



## Clinical trial results:

**Clinical Trial Phase IIB randomized, multicenter, of continuation or non-continuation with 6 cycles of temozolomide after the first 6 cycles of standard first-line treatment in patients with glioblastoma.**

### Summary

EudraCT number	2014-000838-39
Trial protocol	ES
Global end of trial date	14 June 2019

### Results information

Result version number	v1 (current)
This version publication date	05 November 2020
First version publication date	05 November 2020
Summary attachment (see zip file)	Peer review journal publication (Neurooncology GEINO 1401.pdf)

### Trial information

#### Trial identification

Sponsor protocol code	GEINO14-01
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#### Additional study identifiers

ISRCTN number	-
ClinicalTrials.gov id (NCT number)	-
WHO universal trial number (UTN)	-

Notes:

### Sponsors

Sponsor organisation name	Grupo Español de Investigación en Neuro-Oncología (GEINO)
Sponsor organisation address	C/ Velázquez no7, 3 planta, Madrid, Spain, 28001
Public contact	Pau Doñate, MFAR Clinical Research, investigacion@mfar.net
Scientific contact	Pau Doñate, MFAR Clinical Research, investigacion@mfar.net

Notes:

### Paediatric regulatory details

Is trial part of an agreed paediatric investigation plan (PIP)	No
Does article 45 of REGULATION (EC) No 1901/2006 apply to this trial?	No
Does article 46 of REGULATION (EC) No 1901/2006 apply to this trial?	No

Notes:

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**Results analysis stage**

Analysis stage	Final
Date of interim/final analysis	30 September 2019
Is this the analysis of the primary completion data?	Yes
Primary completion date	14 June 2019
Global end of trial reached?	Yes
Global end of trial date	14 June 2019
Was the trial ended prematurely?	No

Notes:

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**General information about the trial**

Main objective of the trial:

Detect differences in the probability of progression-free survival at 6 months between patients with methylated or unmethylated MGMT and residual disease or not, to receive an additional 6 cycles of temozolomide.

Protection of trial subjects:

The trial was conducted in accordance with applicable regulatory requirements and the principles of the Declaration of Helsinki. The protocol was approved by the ethics committees of all participating centers. All patients provided their signed informed consent.

Background therapy: -

Evidence for comparator: -

Actual start date of recruitment	02 September 2014
Long term follow-up planned	No
Independent data monitoring committee (IDMC) involvement?	No

Notes:

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**Population of trial subjects****Subjects enrolled per country**

Country: Number of subjects enrolled	Spain: 159
Worldwide total number of subjects	159
EEA total number of subjects	159

Notes:

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**Subjects enrolled per age group**

In utero	0
Preterm newborn - gestational age < 37 wk	0
Newborns (0-27 days)	0
Infants and toddlers (28 days-23 months)	0
Children (2-11 years)	0
Adolescents (12-17 years)	0
Adults (18-64 years)	159
From 65 to 84 years	0
85 years and over	0

## Subject disposition

### Recruitment

Recruitment details:

From August 22, 2014 to November 27, 2018 166 patients were recruited across 20 centers in Spain.

### Pre-assignment

Screening details:

166 patients were screened, seven of whom were deemed to be ineligible. Seventy-nine patients were randomized to stop temozolomide after cycle 6 (control arm) and 80 to continue for up to six additional cycles (cycles 7 to 12) (experimental arm).

### Period 1

Period 1 title	Baseline (overall period)
Is this the baseline period?	Yes
Allocation method	Randomised - controlled
Blinding used	Not blinded

Blinding implementation details:

No blinding was empowered.

