



## Clinical trial results:

**An open-label, international, multicenter, single-arm, uncontrolled, phase IIIb study of riociguat in patients with PAH who demonstrate an insufficient response to treatment with phosphodiesterase-5 inhibitors (PDE-5i)**

### Summary

EudraCT number	2013-001759-10
Trial protocol	DE CZ IT BE GB FR
Global end of trial date	29 December 2016

### Results information

Result version number	v2 (current)
This version publication date	13 March 2019
First version publication date	15 December 2017
Version creation reason	

### Trial information

#### Trial identification

Sponsor protocol code	BAY63-2521/16719
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#### Additional study identifiers

ISRCTN number	-
ClinicalTrials.gov id (NCT number)	NCT02007629
WHO universal trial number (UTN)	-

Notes:

### Sponsors

Sponsor organisation name	Bayer AG
Sponsor organisation address	Kaiser-Wilhelm-Allee, Leverkusen D-51368, Germany,
Public contact	Therapeutic Area Head, Bayer AG, clinical-trials-contact@bayer.com
Scientific contact	Therapeutic Area Head, Bayer AG, clinical-trials-contact@bayer.com

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	29 December 2016
Is this the analysis of the primary completion data?	No
Global end of trial reached?	Yes
Global end of trial date	29 December 2016
Was the trial ended prematurely?	No

Notes:

## General information about the trial

Main objective of the trial:

To investigate whether it was safe, feasible and beneficial to replace phosphodiesterase-5 inhibitors (PDE-5i) therapy with Riociguat (BAY63-2521) in pulmonary arterial hypertension (PAH) subjects demonstrating insufficient response to PDE-5 inhibition.

Protection of trial subjects:

The conduct of this clinical study met all local legal and regulatory requirements. The study was conducted in accordance with the ethical principles that have their origin in the Declaration of Helsinki and the International Council for Harmonization guideline E6: Good Clinical Practice. Before entering the study, the informed consent form was read by and explained to all subjects. Participating subjects signed informed consent form and could withdraw from the study at any time without any disadvantage and without having to provide a reason for this decision. Only investigators qualified by training and experience were selected as appropriate experts to investigate the study drug.

Background therapy: -

Evidence for comparator: -

Actual start date of recruitment	18 February 2014
Long term follow-up planned	No
Independent data monitoring committee (IDMC) involvement?	No

Notes:

## Population of trial subjects

### Subjects enrolled per country

Country: Number of subjects enrolled	United States: 3
Country: Number of subjects enrolled	Canada: 1
Country: Number of subjects enrolled	Switzerland: 1
Country: Number of subjects enrolled	United Kingdom: 8
Country: Number of subjects enrolled	Belgium: 2
Country: Number of subjects enrolled	Czech Republic: 8
Country: Number of subjects enrolled	France: 4
Country: Number of subjects enrolled	Germany: 23
Country: Number of subjects enrolled	Italy: 11
Worldwide total number of subjects	61
EEA total number of subjects	56

Notes:

<b>Subjects enrolled per age group</b>	
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)	46
From 65 to 84 years	15
85 years and over	0

## Subject disposition

### Recruitment

Recruitment details:

Study was conducted in 20 study centers in Belgium, Czech Republic, France, Germany, Italy, Switzerland, United Kingdom, Canada, United States, Germany, between 18 February 2014 (first subject first visit) and 29 December 2016 (last subject last visit).

### Pre-assignment

Screening details:

Overall, 79 subject were screened, of them 17 were screen failure and 1 withdrew consent; total 61 were assigned to pre-treatment phase (approximately 2 weeks) and treatment phase (titration phase [8 weeks] and maintenance phase [16 weeks]). Of 61 subjects, 51 completed treatment phase and 28 of them entered in an extended drug supply phase (EDSP).

### Period 1

Period 1 title	Main Phase
Is this the baseline period?	Yes
Allocation method	Not applicable
Blinding used	Not blinded

### Arms

Arm title	Riociguat up to 2.5 mg tid (Main Phase)
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Arm description:

Subjects received riociguat film coated immediate-release (IR) tablet 3 times a day (tid) with or without food at a starting dose of 1.0 milligram (mg) and increased by 0.5 mg increments at 2-weekly intervals to a maximum of 2.5 mg tid, until Week 8 (titration phase). An optimal dose was determined based on systolic blood pressure (SBP) and well-being. Thereafter, riociguat continued at the optimal individual dose until Week 24 (Main phase). Dose reductions or stop of study medication for safety reasons were allowed at any time. Increases or re-increases in 0.5 mg steps (maximum dose 2.5 mg) were possible at the investigator's discretion weighing the benefit with potential risks implied.

Arm type	Experimental
Investigational medicinal product name	Riociguat
Investigational medicinal product code	BAY63-2521
Other name	
Pharmaceutical forms	Film-coated tablet
Routes of administration	Oral use

Dosage and administration details:

Subjects received riociguat film coated IR tablet 3 tid with or without food at a starting dose of 1.0 mg and increased by 0.5 mg increments at 2-weekly intervals to a maximum of 2.5 mg tid, until Week 8 (titration phase).

Number of subjects in period 1	Riociguat up to 2.5 mg tid (Main Phase)
Started	61
Completed	51
Not completed	10
Physician decision	1
Consent withdrawn by subject	3
Death	1
Adverse event	4

Lack of efficacy	1
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## Period 2

Period 2 title	Extended Drug Supply Phase (EDSP)
Is this the baseline period?	No
Allocation method	Not applicable
Blinding used	Not blinded

## Arms

<b>Arm title</b>	Riociguat up to 2.5 mg tid EDSP
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### Arm description:

Subjects were offered participation in EDSP and received riociguat 2.5 mg film coated IR tablet 3 tid with or without food for 18 months or until reimbursement.

Arm type	Experimental
Investigational medicinal product name	Riociguat
Investigational medicinal product code	BAY63-2521
Other name	
Pharmaceutical forms	Film-coated tablet
Routes of administration	Oral use

### Dosage and administration details:

Subjects were offered participation in EDSP and received riociguat 2.5 mg film coated IR tablet 3 tid with or without food for 18 months or until reimbursement.

<b>Number of subjects in period 2<sup>[1]</sup></b>	Riociguat up to 2.5 mg tid EDSP
Started	28
Completed	28

### Notes:

[1] - The number of subjects starting the period is not consistent with the number completing the preceding period. It is expected the number of subjects starting the subsequent period will be the same as the number completing the preceding period.

