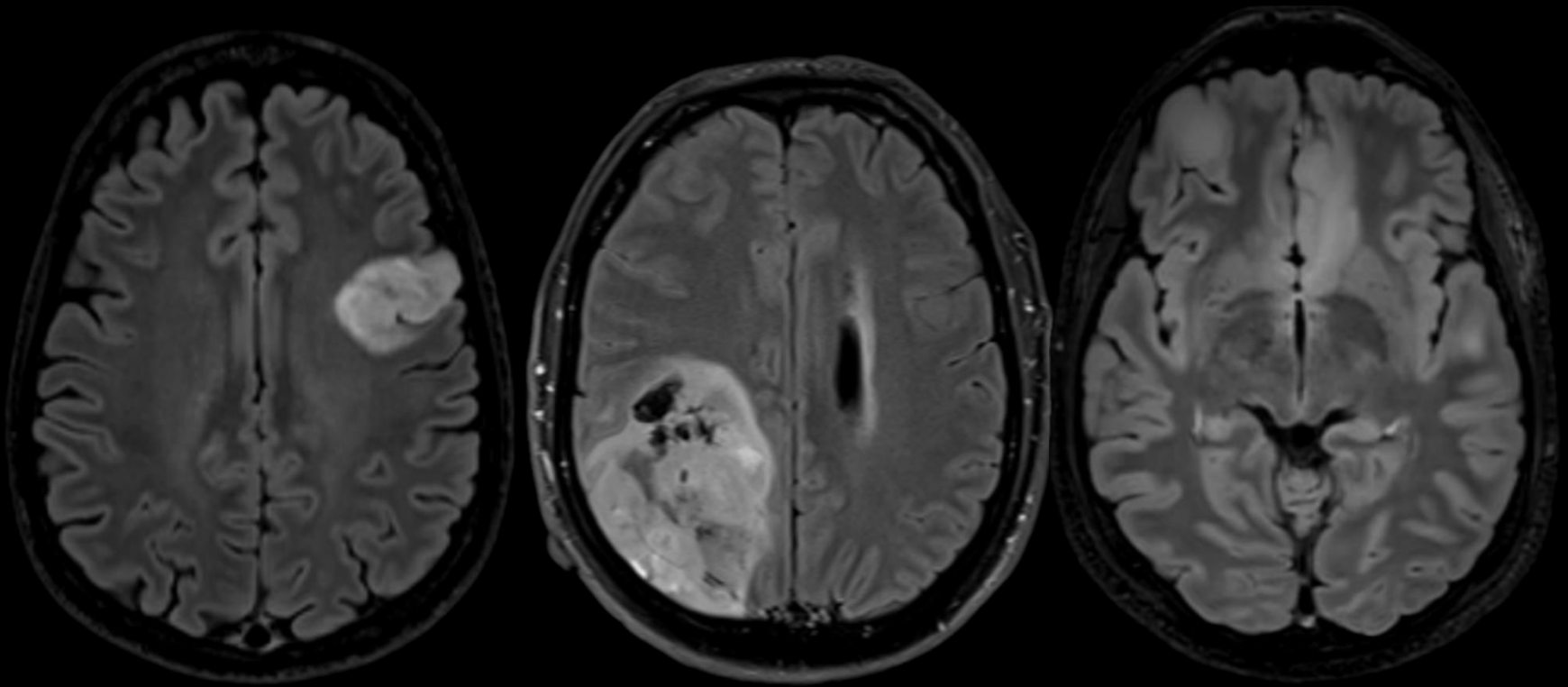


Although the value of ever-increasing extents of resection reaches a limit when surgery leads to diminished functional outcome, it might still be appropriate to prioritise the extent of resection over mild permanent deficits, particularly in young patients