### Arms

Are arms mutually exclusive?	Yes
<b>Arm title</b>	Control

Arm description:

Patients will receive no intervention, stop temozolomide after cycle 6

Arm type	No intervention
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No investigational medicinal product assigned in this arm

<b>Arm title</b>	Experimental arm
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Arm description:

Patients will receive 6 additional temozolomide cycles, a total of 12

Arm type	Experimental
Investigational medicinal product name	Temozolomide
Investigational medicinal product code	
Other name	
Pharmaceutical forms	Capsule, hard
Routes of administration	Oral use

Dosage and administration details:

150-200 mg/m<sup>2</sup>

Administered the first 5 days of a 28 days cycle

<b>Number of subjects in period 1</b>	Control	Experimental arm
Started	79	80
Completed	40	48
Not completed	39	32
Discontinued intervention due to progression	39	31
Lost to follow-up	-	1



## Baseline characteristics

### Reporting groups

Reporting group title	Control
Reporting group description:	
Patients will receive no intervention, stop temozolomide after cycle 6	
Reporting group title	Experimental arm
Reporting group description:	
Patients will receive 6 additional temozolomide cycles, a total of 12	

Reporting group values	Control	Experimental arm	Total
Number of subjects	79	80	159
Age categorical			
Units: Subjects			
In utero			0
Preterm newborn infants (gestational age < 37 wks)			0
Newborns (0-27 days)			0
Infants and toddlers (28 days-23 months)			0
Children (2-11 years)			0
Adolescents (12-17 years)			0
Adults (18-64 years)			0
From 65-84 years			0
85 years and over			0
Age continuous			
Units: years			
arithmetic mean	60.4	60.7	
full range (min-max)	31 to 79	29 to 83	-
Gender categorical			
Units: Subjects			
Female	38	38	76
Male	41	42	83
Residual disease (>10mm)			
Units: Subjects			
Yes	42	41	83
No	37	39	76
KPS index			
Units: Subjects			
<70%	2	2	4
≥70%	77	78	155
Residual Neurological symptom			
Units: Subjects			
Yes	8	19	27
No	71	60	131
NA	0	1	1
DXM dose at inclusion			
Units: Subjects			
0 mg	70	67	137

0.5-2 mg	6	9	15
>2 mg	3	4	7
Barthel index			
Units: Subjects			
index 0	9	12	21
index 1	70	68	138
MMSE			
Units: Subjects			
index <27	10	16	26
index ≥27	60	51	111
NP / ND	9	13	22
Anticonvulsant therapy			
Units: Subjects			
Yes	38	37	75
No	41	43	84
Initial surgery-Treatment at diagnosis			
Units: Subjects			
Biopsy	10	7	17
Complete resection by post-op MRI)	35	28	63
Complete resection without post-op MRI	14	20	34
Subtotal resection	20	25	45
MGMT Methylation status			
Units: Subjects			
Methylated	48	49	97
Unmethylated	31	31	62
IDH1 Mutation status			
Units: Subjects			
IDH1-R132 mutated by ICH	7	1	8
IDH1-R132 non mutated by ICH	66	71	137
not determined	6	8	14

## End points

### End points reporting groups

Reporting group title	Control
Reporting group description:	
Patients will receive no intervention, stop temozolomide after cycle 6	
Reporting group title	Experimental arm
Reporting group description:	
Patients will receive 6 additional temozolomide cycles, a total of 12	

### Primary: Progression free survival at 6 month

End point title	Progression free survival at 6 month
End point description:	
Number of patients (proportion) without progression of disease and time between start of treatment and progression of disease.	
End point type	Primary
End point timeframe:	
6 months after the start of treatment (6 additional cycles of temozolomide for experimental arm or standard of care for control arm)	

End point values	Control	Experimental arm		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	79	80		
Units: Percentage of subjects free of PD				
median (confidence interval 95%)	55.7 (45.8 to 67.8)	61.3 (51.5 to 72.9)		

Attachments (see zip file)	PFS Kaplan Meier/Captura de pantalla 2020-07-13 a las
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### Statistical analyses

Statistical analysis title	Log Rank (Mantel-Cox)
Comparison groups	Control v Experimental arm
Number of subjects included in analysis	159
Analysis specification	Pre-specified
Analysis type	equivalence
P-value	$\leq 0.05$ <sup>[1]</sup>
Method	Logrank
Parameter estimate	Hazard ratio (HR)
Point estimate	0.99

Confidence interval	
level	95 %
sides	2-sided
lower limit	0.71
upper limit	1.38

Notes:

[1] - p values lower than 0.05 will point to discard the null hypothesis, which assumes no differences between treatment arms.

