



Clinical trial results:

The Role Of The New Promising Oncological Pet/Ct Tracer [68Ga] Ga-Fapi For Staging Lung Cancer: A Preliminary Study

Summary

| | |
|--------------------------|------------------|
| EudraCT number | 2021-006570-23 |
| Trial protocol | IT |
| Global end of trial date | 30 November 2024 |

Results information

| | |
|--------------------------------|------------------|
| Result version number | v1 (current) |
| This version publication date | 16 December 2025 |
| First version publication date | 16 December 2025 |

Trial information

Trial identification

| | |
|-----------------------|-------------------|
| Sponsor protocol code | FAPI-POLMONE-2021 |
|-----------------------|-------------------|

Additional study identifiers

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

Notes:

Sponsors

| | |
|------------------------------|---|
| Sponsor organisation name | IRCCS Azienda Ospedaliero-Universitaria di Bologna |
| Sponsor organisation address | Via Albertoni 15, Bologna, Italy, 40138 |
| Public contact | Dott.ssa Lucia Zanoni, U.O. Medicina Nucleare, IRCCS AOU di Bologna, Policlinico di S.Orsola, Bologna, Italy, zanonilucia84@gmail.com |
| Scientific contact | Dott.ssa Lucia Zanoni, U.O. Medicina Nucleare, IRCCS AOU di Bologna, Policlinico di S.Orsola, Bologna, Italy, zanonilucia84@gmail.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 | 08 May 2025 |
| Is this the analysis of the primary completion data? | Yes |
| Primary completion date | 30 November 2024 |
| Global end of trial reached? | Yes |
| Global end of trial date | 30 November 2024 |
| Was the trial ended prematurely? | No |

Notes:

General information about the trial

Main objective of the trial:

The study aims to evaluate the diagnostic performance of PET / CT with 68Ga-FAPI, in patients with staging lung cancer, in the identification of disease locations by comparing the (overall) evaluation of the 68Ga-FAPI outcome PET / CT with histological data

Protection of trial subjects:

Yes (insurance)

Background therapy: -

Evidence for comparator: -

| | |
|---|-------------------------------|
| Actual start date of recruitment | 26 May 2022 |
| Long term follow-up planned | Yes |
| Long term follow-up rationale | Efficacy, Scientific research |
| Long term follow-up duration | 12 Months |
| Independent data monitoring committee (IDMC) involvement? | No |

Notes:

Population of trial subjects

Subjects enrolled per country

| | |
|--------------------------------------|-----------|
| Country: Number of subjects enrolled | Italy: 64 |
| Worldwide total number of subjects | 64 |
| EEA total number of subjects | 64 |

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 | 48 |
| 85 years and over | 2 |

Subject disposition

Recruitment

Recruitment details:

Recruitment dates: from 26May2022 to 30November2023

Recruitment: Nuclear Medicine, AOU di Bologna, Bologna, Italy

Pre-assignment

Screening details:

63 subjects underwent the experimental 68Ga-FAPI-46 PET/CT out of the 64 subjects enrolled: 1/64 subjects withdrew consent before IMP (68Ga-FAPI-46) administration and was excluded from analyses (1 screening failure)

Period 1

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

Arms

| | |
|-----------|--------------------------|
| Arm title | Overall Trial Single arm |
|-----------|--------------------------|

Arm description:

single arm study

Each patient underwent FAPI-PET/CT in addition to its conventional staging flow-chart. No changes in pts management, nor delay in standard diagnostic and therapeutic flow-chart, derived from FAPI-PET/CT results. Treatment plan decided by the referring clinicians on the basis of standard clinical and imaging staging flow-chart.

| | |
|--|------------------------|
| Arm type | Experimental |
| Investigational medicinal product name | 68Ga-FAPI-46 |
| Investigational medicinal product code | [68Ga-FAPI-46] |
| Other name | |
| Pharmaceutical forms | Solution for injection |
| Routes of administration | Intravenous use |

Dosage and administration details:

dosage range 150 to 250 MBq

| Number of subjects in period 1 ^[1] | Overall Trial Single arm |
|---|--------------------------|
| Started | 63 |
| Completed | 63 |

Notes:

[1] - The number of subjects reported to be in the baseline period are not the same as the worldwide number enrolled in the trial. It is expected that these numbers will be the same.