Justification: Not all subjects who completed the main phase were enrolled in EDSP. Subjects may continue to participate in EDSP of the study at the discretion of the investigator. The study drug was provided free of charge until market approval and reimbursement or at the longest for 18 months, whatever date occurs earlier.

## Baseline characteristics

### Reporting groups

Reporting group title	Riociguat up to 2.5 mg tid (Main Phase)
Reporting group description:	
Subjects received riociguat film coated immediate-release (IR) tablet 3 times a day (tid) with or without food at a starting dose of 1.0 milligram (mg) and increased by 0.5 mg increments at 2-weekly intervals to a maximum of 2.5 mg tid, until Week 8 (titration phase). An optimal dose was determined based on systolic blood pressure (SBP) and well-being. Thereafter, riociguat continued at the optimal individual dose until Week 24 (Main phase). Dose reductions or stop of study medication for safety reasons were allowed at any time. Increases or re-increases in 0.5 mg steps (maximum dose 2.5 mg) were possible at the investigator's discretion weighing the benefit with potential risks implied.	

Reporting group values	Riociguat up to 2.5 mg tid (Main Phase)	Total	
Number of subjects	61	61	
Age categorical			
Units: Subjects			

Age continuous			
Units: years			
arithmetic mean	53.9		
standard deviation	± 13.8	-	
Gender categorical			
Units: Subjects			
Female	45	45	
Male	16	16	
World Health Organization Functional Class (WHO FC)			
WHO FC assessment of PAH ranged from functional class I (subjects with pulmonary hypertension [PH] but without resulting limitation of physical activity); class II (subjects with PH resulting in slight limitation of physical activity); class III (subjects with PH resulting in marked limitation of physical activity); class IV (subjects with PH with inability to carry out any physical activity without symptoms); and class V death. Changes to a lower WHO FC resemble improvement; changes to a higher functional class resemble deterioration of PAH.			
Units: Subjects			
Class I	0	0	
Class II	0	0	
Class III	61	61	
Class IV	0	0	
Class V	0	0	
Number of subjects with and without idiopathic PAH			
Number of subjects with and without idiopathic PAH at baseline were reported.			
Units: Subjects			
With idiopathic PAH	56	56	
Without idiopathic PAH	5	5	
Number of subjects receiving sildenafil and tadalafil			
Number of subjects receiving sildenafil and tadalafil before entering RESPITE were reported.			
Units: Subjects			
Subjects receiving sildenafil	40	40	
Subjects receiving tadalafil	21	21	

Number of subjects with and without endothelin receptor antagonists (ERAs) therapy			
Number of subjects with and without ERAs therapy at baseline evaluation were reported.			
Units: Subjects			
With ERAs therapy	50	50	
Without ERAs therapy	11	11	
Six-Minute Walking Distance (6MWD) Test			
6MWD test was used to measure the subjects functional exercise capacity. Subjects were instructed to walk alone, not run, from one end to the other end of the walking course, at their own pace, while attempting to cover as much ground as possible in 6 minutes. No "warm-up" period was performed before the test. Investigators have not walked with the subjects. This was an encouraged test (the person conducting the test encouraged subjects to walk farther or faster by using only standardized phrases). 61 subjects performed the 6MWD test at baseline.			
Units: meter			
arithmetic mean	356.93		
standard deviation	± 80.58	-	
Cardiac Index			
The cardiac output was measured by using the thermodilution methodology and a respective electronic device. 50 subjects performed the cardiac index test at baseline. The cardiac index was assessed by dividing the cardiac output by the person's body surface area (BSA).			
Units: liters per minute per square meter			
arithmetic mean	2.32		
standard deviation	± 0.42	-	
Pulmonary vascular resistance (PVR)			
Baseline value of PVR was calculated in 51 subjects.			
Units: dyne*second*centimeter <sup>-5</sup>			
arithmetic mean	835.36		
standard deviation	± 272.33	-	
N-Terminal Pro-Brain Natriuretic Peptide (NT-proBNP)			
Baseline value of NT-proBNP was calculated in 61 subjects.			
Units: picogram per milliliter (pg/mL)			
arithmetic mean	1189.62		
standard deviation	± 1827.76	-	
EuroQol questionnaire (EQ-5D)			
EQ-5D was a standardized instrument which was used to measure the health outcome. The EQ-5D was a selfreport questionnaire and need to be completed by the subject. After the subject has filled in the questionnaire, the questionnaire was transferred into the electronic case report form (eCRF). EQ-5D was calculated by two types of questionnaires Part A (descriptive health profile) and Part B (visual analogue scale).			
Units: score on a scale			
arithmetic mean	62		
standard deviation	± 17.7	-	

## End points

### End points reporting groups

Reporting group title	Riociguat up to 2.5 mg tid (Main Phase)
Reporting group description: Subjects received riociguat film coated immediate-release (IR) tablet 3 times a day (tid) with or without food at a starting dose of 1.0 milligram (mg) and increased by 0.5 mg increments at 2-weekly intervals to a maximum of 2.5 mg tid, until Week 8 (titration phase). An optimal dose was determined based on systolic blood pressure (SBP) and well-being. Thereafter, riociguat continued at the optimal individual dose until Week 24 (Main phase). Dose reductions or stop of study medication for safety reasons were allowed at any time. Increases or re-increases in 0.5 mg steps (maximum dose 2.5 mg) were possible at the investigator's discretion weighing the benefit with potential risks implied.	
Reporting group title	Riociguat up to 2.5 mg tid EDSP
Reporting group description: Subjects were offered participation in EDSP and received riociguat 2.5 mg film coated IR tablet 3 tid with or without food for 18 months or until reimbursement.	
Subject analysis set title	Full Analysis Set (FAS)
Subject analysis set type	Full analysis
Subject analysis set description: FAS (N=61) included all subjects who were included in the study, were assigned to study treatment, and received at least one dose of study drug.	

### Primary: Change From Baseline in 6 Minute Walking Distance (6MWD)

End point title	Change From Baseline in 6 Minute Walking Distance (6MWD) <sup>[1]</sup>
End point description: 6MWD test was used to measure the subjects functional exercise capacity. Subjects were instructed to walk alone, not run, from one end to the other end of the walking course, at their own pace, while attempting to cover as much ground as possible in 6 minutes. No "warm-up" period was performed before the test. Investigators have not walked with the subjects. This was an encouraged test (the person conducting the test encouraged subjects to walk farther or faster by using only standardized phrases). In the below table 'n' signifies number of evaluable subjects for the respective category.	
End point type	Primary
End point timeframe: Baseline, Week 12 and Week 24	
Notes: [1] - No statistical analyses have been specified for this primary end point. It is expected there is at least one statistical analysis for each primary end point. Justification: No formal statistical testing was planned.	