Lancet Oncol 2025; 26: 1638–50

IDH-mutated glioma

Varying tumour site / bulk / natural history

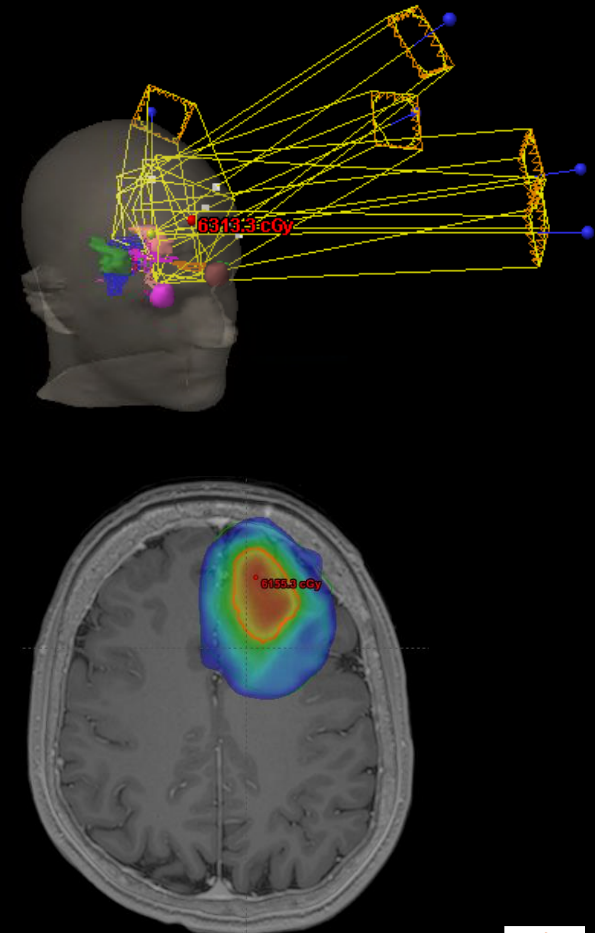


Aims

In IDH-mutated Grade 3 or 4 Glioma managed with IMRT

Audit:

- Relapse Free Survival
- Relationship with
 - Initial tumour volume
 - Residual disease preIMRT



Methods

IDH-mutated Grade3 or 4 Glioma

239 patients receiving IMRT 2008-2024

Managed with:

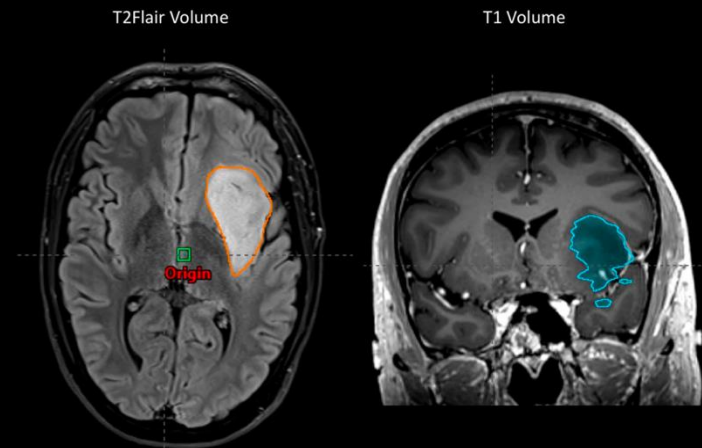
- Upfront IMRT after initial surgery (n=143)
- Delayed IMRT until progression (n=96)

Primary endpoint was (RFS) from IMRT start.

Methods

VOLUMETRIC STUDY

- Manual segmentation of tumour volume
- MRI T1, T2F (T2), T1gd Sequences
- Pre-op and Pre-IMRT
- Assisted by FET PET



Methods

Primary endpoint was (RFS) from IMRT start.