Justification: 63 subjects underwent the experimental 68Ga-FAPI-46 PET/CT out of the overall 64 subjects enrolled: 1/64 subject withdrew consent before IMP (68Ga-FAPI-46) administration and was excluded from analyses (1 screening failure)

Baseline characteristics

Reporting groups

| | |
|--------------------------------|---------------|
| Reporting group title | overall Trial |
| Reporting group description: - | |

| Reporting group values | overall Trial | Total | |
|--|---------------|-------|--|
| Number of subjects | 63 | 63 | |
| Age categorical | | | |
| 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 | 47 | 47 | |
| 85 years and over | 2 | 2 | |
| Age continuous | | | |
| Units: years | | | |
| arithmetic mean | 71 | | |
| full range (min-max) | 45 to 87 | - | |
| Gender categorical | | | |
| Units: Subjects | | | |
| Female | 22 | 22 | |
| Male | 41 | 41 | |

Subject analysis sets

| | |
|----------------------------|---------------|
| Subject analysis set title | Surgical |
| Subject analysis set type | Full analysis |

Subject analysis set description:

Pts referred (according to standard practice) to radical surgery, undergoing standard pathology evaluation and routinely monitored (Thoracic surgery Unit) for 1 year

| | |
|----------------------------|--------------------|
| Subject analysis set title | Non surgical |
| Subject analysis set type | Sub-group analysis |

Subject analysis set description:

Patients excluded from surgery, on the basis of standard clinical and imaging staging flow-chart (non-surgical patients): 68Ga-FAPI PET / CT positivity rate and agreement with conventional staging calculated.

| Reporting group values | Surgical | Non surgical | |
|------------------------|----------|--------------|--|
| Number of subjects | 50 | 13 | |

| | | | |
|--|----------|----------|--|
| Age categorical Units: Subjects | | | |
| In utero Preterm newborn infants (gestational age < 37 wks) Newborns (0-27 days) Infants and toddlers (28 days-23 months) Children (2-11 years) Adolescents (12-17 years) Adults (18-64 years) From 65-84 years 85 years and over | | | |
| Age continuous Units: years | | | |
| arithmetic mean | 72 | 67 | |
| full range (min-max) | 45 to 87 | 52 to 83 | |
| Gender categorical Units: Subjects | | | |
| Female | 17 | 5 | |
| Male | 33 | 8 | |

End points

End points reporting groups

| | |
|-----------------------|--------------------------|
| Reporting group title | Overall Trial Single arm |
|-----------------------|--------------------------|

Reporting group description:

single arm study

Each patient underwent FAPI-PET/CT in addition to its conventional staging flow-chart. No changes in pts management, nor delay in standard diagnostic and therapeutic flow-chart, derived from FAPI-PET/CT results. Treatment plan decided by the referring clinicians on the basis of standard clinical and imaging staging flow-chart.

| | |
|----------------------------|----------|
| Subject analysis set title | Surgical |
|----------------------------|----------|

| | |
|---------------------------|---------------|
| Subject analysis set type | Full analysis |
|---------------------------|---------------|

Subject analysis set description:

Pts referred (according to standard practice) to radical surgery, undergoing standard pathology evaluation and routinely monitored (Thoracic surgery Unit) for 1 year

| | |
|----------------------------|--------------|
| Subject analysis set title | Non surgical |
|----------------------------|--------------|

| | |
|---------------------------|--------------------|
| Subject analysis set type | Sub-group analysis |
|---------------------------|--------------------|

Subject analysis set description:

Patients excluded from surgery, on the basis of standard clinical and imaging staging flow-chart (non-surgical patients): 68Ga-FAPI PET / CT positivity rate and agreement with conventional staging calculated.

Primary: Endpoint 1a (primary): PET/CT diagnostic performance of FAPI, patient-based, for T (n=50)

| | |
|-----------------|--|
| End point title | Endpoint 1a (primary): PET/CT diagnostic performance of FAPI, patient-based, for T (n=50) ^[1] |
|-----------------|--|

End point description:

Time required for subsequent histological examination (Patients underwent surgery mostly within 2 months from the experimental imaging, with a median of 40.5 days).

In pts who underwent surgical treatment, the pathology examination routinely processed of the lung was used as standard of truth to define 68Ga-FAPI PET/CT scans results as true positive (TP), true negative (TN), false positive (FP) or false negative (FN). Sensitivity, specificity, accuracy, positive and negative predictive value (PPV and NPV) were calculated, with relative 95% confidence intervals (95% CI), on a per patient analysis, to evaluate the performance of PET / CT with 68Ga-FAPI for malignant lung lesion (T).

