

QUARTO EVENTO NAZIONALE

SIE incontra i pazienti

LE NUOVE PET ED IL LORO IMPATTO DIAGNOSTICO

26 maggio 2025 Bologna, Royal Hotel Carlton

Stefano Fanti









System: uEXPLORER Pericarditis BW 72 kg Injected: 256 MBq Uptake time: 90 min Scan Duration: 5 min







Camborghini











SHORT AXIS FIELD OF VIEW

LONG AXIS FIELD OF VIEW

EXTENDED FIELD OF VIEW



ULTRA LONG AXIS FIELD OF VIEW

TOTAL BODY





Total-body PET/CT or LAFOV PET/CT? Axial field-of-view clinical classification

Clemens Mingels^{1,2} · Federico Caobelli¹ · Abass Alavi³ · Christos Sachpekidis⁴ · Meiyun Wang⁵ · Hande Nalbant² · Austin R. Pantel³ · Hongcheng Shi⁶ · Axel Rominger¹ · Lorenzo Nardo²

European Journal of Nuclear Medicine and Molecular Imaging (2024) 51:951–953

Table 1 Clinical definition of PET/CT scanners based on the axial field of view and their clinical implications

| Coverage | Terminology | Abbreviation | Field-of-view (FOV) |
|---|-------------------------------|--------------|---------------------|
| PET-system covering a limited axial field-of-view (in a single bed posi- tion) | Short-axial field-of-view PET | SAFOV | <35 cm |
| PET-system covering skull base to mid thighs (in a single bed position) | Long-axial field-of-view PET | LAFOV | >100 cm |
| PET-system covering vertex to toes (in a single bed position) | Total-body PET | TB | >188 cm |





Total-body PET/CT or LAFOV PET/CT? Axial field-of-view clinical

Clemens Mingels^{1,2} + Federico Caobelli¹ · Abass Alavi³ · Christos Sachpekidis⁴ · Meiyun Wang⁵ · Hande Nalbant² · Austin R. Pantel³ · Hongcheng Shi⁶ · Axel Rominger¹ · Lorenzo Nardo²







Definition of a Supercar?





The ONE usually you cannot afford

Società Italiana di Ematologi

SIE incontra i pazienti



Extended Field of View PET

BEFORE



Tuesday, September 12, 2023, 8:00 AM - 9:30 AM Hall B

Cutting Edge Science Track - TROP Session: Total Body PET Methods

> Tuesday, September 12, 2023, 16:45 - 18:15 Hall A

CME 12 - Physics + Oncology & Theranostics + Translational Molecular Imaging & Therapy + Technologists Committee: Long Axial Field-of-View PET Scanners - A Copernical Revolution

Special Focus Session

SF 10 - Total-body PET: technical aspects and clinical applications





TO ACQUIRE VERY GOOD SCANS WITH VERY SHORT ACQUISITION





Total-body PET/CT in a single 30 seconds scan

BOLOGNA, 26 maggio 2025 ROYAL HOTEL CARLTON System: uEXPLORER | Breath-hold 30 s Unpublished, Images courtesy of Sun Yat-sen University Cancer Center, GD, CHN

QUARTO EVENTO NAZIONALE

uEXPLORER Advanced BC FDG Scan Duration: 30 sec

uEXPLORER FDG Scan Duration: 30 sec

uEXPLORER BCR Ga-PSMA Scan Duration: 30 sec

BOLOGNA, 26 maggio 2025 ROYAL HOTEL CARLTON TO ACQUIRE VERY GOOD SCANS WITH VERY SHORT ACQUISITION

INCREASE PRODUCTIVITY ?

DRIVING A LAMBO TO GO TO WORK

TO ACQUIRE VERY GOOD SCANS WITH VERY LOW DOSES

System: uEXPLORER Tracer FDG Injected: 0.37 MBq/Kg

Courtesy Zhongshan Hospital (Shanghai) Y. Hu *et al.,* "The evaluation on the image quality of a total-body PET/CT imaging with an ultra-low injected dose", presented at *SNMMI* (2021)

System: uEXPLORER Lymphoma staging 13yo BW 45 kg Injected: 70 MBq Uptake time:60 min Scan Duration: 5 min

TO ACQUIRE VERY GOOD SCANS WITH VERY LOW DOSE

HOW OFTEN ?

System: uEXPLORER Osteosarcoma staging BW 20 kg Injected: 48 MBq Uptake time:100 min Scan Duration: 4 min

DRIVING A FERRARI IN A DIRTY ROAD

TO ACQUIRE DYNAMIC SCANS AND STUDY LESIONS BIOLOGY

System: uEXPLORER Head & Neck staging Tracer: Ga-FAPI-46 Injected: 300 MBq Dynamic Scan Duration: 55 min

BOLOGNA, 26 maggio 2025 ROYAL HOTEL CARLTON ÷

TO ACQUIRE DYNAMIC SCANS AND STUDY LESIONS BIOLOGY

DOING GREAT SCIENCE ?

Is that really the best we can make ?