All IMRT patients
(n=239)

T2vol at diagnosis
T2vol preIMRT

Upfront postop IMRT
(n=143)

T2vol preop
T2vol postop (preIMRT)
RANO Resect Category

Results: Total Cohort (n=239)

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Astro (55%) : Oligo (45%)

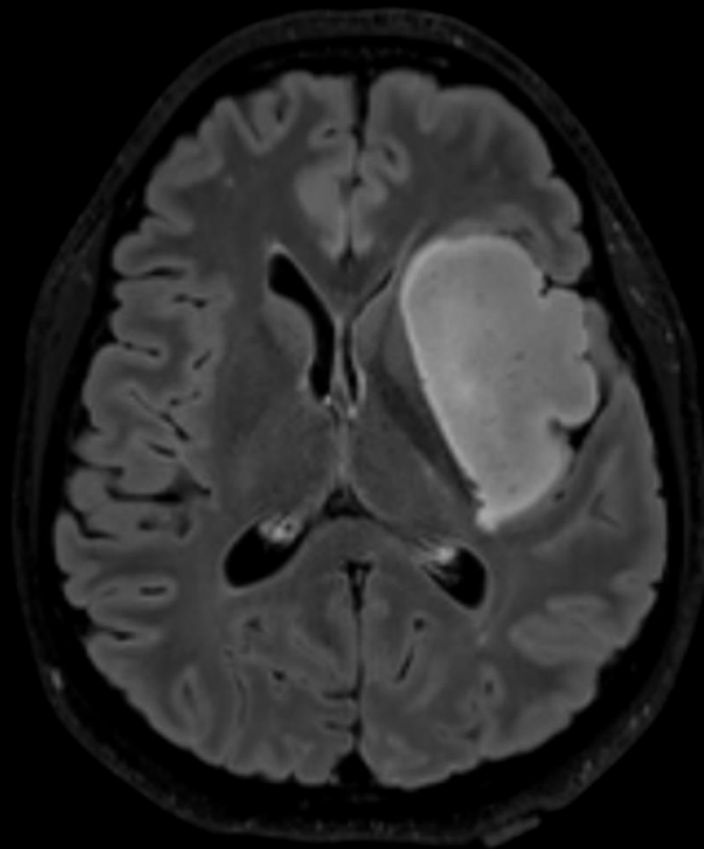
Neuroanatomical subsites:

- Sup/Ant Frontal (27%);
- Lat Front /Insula (24%)
- Parietal (11%)

