Clinical trial results:
Diagnosing Wilson’s Disease with 64-Cu PET/MR – A Pilot Study

Summary

EudraCT number	2021-005464-21
Trial protocol	DK
Global end of trial date	01 April 2023

Results information

Result version number	v1 (current)
This version publication date	22 July 2023
First version publication date	22 July 2023

Trial information

Trial identification

Sponsor protocol code	DiagnosingWD-PET/MR-pilot

Additional study identifiers

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

Notes:

Sponsors

Sponsor organisation name	Aarhus University Hospital
Sponsor organisation address	Palle Juul-Jensens Boulevard, Aarhus N, Denmark, 8200
Public contact	Department of Hepatology, Aarhus University Hospital, levermavetarm@auh.rm.dk
Scientific contact	Department of Hepatology, Aarhus University Hospital, levermavetarm@auh.rm.dk

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:

Results analysis stage

Analysis stage	Final
Date of interim/final analysis	05 July 2023
Is this the analysis of the primary completion data?	Yes
Primary completion date	01 April 2023
Global end of trial reached?	Yes
Global end of trial date	01 April 2023
Was the trial ended prematurely?	No

Notes:

General information about the trial

Main objective of the trial:

We wish to optimize the diagnostic potential of 64Cu PET in Wilson's disease by determining the optimal time point for the scan following tracer injection.

Protection of trial subjects:

Safety data monitored until 14 days after the last scan.

Background therapy: -

Evidence for comparator: -

Actual start date of recruitment	17 August 2022
Long term follow-up planned	No
Independent data monitoring committee (IDMC) involvement?	Yes

Notes:

Population of trial subjects

Subjects enrolled per country

Country: Number of subjects enrolled	Denmark: 15
Worldwide total number of subjects	15
EEA total number of subjects	15

Notes:

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)	14
From 65 to 84 years	1
85 years and over	0

Subject disposition

Recruitment

Recruitment details:

Patients were included through the outpatient clinic. Heterozygote relatives were siblings or parents of patients and were recruited through the patient association. Healthy individuals were recruited through advertisements in our own department.

Pre-assignment

Screening details:

Patients were screened by their physician. Heterozygotes were known carriers of the gene (sibling with gene analysis or parents). Both controls and heterozygotes were screened by an array of standard blood samples (i.e., electrolytes, INR, hemoglobin, leukocytes, CRP, ALT, Bilirubin, creatinine) that had to be within normal range for the inclusion.

Period 1

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

Arms

Are arms mutually exclusive?	Yes
Arm title	WD patients

Arm description: -

Arm type	Experimental
Investigational medicinal product name	64CuCl2
Investigational medicinal product code	
Other name	
Pharmaceutical forms	Concentrate and solvent for solution for injection
Routes of administration	Intravenous use

Dosage and administration details:

Approximately 75 MBq in an intravenous injection

Arm title	Heterozygotes

Arm description: -

Arm type	No intervention

No investigational medicinal product assigned in this arm

Arm title	Controls

Arm description: -

Arm type	No intervention

No investigational medicinal product assigned in this arm

Number of subjects in period 1	WD patients	Heterozygotes	Controls
Started	5	5	5
Completed	5	5	5

Baseline characteristics

Reporting groups

Reporting group title	Baseline characteristics

Reporting group description: -

Reporting group values	Baseline characteristics	Total	
Number of subjects	15	15	
Age categorical			
Median age (quartiles)			
Units: Subjects			
In utero	0	0	
Preterm newborn infants (gestational age < 37 wks)	0	0	
Newborns (0-27 days)	0	0	
Infants and toddlers (28 days-23 months)	0	0	
Children (2-11 years)	0	0	
Adolescents (12-17 years)	0	0	
Adults (18-64 years)	14	14	
From 65-84 years	1	1	
85 years and over	0	0	
Age continuous			
Median age (range)			
Units: years			
median	38		
full range (min-max)	23 to 66	-	
Gender categorical			
Gender			
Units: Subjects			
Female	6	6	
Male	9	9	