### Secondary: Treatment safety

End point title	Treatment safety
End point description:	
Total number of adverse events, type of events and grade. ONLY RELEVANT DIFFERENCES IN TOXICITY BY ARM	
End point type	Secondary
End point timeframe:	
Through the whole study. 4 years	

End point values	Control	Experimental arm		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	79	80		
Units: Number of patients				
Lymphopenia	33	55		
Thrombocytopenia	17	38		
Nausea and Vomiting	10	30		
Fatigue	21	35		
Leucopenia	20	30		

### Statistical analyses

No statistical analyses for this end point

### Secondary: Progression Free survival Median values

End point title	Progression Free survival Median values
End point description:	
Progression free survival assessed by CT scan following the RANO criteria	
End point type	Secondary
End point timeframe:	
Through the whole study. 4 years. The median follow up for each patient was 33.4 months	



End point values	Control	Experimental arm		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	79	80		
Units: Months				
median (confidence interval 95%)	7.77 (5.70 to 9.83)	9.5 (5.93 to 13.07)		

<b>Attachments (see zip file)</b>	PFS Kaplan Meier/Captura de pantalla 2020-07-13 a las
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### Statistical analyses

No statistical analyses for this end point

### Secondary: Overall Survival

End point title	Overall Survival
End point description:	
Time between start of treatment and death	
End point type	Secondary
End point timeframe:	
Through the whole study. 4 years. The median follow up for each patient was 33.4 months.	

End point values	Control	Experimental arm		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	79	80		
Units: Months				
median (confidence interval 95%)	23.3 (17.9 to 28.7)	18.2 (16.7 to 23.8)		

<b>Attachments (see zip file)</b>	OS Kaplan Meier chart/Captura de pantalla 2020-07-13 a las
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### Statistical analyses

No statistical analyses for this end point

### Secondary: Translational sub-study - Biomarkers MSH6 immunoreactivity.

End point title	Translational sub-study - Biomarkers MSH6 immunoreactivity.
End point description:	
MSH6 immunoreactivity.	
partial immunoreactivity of MSH6 in patients by treatment arm	
End point type	Secondary
End point timeframe:	
Baseline determination	

End point values	Control	Experimental arm		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	79	80		
Units: Patients				
MSH6 partial immunoreactivity	6	5		
no MSH6 partial immunoreactivity	73	75		

## Statistical analyses

No statistical analyses for this end point

### Secondary: Median PFS by arm and MGMT methylation status

End point title	Median PFS by arm and MGMT methylation status
End point description:	Median Progression Free Survival depending on treatment arm in patients with MGMT methylation
End point type	Secondary
End point timeframe:	Through the whole study. 4 years. The median follow up for each patient was 33.4 months

End point values	Control	Experimental arm		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	48 <sup>[2]</sup>	49 <sup>[3]</sup>		
Units: Months				
median (confidence interval 95%)	8.5 (6.5 to 10.4)	11.4 (9.2 to 13.6)		

Notes:

[2] - Only patients with MGMT methylated

[3] - Only patients with MGMT methylated

<b>Attachments (see zip file)</b>	PFS Kaplan Meier for patients with MGMT methylatio/Captura
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## Statistical analyses

No statistical analyses for this end point

### Secondary: Median OS by arm and MGMT methylation status

End point title	Median OS by arm and MGMT methylation status
End point description:	Median OS depending on treatment arm in patients with methylated MGMT
End point type	Secondary

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End point timeframe:

Through the whole study. 4 years. The median follow up for each patient was 33.4 months

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End point values	Control	Experimental arm		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	48 <sup>[4]</sup>	49 <sup>[5]</sup>		
Units: Months				
median (confidence interval 95%)	27.1 (20.3 to 33.9)	20.7 (14.7 to 26.7)		