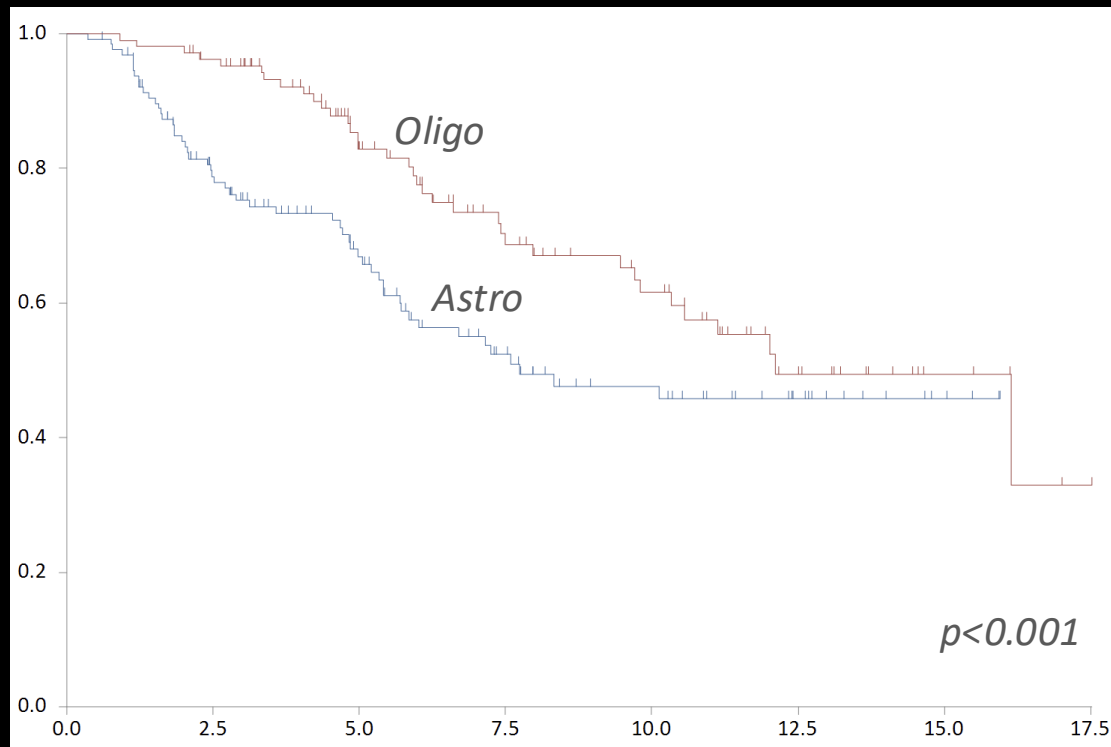
IMRT-ib: 59.4/54Gy in
88%

FET-FDG guidance in 90%

Temozolomide in 88%



Results: Total Cohort (n=239)

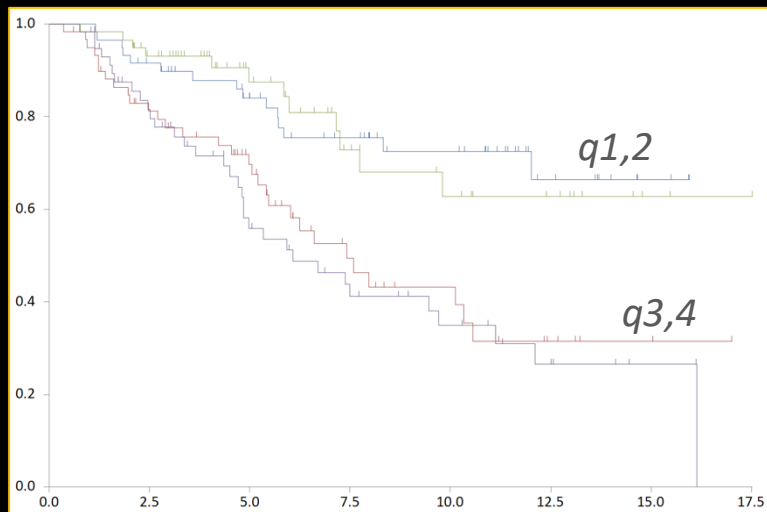


MedianRFS 11.1yrs
(95%CI: 8.9-13.3)

Results: Total Cohort (n=239)

T2 volume at diagnosis

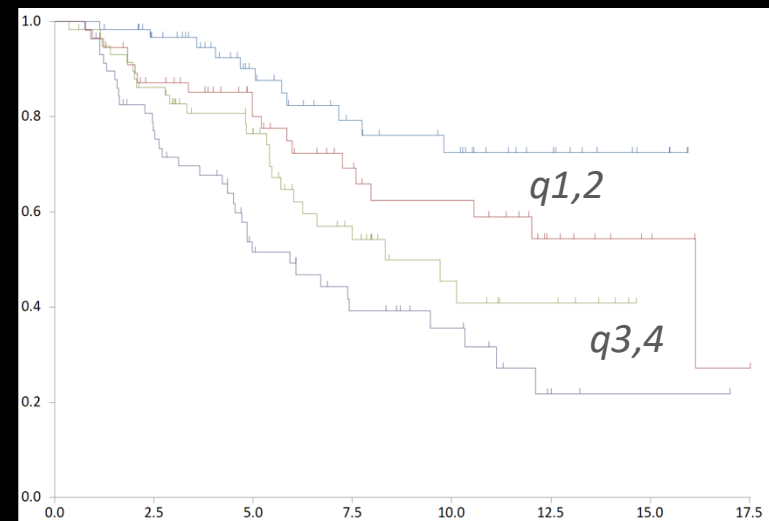
- Median 55cm³ (q1-3: 22-105)



($p < 0.001$)

T2 volume preIMRT

- Median 28cm³ (q1-3: 8-73)



($p < 0.001$)