FAPI PET/CT results for T:

42 TP

2 FN

2 FP

4 TN

| | |
|----------------|---------|
| End point type | Primary |
|----------------|---------|

End point timeframe:

36 months

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: According to the trial protocol: sensitivity, specificity, accuracy, PPV and NPV were calculated, with relative 95% confidence intervals (95% CI), on a per patient analysis, to evaluate the performance of PET / CT with 68Ga-FAPI for T.

| End point values | Surgical | | | |
|--|------------------------|--|--|--|
| Subject group type | Subject analysis set | | | |
| Number of subjects analysed | 50 ^[2] | | | |
| Units: number of sens, spec, ppv, npv, acc | | | | |
| number (confidence interval 95%) | | | | |
| sensitivity | 0.955 (0.893 to 1.016) | | | |
| specificity | 0.667 (0.289 to 1.044) | | | |
| ppv | 0.955 (0.893 to 1.016) | | | |
| npv | 0.667 (0.289 to 1.044) | | | |
| accuracy | 0.920 (0.845 to 0.995) | | | |

Notes:

[2] - comparison of overall FAPI result with surgical histopathology of lung (T)

Statistical analyses

No statistical analyses for this end point

Primary: Endpoint 1b (primary): PET/CT diagnostic performance of FAPI, patient-based, for N (n=46)

| | |
|-----------------|--|
| End point title | Endpoint 1b (primary): PET/CT diagnostic performance of FAPI, patient-based, for N (n=46) ^[3] |
|-----------------|--|

End point description:

Time required for subsequent histological examination (Patients underwent surgery mostly within 2 months from the experimental imaging, with a median of 40.5 days).

In pts who underwent surgical treatment, the pathology examination of N stations routinely processed was used as standard of truth to

define 68Ga-FAPI PET/CT scans results as true positive (TP), true negative (TN), false positive (FP) or false negative (FN).

Sensitivity, specificity, accuracy, PPV and NPV was calculated, with relative 95% confidence intervals (95% CI, on a per patient analysis, to evaluate the performance of PET / CT with 68Ga-FAPI for lymph-node stations (N).

FAPI PET/CT results for N:

6 TP

6 FN

4 FP

30 TN

| | |
|----------------|---------|
| End point type | Primary |
|----------------|---------|

End point timeframe:

36 months

Notes:

[3] - 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: According to the trial protocol: sensitivity, specificity, accuracy, PPV and NPV were calculated, with relative 95% confidence intervals (95% CI), on a per patient analysis, to evaluate the performance of PET / CT with 68Ga-FAPI for N.

| End point values | Surgical | | | |
|----------------------------------|------------------------|--|--|--|
| Subject group type | Subject analysis set | | | |
| Number of subjects analysed | 46 ^[4] | | | |
| Units: sens, spec, ppv, npv, acc | | | | |
| number (confidence interval 95%) | | | | |
| sensitivity | 0.500 (0.217 to 0.783) | | | |
| specificity | 0.882 (0.774 to 0.991) | | | |
| ppv | 0.600 (0.296 to 0.904) | | | |
| npv | 0.833 (0.712 to 0.955) | | | |
| accuracy | 0.783 (0.663 to 0.902) | | | |

Notes:

[4] - Among the 50 patients of the surgical cohort, 46 were subjected to lymphadenectomy

Statistical analyses

No statistical analyses for this end point

Secondary: Endpoint 2a: PET/CT diagnostic performance of FAPI, region-based, for T (n=59)

| | |
|-----------------|--|
| End point title | Endpoint 2a: PET/CT diagnostic performance of FAPI, region-based, for T (n=59) |
|-----------------|--|

End point description:

Time required for subsequent histological examination (Patients underwent surgery mostly within 2 months from the experimental imaging, with a median of 40.5 days).

Sensitivity, specificity, accuracy, PPV and NPV were calculated, with relative 95% confidence intervals (95% CI), on a per region analysis, to evaluate the performance of PET / CT with 68Ga-FAPI for T. In patients referred for radical surgery, the results of PET/CT were validated by the histopathological examination, performed according to the normal care pathway, of the surgical samples of lung lesions (T).