End points

End points reporting groups

Reporting group title	WD patients
Reporting group description: -	
Reporting group title	Heterozygotes
Reporting group description: -	
Reporting group title	Controls
Reporting group description: -	

Primary: Liver SUV 20 hours

End point title	Liver SUV 20 hours
End point description:	
End point type	Primary
End point timeframe:	
End-of-trial	

End point values	WD patients	Heterozygotes	Controls	
Subject group type	Reporting group	Reporting group	Reporting group	
Number of subjects analysed	5	5	5	
Units: SUV (unitless)				
arithmetic mean (standard deviation)	33.78 (± 5.34)	31.27 (± 2.67)	20.08 (± 2.71)	

Statistical analyses

Statistical analysis title	One-way ANOVA
Comparison groups	Heterozygotes v Controls v WD patients
Number of subjects included in analysis	15
Analysis specification	Pre-specified
Analysis type	other[1]
P-value	= 0.0002
Method	ANOVA

Notes:
[1] - Group difference

Primary: Liver SUV 48 hours

End point title	Liver SUV 48 hours
End point description:	
End point type	Primary

End point timeframe: End-of-trial

End point values	WD patients	Heterozygotes	Controls	
Subject group type	Reporting group	Reporting group	Reporting group	
Number of subjects analysed	5	5	5	
Units: SUV (unitless)				
arithmetic mean (standard deviation)	38.28 (± 6.4)	32.29 (± 5.21)	18.00 (± 3.48)	

Statistical analyses

Statistical analysis title	One-way ANOVA
Comparison groups	WD patients v Heterozygotes v Controls
Number of subjects included in analysis	15
Analysis specification	Pre-specified
Analysis type	other
P-value	= 0.5
Method	ANOVA

Primary: Liver SUV 54 hours

End point title	Liver SUV 54 hours
End point description:	
End point type	Primary
End point timeframe: End-of-trial	

End point values	WD patients	Heterozygotes	Controls	
Subject group type	Reporting group	Reporting group	Reporting group	
Number of subjects analysed	5	5	5	
Units: SUV (unitless)				
arithmetic mean (standard deviation)	38.44 (± 5.18)	29.44 (± 3.25)	17.10 (± 2.98)	

Statistical analyses

Statistical analysis title	One-way ANOVA
Comparison groups	WD patients v Heterozygotes v Controls

Number of subjects included in analysis	15
Analysis specification	Pre-specified
Analysis type	other
P-value	= 0.7
Method	ANOVA

Primary: Liver SUV 68 hours

End point title	Liver SUV 68 hours

End point description:

End point type	Primary

End point timeframe:

End-of-trial

End point values	WD patients	Heterozygotes	Controls	
Subject group type	Reporting group	Reporting group	Reporting group	
Number of subjects analysed	5	5	5	
Units: SUV (unitless)				
arithmetic mean (standard deviation)	36.59 (± 6.72)	29.63 (± 2.34)	15.50 (± 2.60)	

Statistical analyses

Statistical analysis title	One-way ANOVA
Comparison groups	WD patients v Heterozygotes v Controls
Number of subjects included in analysis	15
Analysis specification	Pre-specified
Analysis type	other
P-value	= 0.3
Method	ANOVA

Primary: Gallbladder SUV 20 hours

End point title	Gallbladder SUV 20 hours

End point description:

End point type	Primary

End point timeframe:

End-of-trial

End point values	WD patients	Heterozygotes	Controls	
Subject group type	Reporting group	Reporting group	Reporting group	
Number of subjects analysed	4[2]	5	5	
Units: SUV (unitless)				
arithmetic mean (standard deviation)	2.87 (± 0.75)	9.01 (± 2.98)	32.80 (± 9.19)	

Notes:

[2] - One had had the gallbladder removed

Statistical analyses

Statistical analysis title	One-way ANOVA
Comparison groups	WD patients v Heterozygotes v Controls
Number of subjects included in analysis	14
Analysis specification	Pre-specified
Analysis type	other
P-value	< 0.0001
Method	ANOVA