Notes:

[4] - Only patients with MGMT methylated

[5] - Only patients with MGMT methylated

<b>Attachments (see zip file)</b>	OS Kaplan Meier for patients with MGMT methylation/Captura
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### Statistical analyses

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No statistical analyses for this end point

## Adverse events

### Adverse events information

Timeframe for reporting adverse events:

Through the clinical study. About 4 years

Adverse event reporting additional description:

In addition, clinically relevant changes on physical examination and abnormal parameters found on complementary examinations (eg radiography, ECG) should also be reported like AE.

Assessment type	Systematic
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### Dictionary used

Dictionary name	NCI CTCAE
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Dictionary version	4.0
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### Reporting groups

Reporting group title	Control
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Reporting group description:

Patients will receive no intervention, stop temozolomide after cycle 6

Reporting group title	Experimental arm
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Reporting group description:

Patients will receive 6 additional temozolomide cycles, a total of 12

Serious adverse events	Control	Experimental arm	
Total subjects affected by serious adverse events			
subjects affected / exposed	5 / 79 (6.33%)	9 / 80 (11.25%)	
number of deaths (all causes)	52	63	
number of deaths resulting from adverse events			
Vascular disorders			
Intra-cranial hypertension			
subjects affected / exposed	0 / 79 (0.00%)	1 / 80 (1.25%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Pulmonary embolism			
subjects affected / exposed	1 / 79 (1.27%)	0 / 80 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Cardiac disorders			
claudication			
subjects affected / exposed	0 / 79 (0.00%)	1 / 80 (1.25%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Nervous system disorders			

Dysarthria			
subjects affected / exposed	1 / 79 (1.27%)	0 / 80 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Neurological impairment			
subjects affected / exposed	0 / 79 (0.00%)	2 / 80 (2.50%)	
occurrences causally related to treatment / all	0 / 0	0 / 2	
deaths causally related to treatment / all	0 / 0	0 / 0	
Epilepsy			
subjects affected / exposed	0 / 79 (0.00%)	1 / 80 (1.25%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Seizure			
subjects affected / exposed	0 / 79 (0.00%)	1 / 80 (1.25%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
General disorders and administration site conditions			
Syncope			
subjects affected / exposed	1 / 79 (1.27%)	0 / 80 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
General deterioration			
subjects affected / exposed	1 / 79 (1.27%)	1 / 80 (1.25%)	
occurrences causally related to treatment / all	0 / 1	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Respiratory, thoracic and mediastinal disorders			
Dyspnoea			
subjects affected / exposed	1 / 79 (1.27%)	0 / 80 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Musculoskeletal and connective tissue disorders			
Femur fracture			

subjects affected / exposed	0 / 79 (0.00%)	1 / 80 (1.25%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Infections and infestations			
Respiratory infection			
subjects affected / exposed	0 / 79 (0.00%)	1 / 80 (1.25%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	

Frequency threshold for reporting non-serious adverse events: 1 %

<b>Non-serious adverse events</b>	Control	Experimental arm	
Total subjects affected by non-serious adverse events			
subjects affected / exposed	79 / 79 (100.00%)	80 / 80 (100.00%)	
Vascular disorders			
Thromboembolism			
subjects affected / exposed	2 / 79 (2.53%)	0 / 80 (0.00%)	
occurrences (all)	2	0	
General disorders and administration site conditions			
Asthenia			
subjects affected / exposed	21 / 79 (26.58%)	35 / 80 (43.75%)	
occurrences (all)	21	35	
Anxiety			
subjects affected / exposed	2 / 79 (2.53%)	1 / 80 (1.25%)	
occurrences (all)	2	1	
Pain			
subjects affected / exposed	10 / 79 (12.66%)	13 / 80 (16.25%)	
occurrences (all)	10	13	
Respiratory, thoracic and mediastinal disorders			
Respiratory disorder			
subjects affected / exposed	2 / 79 (2.53%)	1 / 80 (1.25%)	
occurrences (all)	2	1	
Cardiac disorders			
Cardiac events			