FAPI PET/CT results for T regions (n=59):

TP 45

FN 8

FP 2

TN 4

| | |
|----------------|-----------|
| End point type | Secondary |
|----------------|-----------|

End point timeframe:

36 months

| End point values | Surgical | | | |
|----------------------------------|------------------------|--|--|--|
| Subject group type | Subject analysis set | | | |
| Number of subjects analysed | 50 ^[5] | | | |
| Units: sens, spec, ppv, npv, acc | | | | |
| number (confidence interval 95%) | | | | |
| sensitivity | 0.849 (0.753 to 0.945) | | | |

| | | | | |
|-------------|------------------------|--|--|--|
| specificity | 0.667 (0.289 to 1.044) | | | |
| ppv | 0.957 (0.900 to 1.015) | | | |
| npv | 0.333 (0.067 to 0.600) | | | |
| accuracy | 0.831 (0.735 to 0.926) | | | |

Notes:

[5] - Among the 50 patients of the surgical cohort, 59 lung lesions (T) were examined

Statistical analyses

No statistical analyses for this end point

Secondary: Endpoint 2b: PET/CT diagnostic performance of FAPI, region-based, for N (n=217)

| | |
|-----------------|---|
| End point title | Endpoint 2b: PET/CT diagnostic performance of FAPI, region-based, for N (n=217) |
|-----------------|---|

End point description:

Time required for subsequent histological examination (Patients underwent surgery mostly within 2 months from the experimental imaging, with a median of 40.5 days).

Sensitivity, specificity, accuracy, PPV and NPV were calculated, with relative 95% confidence intervals (95% CI), on a N region based analysis, to evaluate the performance of PET / CT with 68Ga-FAPI for N. In patients referred for radical surgery, the results of PET/CT (N) were validated by the surgical histopathological examination, performed according to the normal care pathway, of the resected lymphnodes.

FAPI PET/CT results for N region:

TP 8
FN 7
FP 7
TN 195

| | |
|----------------|-----------|
| End point type | Secondary |
|----------------|-----------|

End point timeframe:

36 months

| End point values | Surgical | | | |
|----------------------------------|------------------------|--|--|--|
| Subject group type | Subject analysis set | | | |
| Number of subjects analysed | 46 ^[6] | | | |
| Units: sens, spec, ppv, npv, acc | | | | |
| number (confidence interval 95%) | | | | |
| sensitivity | 0.533 (0.281 to 0.786) | | | |
| specificity | 0.965 (0.940 to 0.991) | | | |
| ppv | 0.533 (0.281 to 0.786) | | | |
| npv | 0.965 (0.940 to 0.991) | | | |
| accuracy | 0.935 (0.903 to 0.968) | | | |

Notes:

[6] - 46 out of 50 surgical patients addressed to nodal dissection: overall, 217 N-stations examined

Statistical analyses

No statistical analyses for this end point

Secondary: Endpoint 3: concordance of 68Ga-FAPI PET/CT with final conventional staging in pts excluded from radical surgery

| | |
|-----------------|--|
| End point title | Endpoint 3: concordance of 68Ga-FAPI PET/CT with final conventional staging in pts excluded from radical surgery |
|-----------------|--|

End point description:

In pts excluded from surgery, positivity rate was calculated and concordance with conventional Tstaging was assessed

| | |
|----------------|-----------|
| End point type | Secondary |
|----------------|-----------|

End point timeframe:

36 months

| End point values | Non surgical | | | |
|--|----------------------|--|--|--|
| Subject group type | Subject analysis set | | | |
| Number of subjects analysed | 13 ^[7] | | | |
| Units: % | | | | |
| % positivity rate FAPI for T | 77 | | | |
| % positivity rate FAPI for N | 50 | | | |
| % agreement T between FAPI and biopsy | 60 | | | |
| % agreement N between FAPI and biopsy | 95 | | | |
| % agreement T standard FDG PET with biopsy | 60 | | | |
| % agreement N standard FDG PET with biopsy | 75 | | | |

Notes:

[7] - 13 patients not addressed to surgery: 13 T and 20 N regions examined.

Statistical analyses

No statistical analyses for this end point

Secondary: Endpoint 4a: FAPI PET/CT diagnostic performance using semiquantitative PET parameters, region-based, for T

| | |
|-----------------|--|
| End point title | Endpoint 4a: FAPI PET/CT diagnostic performance using semiquantitative PET parameters, region-based, for T |
|-----------------|--|

End point description:

The performance of continuous semiquantitative PET variables (for example SUVmax and target to background ratios-TBRs) were evaluated in relation to the result of the histological examination of T,

when available.