End point values	Riociguat up to 2.5 mg tid (Main Phase)			
Subject group type	Reporting group			
Number of subjects analysed	52 <sup>[2]</sup>			
Units: meter				
arithmetic mean (standard deviation)				
Change at Week 12 (n=52)	26.95 (± 58.23)			
Change at Week 24 (n=51)	34.28 (± 61.49)			

Notes:

[2] - FAS with evaluable subjects for this end point.

### Statistical analyses



No statistical analyses for this end point

### Other pre-specified: Change From Pre-treatment in 6 Minute Walking Distance (6MWD)

End point title	Change From Pre-treatment in 6 Minute Walking Distance (6MWD)
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End point description:

6MWD test was used to measure the subjects functional exercise capacity. Subjects were instructed to walk alone, not run, from one end to the other end of the walking course, at their own pace, while attempting to cover as much ground as possible in 6 minutes. No "warm-up" period was performed before the test. Investigators have not walked with the subjects. This was an encouraged test (the person conducting the test encouraged subjects to walk farther or faster by using only standardized phrases). In the below table 'n' signifies number of evaluable subjects for the respective category.

End point type	Other pre-specified
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End point timeframe:

Pre-treatment, Week 12 and Week 24

End point values	Riociguat up to 2.5 mg tid (Main Phase)			
Subject group type	Reporting group			
Number of subjects analysed	52 <sup>[3]</sup>			
Units: meter				
arithmetic mean (standard deviation)				
Change at Week 12 (n=52)	24.42 (± 57.28)			
Change at Week 24 (n=51)	31 (± 63.32)			

Notes:

[3] - FAS with evaluable subjects for this end point.

### Statistical analyses

No statistical analyses for this end point

### Other pre-specified: Change From Baseline in Cardiac Index

End point title	Change From Baseline in Cardiac Index
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End point description:

The cardiac output was measured by using the thermodilution methodology and a respective electronic device. The cardiac index was assessed by dividing the cardiac output by the person's BSA.

End point type	Other pre-specified
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End point timeframe:

Baseline, Week 24

<b>End point values</b>	Riociguat up to 2.5 mg tid (Main Phase)			
Subject group type	Reporting group			
Number of subjects analysed	48 <sup>[4]</sup>			
Units: liter per minute per square meter				
arithmetic mean (standard deviation)				
Change at Week 24	0.32 (± 0.53)			

Notes:

[4] - FAS with evaluable subjects for this end point.

### Statistical analyses

No statistical analyses for this end point

### Other pre-specified: Change From Pre-treatment in N-Terminal Pro-Brain Natriuretic Peptide (NTproBNP)

End point title	Change From Pre-treatment in N-Terminal Pro-Brain Natriuretic Peptide (NTproBNP)
End point description: NT-proBNP cardiac biomarker was used to detect, diagnose, and evaluate the severity of heart failure. A higher level of the marker was indicative of heart failure. In the below table 'n' signifies number of evaluable subjects for the respective category.	
End point type	Other pre-specified
End point timeframe: Baseline, Week 12 and Week 24	

<b>End point values</b>	Riociguat up to 2.5 mg tid (Main Phase)			
Subject group type	Reporting group			
Number of subjects analysed	54 <sup>[5]</sup>			
Units: picogram per milliliter (pg/mL)				
arithmetic mean (standard deviation)				
Change at Week 12 (n=54)	-77.17 (± 1251.99)			
Change at Week 24 (n=52)	-347.12 (± 1235.21)			

Notes:

[5] - FAS with evaluable subjects for this end point.

### Statistical analyses

No statistical analyses for this end point

### Other pre-specified: Change From Baseline in World Health Organization Functional Class (WHO FC)

End point title	Change From Baseline in World Health Organization Functional Class (WHO FC)
End point description: WHO FC assessment of PAH ranged from functional class I (subjects with PH but without resulting limitation of physical activity); class II (subjects with PH resulting in slight limitation of physical	

activity); class III (subjects with PH resulting in marked limitation of physical activity); class IV (subjects with PH with inability to carry out any physical activity without symptoms); and class V death. Changes to a lower WHO FC resemble improvement; changes to a higher functional class resemble deterioration of PAH. In the below table 'n' signifies number of evaluable subjects for the respective category.

End point type	Other pre-specified
End point timeframe:	
Baseline, Week 12 and Week 24	

End point values	Riociguat up to 2.5 mg tid (Main Phase)			
Subject group type	Reporting group			
Number of subjects analysed	54 <sup>[6]</sup>			
Units: subjects				
Change at Week 12 (n=54): WHO FC -2	1			
Change at Week 12 (n=54): WHO FC -1	26			
Change at Week 12 (n=54): WHO FC 0	27			
Change at Week 12 (n=54): WHO FC 1	0			
Change at Week 12 (n=54): WHO FC 2	0			
Change at Week 24 (n=52): WHO FC -2	1			
Change at Week 24 (n=52): WHO FC -1	27			
Change at Week 24 (n=52): WHO FC 0	24			
Change at Week 24 (n=52): WHO FC 1	0			
Change at Week 24 (n=52): WHO FC 2	0			

Notes:

[6] - FAS with evaluable subjects for this end point.