Primary: Gallbladder SUV 48 hours

End point title	Gallbladder SUV 48 hours

End point description:

End point type	Primary

End point timeframe:

End-of-trial

End point values	WD patients	Heterozygotes	Controls	
Subject group type	Reporting group	Reporting group	Reporting group	
Number of subjects analysed	4[3]	4[4]	5	
Units: SUV (unitless)				
arithmetic mean (standard deviation)	2.63 (± 0.84)	6.39 (± 1.66)	11.40 (± 4.19)	

Notes:

[3] - One had had the gallbladder removed

[4] - One where the gallbladder was not visible on scan (collapsed)

Statistical analyses

Statistical analysis title	One-way ANOVA
Comparison groups	WD patients v Heterozygotes v Controls
Number of subjects included in analysis	13
Analysis specification	Pre-specified
Analysis type	other
P-value	= 0.003
Method	ANOVA

Primary: Gallbladder SUV 54 hours

End point title	Gallbladder SUV 54 hours

End point description:

End point type	Primary

End point timeframe:

End-of-trial

End point values	WD patients	Heterozygotes	Controls	
Subject group type	Reporting group	Reporting group	Reporting group	
Number of subjects analysed	4[5]	4[6]	4[7]	
Units: SUV (unitless)				
arithmetic mean (standard deviation)	2.60 (± 0.47)	4.48 (± 4.13)	8.72 (± 5.57)	

Notes:

[5] - One had had the gallbladder removed

[6] - One where the gallbladder was not visible on the scan (collapsed)

[7] - One where the gallbladder was not visible on the scan (collapsed)

Statistical analyses

Statistical analysis title	One-way ANOVA
Comparison groups	WD patients v Heterozygotes v Controls
Number of subjects included in analysis	12
Analysis specification	Pre-specified
Analysis type	other
P-value	= 0.2
Method	ANOVA

Primary: Gallbladder SUV 68 hours

End point title	Gallbladder SUV 68 hours

End point description:

End point type	Primary

End point timeframe:

End-of-trial

End point values	WD patients	Heterozygotes	Controls	
Subject group type	Reporting group	Reporting group	Reporting group	
Number of subjects analysed	4[8]	3[9]	4[10]	
Units: SUV (unitless)				
arithmetic mean (standard deviation)	2.74 (± 0.75)	3.36 (± 1.57)	13.68 (± 5.10)	

Notes:

[8] - One had had the gallbladder removed

[9] - Two where the gallbladder was not visible on the scan (collapsed)

[10] - One where the gallbladder was not visible on the scan (collapsed)

Statistical analyses

Statistical analysis title	One-way ANOVA
Comparison groups	WD patients v Heterozygotes v Controls
Number of subjects included in analysis	11
Analysis specification	Pre-specified
Analysis type	other
P-value	= 0.0013
Method	ANOVA

Adverse events

Adverse events information[1]	
Timeframe for reporting adverse events: 14 days after last scan	
Assessment type	Systematic

Dictionary used	
Dictionary name	MedDRA
Dictionary version	2.1

Reporting groups	
Reporting group title	All groups
Reporting group description: -	

Serious adverse events	All groups		
Total subjects affected by serious adverse events			
subjects affected / exposed	0 / 15 (0.00%)		
number of deaths (all causes)	0		
number of deaths resulting from adverse events	0		

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

Non-serious adverse events	All groups		
Total subjects affected by non-serious adverse events			
subjects affected / exposed	0 / 15 (0.00%)		

Notes:

[1] - There are no non-serious adverse events recorded for these results. It is expected that there will be at least one non-serious adverse event reported.
Justification: There were no adverse events (serious or non-serious) in the study.

More information

Substantial protocol amendments (globally)

Were there any global substantial amendments to the protocol? No

Interruptions (globally)

Were there any global interruptions to the trial? No

Limitations and caveats

None reported