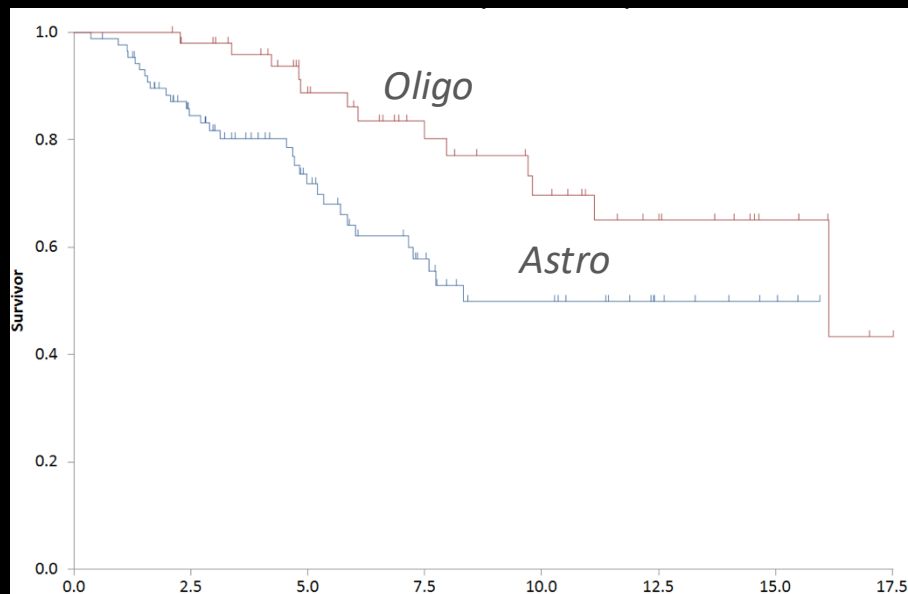
Results: Upfront IMRT (n=143)

Oligo

Astro

Results: Upfront IMRT (n=143)

Increased proportion of Astrocytoma (63%)
Similar neuroanatomical sites



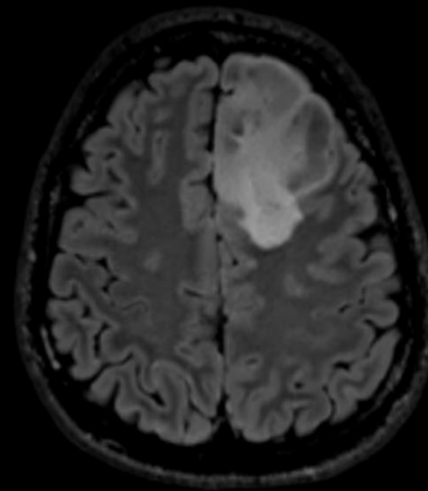
Astrocytoma: 8.3years (95%CI: 7.1-15.9)

Oligodendroglioma: 16.1years (95%CI: 11.1-17.5)

Results: Upfront IMRT (n=143)

Preop

	Median (cm3)	Quartile
T1gad	0	mean 4.5cm3
T2	54	q1-3: 21-110
T1	39	q1-3: 16-86



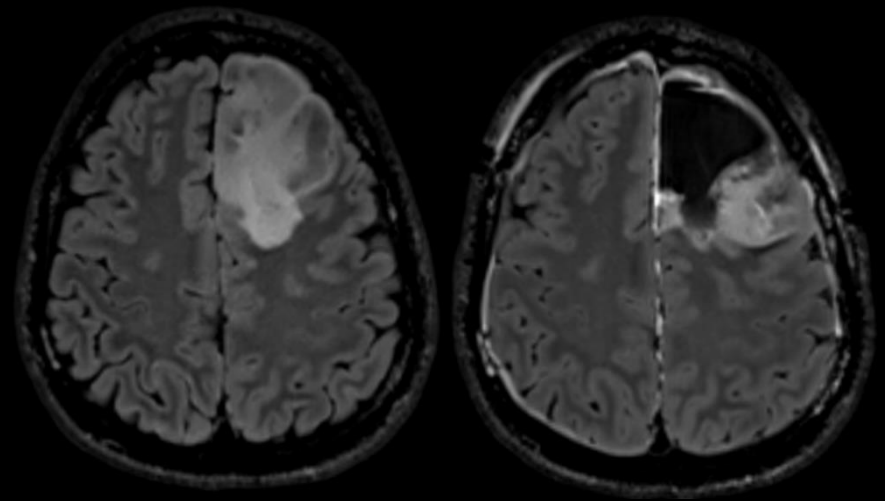
Results: Upfront IMRT (n=143)