## Statistical analyses

No statistical analyses for this end point

## Other pre-specified: Percentage of Subjects With Clinical Worsening

End point title	Percentage of Subjects With Clinical Worsening
End point description:	
Clinical worsening was defined as death (all-cause mortality); atrial septostomy; lung transplantation; non-planned PAH-related hospitalisation; start of new PAH treatment (ERA, inhaled or oral prostanoid) or modification of pre-existing treatment, initiation of intravenous or subcutaneous prostanoids; persistent decrease of greater than (>) 15% from baseline or >30% from last measurement in 6MWD; persistent worsening of WHO FC; or appearance or worsening of signs/symptoms of right heart failure not responding to optimised oral diuretic therapy. All identified and suspected clinical worsening events were confirmed by independent central adjudication.	
End point type	Other pre-specified
End point timeframe:	
Baseline to Week 24	

<b>End point values</b>	Riociguat up to 2.5 mg tid (Main Phase)			
Subject group type	Reporting group			
Number of subjects analysed	61 <sup>[7]</sup>			
Units: percentage of subjects				
number (not applicable)	9.8			

Notes:

[7] - FAS

## Statistical analyses

No statistical analyses for this end point

## Other pre-specified: Change From Baseline in European Quality of life (QoL)-Group (EQ)-5D Questionnaire

End point title	Change From Baseline in European Quality of life (QoL)-Group (EQ)-5D Questionnaire
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End point description:

EQ-5D was a standardized instrument which was used to measure the health outcome. The EQ-5D was a selfreport questionnaire and needed to be completed by the subject. After the subject filled in the questionnaire, the questionnaire was transferred into the electronic case report form (eCRF). EQ-5D was calculated by two types of questionnaires Part A (descriptive health profile) and Part B (visual analogue scale). Part A, EQ-5D comprised 5-item questionnaires to measure own health profile status (mobility, self-care, usual activities, pain/discomfort, and anxiety/depression). Each measure has three levels (1. no problems, 2. some problems, 3. extreme problems). In Part B, visual analogue rating scale to measure how good or bad a health state was. Scale was drawn by using thermometer-like scale, on which the best state imagine was marked as 100 and worst state imagine was marked as 0. In the below table 'n' signifies number of evaluable subjects for the respective category.

End point type	Other pre-specified
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End point timeframe:

Baseline, Week 12 and Week 24

<b>End point values</b>	Riociguat up to 2.5 mg tid (Main Phase)			
Subject group type	Reporting group			
Number of subjects analysed	52 <sup>[8]</sup>			
Units: score on a scale				
arithmetic mean (standard deviation)				
EQ-5D-Visual Analog Scale:Change at Week 12 (n=52)	6.1 (± 15.4)			
EQ-5D-Visual Analog Scale:Change at Week 24 (n=52)	6.5 (± 19.4)			
EQ-5D-Utility score: Change at Week 12 (n=51)	0.07 (± 0.29)			
EQ-5D-Utility score: Change at Week 24 (n=52)	0.07 (± 0.28)			

Notes:

[8] - FAS with evaluable subjects for this end point.

## Statistical analyses

No statistical analyses for this end point

**Other pre-specified: Percentage of Subjects Without Clinical Worsening who Achieve at Least WHO FC II and an Improvement in 6 MWD of Greater Than or Equal to ( $\geq$ ) 30 meters**

End point title	Percentage of Subjects Without Clinical Worsening who Achieve at Least WHO FC II and an Improvement in 6 MWD of Greater Than or Equal to ( $\geq$ ) 30 meters
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End point description:

Percentage of subjects without clinical worsening who achieve at least who FC II and an improvement in 6 MWD of  $\geq$  30 meters were reported. In the below table 'n' signifies number of evaluable subjects for the respective category.

End point type	Other pre-specified
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End point timeframe:

Baseline, Week 12 and Week 24

End point values	Riociguat up to 2.5 mg tid (Main Phase)			
Subject group type	Reporting group			
Number of subjects analysed	54 <sup>[9]</sup>			
Units: percentage of subjects				
number (not applicable)				
WHO FC II, Week 12: No (n=27)	50			
WHO FC II, Week 12: Yes (n=27)	50			
WHO FC II, Week 24: No (n=24)	46.2			
WHO FC II, Week 24: Yes (n=28)	53.8			
6 MWD $\geq$ 30 m, Week 12: No (n=24)	46.2			
6 MWD $\geq$ 30 m, Week 12: Yes (n=28)	53.8			
6 MWD $\geq$ 30 m, Week 24: No (n=25)	49			
6 MWD $\geq$ 30 m, Week 24: Yes (n=26)	51			

Notes:

[9] - FAS with evaluable subjects for this end point.

**Statistical analyses**

No statistical analyses for this end point

## Adverse events

### Adverse events information

Timeframe for reporting adverse events:

From start of study treatment up to 30 days after last study drug intake for main phase and from start of study treatment in EDSP up to the end of study in EDSP subjects

Assessment type	Non-systematic
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### Dictionary used

Dictionary name	MedDRA
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Dictionary version	19.1
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### Reporting groups

Reporting group title	Riociguat up to 2.5 mg tid Main phase
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Reporting group description:

Subjects received riociguat (BAY63-2521) film coated IR tablet tid with or without food at a starting dose of 1.0 mg and increased by 0.5 mg increments at 2-weekly intervals to a maximum of 2.5 mg tid, until Week 8 (titration phase). An optimal dose was determined based on SBP and well-being. Thereafter, riociguat continued at the optimal individual dose until Week 24 (Main phase). Dose reductions or stop of study medication for safety reasons were allowed at any time. Increases or re-increases in 0.5 mg steps (maximum dose 2.5 mg) were possible at the investigator's discretion weighing the benefit with potential risks implied.

Reporting group title	Riociguat up to 2.5 mg tid EDSP
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Reporting group description:

Subjects were offered participation in EDSP and received riociguat 2.5 mg film coated IR tablet 3 tid with or without food for 18 months or until reimbursement. Treatment-emergent adverse events (TEAEs) during EDSP included either ongoing from main phase at the time of entry into EDSP or newly reported in EDSP.

<b>Serious adverse events</b>	Riociguat up to 2.5 mg tid Main phase	Riociguat up to 2.5 mg tid EDSP	
Total subjects affected by serious adverse events			
subjects affected / exposed	10 / 61 (16.39%)	7 / 28 (25.00%)	
number of deaths (all causes)	5	4	
number of deaths resulting from adverse events	2	3	
Injury, poisoning and procedural complications			
Femur fracture			
subjects affected / exposed	0 / 61 (0.00%)	1 / 28 (3.57%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 1	
Subdural haematoma			
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 1	0 / 0	
Vascular disorders			
Hypotension			

subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Cardiac disorders			
Bradycardia			
subjects affected / exposed	0 / 61 (0.00%)	1 / 28 (3.57%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Right ventricular failure			
subjects affected / exposed	3 / 61 (4.92%)	0 / 28 (0.00%)	
occurrences causally related to treatment / all	1 / 3	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Surgical and medical procedures			
Medical device change			
subjects affected / exposed	0 / 61 (0.00%)	1 / 28 (3.57%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Interventional procedure			
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Blood and lymphatic system disorders			
Anaemia			
subjects affected / exposed	0 / 61 (0.00%)	1 / 28 (3.57%)	
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			
Asthenia			
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences causally related to treatment / all	1 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Chest pain			