subjects affected / exposed occurrences (all)	1 / 79 (1.27%) 1	0 / 80 (0.00%) 0	
Nervous system disorders Neurologic impairment subjects affected / exposed occurrences (all)	41 / 79 (51.90%) 41	38 / 80 (47.50%) 38	
Blood and lymphatic system disorders Leukopenia subjects affected / exposed occurrences (all)	20 / 79 (25.32%) 20	30 / 80 (37.50%) 30	
Neutropenia subjects affected / exposed occurrences (all)	2 / 79 (2.53%) 2	3 / 80 (3.75%) 3	
Anemia subjects affected / exposed occurrences (all)	8 / 79 (10.13%) 8	4 / 80 (5.00%) 4	
Lymphopenia subjects affected / exposed occurrences (all)	33 / 79 (41.77%) 33	55 / 80 (68.75%) 55	
Thrombocytopenia subjects affected / exposed occurrences (all)	17 / 79 (21.52%) 17	38 / 80 (47.50%) 38	
Alkaline phosphatase high subjects affected / exposed occurrences (all)	4 / 79 (5.06%) 4	3 / 80 (3.75%) 3	
Potassium high subjects affected / exposed occurrences (all)	6 / 79 (7.59%) 6	3 / 80 (3.75%) 3	
Sodium high subjects affected / exposed occurrences (all)	5 / 79 (6.33%) 5	7 / 80 (8.75%) 7	
GGT high subjects affected / exposed occurrences (all)	6 / 79 (7.59%) 6	4 / 80 (5.00%) 4	
GOT high			

subjects affected / exposed occurrences (all)	3 / 79 (3.80%) 3	1 / 80 (1.25%) 1	
GPT high subjects affected / exposed occurrences (all)	7 / 79 (8.86%) 7	5 / 80 (6.25%) 5	
Bilirubin high subjects affected / exposed occurrences (all)	8 / 79 (10.13%) 8	7 / 80 (8.75%) 7	
Ear and labyrinth disorders Hearing loss subjects affected / exposed occurrences (all)	2 / 79 (2.53%) 2	1 / 80 (1.25%) 1	
Gastrointestinal disorders Vomiting subjects affected / exposed occurrences (all)	10 / 79 (12.66%) 10	30 / 80 (37.50%) 30	
Skin and subcutaneous tissue disorders Skin disorder subjects affected / exposed occurrences (all)	3 / 79 (3.80%) 3	4 / 80 (5.00%) 4	
Renal and urinary disorders Creatinine urine subjects affected / exposed occurrences (all)	6 / 79 (7.59%) 6	3 / 80 (3.75%) 3	
Musculoskeletal and connective tissue disorders Bone events subjects affected / exposed occurrences (all)	4 / 79 (5.06%) 4	3 / 80 (3.75%) 3	
Infections and infestations Constipation subjects affected / exposed occurrences (all)	2 / 79 (2.53%) 2	6 / 80 (7.50%) 6	
Infection subjects affected / exposed occurrences (all)	5 / 79 (6.33%) 5	11 / 80 (13.75%) 11	
Metabolism and nutrition disorders			



Hyperglycaemia			
subjects affected / exposed	19 / 79 (24.05%)	14 / 80 (17.50%)	
occurrences (all)	19	14	
Anorexia			
subjects affected / exposed	1 / 79 (1.27%)	4 / 80 (5.00%)	
occurrences (all)	1	4	

## More information

### Substantial protocol amendments (globally)

Were there any global substantial amendments to the protocol? Yes

Date	Amendment
13 December 2016	Inclusion of 2 new centers

Notes:

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### Interruptions (globally)

Were there any global interruptions to the trial? No

### Limitations and caveats

None reported

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### Online references

<http://www.ncbi.nlm.nih.gov/pubmed/32328662>