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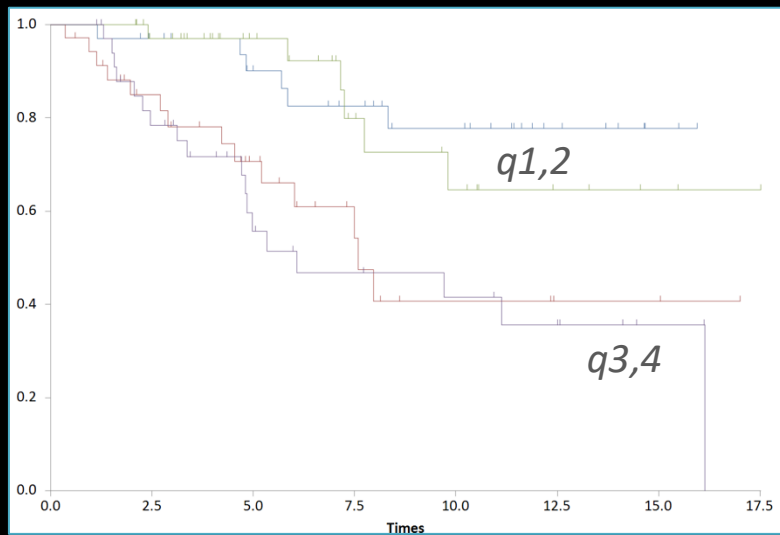
Postop

	Median (cm3)	Quartile
T1gad	0	mean 0.6cm3
T2	25	q1-3: 3-65
T1	23	q1-3: 2-36

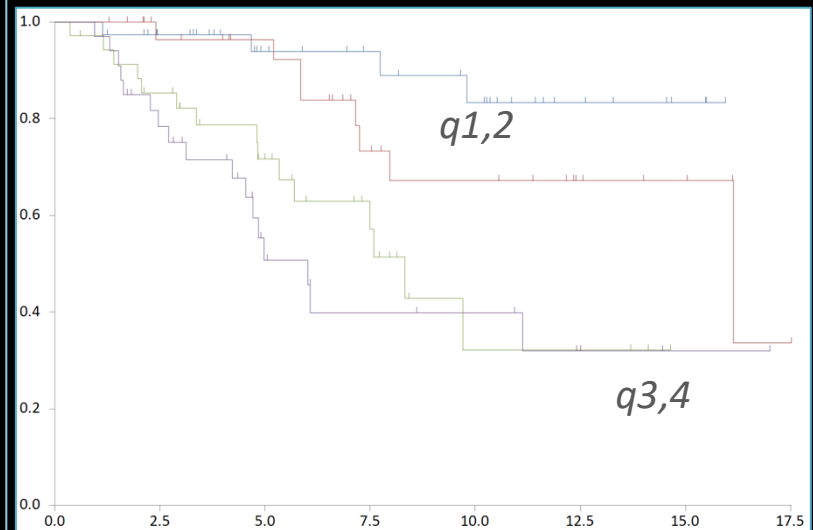


Results: Upfront IMRT (n=143)