subjects affected / exposed	0 / 61 (0.00%)	1 / 28 (3.57%)	
occurrences causally related to treatment / all	0 / 0	1 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Death			
subjects affected / exposed	0 / 61 (0.00%)	1 / 28 (3.57%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 1	
Gastrointestinal disorders			
Abdominal pain lower			
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Dyspepsia			
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Hepatobiliary disorders			
Cholecystitis			
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Respiratory, thoracic and mediastinal disorders			
Dyspnoea exertional			
subjects affected / exposed	0 / 61 (0.00%)	1 / 28 (3.57%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Pulmonary hypertension			
subjects affected / exposed	0 / 61 (0.00%)	1 / 28 (3.57%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Psychiatric disorders			
Depression			



subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Renal and urinary disorders			
Renal failure			
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Infections and infestations			
Pneumonia			
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 1	0 / 0	
Escherichia urinary tract infection			
subjects affected / exposed	0 / 61 (0.00%)	1 / 28 (3.57%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Respiratory tract infection			
subjects affected / exposed	0 / 61 (0.00%)	1 / 28 (3.57%)	
occurrences causally related to treatment / all	0 / 0	1 / 1	
deaths causally related to treatment / all	0 / 0	1 / 1	

Frequency threshold for reporting non-serious adverse events: 0 %

<b>Non-serious adverse events</b>	Riociguat up to 2.5 mg tid Main phase	Riociguat up to 2.5 mg tid EDSP	
Total subjects affected by non-serious adverse events			
subjects affected / exposed	57 / 61 (93.44%)	23 / 28 (82.14%)	
Neoplasms benign, malignant and unspecified (incl cysts and polyps)			
Skin papilloma			
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences (all)	1	0	
Colon adenoma			
subjects affected / exposed	0 / 61 (0.00%)	1 / 28 (3.57%)	
occurrences (all)	0	1	

Monoclonal gammopathy subjects affected / exposed occurrences (all)	1 / 61 (1.64%) 1	0 / 28 (0.00%) 0	
Vascular disorders			
Flushing subjects affected / exposed occurrences (all)	1 / 61 (1.64%) 1	1 / 28 (3.57%) 1	
Hypertension subjects affected / exposed occurrences (all)	0 / 61 (0.00%) 0	1 / 28 (3.57%) 1	
Hypotension subjects affected / exposed occurrences (all)	9 / 61 (14.75%) 10	2 / 28 (7.14%) 2	
General disorders and administration site conditions			
Asthenia subjects affected / exposed occurrences (all)	2 / 61 (3.28%) 2	2 / 28 (7.14%) 2	
Chest discomfort subjects affected / exposed occurrences (all)	1 / 61 (1.64%) 1	0 / 28 (0.00%) 0	
Chest pain subjects affected / exposed occurrences (all)	1 / 61 (1.64%) 1	2 / 28 (7.14%) 2	
Cyst subjects affected / exposed occurrences (all)	1 / 61 (1.64%) 1	1 / 28 (3.57%) 1	
Fatigue subjects affected / exposed occurrences (all)	6 / 61 (9.84%) 8	0 / 28 (0.00%) 0	
Feeling cold subjects affected / exposed occurrences (all)	1 / 61 (1.64%) 1	0 / 28 (0.00%) 0	
Influenza like illness subjects affected / exposed occurrences (all)	1 / 61 (1.64%) 1	0 / 28 (0.00%) 0	
Injection site inflammation			

subjects affected / exposed occurrences (all)	0 / 61 (0.00%) 0	1 / 28 (3.57%) 1	
Oedema subjects affected / exposed occurrences (all)	3 / 61 (4.92%) 3	0 / 28 (0.00%) 0	
Oedema peripheral subjects affected / exposed occurrences (all)	8 / 61 (13.11%) 9	1 / 28 (3.57%) 1	
Pyrexia subjects affected / exposed occurrences (all)	1 / 61 (1.64%) 1	1 / 28 (3.57%) 1	
Puncture site haemorrhage subjects affected / exposed occurrences (all)	1 / 61 (1.64%) 1	0 / 28 (0.00%) 0	
Sensation of foreign body subjects affected / exposed occurrences (all)	1 / 61 (1.64%) 1	0 / 28 (0.00%) 0	
Reproductive system and breast disorders Haematospermia subjects affected / exposed occurrences (all)	0 / 61 (0.00%) 0	1 / 28 (3.57%) 1	
Menorrhagia subjects affected / exposed occurrences (all)	2 / 61 (3.28%) 2	0 / 28 (0.00%) 0	
Haemorrhagic ovarian cyst subjects affected / exposed occurrences (all)	1 / 61 (1.64%) 1	0 / 28 (0.00%) 0	
Respiratory, thoracic and mediastinal disorders Cough subjects affected / exposed occurrences (all)	5 / 61 (8.20%) 6	2 / 28 (7.14%) 2	
Dyspnoea subjects affected / exposed occurrences (all)	6 / 61 (9.84%) 6	4 / 28 (14.29%) 4	
Dyspnoea exertional			

subjects affected / exposed	0 / 61 (0.00%)	1 / 28 (3.57%)
occurrences (all)	0	1
Epistaxis		
subjects affected / exposed	5 / 61 (8.20%)	2 / 28 (7.14%)
occurrences (all)	6	4
Haemoptysis		
subjects affected / exposed	1 / 61 (1.64%)	1 / 28 (3.57%)
occurrences (all)	1	3
Hyperventilation		
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)
occurrences (all)	1	0
Hypoxia		
subjects affected / exposed	0 / 61 (0.00%)	1 / 28 (3.57%)
occurrences (all)	0	1
Nasal congestion		
subjects affected / exposed	2 / 61 (3.28%)	1 / 28 (3.57%)
occurrences (all)	2	1
Productive cough		
subjects affected / exposed	0 / 61 (0.00%)	2 / 28 (7.14%)
occurrences (all)	0	2
Pulmonary artery aneurysm		
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)
occurrences (all)	1	0
Pulmonary hypertension		
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)
occurrences (all)	1	0
Upper respiratory tract congestion		
subjects affected / exposed	1 / 61 (1.64%)	1 / 28 (3.57%)
occurrences (all)	1	1
Pulmonary arterial hypertension		
subjects affected / exposed	1 / 61 (1.64%)	1 / 28 (3.57%)
occurrences (all)	1	1
Oropharyngeal discomfort		
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)
occurrences (all)	1	0
Oropharyngeal pain		