QUARTO EVENTO NAZIONALE

SIE incontra i pazienti

MUCH HIGHER SENSITIVITY

24 cm AFOV scanner

Sensitivity @ 0 cm: 12.05 cps/kBq

STANDARD 70 cm NEMA Line Source

axial sensitivity at radial 0 cm 140 120 100 ABq 80 dos 60 40 20 200 400 800 1000 1200 1400 600 Slice

175 cm Line Source

Sensitivity @ 0 cm: 135.4 cps/kBq

GREAT SPATIAL RESOLUTION

| Source Location | ı (0, 10) mm | | | (0, 100) mm | | | (0, 200) mm | | |
|-----------------|--------------|--------|-------|-------------|--------|-------|-------------|--------|-------|
| Direction | Tangential | Radial | Axial | Tangential | Radial | Axial | Tangential | Radial | Axial |
| FWHM (mm) | 2.93 | 3.00 | 3.15 | 3.08 | 3.33 | 3.26 | 3.72 | 4.79 | 3.46 |

LYSO Crystals 2.76 x 2.76 x 18.1 mm³

MUCH HIGHER SENSITIVITY

GREAT SPATIAL RESOLUTION

OUTSTANDING IMAGE QUALITY

BETTER CLINICAL RESULTS

Pancreatic Cancer Staging Tracer: FDG Injected: 300 MBq SAFOV Scan Duration: 12 min uexpiorei

BETTER DEFINITION

MORE LESIONS VISUALIZED

MAKING CLINICAL DIFFERENCE ?

uEXPLORER Scan Duration: 5 min

zienti

R

uEXPLORER Scan Duration: 5 min

BOLOGNA, 26 maggio 2025 ROYAL HOTEL CARLTON Multiple Myeloma Staging Tracer: FDG Injected: 300 MBq SAFOV Scan Duration: 16 min DEFINITION MORE LESIONS VISUALIZED MAKING CLINICAL DIFFERENCE ?

BETTER

QUARTO EVENTO NAZIONALE

LAFOV

SAFOV

Characterization of a millimetric pulmonary nodule of the upper right lobe Tracer: FDG Injected: 240 MBq

BOLOGNA, 26 maggio 2025 ROYAL HOTEL CARLTON BETTER DEFINITION

MORE LESIONS VISUALIZED

MAKING CLINICAL DIFFERENCE ?

Prostate Cancer BCR Tracer: Ga-PSMA Injected: 160 MBq SAFOV Scan Duration: 15 min BETTER DEFINITION MORE LESIONS VISUALIZED MAKING CLINICAL

DIFFERENCE ?

uEXPLORER Scan Duration: 8 min

QUARTO EVENTO NAZIONALE

SIE incontra i pazienti

Società Italiana di Ematologi

A 70-year-old man with a diagnosis of prostate cancer, surgically treated, BCR. Tracer: Ga-PSMA Injected: 110 MBq

A total of 102 patients were enrolled.

Overall, on a patients basis, the SAFOV PET was positive in 46 patients (45%) and negative in 41 patients (41%), while the TB LAFOV PET was positive in 60 patients (59%) and negative in 27 patients (26%).

Among SAFOV-positive-LAFOV-positive patients, discordant results were observed in 33/102 patients (32%), in terms of different number of positive findings, more identified on the LAFOV PET scan.

The two paired acquisitions were concordant in terms of overall positivity/negativity in 72 out of 80 cases (90%) and discordant in 8 out of 80 cases (10%), where the SAFOV PET scan was negative but the TB LAFOV PET scan was positive.

LAFOV +

LAFOV +

LAFOV

Società Italiana di Ematolog

LAFOV +

A 73-year-old woman with a recent diagnosis of mucinous neoplasm of the appendix and a CT finding of a para-mediastinal nodule. Tracer: FDG Injected: 240 MBq

SAFOV Scan Duration: 15 min

LAFOV Scan Duration: 8 min

2016 PR for prostate ADK (GS 4+3, ISUP GG 3, iPSA 3.9 ng/mL). In 2020 BCR (PSA 0.89 ng/mL) performs RT on the lodge. New BCR in 2024 (PSA 0.33 ng/mL). Ga-PSMA Injected: 160 MBq

Società Italiana di Ematolo

Vaginal blood loss. She underwent hysteroscopy in May 2024 with biopsy: superficial fragments of high-grade endometrial carcinoma. FDG PET/CT staging.

In 2021 (PSA 4.4 ng/mL) prostate biopsy with a result of GS 3+3, ISUP GG 1. Active surveillance since then. In 2024 (PSA 4.98 ng/mL) they repeated biopsy with GS 4+4, ISUP GG 4.

LAFOV +

The additional information obtained from the TB LAFOV acquisition led to a theoretical change in therapeutic management of 20/102 patients (20%).

Limits: Few cases No pathologic confirmation Selection Bias Scanning Bias

Ongoing: More cases Pathologic confirmation Random Scanning

QUARTO EVENTO NAZIONALE

CONCLUSIONS

LE NUOVE PET ED IL LORO IMPATTO DIAGNOSTICO

Total Body PET

CONCLUSIONS

LE NUOVE PET ED IL LORO IMPATTO DIAGNOSTICO

SHOULD WE ADOPT A LAVOF ?

SHOULD WE BUY A SUPERCAR ?

SHOULD WE BUY A SUPERCAR ?

TO MAKE AN INVESTMENT ?

TO IMPRESS PEOPLE ?

TO REALLY SPEED UP ?

LE NUOVE PET ED IL LORO IMPATTO DIAGNOSTICO

THANK YOU