T2 volume at Diagnosis
 $p < 0.001$

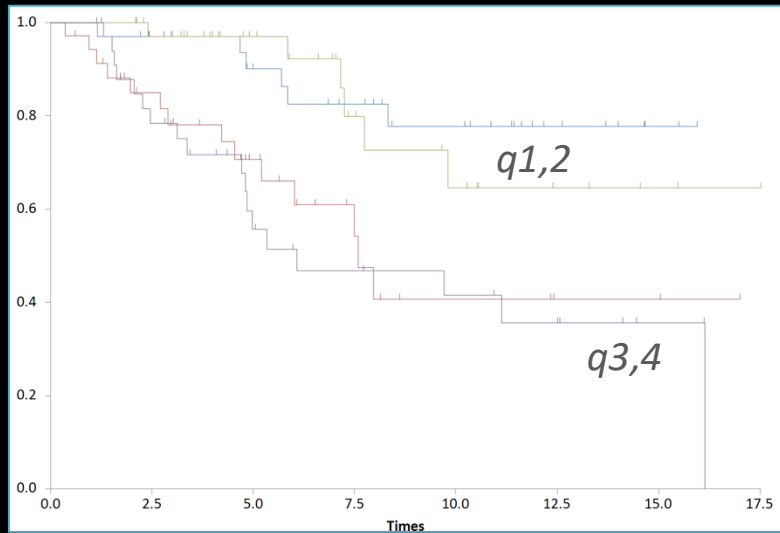


T2 volume preIMRT
 $p = 0.01$

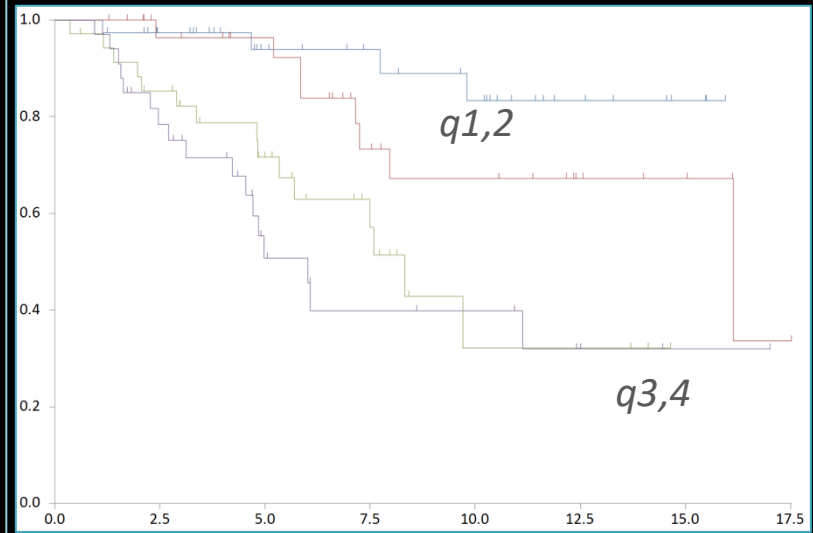


Results: Upfront IMRT (n=143)

T2 volume at Diagnosis
 $p < 0.001$



T2 volume preIMRT
 $p = 0.01$



Significance only for highest residual volume quartiles and astrocytoma only
Oligodendroglioma ($p = 0.58$ for T2pre; and $p = 0.27$ for T2post).

Results: Upfront IMRT (n=143)

RANO Resect Category

Class 2:
maximal T2-FLAIR resection

0–5 cm³ T2-FLAIR tumour"

Class 3:
submaximal T2-FLAIR resection

>5–25 cm³ T2-FLAIR tumour

Class 4:
minimal T2-FLAIR resection

T2-FLAIR tumour and/or
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Results: Upfront IMRT (n=143)

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RANO Resect Category

Class 2:
maximal T2-FLAIR resection

0-5 cm³ T2-FLAIR tumour"

Class 2: 33%

Class 3:
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>5-25 cm³ T2-FLAIR tumour