subjects affected / exposed occurrences (all)	1 / 61 (1.64%) 1	0 / 28 (0.00%) 0	
Psychiatric disorders			
Depression			
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences (all)	1	0	
Anxiety			
subjects affected / exposed	0 / 61 (0.00%)	1 / 28 (3.57%)	
occurrences (all)	0	1	
Investigations			
Blood creatinine increased			
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences (all)	1	0	
Blood potassium decreased			
subjects affected / exposed	2 / 61 (3.28%)	2 / 28 (7.14%)	
occurrences (all)	2	2	
Blood thyroid stimulating hormone increased			
subjects affected / exposed	0 / 61 (0.00%)	1 / 28 (3.57%)	
occurrences (all)	0	1	
Electrocardiogram QT prolonged			
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences (all)	1	0	
International normalised ratio increased			
subjects affected / exposed	2 / 61 (3.28%)	1 / 28 (3.57%)	
occurrences (all)	2	1	
Low density lipoprotein increased			
subjects affected / exposed	1 / 61 (1.64%)	1 / 28 (3.57%)	
occurrences (all)	1	1	
Respiratory rate increased			
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences (all)	1	0	
Weight increased			
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences (all)	1	0	
Occult blood positive			

subjects affected / exposed occurrences (all)	1 / 61 (1.64%) 1	0 / 28 (0.00%) 0	
Injury, poisoning and procedural complications			
Accident			
subjects affected / exposed occurrences (all)	0 / 61 (0.00%) 0	1 / 28 (3.57%) 1	
Arthropod bite			
subjects affected / exposed occurrences (all)	1 / 61 (1.64%) 1	0 / 28 (0.00%) 0	
Fall			
subjects affected / exposed occurrences (all)	1 / 61 (1.64%) 1	1 / 28 (3.57%) 1	
Overdose			
subjects affected / exposed occurrences (all)	1 / 61 (1.64%) 1	0 / 28 (0.00%) 0	
Subcutaneous haematoma			
subjects affected / exposed occurrences (all)	2 / 61 (3.28%) 2	0 / 28 (0.00%) 0	
Contusion			
subjects affected / exposed occurrences (all)	1 / 61 (1.64%) 1	1 / 28 (3.57%) 1	
Thermal burn			
subjects affected / exposed occurrences (all)	1 / 61 (1.64%) 1	0 / 28 (0.00%) 0	
Cardiac disorders			
Palpitations			
subjects affected / exposed occurrences (all)	2 / 61 (3.28%) 2	1 / 28 (3.57%) 1	
Pericardial effusion			
subjects affected / exposed occurrences (all)	1 / 61 (1.64%) 1	1 / 28 (3.57%) 1	
Right ventricular failure			
subjects affected / exposed occurrences (all)	4 / 61 (6.56%) 4	1 / 28 (3.57%) 1	
Nervous system disorders			

Cervicobrachial syndrome			
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences (all)	1	0	
Dizziness			
subjects affected / exposed	10 / 61 (16.39%)	0 / 28 (0.00%)	
occurrences (all)	11	0	
Dizziness postural			
subjects affected / exposed	2 / 61 (3.28%)	1 / 28 (3.57%)	
occurrences (all)	2	1	
Headache			
subjects affected / exposed	12 / 61 (19.67%)	3 / 28 (10.71%)	
occurrences (all)	18	3	
Hypoaesthesia			
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences (all)	1	0	
Multiple sclerosis			
subjects affected / exposed	1 / 61 (1.64%)	1 / 28 (3.57%)	
occurrences (all)	1	1	
Paraesthesia			
subjects affected / exposed	0 / 61 (0.00%)	2 / 28 (7.14%)	
occurrences (all)	0	3	
Sciatica			
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences (all)	1	0	
Syncope			
subjects affected / exposed	0 / 61 (0.00%)	1 / 28 (3.57%)	
occurrences (all)	0	2	
Balance disorder			
subjects affected / exposed	0 / 61 (0.00%)	1 / 28 (3.57%)	
occurrences (all)	0	1	
Blood and lymphatic system disorders			
Anaemia			
subjects affected / exposed	3 / 61 (4.92%)	1 / 28 (3.57%)	
occurrences (all)	3	2	
Increased tendency to bruise			

<p>subjects affected / exposed</p> <p>occurrences (all)</p> <p>Iron deficiency anaemia</p> <p>subjects affected / exposed</p> <p>occurrences (all)</p>	<p>1 / 61 (1.64%)</p> <p>1</p> <p>0 / 61 (0.00%)</p> <p>0</p>	<p>0 / 28 (0.00%)</p> <p>0</p> <p>1 / 28 (3.57%)</p> <p>1</p>	
<p>Ear and labyrinth disorders</p> <p>Ear pain</p> <p>subjects affected / exposed</p> <p>occurrences (all)</p> <p>Vertigo</p> <p>subjects affected / exposed</p> <p>occurrences (all)</p>	<p>1 / 61 (1.64%)</p> <p>1</p> <p>2 / 61 (3.28%)</p> <p>3</p>	<p>0 / 28 (0.00%)</p> <p>0</p> <p>0 / 28 (0.00%)</p> <p>0</p>	
<p>Eye disorders</p> <p>Eyelid oedema</p> <p>subjects affected / exposed</p> <p>occurrences (all)</p> <p>Cataract</p> <p>subjects affected / exposed</p> <p>occurrences (all)</p> <p>Visual impairment</p> <p>subjects affected / exposed</p> <p>occurrences (all)</p>	<p>1 / 61 (1.64%)</p> <p>1</p> <p>0 / 61 (0.00%)</p> <p>0</p> <p>1 / 61 (1.64%)</p> <p>1</p>	<p>0 / 28 (0.00%)</p> <p>0</p> <p>1 / 28 (3.57%)</p> <p>1</p> <p>0 / 28 (0.00%)</p> <p>0</p>	
<p>Gastrointestinal disorders</p> <p>Abdominal pain</p> <p>subjects affected / exposed</p> <p>occurrences (all)</p> <p>Abdominal pain lower</p> <p>subjects affected / exposed</p> <p>occurrences (all)</p> <p>Abdominal pain upper</p> <p>subjects affected / exposed</p> <p>occurrences (all)</p> <p>Constipation</p> <p>subjects affected / exposed</p> <p>occurrences (all)</p> <p>Diarrhoea</p>	<p>1 / 61 (1.64%)</p> <p>1</p> <p>1 / 61 (1.64%)</p> <p>2</p> <p>5 / 61 (8.20%)</p> <p>7</p> <p>2 / 61 (3.28%)</p> <p>2</p>	<p>2 / 28 (7.14%)</p> <p>2</p> <p>0 / 28 (0.00%)</p> <p>0</p> <p>2 / 28 (7.14%)</p> <p>2</p> <p>1 / 28 (3.57%)</p> <p>1</p>	