MBP=mediastinal blood pool

AUC= area under the curve

| | |
|----------------------|-----------|
| End point type | Secondary |
| End point timeframe: | |
| 36 months | |

| End point values | Surgical | | | |
|----------------------------------|-------------------------|--|--|--|
| Subject group type | Subject analysis set | | | |
| Number of subjects analysed | 50 ^[8] | | | |
| Units: AUC | | | | |
| number (confidence interval 95%) | | | | |
| AUC SUVmax-T (Tmax) | 0.61 (0.3342 to 0.889) | | | |
| AUC TBR-L (Tmax/Liver mean) | 0.64 (0.3347 to 0.9389) | | | |
| AUC TBR-MBP (Tmax/MBP mean) | 0.65 (0.3573 to 0.9445) | | | |
| AUC TBR-P (Tmax/Lung mean) | 0.63 (0.3226 to 0.9415) | | | |

Notes:

[8] - Among the 50 patients of the surgical cohort, 59 lung lesions (T) were examined

Statistical analyses

No statistical analyses for this end point

Secondary: Endpoint 4b: FAPI PET/CT diagnostic performance using semiquantitative PET parameters, region-based, for N

| | |
|-----------------|--|
| End point title | Endpoint 4b: FAPI PET/CT diagnostic performance using semiquantitative PET parameters, region-based, for N |
|-----------------|--|

End point description:

The performance of continuous semiquantitative PET variables (for example SUVmax and TBR) were evaluated in relation to the result of the histological examination, when available.

| | |
|----------------------|-----------|
| End point type | Secondary |
| End point timeframe: | |
| 36 months | |

| End point values | Surgical | | | |
|----------------------------------|-------------------------|--|--|--|
| Subject group type | Subject analysis set | | | |
| Number of subjects analysed | 46 ^[9] | | | |
| Units: AUC | | | | |
| number (confidence interval 95%) | | | | |
| AUC SUVmax-N (Nmax) | 0.79 (0.6477 to 0.9099) | | | |

| | | | | |
|-----------------------------|-------------------------|--|--|--|
| AUC TBR-L (Nmax/Liver mean) | 0.78 (0.6538 to 0.9099) | | | |
| AUC TBR-MBP (Nmax/MBP mean) | 0.78 (0.6477 to 0.9094) | | | |
| AUC TBR-P (Nmax/Lung mean) | 0.78 (0.6465 to 0.9071) | | | |

Notes:

[9] - 46 out of 50 surgical patients addressed to nodal dissection: overall, 217 N-stations examined.

Statistical analyses

No statistical analyses for this end point

Secondary: Endpoint 5: comparison hypothetical treatment plan derived from 68Ga-FAPI with the conventional treatment already performed

| | |
|-----------------|---|
| End point title | Endpoint 5: comparison hypothetical treatment plan derived from 68Ga-FAPI with the conventional treatment already performed |
|-----------------|---|

End point description:

At the end of the standard management of pts included in the study, a hypothetical treatment plan using the FAPI-PET/CT results was defined. The conventional and already performed treatment plan (derived from the conventional staging flow-chart) and the hypothetical one (derived from FAPI) were compared to assess a only theoretical potential clinical impact of the new tracer in the next future. final TNMstaging (stageI-IV) assessed by AJCC8thEdition.

| | |
|----------------|-----------|
| End point type | Secondary |
|----------------|-----------|

End point timeframe:

End of Trial

| End point values | Surgical | | | |
|--|----------------------|--|--|--|
| Subject group type | Subject analysis set | | | |
| Number of subjects analysed | 50 ^[10] | | | |
| Units: agreement % | | | | |
| % agreement fapi-histology TNM | 48 | | | |
| % agreement fdg-histology TNM | 43 | | | |
| % FAPI-FDG discordant cases | 30 | | | |
| % FDG-derived correct surgical management | 69 | | | |
| % FAPI-derived correct surgical management | 87 | | | |

Notes:

[10] - surgical cohort (TNM final staging determined by surgical histopathology as standard of truth)

Statistical analyses

No statistical analyses for this end point

Adverse events

Adverse events information^[1]

Timeframe for reporting adverse events:

1 month from FAPI PET/CT (as per protocol)

Adverse event reporting additional description:

no

| | |
|-----------------|----------------|
| Assessment type | Non-systematic |
|-----------------|----------------|

Dictionary used

| | |
|-----------------|--------|
| Dictionary name | MedDRA |
|-----------------|--------|

| | |
|--------------------|------|
| Dictionary version | 27.1 |
|--------------------|------|

Reporting groups

| | |
|-----------------------|---------------|
| Reporting group title | overall trial |
|-----------------------|---------------|

Reporting group description: -

| Serious adverse events | overall trial | | |
|---|----------------|--|--|
| Total subjects affected by serious adverse events | | | |
| subjects affected / exposed | 0 / 63 (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 | overall trial | | |
|---|----------------|--|--|
| Total subjects affected by non-serious adverse events | | | |
| subjects affected / exposed | 0 / 63 (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 are not recorded adverse events for the timeframe

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