Class 3: 18%

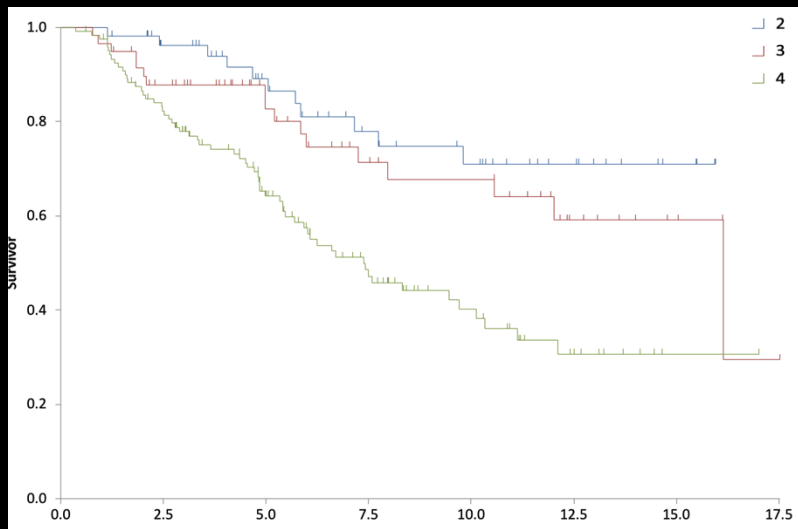
Class 4:
minimal T2-FLAIR resection

T2-FLAIR tumour and/or
>0 cm³ contrast-enhancing tumour

Class 4: 49%

Results: Upfront IMRT (n=143)

RFS for RANO Resect Category



RANO Resect Category

Class 2:
maximal T2-FLAIR resection

0-5 cm³ T2-FLAIR tumour

Class 2: 33%

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>5-25 cm³ T2-FLAIR tumour

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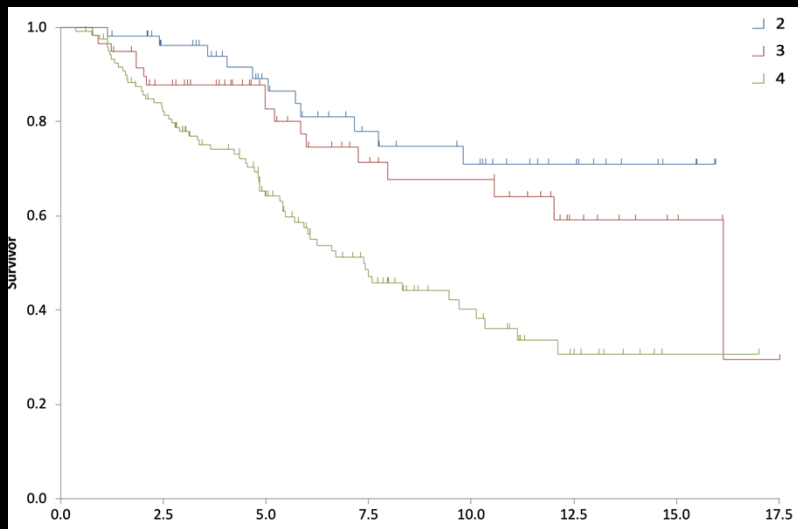
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T2-FLAIR tumour and/or
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Class 4: 49%

Results: Upfront IMRT (n=143)

RFS for RANO Resect Category



Class 2,3 vs 4 ($p=0.01$)
Thus only at $>25\text{cm}^3$ residual

RANO Resect Category

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0-5 cm³ T2-FLAIR tumour"

Class 2: 33%

Class 3:
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>5-25 cm³ T2-FLAIR tumour

Class 3: 18%

Class 4:
minimal T2-FLAIR resection

T2-FLAIR tumour and/or
>0 cm³ contrast-enhancing tumour

Class 4: 49%

Conclusions

- Patients with Grade 3 / 4 IDH-mutated glioma have durable RFS despite large residual tumour volume.
- Following adjuvant IMRT, outcome may actually be more related to tumour burden at diagnosis
 - rather than just volume of residual disease
 - especially at residual volumes $< 25\text{cm}^3$.

Conclusions

- Optimal neurosurgical management remains safe complete resection with minimal residual disease.
- This however is to be balanced with risks of potential morbidity in patients with expected long survival.



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