subjects affected / exposed	11 / 61 (18.03%)	4 / 28 (14.29%)	
occurrences (all)	14	5	
Dyspepsia			
subjects affected / exposed	13 / 61 (21.31%)	4 / 28 (14.29%)	
occurrences (all)	13	4	
Dysphagia			
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences (all)	1	0	
Faeces discoloured			
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences (all)	1	0	
Flatulence			
subjects affected / exposed	1 / 61 (1.64%)	1 / 28 (3.57%)	
occurrences (all)	1	1	
Gastrooesophageal reflux disease			
subjects affected / exposed	2 / 61 (3.28%)	1 / 28 (3.57%)	
occurrences (all)	2	1	
Haematochezia			
subjects affected / exposed	1 / 61 (1.64%)	1 / 28 (3.57%)	
occurrences (all)	1	1	
Nausea			
subjects affected / exposed	5 / 61 (8.20%)	3 / 28 (10.71%)	
occurrences (all)	6	3	
Rectal haemorrhage			
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences (all)	1	0	
Vomiting			
subjects affected / exposed	9 / 61 (14.75%)	5 / 28 (17.86%)	
occurrences (all)	11	6	
Colon dysplasia			
subjects affected / exposed	0 / 61 (0.00%)	1 / 28 (3.57%)	
occurrences (all)	0	1	
Hepatobiliary disorders			
Cholecystitis			
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences (all)	1	0	

Skin and subcutaneous tissue disorders			
Acne			
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences (all)	1	0	
Alopecia			
subjects affected / exposed	0 / 61 (0.00%)	1 / 28 (3.57%)	
occurrences (all)	0	1	
Erythema			
subjects affected / exposed	3 / 61 (4.92%)	0 / 28 (0.00%)	
occurrences (all)	4	0	
Pruritus			
subjects affected / exposed	3 / 61 (4.92%)	0 / 28 (0.00%)	
occurrences (all)	3	0	
Psoriasis			
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences (all)	1	0	
Rash macular			
subjects affected / exposed	1 / 61 (1.64%)	1 / 28 (3.57%)	
occurrences (all)	1	1	
Skin lesion			
subjects affected / exposed	0 / 61 (0.00%)	1 / 28 (3.57%)	
occurrences (all)	0	3	
Skin reaction			
subjects affected / exposed	0 / 61 (0.00%)	1 / 28 (3.57%)	
occurrences (all)	0	1	
Telangiectasia			
subjects affected / exposed	1 / 61 (1.64%)	1 / 28 (3.57%)	
occurrences (all)	1	1	
Ingrown hair			
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences (all)	1	0	
Renal and urinary disorders			
Haematuria			
subjects affected / exposed	0 / 61 (0.00%)	1 / 28 (3.57%)	
occurrences (all)	0	1	
Renal failure			

subjects affected / exposed	2 / 61 (3.28%)	0 / 28 (0.00%)	
occurrences (all)	2	0	
Bladder disorder			
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences (all)	1	0	
Musculoskeletal and connective tissue disorders			
Arthralgia			
subjects affected / exposed	3 / 61 (4.92%)	1 / 28 (3.57%)	
occurrences (all)	3	2	
Back pain			
subjects affected / exposed	2 / 61 (3.28%)	1 / 28 (3.57%)	
occurrences (all)	2	1	
Bone pain			
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences (all)	1	0	
Flank pain			
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences (all)	1	0	
Joint swelling			
subjects affected / exposed	1 / 61 (1.64%)	1 / 28 (3.57%)	
occurrences (all)	1	1	
Muscle spasms			
subjects affected / exposed	2 / 61 (3.28%)	2 / 28 (7.14%)	
occurrences (all)	3	2	
Musculoskeletal pain			
subjects affected / exposed	1 / 61 (1.64%)	1 / 28 (3.57%)	
occurrences (all)	1	1	
Pain in extremity			
subjects affected / exposed	3 / 61 (4.92%)	1 / 28 (3.57%)	
occurrences (all)	3	1	
Pain in jaw			
subjects affected / exposed	1 / 61 (1.64%)	1 / 28 (3.57%)	
occurrences (all)	1	1	
Rheumatoid arthritis			

subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences (all)	1	0	
Intervertebral disc protrusion			
subjects affected / exposed	0 / 61 (0.00%)	1 / 28 (3.57%)	
occurrences (all)	0	1	
Intervertebral disc disorder			
subjects affected / exposed	0 / 61 (0.00%)	1 / 28 (3.57%)	
occurrences (all)	0	1	
Infections and infestations			
Bronchitis			
subjects affected / exposed	2 / 61 (3.28%)	3 / 28 (10.71%)	
occurrences (all)	2	3	
Cellulitis			
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences (all)	1	0	
Ear infection			
subjects affected / exposed	0 / 61 (0.00%)	1 / 28 (3.57%)	
occurrences (all)	0	1	
Conjunctivitis			
subjects affected / exposed	0 / 61 (0.00%)	1 / 28 (3.57%)	
occurrences (all)	0	1	
Eye infection			
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences (all)	1	0	
Fungal skin infection			
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences (all)	2	0	
Gastroenteritis			
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences (all)	1	0	
Gastroenteritis viral			
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences (all)	1	0	
Gastrointestinal infection			
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)	
occurrences (all)	1	0	

Gingivitis		
subjects affected / exposed	0 / 61 (0.00%)	1 / 28 (3.57%)
occurrences (all)	0	1
Laryngitis		
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)
occurrences (all)	1	0
Lower respiratory tract infection		
subjects affected / exposed	0 / 61 (0.00%)	1 / 28 (3.57%)
occurrences (all)	0	1
Mastitis		
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)
occurrences (all)	1	0
Nasopharyngitis		
subjects affected / exposed	9 / 61 (14.75%)	1 / 28 (3.57%)
occurrences (all)	11	1
Sinusitis		
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)
occurrences (all)	1	0
Upper respiratory tract infection		
subjects affected / exposed	1 / 61 (1.64%)	1 / 28 (3.57%)
occurrences (all)	1	1
Urinary tract infection		
subjects affected / exposed	1 / 61 (1.64%)	1 / 28 (3.57%)
occurrences (all)	1	1
Vulvovaginal candidiasis		
subjects affected / exposed	0 / 61 (0.00%)	1 / 28 (3.57%)
occurrences (all)	0	1
Pharyngotonsillitis		
subjects affected / exposed	1 / 61 (1.64%)	0 / 28 (0.00%)
occurrences (all)	1	0
Catheter site infection		
subjects affected / exposed	0 / 61 (0.00%)	1 / 28 (3.57%)
occurrences (all)	0	3
Post viral fatigue syndrome		
subjects affected / exposed	0 / 61 (0.00%)	1 / 28 (3.57%)
occurrences (all)	0	1

Respiratory tract infection viral subjects affected / exposed occurrences (all)	0 / 61 (0.00%) 0	1 / 28 (3.57%) 1	
Respiratory tract infection subjects affected / exposed occurrences (all)	0 / 61 (0.00%) 0	1 / 28 (3.57%) 1	
Puncture site infection subjects affected / exposed occurrences (all)	0 / 61 (0.00%) 0	1 / 28 (3.57%) 1	
Metabolism and nutrition disorders			
Dehydration subjects affected / exposed occurrences (all)	1 / 61 (1.64%) 1	0 / 28 (0.00%) 0	
Fluid overload subjects affected / exposed occurrences (all)	1 / 61 (1.64%) 1	0 / 28 (0.00%) 0	
Gout subjects affected / exposed occurrences (all)	2 / 61 (3.28%) 2	0 / 28 (0.00%) 0	
Hypercholesterolaemia subjects affected / exposed occurrences (all)	0 / 61 (0.00%) 0	1 / 28 (3.57%) 1	
Hypocalcaemia subjects affected / exposed occurrences (all)	1 / 61 (1.64%) 2	0 / 28 (0.00%) 0	
Hypokalaemia subjects affected / exposed occurrences (all)	4 / 61 (6.56%) 4	2 / 28 (7.14%) 2	
Decreased appetite subjects affected / exposed occurrences (all)	1 / 61 (1.64%) 1	1 / 28 (3.57%) 1	

## More information

### Substantial protocol amendments (globally)

Were there any global substantial amendments to the protocol? Yes

Date	Amendment
20 February 2014	Following modifications were done in this amendment: 1: Changed sildenafil dose from 20 mg tid to 80 mg tid. 2: Reduced washout period for sildenafil from 3 to 1 day. It stayed 3 days for tadalafil. 3: Revised inclusion criteria: A. Subjects with associated PAH due to congenital heart disease were allowed to be enrolled. B. The upper limit for cardiac index as one of the criteria for insufficient response/not at treatment target was increased from <2.5 to <3.0 liter per minute per square meter (L/min/m <sup>2</sup> ). Lower limit for pulmonary vascular resistance as an additional inclusion criterion was proportionally decreased from >480 to 400 dyne*second*centimeter <sup>-5</sup> . C. Age range widened to include subjects up to 75 years old. 4: Following exclusion criteria revised: A -Moderate to severe bronchial asthma or chronic obstructive pulmonary disease and -Moderate to severe restrictive lung disease total lung capacity <70% predicted replaced with: - Evidence of clinically significant restrictive or obstructive parenchymal lung diseases in the judgment of the investigator (based on a clean computed tomography [CT] lung scan). B. The lower limit for diffusing capacity of lung for carbon monoxide as an exclusion criterion was decreased from 40 to 30% predicted. C. Previous treatment with riociguat was added as an exclusion criterion. 5: Revised withdrawal criteria: Subject diagnosed with pulmonary veno-occlusive disease while on treatment with study drug the administration of riociguat had to be stopped immediately. 6: Dose increase time during titration phase was increased to also allow increase at Visit 5 (Week 8). 7: LPH questionnaire was removed from the study procedures. 8: Corrected time periods definitions: Time periods of 3 months and 12 weeks were replaced by 90 days. 9: Syncope as special interest AE was replaced by symptomatic hypotension and hemoptysis. 10: Left atrial volume index was added as an additional echocardiogram parameter.
27 February 2015	Following modifications were done in this amendment: Modification 1: Added interim analysis: An interim analysis was added to evaluate clinical monitoring signals on efficacy and/or safety, which would be presented to the advisory board to support continued enrollment in the study, because experience of switching from PDE-5i in this patient population is very limited. Modification 2: Added time window for prior PDE-5i therapy: Time window of 7 days was added to the period of 90 days for prior PDE-5i therapy, to better adapt to routine clinical practice and to allow for more flexibility. Modification 3: Change of the sponsor's medically responsible person: Sponsor's medically responsible person was changed; therefore the name was updated on the signature page. Modification 4: Other text/inconsistencies corrections: In addition to the changes specified above the protocol text was corrected for better clarity and consistency.

24 February 2016	<p>Following modifications were done in this amendment: Modification 1. The definition of end of study and the time point for reporting was clarified. The time point for the clinical study report is the last visit of the last subject in the main phase (maintenance phase up to Visit 7 at Week 24 including the safety follow-up visit, if applicable). The extended drug supply phase is considered an extension of the study and will be reported as an addendum to the study report. Modification 2. Addition of transition to long-term extension study: The option was implemented for subjects to transition to a separate long-term extension study at the end of the maintenance phase or during the extended drug supply phase. Modification 3: Change of the sponsor's medically responsible person: Sponsor's medically responsible person was changed; therefore the name was updated on the signature page. Modification 4. Clarification of applicability of the safety follow-up visit: It was clarified that the safety follow-up visit is applicable only for subjects who terminate the treatment prematurely or formally complete treatment according to protocol at Visit 7. Subjects continuing treatment after Visit 7 without treatment interruption in the extended drug supply phase of the study or in a Bayer/ Merck Sharp &amp; Dohme (MSD-sponsored) riociguat long-term extension study or any other extended access program for riociguat are not required to come in for the safety follow-up visit.</p>
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Notes:

## Interruptions (globally)

Were there any global interruptions to the trial? No

## Limitations and caveats

Limitations of the trial such as small numbers of subjects analysed or technical problems leading to unreliable data.

Occurrence of "±" in relation with geometric CV is auto-generated and cannot be deleted. Decimal places were automatically truncated if last decimal equals zero.

Notes: